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Landscape Use and Transhumance in the Sierra Morena through the Ages

Keywords: *dehesas*, agriculture, pastoralism, mobility, ore mining

Abstract

In a diachronic view over large parts of the last 5000 years which focuses mainly on the Chalcolithic/Bronze Age, Roman Period, Late Middle Ages and the Modern era, Sierra Morena appears as a ResourceAssemblage in which livestock farming and the associated cattle drive, forestry and ore mining played a central role. Over time, different strategies are becoming visible with which the specific natural conditions of this mountain landscape are being countered. These are often complementary to the resources and their forms of use in the neighbouring fertile river valleys of the Guadalquivir and Guadiana. In a historical view, the ways of dealing with the respective important resources in the Sierra Morena are examined in relation to the ways of using the neighbouring landscapes. Long-term trends are also sought which characterise the specific ResourceCultures, perceptions, use and representations of the landscape in the Sierra Morena. Important aspects are the associated effects on the socio-cultural dynamics in the region.

1. Introduction

The Sierra Morena is a relatively flat mountainous landscape located between the Spanish Central Plateau (Meseta) and the Betic Depression running west/east for approximately 300km and separating the fertile Guadalquivir valley from that of the Guadiana (*fig. 1*). Its surface is covered by open oak forests and the typical Mediterranean vegetation with poor soil quality (*fig. 2*). For long periods of human history, livestock farming has been the most sensible form of exploitation, alongside mining for the region's rich and complex ores (Domergue 1987; Pérez Macías 1996; 1998; Hunt Ortiz 2003; Bartelheim 2007; Contreras Cortés/Dueñas Molina 2010; Gauß 2015; Arboledas Martínez/Alarcón García 2018), which is not the key aspect of this paper und is thus only briefly summarised. Here the emphasis is mainly on animal husbandry, which is often linked to the mobility of livestock and people over short or long distances in order to be able to use the advantages of different ecological zones of the Sierra Morena, its neighbourhood and other parts of the Iberian Peninsula as effectively as possible under the prevailing climatic conditions. Thus, in addition to the short-distance cattle drive, which mainly connects winter and summer grazing areas in neighbouring valley and mountain regions (*trasterminancia*, transterminance), in the Iberian Peninsula the connection of distant grazing regions in the south and north has been a common form of use (*trashumancia*, transhumance), which has been well documented over long periods of history. For summer use, herds of livestock (mainly sheep, but also goats and cattle) from Andalusia were often driven to the lush grazing grounds on the edge of the northern Meseta (mainly Cordillera Cantábrica, Montes de León, Macizo Galaico, Sierra de la

Fig. 1. Topographical map of the Iberian Peninsula with the regions and geographical locations mentioned in the text.

Fig. 2. View of the Sierra Morena with a *dehesa* in the foreground, Santa Olalla del Cala.

Demanda) and for winter to the snow and ice-free regions of the south. In the course of this, they passed through the Sierra Morena on cattle drive routes that had been used repeatedly over a long period of time. These routes are still visible today and bear witness to this practice, even though in recent decades mainly local cattle farming was practised. From a cultural-historical point of view, these livestock movements have played an important role in supra-regional communication, as significant material and immaterial exchanges took place on the routes by means of the people who were travelling with them, but also independently.

The different facets of the use of the Sierra Morena, the interlocking of the individual elements and their change over time make it clear that, in a diachronic view, this landscape represents a ResourceAssemblage, which is a constellation of heterogeneous material and immaterial resources (Hardenberg et al. 2017; Bartelheim et al. 2021a) in a constant process of change and forms the basis of various social dynamics. We have numerous information from different periods about these dynamics as well as about the individual forms of use of the landscape, although the sources differ significantly over time. The focus of the presentation here therefore varies from era to era, depending on the sources. However,

Fig. 3. View of the southern slopes of the Sierra Morena with the Guadalquivir valley, Lora del Río.

Fig. 4. View from the southern fringe of the Sierra Morena into the Guadalquivir valley with the Sierra Bética in the background, Villaverde del Río.

livestock farming, and the associated cattle drive is a constant element of the ResourceAssemblage. In accordance with the research focus of the participating authors, the paper concentrates primarily on the western part of the Sierra Morena and on studies of selected periods that comprise the Chalcolithic/Bronze Age, Roman period, Late Middle Ages and the Modern era. Even if this does not provide a closed diachronic overview, important trends can be followed over time.

A special feature of the symbiosis of livestock farming and landscape use in the south of the Iberian Peninsula is the development of the *dehesas*, whose medieval meaning as demarcated pastures for livestock changes later, as will be explained below. The term in common use today refers more to an anthropogenically shaped landscape with grazed or cultivated oak groves, which is used in many ways and thus forms the basis for various ResourceCultures. The beginnings of such a way of dealing with the landscape can be traced back to prehistory, when it formed in the course of increasing development in the context of the spread of an agro- and silvopastoral economy (*fig. 3–4*).

2. Pastoral Practices during the Late Iberian Prehistory in the Western Sierra Morena

Due to the special characteristics of the western Sierra Morena soils, extensive agriculture was not possible to carry out during the Copper Age and thus, along with the forest resources, the main activity was husbandry. Some mountain areas in the Upper Guadalquivir region coped with the soil issue during the Bronze Age recurring to animal husbandry. Interaction between animals and agricultural activities via low scale manuring or stubble grazing helped to sustain economically the settlements (Chapman 2008; Knipper et al. 2020). Manuring practices have not been proven along the Lower Guadalquivir Valley yet, which is why other strategies have also to be considered, probably extensive agriculture along the *Lacus Ligustinus* and the Guadalquivir mouth and pastoralist practices throughout the Sierra Morena. Although what one can see today or what one can learn from past medieval sources might not be what happened during prehistory, one should bear in mind that this area has not been the subject of industrialisation and therefore, the landscape nowadays is not heavily modified.

It is known that during recent times populations have been self-sufficient in mountain areas during food shortages and even providing supplies to populations inhabiting the valley (Ojeda Rivera/Silva Pérez 1997). Looking back into antiquity, the management of livestock might have consisted of the typical prehistoric husbandry based on *caprines*, *suids* and *bovids*, and since modern times, they might have reflected some sort of movement within the Sierra and the fertile lands of the Guadalquivir (Joffre et al. 1988).

During the first half of the 20th cent. AD, some research on transhumance has been done on the Iberian Peninsula, mainly in Spain (Aitken 1945;

Fribourg 1910; Dantín Cereceda 1940; Fontavella 1951; Llobet/Vila 1951; Rosa 1861; Sorre 1932; Valenti 1950; Violant/Simorra 1948). From this specific and very regional point of view, research has been moved forward applying more recent methodologies and an increasingly archaeological focus (Kalkbrenner 1994; Walker 1983; Sánchez Meseguer/Galán Saulnier 2004; Logemann et al. 1994; Murrieta Flores 2012; Chapman 1979; Davidson 1980; Cara Barrionuevo/Rodríguez López 1987; Galán Domingo/Martín Bravo 1991/1992; Ruiz-Gálvez Priego 1998; Galán Domingo/Ruiz-Gálvez 2001; Murrieta Flores 2007; Wheatley et al. 2010; Murrieta Flores 2010; Carvalho et al. 2017; Fernández Mier/Tente 2018). Specifically, the object of research was to look at the relationship of prehistoric routes and mobility patterns. One of the methods for understanding the use of routes was using spatial techniques and linking megalithic monuments with potential pathways. Recent studies operating with spatial techniques have considered the connection of prehistoric monuments, prehistoric pathways, and the historical transhumance routes (Murrieta Flores et al. 2011a; 2011b; Wheatley et al. 2010). However, although results are quite positive and prehistoric monuments are associated with historical routes (Murrieta Flores 2012), it is still unclear whether those pathways could have been used during the Late Prehistory. Similar efforts are being made for studying mobility during the Bronze Age. Despite changes in funerary practices and settlement patterns, it is very likely that some natural corridors could have been used as routes for interaction between different villages along the Guadalquivir and with the Guadiana valley. Using spatial techniques such as GIS with information regarding coincidences in ceramic typology, funerary practices and types of settlement (Chala Aldana, this volume), project A 02 of the collaborative research centre (SFB 1070) ResourceCultures is assessing if those corridors could have been used for moving people, ideas, objects and for herding strategies.

Another aspect to consider is the size and the configuration of the herds, which during prehistory might not have roamed the landscapes so much. The growth of the human population from the Neolithic to the Copper Age and the need to increase the size, the herds – along with the agricultural surplus that is necessary to feed larger herds – implied the necessity of more open landscapes. This becomes even more obvious at the transition from the Copper (ca. 3200–2200 calBC) to the Bronze Age (ca. 2200–1500 calBC) when pasture and herding activities increased considerably (García Sanjuán 1999). Regarding this aspect, it is important to point out that this change during the Bronze Age is also related to a preference of settlement locations near natural corridors. Since the main activity at the Sierra Morena remains as pastoralism, the increase of herding strategies might have required seasonal mobility practices. The region's wealth in ores suggests that the deposits in the mountains were exploited, but, except for occasional in-depth investigations in peripheral areas (Pérez Macías 1996; Hunt Ortiz 2003; Arboledas Martínez et al., this volume), there is still no conclusive evidence of their prehistoric exploitation. Only in the southwestern fringe area of the Sierra Morena in Riotinto and its surroundings the intensive use in the course of the Final Bronze Age and Early Iron Age is well documented (Bartelheim 2007).

The scarcity of stable settlement architecture in southwest Spain between the Late Neolithic and the Bronze Age could be the result of a lack of visibility in the archaeological record due to the construction method or later overbuilding (Bartelheim et al. 2021b), but it also might hint to a higher degree of mobility within the area. In addition, the results of some chemical analyses on Bronze Age animal bones from the Meseta seem to support this hypothesis (Sánchez Meseguer/Galán Saulnier 2004; Logemann et al. 1994). So does the application of spatial analysis (Murrieta Flores 2012) which suggests that prehistoric habitats are more likely to be found near natural corridors. But it is not clear yet whether transhumance was the predominant strategy. On the contrary, assuming that herds were smaller than in historical times, during Late Prehistory a possible short-distance transhumance or transterminance would be more likely (Murrieta Flores 2012).

Another aspect apart from the relationship of the Sierra Morena with the Guadalquivir valley are the links with other sites in the northern part of the Sierra and the connection to the Guadiana valley. Since the megalithic sites found in the upper parts of the Sierra (Murrieta Flores 2012)

are located near natural corridors, this might have worked also both ways, towards the south (Guadalquivir valley) and towards the north (Guadiana valley, Extremadura) and the Meseta.

The use of new techniques such as biochemical analyses using strontium ($^{87}Sr/^{86}Sr$) or oxygen ($\delta^{18}O$) isotope analysis to investigate mobility in prehistoric societies has demonstrated for southwestern Spain that central places such as Valencina-Castilleja exhibit a large number of non-local human individuals (Díaz-Zorita Bonilla 2017), while some in other small places in the Sierra Morena, such as the Tholos de Palacio III, the isotope analyses of the bones showed values that point to a local provenance of the deceased (Díaz-Zorita Bonilla et al. 2009). In addition, some results from Valencina-Castilleja are showing very radiogenic $^{87}Sr/^{86}Sr$ values which are also detected in material from the Guadiana valley and are consistent with a possible interaction between both valleys. The high degree of mobility found at Valencina-Castilleja (Díaz-Zorita Bonilla 2017) is not surprising, if one considers that mega-sites with these characteristics are already engaged in long-distance trade routes (García Sanjuán et al. 2018). Specifically, while looking at mobility and dietary subsistence practices using oxygen ($\delta^{18}O$) and carbon ($\delta^{13}C$) isotope analysis (Díaz-Zorita Bonilla et al. 2017) different subsistence practices and habitats of species were detected as well as seasonal movements of cattle. Ongoing isotopic analyses are assessing whether during the Bronze Age villages in the Guadalquivir valley had close interaction with the Sierra Morena, including exchange and movement of people from the mountains to integrate with the groups living next to the Guadalquivir estuary.

Along with economic and cultural factors, climate could also have played a role in massive movements of people. Recent studies (Hinz et al. 2019) found a possible correlation between short drier phases linked to the 4.2ka BP event and demographic changes on the Iberian Peninsula. They presume a drastic reduction in settlement activity just before the transition from the Chalcolithic to the Bronze Age in southern Portugal, followed by an increase of settlement activity in southeast Spain (Hinz et al. 2019). Although the climatic development does not correlate directly with such supposed population changes, the studies indicate that it could have played a role in the way people organised their settlement system during this period. If climate impacted the whole region in such a way, it is possible that the Guadiana and the Guadalquivir valleys could have been used for transferring people between regions during these drier phases. Some studies even consider a massive migration to the east in response to these climatic changes (Lillios et al. 2016).

Although the archaeological evidence and the scientific analyses point towards an existing connection between the Guadalquivir valley and the Sierra Morena and possibly even with the Guadiana river (see Díaz-Zorita Bonilla et al., this volume), the question of mobility is not yet solved. The link of the megalithic monuments in the Sierra Morena, with natural corridors and historical routes and the high degree of mobility at some mega sites, suggest that those natural passages in the Sierra Morena might have been used since prehistoric times. Whether there was already an organised system of transterminance, likely to have existed due to the favourable conditions of different use of resources and landscapes among the Sierra and the valley, is still under investigation. The analysis of other archaeological sites in the foothills of the Sierra Morena might shed more light on the husbandry practices and the human mobility patterns during the Bronze Age. In this way, an increase of herding activities and consequently a larger use of pasture lands at the transition from the Copper Age to the Bronze Age could be tested (see Díaz-Zorita Bonilla et al., this volume).

3. Livestock Farming and Transhumance in the Sierra Morena Area in Roman Times

While from prehistoric times we only have the hypothetical reconstruction of pathways and the analysis of animal bones, especially with regard to anatomical features and stable isotopes ($^{87}Sr/^{86}Sr$ and $\delta^{18}O$), for the reconstruction of the mobility of livestock in the Sierra Morena and its marginal zones, the spectrum of information on the conditions in Roman times is somewhat broader, but without improving fundamentally.

Fig. 5. *Dehesa* landscape in the Sierra Morena with the typical mix of holm oaks, cork oaks and pastures, Villanueva del Río.

The written sources available to a greater extent for that period report little on the subject of livestock farming and the mobility of herds, in contrast to arable farming. This applies to the Iberian Peninsula as well as to the entire Roman Empire in general (Sáez Fernández 2001). Nevertheless, it can be assumed that livestock farming played an important economic role in Roman times and built on earlier established structures, including on the Iberian Peninsula. As in prehistoric periods, the different climatic zones in the Mediterranean area and their optimal use suggested transhumant livestock farming for the Roman period. In Italy, this is documented over long distances, e.g. from southern to central Italy (Varro, 'Rerum rusticarum' II) (Gómez Pantoja 2001, 179).

In view of the natural situation on the Iberian Peninsula, which is comparable to Italy in many respects, it is reasonable to assume that the ecological potential there was also exploited in a similar way after the establishment of Roman rule, particularly in the south and east of the peninsula. However, the source situation does not allow any clear statements to be made as to the extent to which the political possibilities for more extensive transhumance already existed on the Iberian Peninsula in pre-Roman times, given the political fragmentation: was the safety of herds guaranteed? Were there agreements on grazing and transit rights? Did regional rulers force such agreements because, as owners of large herds, which formed their economic basis, they had an interest in their ability to move between the various ecological zones? Under these circumstances, it would have been conceivable that the development of *dehesas* as grazing grounds in mountainous regions would have been promoted in order to create pastures for livestock (Aranda García 2016, 43). However, there is a lack of both historical news and archaeological evidence of this, especially from the Sierra Morena (Sánchez-Corriendo Jaén 1997). Only from the Sierra de Gredos about 250km to the north scientific studies exist that provide some insights here (López Sáez et al. 2018). There, pollen profiles from peat bogs in the period around the turn of the 21st century reveal an open landscape in the lower part of the mountain region up to 1000m above sea level, with indicators for the migration of animals (López Sáez et al. 2018, 237). Already from the Iron Age in the last millennium BC, the influence of seasonal grazing can be observed, presumably in open grazing areas, which are conceivable as *dehesas*, in the context of a cattle drift at probably short distances (transterminance) (Abel-Schaad/López-Sáez 2013). Since these altitudes correspond approximately to the highest areas of the Sierra Morena, it is evident that the use of the mountainous areas up to the upper mountain regions for cattle grazing in conjunction with an opening of the vegetation in those periods is also conceivable there (*fig. 5*).

A central element in ensuring the feasibility of transhumance was the guarantee of rights of way and grazing rights. With the consolidation of Roman rule on the Iberian Peninsula and the establishment of the provinces, the uniform legal conditions for the organisation of transregional movements of people and animals were created. According to Sáez Fernández (2001), Roman written sources report that the *mesetas* were rich in livestock that moved from there and from Extremadura through the Sierra Morena to present-day Andalusia. However, similar to prehistory, the reconstruction of paths that may have served transhumance is difficult for the Roman period. It is often assumed that pre-Roman cattle drive routes often served as generally important long-distance routes and that Roman roads were built on these routes. It is also conceivable that transhumance routes were already used by Hannibal in his battle against the Romans in Hispania

at the end of the 3rd cent. BC (Sánchez Moreno 2000). However, the actual course of Roman roads is often difficult to follow in the terrain. Although it is often known from written sources which major towns they connected, for many sections there is no concrete evidence of their exact course and they can only be accessed via favourable topographical connections. In many cases, the only remaining evidence is the conclusion of cattle drive routes that have been handed down from more recent periods.

There is very little evidence of the Roman use of the mountains for cattle drift in the Sierra Morena. Clearly related archaeological findings are not known and finds are rare. These include iron knives from the 1st cent. AD, which were found in the neighbouring Sierra de Cazorla on the upper Guadalquivir and may have been used to shear sheep in the summer months on the summer pastures there (Aranda García 2016, 53). Analyses of animal bones, which could provide information on the migration of animals, are missing, as are pollen profiles, from which anthropogenic or zoogenic landscape changes could be deduced. Also, the evidence of ore mining in the Sierra Morena from Roman times, which is much more numerous than from prehistory, does not help much here, since it is essentially limited to the mines and the processing sites themselves (Domergue 1987; Pérez Macías 1998; Contreras Cortés/Dueñas Molina 2010; Arboledas Martínez 2010). Although it can be assumed that these production sites were integrated into a network consisting of settlements, supply systems and infrastructure as part of a ResourceComplex, there are few exceptions from the foothills where studies of the surroundings have been made (Schattner et al. 2012; Arboledas Martínez 2015).

Some epigraphic information could give an indication of animal drift. 13 funerary inscriptions from the province of Jaén that can be dated by palaeographic features and epigraphic formulation types to the period between the second half of the 1st and the middle of the 2nd cent. BC (Aranda García 2016, 61–64) were each dedicated to a deceased person by a group called *sodales*. They represent the largest concentration of inscriptions with this donor indication in the Iberian Peninsula. In one case (from Santo Tomé) they are called *sodales oviari* (Aranda García 2016, 63). According to its common use in Hispanic epigraphy, the term *sodales* is used to refer to brotherhoods (Gómez Pantoja 2001, 184 f.). It is conceivable, in the case of the inscription from Santo Tomé, which indicates the link with sheep, that this could have been a brotherhood of shepherds who placed the inscription. Given that in more recent historical times, particularly from the Middle Ages onwards, transhumance was organised for practical logistical reasons in groups that often maintained longer-term social ties with one another, it is possible that such associations in the sense of brotherhoods already existed in Roman times. If this was the case, they could have assumed the role of family units that were otherwise responsible for burying people and affixing commemorative inscriptions, according to Aranda García (2016, 55). The remaining twelve inscriptions from the province of Jaén do not specify those *sodales*. However, Aranda García argues that the groups mentioned in the other inscriptions were also shepherds, since the majority of the ages in the texts are between 20 and 45 years. Such an adult age corresponded to the usual requirements for the activity of shepherds (Aranda García 2016, 56). Greek or Latin sounding names on the inscriptions could refer to slaves who, according to the information provided by Varro (‘Rerum rusticarum’ II, 10), were usually used for herding cattle. In addition, ten of the inscriptions, including the one from San Tomé, are concentrated in the area at the western foot of the Sierra de Cazorla, in a relatively restricted area, which, following Aranda García, could indicate that, as in San Tomé, these could have been those of brotherhoods of shepherds (Aranda García 2016, 56).

If this assumption is correct, the distribution of these inscriptions with the *sodales* in the area at the western foot of the Sierra de Cazorla could be an indication of the existence of transhumant connections with the summer pastures in the mountainous area of the Iberian system near Cuenca, since this was accessible by a direct topographical link via the Via Augusta with the southern Meseta. Otherwise, the epigraphic and archaeological evidence in the area of the Sierra de Cazorla points to rather shorter areas of movement of livestock, in the sense of *trasterminancia*, from Cástulo and

Fig. 6. Detailed topographical map of the south of the Iberian Peninsula with the regions and sites mentioned in the text.

the eastern Sierra Morena as winter quarters to the mountainous regions of the Sierra de Cazorla, Sierra Mágina or other mountain ranges in the Jaén area as summer pastures (Aranda García 2016, 57 f.).

If the epigraphic evidence is interpreted correctly, this could be a small clue to an organisational form of the people involved in the cattle drive, which would provide information that goes beyond the prehistoric evidence. Overall, the information situation in Roman times does not offer any fundamental progress in the knowledge of the use and transformation of landscape in the context of livestock farming. For the Visigoth era and the Early Middle Ages, the archaeobotanical evidence from the Gredos mountains speaks for a continuous use of the mountain zones with varying intensities, although there, like in the Sierra Morena, the archaeological evidence for the presence of people is still very scarce (López Saéz et al. 2020, 238 f.). In the Late Middle Ages, however, especially for the phase that follows the Christian conquest of western Andalusia in the 13th cent. AD, the abundance and explanatory quality of the sources for the use of the landscape in the Sierra Morena increases significantly. Therefore, aspects can be highlighted and details can be dealt with that have remained in the dark for earlier periods of time.

4. Livestock, Pastures and Transhumance in the Western Sierra Morena during the Late Middle Ages

The geographical area in the north of the current provinces of Huelva and Seville (*fig. 6*) forms a homogeneous territory, with a particular physiognomy that can partly explain its historical trajectory and its vocation for livestock. Indeed, it is an area dominated by a rugged relief – although not very high – which prevents the development of intensive agriculture and encourages the promotion of livestock activity (Carmona Ruiz 1994, 63).

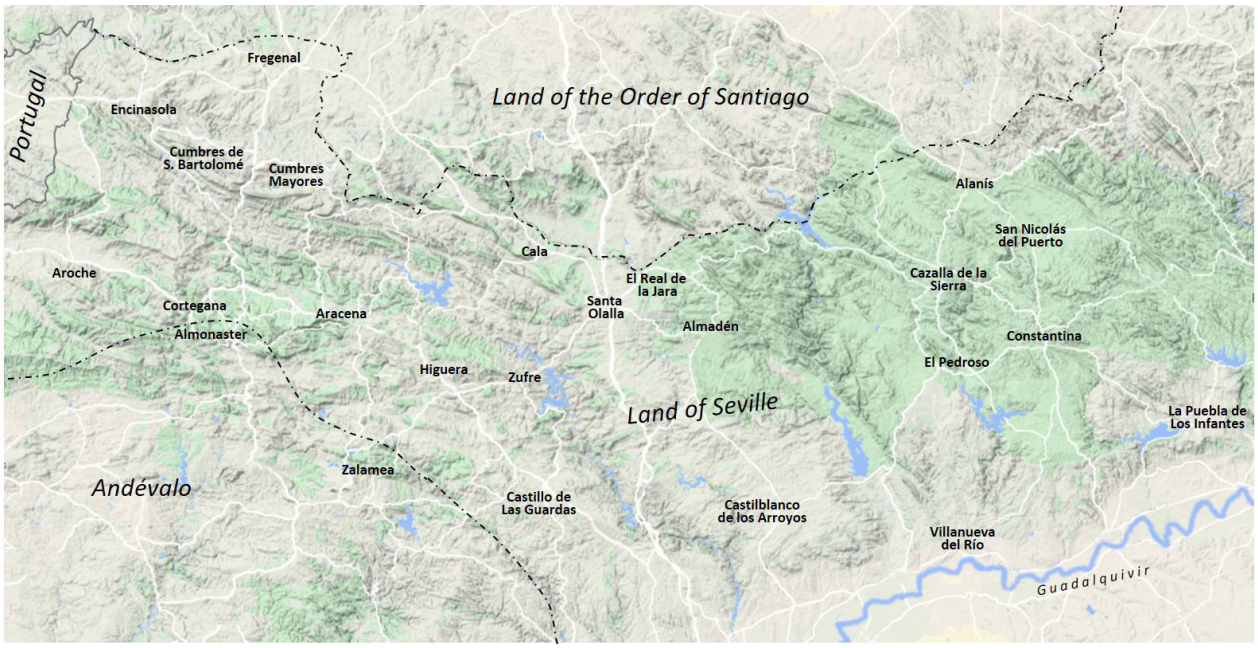

Fig. 7. Detailed map of northwestern Andalusia with Late Medieval sites mentioned in the text. The dotted line indicates the limits of the Sierra Norte (northern mountain range) of the Late Medieval Kingdom of Seville.

Thus, the Christian conquest of the territory in the 13th cent. AD meant the accentuation of the depopulation of the area, due to the flight of the scarce previous Muslim population and the preference of the new settlers for more fertile, better interconnected and safer lands, which meant that there were notable problems for its repopulation, which caused that even relatively fertile spaces were left empty and were equally susceptible to the use of livestock (Carmona Ruiz 2018, 94; this volume). The ResourceComplex surrounding medieval ore mining in the Sierra Morena has not yet received much attention. Even though written sources provide evidence of the continuous use of the deposits up to modern times, there is little material evidence of this (Martín Civantos et al. 2010). The extent to which the ResourceComplex around mining and its infrastructure overlapped with those around agriculture in the Middle Ages, in analogy to those shown by the investigations at the Roman mining municipium of Munigua, prov. Seville, on the edge of the Sierra Morena (Schattner et al. 2012), must remain open in the absence of relevant studies.

After the conquest of the westernmost part of the Sierra Morena in the middle of the 13th cent. AD and the successive political upheavals it suffered, due to its claims by both the Portuguese and Castilian crowns, the territory finally became part of the Kingdom of Seville, thus being included within the extensive *alfoz* (a rural territory belonging to a city) of Seville and depending on the city itself. Therefore, all the towns in this mountainous area belonged to the Land of Seville, forming part of what is known as the 'community of town and land'. From the point of view of livestock farming, this meant that they were included in its local *mesta,* an institution that depended on the Seville council and controlled all livestock activities in Seville and its land. Furthermore, it meant the existence of a union of communal rights between all the towns subject to the control of the city of Seville, thus facilitating the mobility of the herds in search of good pastureland over a larger territory than that of the municipality to which they belonged, leaving all types of pastureland and enclosed areas outside this regime (Carmona Ruiz 1998a, 70 f.).

Within this region, a differentiation between two sectors began to emerge very early on and finally crystallised in the 15th cent. AD, with a clear internal segmentation into two regions: on the one hand, the Sierra de Constantina, closest to Seville; on the other, the Sierra de Aroche (Borrero 1998; 2000) (*fig. 7*). As mentioned above, due to its abrupt orography and marginal location, this entire territory was characterised during the Medieval period

by a lack of population and the existence of spontaneous vegetation from which the livestock benefited, especially during the summer months. The profusion of wild fauna also reveals that another of the economic riches of these forests was hunting. This can be seen by analysing the 'Libro de la Montería', composed as early as the 14th cent. AD, in which most of the hunting grounds described are to be found in the mountains, with the Sierra Morena and, in particular, the area of Constantina standing out (López et al. 1988, 287–289). Beekeeping development was also important in the mountain territory; although there were apiaries in all the uncultivated areas. Among the areas of special dedication to apiaries, the Sierra Morena stands out especially (Cabrera Muñoz 2003, 261). It was only in the areas closest to the Baetic Depression and with a gentler orography that human action was able to modify the forest formations, shaping a type of mountain very close to what we now call the *dehesa* landscape, that is, a space in which trees coexisted with herbaceous formations and crops of the same type. This area was dedicated especially to livestock farming, because the cattle could feed on the grass, the tree shoots and their fruits, especially the acorn (Argente del Castillo Ocaña 1990, 439).

Although after the Christian conquest of the territory the barren lands were very abundant, from early dates the municipalities began to limit certain spaces. Thus, soon emerged the *dehesas boyales* (grazing lands) destined for farm animals, to which other types of communal grazing lands were added over time, but also private grazing lands. In the case of the Sierra, in addition to the pastures for working livestock – which existed in a large number of municipalities in order to guarantee that these animals had food all year round – it is important to highlight the creation of boundaries which preserved pastureland of exceptional quality, or wood, thus preventing them from being used by livestock farmers from other towns in Seville who were subject to the regime of 'comunidad de villa y tierra' or another type of agreement. In this sense, one can highlight the conflicts that took place between Constantina and Carmona due to the attempts to prevent the entry of the cattle of Carmona's neighbours into its territory, despite the existence of a pasture brotherhood between Seville and Carmona. Within this type of boundary, the acorn pastures were more frequent, destined mainly for local and foreign pigs. In addition, and in order to prevent the neighbours from picking up the acorns before they were ripe, the holm oak woods were fenced off when they began to mature – at the end of September – preventing people with pigs or cattle from entering the woods until the acorns were ripe and fell to the ground, opening them up for communal use at the beginning of November (Carmona Ruiz 2011). It is also worth noting that the pastures, both in the Constantina and Aracena mountains, preserved the wood from the oak groves in these places for the Seville shipyards (Carmona Ruiz 2011, 195; Pérez Embid 1999, 119).

In fact, one of the main problems that occurred in the western part of the Sierra Morena was the arrival of large numbers of cattle from other parts of Seville, taking advantage of the existence of a grazing community. The ease with which food could be found in the forests and mountains of the mountainous area meant that the problems of confrontation with farmers due to the invasion of their crops were minimal in the face of the struggles that took place between cattle breeders to provide the best food for their livestock. These confrontations increased considerably from the second half of the 15th cent. AD onwards, above all as a result of the increase in population and, therefore, in the need for more food, both for animals and people, which also led to an increase in cultivation areas to the detriment of livestock areas. For this reason, the solution sought in many mountain towns was the creation of new pastures, thus distracting large areas of grazing land from the prevailing communal regime. In order to create such pastures, the mountain councils had to obtain authorisation, either from the Crown or from the Seville Cabildo, which they did not always obtain, although they also made the restrictions illegally. In this respect we are aware of numerous lawsuits filed by cattle breeders denouncing the creation of *dehesas*. As a result, for example, in 1382 AD the Council of Seville carried out an inspection in the towns of Constantina, Cazalla, Alanís, El Pedroso and Villanueva del Camino, asking the authorities of those towns to destroy the *dehesas* that had been

illegally created (Carmona Ruiz 2011, 199). Something similar happened in the Sierra de Aroche, where at the beginning of the 16th cent. AD the council of Aroche owed a large amount of uncultivated land for communal use (Pérez-Embid 1999, 93–110). In addition, the councils of the Sierra created pastureland which they leased out and which they called *dehesas de propios*, including the Navalmentino pastureland which, in the mid-16th cent. AD, accounted for 43.7% of the total income of the council of Aracena (Pérez-Embid 1990, 200).

There were also some conflicts over the use of some *dehesas* which had originally been used by several towns and at some point one of them tried to monopolise their use. An example of this is the ruling given in 1371 AD in Seville, which forced the common use of several *dehesas* between Cortegana and Aroche (Carmona Ruiz 1994, 76). In relation to this, it is worth noting the existence of a large area between Portugal and Seville known as the 'Tierra de la Contienda', which was constituted as a kind of 'no man's land' and was used as pasture by the councils of Aroche, Encinasola and Moura, with many conflicts due to the attempts of each of these towns to appropriate part of these lands (Carmona Ruiz 1998b).

It is therefore clear that at the end of the Middle Ages and the beginning of the Modern Age in the Sierra Norte of the Kingdom of Seville, the *dehesa* corresponds to a space which allows, above all, the grazing of the neighbouring herds, making access to the pastureland difficult for the cattle of other regions belonging to the Land of Seville, which, in spite of the severe restrictions, continued to have access to the pastureland of the area. Many of these journeys were short, in a south/north direction, and generally lasted one day. The places they went to were the areas reserved for grazing and the watering holes. Considering the large number of uncultivated areas and water points throughout the mountainous area, the possibilities of movement and the network of local roads, both temporary and permanent, had to be very complex. However, there is little information available about these short radius movements of livestock within the Seville *alfoz* itself. Thus, as was the case in modern-day Extremadura, a short-range transhumance could have taken place throughout the mountainous region of the kingdom of Seville during the late Middle Ages and early Modern Age to make use of the mountain pastures (Clemente 2015, 564).

In any case, one can say that this availability of livestock use of the Sierra by livestock outside the local herd began to have greater difficulties from the second half of the 15th cent. AD. By then, there had already been a significant increase in the population in a large part of the Sierra Norte de Sevilla, with the consequent expansion of farming areas and the proliferation of pastures that prevented access to the pastureland. We have the specific case of the council of Fregenal de la Sierra, also included in the Land of Seville, located in a valley, experienced at the end of the Middle Ages an important agricultural development, in addition to the creation of private pastures that were leased to foreign cattle. This was so detrimental to local livestock that many of the local inhabitants were forced to leave the area in search of pasture in nearby places, sometimes going to lands belonging to the Order of Santiago in the south of the current Extremadura. Part of the beneficiaries of these leases was the transhumant livestock that, under the protection of the Mesta Real, crossed the Iberian Peninsula.

Thus, after the institutionalisation of the Council of the Mesta in the 13th cent. AD, the Crown gave legal protection to the transhumant livestock that moved from the north to the winter pastures of present-day Extremadura and Castilla-La Mancha. It could be thought that, as the conquest of Andalusia coincided with the birth of this institution, transhumant livestock would have taken over the pastures of the area. On the contrary, the important development experienced by local livestock, the protectionism deployed by the Andalusian councils and the permanent danger posed by the border of Granada may explain that, although the Crown always contemplated the possibility of using the southern pastures, during the Medieval period the *mesta* played little role in the region.

It is striking that many authors neglect the south of the peninsula when studying transhumance during the Middle Ages. In spite of this, the latest work on Andalusian livestock has shown the presence, during the final centuries of the Middle Ages, of transhumant livestock in the Upper and

Middle Guadalquivir (Argente del Castillo Ocaña 1991, 283–358). Similarly, the arrival of transhumant livestock has been noted in the northern part of the Kingdom of Seville, specifically in the council of Fregenal de la Sierra, as well as in other towns in what is now the Sierra de Huelva. Some of the transhumant livestock that arrived in the Sierra Norte of Seville after having crossed the lands of the Order of Santiago continued their journey to the Andévalo area and Portugal, taking advantage of the grazing land of the towns they passed through, and also renting out pastures where they could feed their livestock. The origin of this transhumant Mesteño livestock must have been extremely varied, although the great majority were of Soria origin. This can be seen from the fact that in the documentation of the period there are many references to *ganados sorianos* as a synonym for transhumant livestock (Carmona Ruiz 1993, 111–118). Also, in the area of Villanueva de los Infantes, reference is made to the arrival of cattle from Soria and the renting of the town's pastures in 1490 AD (Carmona Ruiz 2011, 200 f.).

Thus, it was not until the end of the 15th cent. AD that continuous information related to the activities of transhumant livestock breeders in Andalusia and specifically in the Sierra Norte of Seville was recorded. The inclusion of Andalusian lands in the Hispanic transhumance networks was favoured by the power acquired by the *mesta* during the reign of the Catholic Monarchs, the disappearance of the danger caused by the Moorish rulers, as well as by the financial problems of some councils and individuals who tried to solve these problems by leasing their lands to the transhumant pastoralists. This provoked major conflicts, not only because the local cattle breeders were seriously deprived, but also because the transhumant cattle breeders that went to some pastures damaged the crops. For this reason, the Council of Seville created some gullies for the passage of the Mesteño herds, which shows the interest of both the local towns and the Council of Seville itself in the arrival of these cattle. Nevertheless, and, as far as the Council of Seville is concerned, it benefited particularly from the lease of the El Caño pastureland, which belonged to the city's own property, with the rest of the councils of Fregenal, Bodonal and Higuera taking advantage of the lease of the pastureland for the grazing of these transhumant livestock, and some individuals who also fenced off their land to sell the pastureland to the Mesteños (Carmona Ruiz 1993, 114).

However, in contrast to the interests of private individuals and some councils in the area, the most important livestock farmers in Seville saw their possibility of grazing in the Sierra reduced. In fact, and under the protection of the power of the municipal *mesta*, these Sevillian stockbreeders managed to get the Crown itself to recognise the obligation of transhumant livestock to pay taxes in the Sierras of Aroche and Aracena, despite the privileges of tax exemption that the Royal Mesta had throughout the kingdom (Carmona Ruiz 1998a, 382).

Therefore, already at the beginning of the Modern Age, the problem of the undue indebtedness of private lands, preventing their temporary use by cattle, was common to the whole kingdom of Seville, constituting a permanent source of conflict between farmers and ranchers. In addition, the owners of the land in question who sold their pasture used the common areas for their livestock, thereby harming the local stockbreeding industry by providing less pasture for a larger number of animals.

5. Landscape Use in the Sierra Morena in the Modern Era

5.1. The Rise and Fall of Transhumance in the Modern Era

Since the late Middle Ages, the semantic meaning and significance of both *dehesa* and transhumance have changed considerably. While well into the 20th cent. AD, the term *dehesa* retained its meaning as a pasture whose usufruct was exclusively reserved for a determined party, the growing practice of *adehesamiento*, which refers to the full privatisation of pastures by individuals and the village councils to generate income, resulted in the increasing disintegration of the *dehesas* and common rights of use. Pastures and potentially arable land, whose shared use the villagers had repeatedly fought for, were thus enclosed and in many cases leased as grazing land to the

transhumant flocks.[1] In addition, varying demographic and economic pressure from the 15th cent. AD onwards led to conversions of many (wood-) pastures into cultivated land wherever the soil allowed to do so. According to Guzmán Álvarez, the reason that the term *dehesa* is nowadays linked to the savannah-like landscape of holm and cork oaks is that this peculiar landscape constituted the *dehesas* for the local population in the sierra regions of southwestern Spain. There, the use of *dehesa* as pastures together with the notion of common rights for – at least partial – use remained because the soils of their wood-pastures did mostly not allow any alternative use (Guzmán Álvarez 2016, 10).[2]

The fate of the *dehesas* and the villagers whose livelihoods depended on the communal use of lands for cultivation as well as the grazing and fattening of livestock was thus still determined by the transhumant enterprise long after the Middle Ages.[3] When exactly the Spanish transhumance and thus the *mesta* reached its peak, is far from agreed. While some identify this peak already in the 16th cent. AD with the indication that between 2.5 and 3 million sheep roamed the territories of the Spanish kingdom (Rodríguez Blanco 1993, 75), others date it to the second half of the 17th cent. AD when the flocks reached 3.5 million sheep (Guzmán Álvarez 2016, 7). Another interpretation designates the 18th cent. AD as the transhumance's 'highest point' (Collantes 2009, 130). If we take the sheer number of sheep as the criterion to establish the importance of transhumance, then the latter statement would be supported by the fact that in the 18th cent. AD, 4.5 million transhumant sheep are said to have roamed Spain (O'Flanagan et al. 2011, 558). Either way, transhumance, which due to its high economic importance had enjoyed protection by the very Crown, had lost its long-established privileges by the turn of the 19th cent. AD. In 1836, the *mesta*, a remnant of the glorious times of Spanish Merino wool production, was finally abolished.

Starting in the 18th cent. AD, several liberal reforms had resulted in the establishment of a market society in the Modern era which increasingly replaced the feudal order (Polanyi [1944] 2001; Collantes 2009). This meant first and foremost the acceleration of the already addressed privatisation (*adehesamiento*) and alienation of land (*desamortización*). The renewed population growth led those who held individual property rights over land to prefer to cultivate it rather than lease it as pasture for transhumant flocks in the first half of the 19th cent. AD. This new scarcity of pastures led to the increase of the rental price of winter pastures (Collantes 2009, 131). The decline in sheep raising was also due to the fact that Spain had dissolved the monopoly on the precious Merino breed, as the result of which there was actual competition from foreign states on the international wool market (Collantes 2009, 131). When in the 19th cent. AD the railway was introduced that linked southern and northern Spain, regional markets became integrated and comparative advantages in cultivation (in the lowlands, e.g. in Extremadura) and livestock farming (mountain areas in the north) were exploited. Eventually, the transport of fodder became cheaper than the transport of flocks on foot (Collantes 2009, 134).

Sheep raising in the north was increasingly based on only short-distance movement of the flocks (in Spanish referred to as *trasterminancia*) and stable feeding in winter time (Collantes 2009, 135). In addition, the increasing demand for milk and meat had given cattle breeding priority over sheep farming and in 1865 the number of transhumant sheep comprised only 1.8 million (O'Flanagan et al. 2011, 558). In the increasingly rare case that

1 The exclusion of agricultural farmers and local livestock from these private *dehesas* had the effect that the areas were no longer cleared regularly and became thus overgrown with scrub. At the end of the 16th cent. AD, the poor state of some *dehesas* was lamented by officials (Rodríguez Blanco 1993, 87).

2 After the return from his visit to the Sierra Morena region, US geographer Parsons claimed the following: '*Dehesa* is a regional term for a wooded country property; where the name persists in agricultural areas that are now treeless, it can be taken as evidence of the former presence of oak trees' (Parsons 1962, 213). The historical tracing of the term demonstrates clearly, however, that *dehesa* was a legal category of land tenure and that the sparse tree layer was 'not an essential trait of its definition' before the latter half of the 20th cent. AD (Guzmán Álvarez 2016, 5). The nominal or 'map-*dehesas*' may today be cultivated or even urbanised (Guzmán Álvarez 2016, 9).

3 Acosta Naranjo, for example, indicates the rejection of the villagers of Montemolín and Puebla del Maestre (Extremadura) when the local *dehesas* were leased to transhumant sheep at the end of the 18th and in the middle of the 19th cent. AD (Acosta Naranjo 2008, 40 f.).

the complementary use of pastures across the country was still practised, transhumance was continued. However, it was done so by other means: 'Within very few decades, the trains almost completely replaced the only means of overland transport that had existed until then: walking, on ox roads, or on horses' (Garzón 2017, 43, translation by M. Melles). The ancient drove way network, the *cañadas*, was adapted so that access to the train stations was guaranteed where the flocks could be loaded. These trains were in service until the late 1990s (Garzón 2017, 44). The shrinking numbers of transhumant sheep and the transport via railway left the long-distance drove ways abandoned by the flocks and shepherds.

5.2. Industrialisation and the Living Heritage of Transhumance

From the 1960s, train transport of animals was increasingly complemented by their transport on lorries (Garzón 2017, 44). In the 1980s, only 250,000 transhumant sheep were left, of which 4% were driven across the *cañadas*, 83% transferred via trains, and 13% transported on lorries (O'Flanagan et al. 2011, 558). According to Garzón (2017, 44), the last traditional long-distance transhumance across Spain dates back to the 1950s when the flocks of the Marqués de Perales were walked from La Serena (Extremadura) to the mountain passes in Lois (León) by shepherds from the Leonese village Tejerina. The further industrialisation of the production of animal feed freed farmers fully from the constraints of their local environments and led to intensification processes of livestock breeding to the detriment of extensive grazing practices (Collantes 2009, 135).

The social and economic importance of transhumance has sunk and today it somewhat oscillates between being a sheer cultural memory and an actual effort to revitalise this traditional farming practice. The results are two parallel developments: While on the one hand, transhumance is more and more turned into a heritage, it is at the same time regaining momentum as an environmentally valuable farming practice. Numerous museums and *fiestas de la trashumancia* bear witness to the transformation of transhumance into a heritage. The museums are, however, mostly located in the north of Spain, which is the ancient origin of the transhumant flocks which were owned by wealthy stockmen. They are located in Aragón, Castile and León, in Catalonia, in La Rioja and Navarre (Vidal-González 2009, 16). In Extremadura, which provided the traditional winter pastures for the transhumant flocks, there are only two interpretation centres for transhumance and the *cañadas* in the Cáceres province.[4]

While this musealisation may be interpreted as 'a clear indication, quite evident, of the abandonment of this activity' (Vidal-González 2009, 16, translation by M. Melles), it may come as a surprise that the 1990s count an increased number of one million transhumant sheep, while in the period 2004–2009 there were still 800,000 (O'Flanagan et al. 2011, 570 f.). One part of the explanation for the re-awakened interest in transhumant activity dates back to initiatives of NGOs such as 'Concejo de la Mesta' founded in 1992 and renamed 'Asociación Trashumancia y Naturaleza' in 1997. The foundation of this NGO followed the 1992 UN Convention on Biological Diversity whose Article 8 (j) stipulates the maintenance of 'practices […] embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity' (UN 1992). The NGO started to reintroduce annual long-distance transhumance of at least 1,000km from 1993, with ever-increasing participation of farmers and shepherds (Garzón 2017, 52 f.).[5] For some years, a flock of a few thousand sheep, including those of other farmers, has been transported on lorries in early summer to pastures in the Cantabrian mountains. This is quite remarkable as in former times it was primarily flocks based in northern Spain that moved to the south in winter and not vice versa. The distance of 650–700km, however, is made within one day and not,

4 The Interpretation Centre of the High Mountains and Transhumance of Valle del Jerte <http://vallecereza.com/valle-de-jerte/museos-y-centros-de-interpretacion-del/> (last access 08.11.2021) and the Interpretation Centre of the Vías Pecuarias in Malpartida de Cáceres <https://www.malpartidadecaceres.es/centro-de-informacion-y-documentacion-de-vias-pecuarias/> (last access 08.11.2021).

5 Another example for the revitalisation of transhumance is the project of the Fundación Monte Mediterráneo in Santa Olalla del Cala (Andalusia).

as it used to be, during the course of weeks on foot. Since the driving of the flocks up to the pastures does not start before June 13, feast day of Saint Anthony – the patron of numerous municipalities in Castile and León – the sheep do not leave their Andalusian *dehesa* before mid-June. This poses a problem to the soils since the period between mid-May and mid-June is crucial in the regeneration of the Mediterranean ecosystems. Also, at the end of April saplings of holm and cork oaks start to grow which are eaten by the livestock that stays in the pastures (Garzón 2017, 45). The consequence are *dehesas* with disproportionately high percentages of centenary trees.[6]

In contrast to the latter project, which is above all concerned with the complementary use and regeneration of pastures in the south and north of Spain, the Asociación Trashumancia y Naturaleza highlights the importance of keeping the *cañada* system in use. They are often referred to as natural corridors as the sheep do not only fertilise the areas while making their way but also carry seeds from one place to another and thus facilitate the reproduction of plants. The *cañadas* comprise 125,000km of length and a surface of 420,000ha, which makes for 1% of the Spanish national territory. When the drove ways are not crossed by transhumant herds anymore, they become overgrown with shrubs. Other consequences are their usurpation 'by neighbouring owners, roads, buildings, estates and landfills' (Garzón 2017, 50, translation by M. Melles). A *cañada* system with free access and cleared roads and paths, however, is a necessary prerequisite to re-introduce transhumant activity (Garzón 2017, 51). The NGO and numerous sheep farmers and environmentalists have thus spoken out for the reclamation and preservation of the cattle roads. Their efforts were rewarded on March 23 in 1995 when the Spanish parliament passed the 'Law of the Vías Pecuarias' guaranteeing the *cañadas* status as public domain and their protection via the creation of the National Network of Cattle Roads (BOE 2020). Since that day, 2,000 sheep return every year on March 23 to flock the Spanish capital and celebrate the *Fiesta de la Trashumancia* of Madrid (Garzón 2017, 53).

Apart from the revivalist and environmentalist motivation for the gradual recovery of transhumance, EU subsidies are also assessed to be a 'main incentive' (O'Flanagan et al. 2001, 568). The overall role of the European Union since Spain's accession in 1986 is seen as somewhat ambiguous for sheep raising since its subsidies favour increased flocks dominated by ewes, according to whose number subsidies are calculated (Beckmann/Garzón Heydt 2009, 243). This leads to an overload of livestock in the pastures which end up overgrazed. Due to the abandonment of traditional farming practices, sheep farmers are increasingly dependent on feed from external sources and the rentability of their farms today depends heavily on the subsidies granted by the EU (Acosta Naranjo 2008, 157). On the other hand, O'Flanagan et al. (2011, 558 f.) point to the fact that EU accession has also led to small-scale recovery of transhumant practices, in particular with subsidies benefitting marginalised areas. In the central Ebro valley of Aragon, for example, the number of transhumant sheep – though, admittedly, they would rather be referred to as *trasterminantes*, meaning that they walk only short distances – increased fivefold from 25,000 to 134,000 within a decade (O'Flanagan et al. 2011, 571).

5.3. 'There are no Shepherds Anymore – There are only *Ganaderos*': an Extremaduran Village in the Post-Pastoral Epoch

Siruela, an Extremaduran village of not quite 2,000 inhabitants can be used to illustrate the dynamics of the post-pastoral epoch. It was declared 'winter capital of transhumance' in 2012 by the Asociación Trashumancia y Naturaleza and installed a monolith with this caption each at its entrances to make a visible claim for its pastoral heritage (DEX 2017) (*fig. 8*). Indeed, Siruela's winter pastures played a key role in the transhumance of Merino sheep and during the 16th cent. AD, to some the peak of Spanish wool production, several meetings of the *mesta* were held there (Rodríguez Serrano 2012, 73,

6 Further consequences of the delayed departure of the transhumant livestock are overgrazed pastures, the pollution of water points, the destruction of shelter and food resources which are vital for the terrestrial fauna, and the disturbance of reproductive cycles of sensitive species such as bustards (Beckmann/Garzón Heydt 2009, 245).

Fig. 8. Monolith placed at the entrance to the village Siruela (Extremadura). A board provides information on the historical background to the declaration of Siruela as 'winter capital of transhumance'.

Fig. 9. Cattle track Cañada de las Urracas ('The magpies' track'). This branch of the Cañada Real Segoviana crosses the Extremaduran *dehesa* landscape for almost 10km connecting the villages Tamurejo and Siruela (comarca La Siberia).

81–85). Pastoralism has always played a huge role in the village. However, memories of the elderly who are probably the last to have lived as shepherds are, needless to say, not connected to any form of long-distance transhumance across Spain, but rather to the local *dehesa*. Until today, the local usage of the term indicates that there is more to it than the simple designation of a type of landscape. Indeed, what today is, from an ecological point of view, known as *dehesa*, may also be found in other parts of the village's surroundings. The *dehesa*, however, refers to an area of 5,000ha which,[7] until a little over 27 years ago, belonged to the notorious Duchess of Alba (Cayetana Fitz-James Stuart, 1926–2014) and which has since then been in the hands of the village.

Indeed, Siruela is one of the many historical examples in which transhumance divided the opinions of local stakeholders, in this case the Conde of Siruela and the villagers. In 1587 an arbitration agreement was reached which granted the *siroleños* the summer pasture and the *señores* the winter pasture (Rodríguez Serrano 2012, 89). Strong tensions rose again in the 1980s when the Duchess started an effort to sell the *dehesa* of Siruela to private individuals. However, some unresolved and not further specified illegalities revolving her forced the duchess to finally cede the *dehesa* to the Junta of Extremadura at a reasonable price. The Junta then sold the 5,000ha at a symbolic price of one peseta per hectare to the municipality – which today would equal the surreal price of EUR 30 for the entire *dehesa*.

In spite of the ambivalence marking the relation between the rent-seeking counts and their ancestors, the villagers seek to keep alive the heritage of Siruela as one of the principal showplaces of transhumance. What is more, the comarca La Siberia was declared biosphere reservation in 2019. Since 2012, the *Fiesta de la Trasterminancia* has been celebrated annually. Its core is an organised collective walk together with a flock of black Merino sheep from the village of Tamurejo to Siruela across a *cañada* of 10km length (*fig. 9*). Since 2017, it has been integrated into the comarca-wide *Fiesta de la Trashumancia* which enhances the festivities by two days and the route of the walk by two municipalities. In 2018, the family who organised the annual tour and breed the black merino sheep gathered a group of well-known artists such as filmmakers, authors and cartoonists and organised a three-day walk with the sheep. The *caravana negra* received much attention from the media throughout the country (*fig. 10*).

Asked whether they would also like to revive pastoralism, the elderly of the village, who remember their days as shepherds very well, are quite unanimous. 'No way!', Pablo laughs out. What was

7 Number repeatedly stated during an interview by the former mayor of Siruela, in November 2018.

Fig. 10. Just like in the past? A flock of black merino sheep setting off for a short-distance *trasterminancia* whose destination is the *dehesa* of Siruela.

Fig. 11. The *dehesa* of Siruela. Once roamed by shepherds and their flocks, the *dehesa* is now subdivided into smaller plots that are enclosed with wire-netting fences, cattle grids and gates.

the shepherd's life like, then? Usually, as Pablo explains, there would be three shepherds for one sheep flock, two *mayorales* (adults), and one *zagal*, as the shepherd's boy was called. Instead of going to school, Rafael, another elderly villager, would spend his entire youth as a shepherd, starting as 8 year-old and until the age of 17. The position of *zagal* meant to stay 24 hours with the flock while the *mayorales* were those held accountable for the flocks and charged with whatever else there was to organise. For instance, they went to the village for some business and brought food to the shepherds who stayed with the flock. The sheep roamed the *dehesa* which is divided into several parts referred to as *quintos*. Each *quinto* has six or seven *majadas*, spacious pens enclosed by a low drystone wall. To every such *majada* belonged a shepherd's hut, or *chozo*, where the shepherds stayed overnight. The young shepherd boys returned home only one day per month while the *mayorales* would do so on every third day, as Pablo explains.

The *zagales* were mostly the sons of the elder shepherds (Acosta Naranjo 2002, 269), and so, too, Pablo remembers how he enjoyed spending a great amount of time with his father. They would eat only twice a day and every time the same: *migas* (bread crumbs soaked in garlic water) in the morning, and milk soup in the evening. The shepherds were accompanied by mastiffs, large guard dogs with big neck folds which serve for the dog's protection in the fight with wolves or other predators. As he felt lonely quite often as a young *zagal*, Rafael remembers how he used to talk to the dog for the lack of human company.[8] Pablo remembers the fear he felt when the wolves came to chase the sheep, or the day when he returned to his *chozo* to discover that someone had broken in and stolen away his beloved blanket.

In the post-pastoral landscape, mobility has given way to sedentary livestock farming. While until 50 years ago, the daily walk to a water point and back to a *majada* comprised between 8km and 9km, today the *dehesa's quintos* are subdivided into smaller plots and, importantly, fenced (*fig. 11*). The flock stays in the plot overnight and is only from time to time moved to another. 'There are no shepherds anymore, there are only *ganaderos*', as Rafael summarises, *ganadero* referring to today's livestock farmers. 'There were no plots, there was no wire', he describes the past. Today's sheep farmers, according to Rafael, just drive their car to the plots and pour out feed from a bag, 'and that's it'. Apart from the loss of the shepherds' skills, the enclosure of the *dehesa* has also negative effects on the environment: 'Today, where there used to be a hundred sheep in one *quinto*, there are 300 or 400', another elderly villager complains,

8 A similar observation was made by Flores del Manzano (1993, 333).

concluding: 'They eat more with their feet than with their mouth'.

Apart from overgrazing and the degradation of the *dehesa*'s soils, the loss of the profession of the shepherd involves the loss of the technique of *majadaleo*. From an environmental point of view, *majadaleo* is desirable due to the historical function of the sheep as welcome fertilisers (Acosta Naranjo 2002, 263). It refers to the practice of enclosing the sheep overnight in a mobile pen which is moved each day to another spot so that a certain area, the *majadal*, is intensively fertilised over a short period of time. Afterwards, this area is given time to regenerate. As a result, the best pastures of the *dehesa* were usually found in the *majadales* (Acosta Naranjo 2008, 262). Interestingly, farmers who engage in 'holistic management' are starting to imitate a practice which over the past decades died out. Here, the total of available pasture is subdivided into as many small plots as possible. The livestock is then moved from plot to plot every few days, leaving the soil of each plot a regeneration period of several months.

6. Conclusions

In a diachronic view of the genesis of the landscape in the Sierra Morena, especially in its western part, which is the main focus of the study here, continuities as well as discontinuities in the processes of anthropisation and use can be identified, which characterise the development of the landscape as a ResourceAssemblage. In the course of prehistory, it appears that the original forest landscape was increasingly opened up. However, archaeological evidence of this can only be found in isolated settlement and burial sites due to a lack of research activity (Pérez Macías 1997; García Sanjuán 1998; García Sanjuán/Wheatley 2006; Hurtado Pérez et al. 2011; Murrieta Flores 2012). Here, the analogy with neighbouring regions from which further relevant studies are available can help, such as in the Sierra de Gredos, where palaeoecological analyses suggest the use of altitudes corresponding to those of the upper Sierra Morena as pasture for livestock at least since the beginning of the last millennium BC (López Sáez et al. 2018). In the Sierra Morena, direct evidence of the use of the area in the context of a Resource-Complex around agriculture with animal husbandry has not yet been found due to the lack of bone preservation possibilities. Only indirectly, isotope analyses of animal bone finds from the Guadalquivir valley speak in favour of breeding in the Sierra Morena. There are also no indications of agriculture in the Sierra Morena. The proximity of prehistoric sites to traditional drove ways and natural passages in the mountains suggests the existence of long-distance routes across the mountains, which also could have been used for cattle drives, however without any concrete evidence of this (see Díaz-Zorita Bonilla et al., this volume). The few finds of prehistoric mining activities also do not help here, nor does the more proliferous mining record from Roman times, due to a lack of investigation into the surroundings of the mines. In the Roman period there is merely indirect evidence from the eastern part of the Sierra Morena as a grazing ground in the context of small-scale livestock drift as a continuation of the Resource-Complex around agriculture, which suggests similar practices in the west, without being able to prove this with reliable source material.

For the Middle Ages we have knowledge about the increasing settlement of the Sierra Morena, especially through written documents. The formation of settlement units in the mountainous region, the associated *dehesas* and the progressive development of transhumance in the course of the establishment of the *mesta* system show an increasing structuring of the landscape. The use of this landscape has triggered certain socio-cultural dynamics. While the development of ever larger territorial units bound to lordships or belonging to settlements divided the landscape into fixed estates with local use, especially from the late Middle Ages onwards, the cattle drive over long distances became more and more important, with herds increasing in size. The now frequent crossing of the various territories with the animals and their local feeding led to conflicts over resources with regard to keeping land open for passage and the use of grazing opportunities. The ResourceCultures of the transhumant herders and the sedentary farmers were in clear opposition here, which required central regulation, as was implemented in the form of the creation of the state-controlled system

of *cañadas reales* from the 13th cent. AD onwards. However, this did not prevent the fact that until well into modern times, in the course of an increasingly large accumulation of land ownership and subsequent control by fencing, rights of passage and grazing were repeatedly called into question in many places, with corresponding disputes as consequences.

While we have only little archaeological evidence for medieval ore mining and its economic environment in the Sierra Morena, written sources report their continuous use (Martín Civantos et al. 2010). In modern times, however, mining must have suffered a massive loss of importance as a result of the discovery and subsequent exploitation of the rich deposits in the Spanish colonial areas of Latin America at the beginning of the Modern era, which probably led to a noticeable decline (Sánchez Gómez 1989, 38). Until the late 19th cent. AD, mining no longer played a significant economic role in the Sierra Morena. Only after Spain's loss of its South American colonies and the potential to mine ore on an industrial scale developed in the wake of the Industrial Revolution did mining regain a central economic function for the respective region in some marginal areas of the Sierra Morena, as with the silver and lead production in the Linares area (Dueñas Molina et al. 2010) or the copper and sulphur production in Riotinto and Tharsis (Pérez López 2006; Carvajal Quirós 2012). It retained this function until its decline due to lack of profitability in the middle of the 20th cent. AD. The metal production and its environment, including mining, reveals its character as a ResourceAssemblage, especially in the Sierra Morena, in view of the changing economic importance of the region depending on external factors such as political events (e.g. in the Spanish colonies), world market prices or technological innovations in mining technology.

During the High and Late Middle Ages, the mostly rather small-scale parcelling out of the landscape of the Sierra Morena created the basis for providing a relatively large number of people with a reasonably adequate subsistence. In modern times and especially in the last few decades, an increasingly large concentration of land in a few hands led to a clear social differentiation between, on the one hand, rich land and livestock owners and, on the other hand, farmers, agricultural workers and herdsmen. Adequate participation in the agricultural and forestry use of the landscape as a ResourceAssemblage has been possible for increasingly fewer people in the Sierra Morena. The lack of economic development in the region and the increasing lack of prospects have encouraged massive emigration in recent decades. Particularly as a result of Spain's accession to the EU in 1986, there was a change in the regional economic structure, on the one hand towards the industrial mass production of agricultural products, and on the other towards the marketing of regional products as quality goods (e.g. Ibérico ham). In addition to a change in the forms of use of the landscape, this is also accompanied by a change in the perception of the inhabitants (as a relatively normal agricultural region instead of a social outpost), the consumers of the products (as a quality certificate instead of a backward economic region) and the visitors (as an increasingly recreational area instead of just a transit region).

The changes in the way the landscape in the Sierra Morena is treated, its perception and the socioeconomic dynamics associated with its use show in a diachronic perspective that, on the one hand, ResourceCultures typical of their time can be recognised and vary considerably from one another depending on the way they are viewed and the sources of information. On the other hand, however, there are also constants in the forms of use over all epochs (e.g. livestock farming associated with mobility) or several periods (e.g. ore mining). Social phenomena and dynamics, such as the conflicts between mobile and sedentary users of the landscape or tendencies towards differentiating the extent of land ownership in the context of economic and political processes, also shape the way the landscape is dealt with through the ages. Such an analysis with a long-term perspective of the use of the landscape requires the extension of the subject perspective to close interdisciplinary cooperation, especially with the historical sciences and cultural anthropology. This provides the opportunity to illuminate socio-cultural processes using analogies from more recent periods under comparable environmental conditions in a multilayered way, which is not possible with purely disciplinary (e.g. archaeological) source material.

The resulting interpretative possibilities and insights help to significantly broaden the interpretive horizon in order to recognise how landscapes were (and are) organised, shaped and controlled as ResourceAssemblages and which socio-cultural and political dynamics are associated with them.

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Bibliography

Abel-Schaad/López-Sáez 2013: D. Abel-Schaad/J. A. López-Sáez, Vegetation Changes in Relation to Fire History and Human Activities at the Peña Negra Mire (Bejar Range, Iberian Central Mountain System, Spain) during the past 4.000 years. Vegetation History and Archaeobotany 22, 2013, 199–214.

Acosta Naranjo 2002: R. Acosta Naranjo, Los entramados de la diversidad. Antropología social de la dehesa (Badajoz 2002).

Acosta Naranjo 2008: R. Acosta Naranjo, Dehesa de la sobremodernidad. La cadencia y el vértigo (Badajoz 2008).

Aitken 1945: R. Aitken, Routes of Transhumance on the Spanish Meseta. Geographical Journal 106, 1945, 59–69.

Aranda García 2016: J. A. Aranda García, De pastores y caminos. Trashumancia en el Alto Guadalquivir en época romana. Antiqvitas 28, 2016, 39–64.

Arboledas Martínez 2010: L. Arboledas Martínez, Minería y metalurgia romana en el Sur de la Península Ibérica. Sierra Morena oriental. British Archaeological Reports. International Series 2121 (Oxford 2010).

Arboledas Martínez 2015: L. Arboledas Martínez, Explotación y organización de un territorio minero del sur de Hispania. Sierra Morena oriental. Onoba 2015.3, 79–103.

Arboledas Martínez/Alarcón García 2018: L. Arboledas Martínez/E. Alarcón García, Redefining the Role of Metal Production during the Bronze Age of South-Eastern Iberia. The Mines of Eastern Sierra Morena. Documenta Praehistorica 45, 2018, 138–153.

Argente del Castillo Ocaña 1990: C. Argente del Castillo Ocaña, La utilización pecuaria de los baldíos andaluces. Siglos XIII–XIV. Anuario de Estudios Medievales 20, 1990, 437–466.

Argente del Castillo Ocaña 1991: C. Argente del Castillo Ocaña, La ganadería medieval andaluza. Siglos XIII–XVI (reinos de Jaén y Córdoba) (Jaén 1991).

Bartelheim 2007: M. Bartelheim, Die Rolle der Metallurgie in vorgeschichtlichen Gesellschaften. Sozioökonomische und kulturhistorische Aspekte der Ressourcennutzung. Ein Vergleich zwischen Andalusien, Zypern und dem Nordalpenraum. / The Role of Metallurgy in Prehistoric Societies. Socioeconomic and Cultural Aspects of the Use of Resources. A Comparison between Andalusia, Cyprus and the North Alpine Area. Forschungen zur Archäometrie und Altertumswissenschaft 2 (Rahden/Westf. 2007).

Bartelheim et al. 2021a: M. Bartelheim/L. García Sanjuán/R. Hardenberg, Human-Made Environments. The Development of Landscapes as ResourceAssemblages. An Introduction. In: M. Bartelheim/L. García Sanjuán/R. Hardenberg (eds.), Human-Made Environments – The Development of Landscapes as ResourceAssemblages. RessourcenKulturen 15 (Tübingen 2021) 7–22.

Bartelheim et al. 2021b: M. Bartelheim/D. Chala Aldana/M. Díaz-Zorita Bonilla, The Known Unknowns. Bronze Age Settlement and Landscape Use in Southwestern Spain. In: M. Bartelheim/L. García Sanjuán/R. Hardenberg (eds.), Human-Made Environments – The Development of Landscapes as ResourceAssemblages. RessourcenKulturen 15 (Tübingen 2021) 139–162.

Beckmann/Garzón Heydt 2009: H. B. Beckmann/J. Garzón Heydt, Transhumance as Tool of Species Conservation in Times of Climate Change. In: D. Knaute/S. Kagan (eds.), Sustainability in Karamoja? Rethinking the Terms of Global Sustainability in a Crisis Region of Africa (Köln 2009) 235–262.

BOE 2020: Boletín oficial del Estado, Ley 3/1995, de 23 de marzo, de vías pecuarias, <https://www.boe.es/eli/es/l/1995/03/23/3> (last access 17.09.2020).

Borrero 1998: M. Borrero Fernández, La situación demográfica de la Sierra Norte de Sevilla a fines de la Edad Media. Siglo XV–1534, Historia. Instituciones. Documentos 25, 1998, 43–72.

Borrero 2000: M. Borrero Fernández, El poblamiento rural sevillano antes y después del Repartimiento, Sevilla 1248. Congreso Internacional Aniversario de la Conquista de la Ciudad de Sevilla por Fernando III, rey de Castilla y León (Madrid 2000) 319–336.

Cabrera Muñoz 2003: E. Cabrera Muñoz, El bosque, el monte y su aprovechamiento en la España del sur durante la Baja Edad Media. In: F. Javier Peréz-Embid (ed.), La Andalucía Medieval. Actas de las I Jornadas de Historia rural y medio ambiente (Huelva 2003) 273–292.

Cara Barrionuevo/Rodríguez López 1987: L. Cara Barrionuevo/J. M. Rodríguez López, Trashumancia ganadera y megalitos. El caso del Valle Medio-Bajo del río Andarax (Almería). Crónica del XVIII Congreso Arqueológico Nacional (Las Palmas de Gran Canaria, Santa Cruz de Tenerife 1987) (Zaragoza 1987) 235–248.

Carmona Ruiz 1993: M. A. Carmona Ruiz, La penetración de las redes de trashumancia castellana en la Sierra Norte de Sevilla. Anuario de Estudios Medievales 23, 1993, 111–120.

Carmona Ruiz 1994: M. A. Carmona Ruiz, Notas sobre la ganadería de la Sierra de Huelva en el siglo XV. Historia. Instituciones. Documentos 21, 1994, 63–82.

Carmona Ruiz 1998a: M. A. Carmona Ruiz, La ganadería en el reino de Sevilla durante la Baja Edad Media (Sevilla 1998).

Carmona Ruiz 1998b: M. A. Carmona Ruiz, La explotación ganadera de la frontera luso-española. La 'Contienda' de Moura, Nódar, Aroche y Encinasola. Revista da Faculdade de Letras. Série de História 15, 1998, 461–512.

Carmona Ruiz 2011: M. A. Carmona Ruiz, El aprovechamiento de los espacios incultos en la Andalucía Medieval. El caso de la Sierra Norte de Sevilla. In: E. Martín Gutiérrez (ed.), El paisaje rural en Andalucía Occidental durante los siglos bajomedievales (Cádiz 2011) 193–208.

Carmona Ruiz 2018: M. A. Carmona Ruiz, La transformación de los paisajes rurales en el valle del Guadalquivir tras la conquista cristiana (Siglo XIII). In: J. Torró/E. Guinot Rodríguez (eds.), Trigo y ovejas. El impacto de las conquistas en los paisajes agrarios (Siglos XI–XVI) (Valencia 2018) 93–117.

Carvajal Quirós 2012: J. M. Carvajal Quirós, Tharsis. Las minas de Alosno en el espacio y el tiempo (Huelva 2012).

Carvalho et al. 2017: A. F. Carvalho/V. Pereira/C. Duarte/C. Tente, Neolithic Archaeology at the Penedo dos Mouros Rock-Shelter (Gouveia, Portugal) and the Issue of Primitive Transhumance Practices in the Estela Mountain Range. Zephyrus 79, 2017, 19–38.

Chapman 1979: R. W. Chapman, Transhumance and Megalithic Tombs in Iberia. Antiquity 53, 1979, 150–152.

Chapman 2008: R. W. Chapman, Producing Inequalities. Regional Sequences in Later Prehistoric Southern Spain. Journal of World Prehistory 21, 2008, 195–260.

Clemente 2015: J. Clemente Ramos, La montaña extremeña (siglos XV–XVI). Paisaje y economía. Revista de Estudios Extremeños 71.1, 2015, 539–568.

Collantes 2009: F. Collantes, The Demise of European Mountain Pastoralism. Spain 1500–2000. Nomadic Peoples 13.2, 2009, 124–145.

Contreras Cortés/Dueñas Molina 2010: F. Contreras Cortés/J. Dueñas Molina (eds.), La minería y la metalurgia en el Alto Guadalquivir. Desde sus orígenes hasta nuestros días (Jaén 2010).

Dantín Cereceda 1940: J. Dantín Cereceda, Cañadas ganaderas españolas. Comptes Rendus Congreso das Ciencias da Populaçao (Porto 1940).

Davidson 1980: J. Davidson, Transhumance, Spain and Ethnoarchaeology. Antiquity 54, 1980, 144–147.

DEX 2017: Digital Extremadura, Siruela, capital de invierno de la trashumancia, <https://digitalextremadura.com/siruela-capital-invierno-la-transhumancia/> (last access 18.09.2020).

Díaz-Zorita Bonilla 2017: M. Díaz-Zorita Bonilla, The Copper Age in South-West Spain. A Bioarchaeological Approach to Prehistoric Social Organisation. British Archaeological Reports. International Series S2840 (Oxford 2017).

Díaz-Zorita Bonilla et al. 2009: M. Díaz-Zorita Bonilla/A. J. Waterman/K. J. Knudson, Explorando la movilidad y los patrones dietarios en una comunidad de la Edad del Cobre. Estudio preliminar bioarqueológico del tholos de Palacio III (Almadén de la Plata, Sevilla). In: M. Polo Cerdá/E. García-Prosper (eds.), Investigaciones Histórico-Médicas sobre Salud y Enfermedad en el Pasado. Actas del IX Congreso Nacional de Paleopatología (Valencia 2009) 669–676.

Díaz-Zorita Bonilla et al. 2017: M. Díaz-Zorita Bonilla/K. J. Knudson/J. Escudero Carrillo/H. Bocherens/L. García Sanjuán (eds), Mobility Patterns and Paleodietary Insights into Human and Cattle at the Copper Age Mega-Site of Valencina (Seville, Spain) through δ18O and δ13C Isotope Analysis. Menga. Revista de Prehistoria de Andalucía 8, 2017, 53–70.

Domergue 1987: C. Domergue, Catalogue des mines et des fonderies antiques de la Péninsule Ibérique 1 (Paris 1987).

Dueñas Molina et al. 2010: J. Dueñas Molina/D. Campos López/F. Molina Molina/M. Romera Martínez/A. Molina Vega/F. Villanueva Real/A. Pérez Sánchez/Á. Hidalgo Gálvez, La minería del plomo de los siglos XIX y XX. In: F. Contreras Cortés/J. Dueñas Molina (eds.), La minería y la metalúrgia en el Alto Guadalquivir. Desde sus orígenes hasta nuestros días (Jaén 2010) 259–342.

Fernández Mier/Tente 2018: M. Fernández Mier/C. Tente, Transhumant Herding Systems in Iberia. In: E. Costello/E. Svensson, Historical Archaeologies of Transhumance across Europe. Themes in Contemorary Archaeology 6 (London 2018) 219–232.

Flores del Manzano 1993: F. Flores del Manzano, Trashumancia y pastoreo in Extremadura. Su influencia en la sociedad y cultura tradicionales. In: S. Rodríguez Becerra (ed.), Trashumancia y cultura pastoril in Extremadura (Mérida 1993) 309–339.

Fontavella 1951: V. F. Fontavella, La transhumancia y la evolución ganadero-lanar en la provincia de Valencia. Estudios Geográficos 12, 1951, 773–805.

Fribourg 1910: A. Fribourg, La transhumance en Espagne. Annales de Geographie 19.105, 1910, 231–244.

Galán Domingo/Martín Bravo 1991/1992: E. Galán Domingo/A. M. Martín Bravo, Megalitismo y zonas de paso en la Cuenca extremeña del Tajo. Zephyrus 44/45, 1991/1992, 193–205.

Galán Domingo/Ruiz-Gálvez 2001: E. Galán Domingo/M. Ruiz-Gálvez, Rutas ganaderas, trasterminancia y caminos antiguos. El caso del Occidente Peninsular entre el Calcolítico y la Edad del Hierro. In: J. Gómez-Pantoja (ed.), Los rebaños de Gerión. Pastores y trashumancia en Iberia antigua y medieval (Madrid 2001) 279–311.

García Sanjuán 1998: L. García Sanjuán (ed.), La Traviesa. Ritual funerario y jerarquización social en una comunidad de la Edad del Bronce de Sierra Morena Occidental. Spal. Monografías 1 (Sevilla 1998).

García Sanjuán 1999: L. García Sanjuán, Los orígenes de la estratificación social. Patrones de desigualdad en la Edad de Bronce del Suroeste de la Península Ibérica (Sierra Morena Occidental c. 1700–1100 a.n.e/2100–1300 A.N.E.). British Archaeological Reports. International Series 823 (Oxford 1999).

García Sanjuán et al. 2018: L. García Sanjuán/J. M. Vargas Jiménez/L. M. Cáceres Puro/M. E. Costa Caramé/M. Díaz-Guardamino/M. Díaz-Zorita Bonilla/A. Fernández Flores/V. Hurtado Pérez/P. López Aldana/E. Méndez Izquierdo/A. Pajuelo Pando/J. Rodríguez Vidal/D. Wheatley/C. Bronk Ramsey/A. Delgado Huertas/E. Dunbar/A. Mora González/A. Bayliss/N. Beavan/D. Hamilton/A. Whittle, Assembling the dead, gathering the living: radiocarbon dating and bayesian modelling for Copper Age Valencina de la Concepción (Seville, Spain). Journal of World Prehistory 31.2, 2018, 179–313.

García Sanjuán/Wheatley 2006: L. García Sanjuán/D. W. Wheatley, Recent Investigations of the Megalithic Landscapes of Sevilla Province, Andalusia. Dolmen de Palacio III. In: R. Joussaume/L. Laporte/C. Scarre (eds.), Origin and Development of the Megalithic Phenomenon of Western Europe. Proceedings of the International Symposium (Bougon, France, October 26th–30th 2002) (Paris 2006) 473–484.

Garzón 2017: J. Garzón, 25 años recuperando la trashumancia en España. Ambienta 120, 2017, 42–57.

Gauß 2015: R. Gauß, Zambujal und die Anfänge der Metallurgie in der Estremadura (Portugal). Technologie der Kupfergewinnung, Herkunft des Metalls und soziokulturelle Bedeutung der Innovation. Iberia archaeologica 15.1 (Tübingen 2015).

Gómez Pantoja 2001: J. Gómez Pantoja, Pastio agrestis. Pastoralismo en Hispania romana. In: J. Gómez Pantoja (ed.), Los rebaños de Gerión. Pastores y trashumancia en Iberia antigua y medieval (Madrid 2001) 174–194.

Guzmán Álvarez 2016: J. R. Guzmán Álvarez, The Image of a Tamed Landscape. *Dehesa* through History in Spain. Culture & History Digital Journal 5.1, 2016, 1–17.

Hardenberg et al. 2017: R. Hardenberg/M. Bartelheim/J. Staecker, The ‚Resource Turn'. A Socio-Cultural Perspective on Resources. In: A. K. Scholz/M. Bartelheim/R. Hardenberg/J. Staecker (eds.), ResourceCultures. Sociocultural Dynamics and the Use of Resources – Theories, Methods, Perspectives. RessourcenKulturen 5 (Tübingen 2017) 13–24.

Hinz et al. 2019: M. Hinz/J. Schirrmacher/J. Kneisel/C. Rinne/M. Weinelt, The Chalcolithic–Bronze Age Transition in Southern Iberia under the Influence of the 4.2 ka BP Event? A Correlation of Climatological and Demographic Proxies. Journal of Neolithic Archaeology 21, 2019, 1–26.

Hunt Ortiz 2003: M. Hunt Ortiz, Prehistoric Mining and Metallurgy in South West Iberian Peninsula. British Archaeological Reports. International Series 1188 (Oxford 2003).

Hurtado Pérez et al. 2011: V. M. Hurtado Pérez/L. García Sanjuán/M. A. Hunt/L. Ortiz, El asentamiento de El Trastejón (Huelva). Investigaciones en el marco de los procesos sociales y culturales de la Edad del Bronce en el Suroeste de la Península Ibérica (Sevilla 2011).

Joffre et al. 1988: R. Joffre/J. Vacher/C. de los Llanos/G. Long, The Dehesa. An Agrosilvopastoral System of the Mediterranean Region with Special Reference to the Sierra Morena Area of Spain. Agroforestry Systems 6, 1988, 71–96.

Kalkbrenner 1994: G. Kalkbrenner, Untersuchungen zur frühen Herdenviehwirtschaft auf der Iberischen Halbinsel (PhD-Thesis Universität Freiburg 1994).

Knipper et al. 2020: C. Knipper/C. Rihuete-Herrada/J. Voltas/P. Held/V. Lull, Reconstructing Bronze Age Diets and Farming Strategies at the Early Bronze Age sites of La Bastida and Gatas (Southeast Iberia) Using Stable Isotope Analysis. PLoS ONE 15.3, 2020, e0229398.

Lillios et al. 2016: K. T. Lillios/A. Blanco-González/B. L. Drake/J. A. López-Sáez, Mid-Late Holocene Climate, Demography, and Cultural Dynamics in Iberia. A Multi-proxy Approach. Quaternary Science Reviews 135, 2016, 138–153.

Llobet/Vila 1951: S. Llobet/V. Vila, La trashumancia en Cataluña. In: Comptes rendus du XVI Congrès International de Géographie de Lisbonne 1949.3 (Lisbon 1951) 36–47.

Logemann et al. 1994: E. Logemann/G. Kalkbrenner/B. Krützfeldt/W. Schüle, Mercury in Bones of Domestic Animals. Evidence of Prehistoric Transhumance. In: V. Spiehler (ed.), Proceedings of the 1994 Joint Tiaft/Soft International Meeting (Tampa 1994) 163–171.

López et al. 1988: A. López Ontiveros/B. Valle Buenestado/R. García Verdugo, Caza y paisaje geográfico en tierras béticas según el Libro de la Montería. In: E. Cabrera Muñoz (coord.), Andalucía entre Oriente y Occidente (1236–1492). Actas del V Coloquio Internacional de Historia Medieval de Andalucía (Córdoba 1988) 281–307.

López Sáez et al. 2018: J. A. López Sáez/A. Blanco González/D. Abel Schaad/S. Robles López/R. Luelmo Lautenschlaeger/S. Pérez Díaz/F. Alba Sánchez, Transhumance Dynamics in the Gredos Range (Central Spain) during the Last Two Millennia. Environmental and Socio-political Vectors of Change. In: E. Costello/E. Svensson (eds.), Historical Archaeologies of Transhumance across Europe. Themes in Contemorary Archaeology 6 (London 2018) 233–244.

López Sáez et al. 2020: J. A. López-Sáez/R. M. Carrasco/V. Turu/B. Ruiz-Zapata/M. J. Gil-García/R. Luelmo-Lautenschlaeger/S. Pérez-Díaz/F. Alba-Sánchez/D. Abel-Schaad/X. Ros/J. Pedraza, Late Glacial-Early Holocene Vegetation and Environmental Changes in the Western Iberian Central System Inferred from a Key Site. The Navamuño Record, Béjar Range (Spain). Quaternary Science Reviews 230, 2020, 106167.

Martín Civantos et al. 2010: J. M. Martín Civantos/C. Almagro Vidal/L. Arboledas Martínez, Una minería casi desconocida: épocas medieval y moderna. In: F. Contreras Cortés/J. Dueñas Molina (eds.), La minería y la metalurgia en el Alto Guadalquivir: desde sus orígenes hasta nuestros días (Granada 2010) 203–257.

Murrieta Flores 2007: P. Murrieta Flores, Mobility, Transhumance and Prehistoric Landscape. A GIS Approach to the Archaeological Landscape of Almadén de la Plata in Andalucía, Spain (MSc Thesis University of Southampton 2007).

Murrieta Flores 2010: P. Murrieta Flores 2010, Travelling in a Prehistoric Landscape. Exploring the Influences that Shaped Human Movement. In: J. Frischer/J. Webb Crawford/D. Koller (eds.), Making History Interactive. Computer Applications and Quantitative Methods in Archaeology (CAA). Proceedings of the 37th International Conference (Williamsburg, Virginia, United States of America 2009). British Archaeological Reports. International Series 2079 (Oxford 2010) 258–276.

Murrieta Flores 2012: P. Murrieta Flores, Understanding Human Movement Through Spatial Technologies. The Role of Natural Areas of Transit in the Late Prehistory of South-Western Iberia. Trabajos de Prehistoria 69, 2012, 103–122.

Murrieta Flores et al. 2011a: P. Murrieta Flores/D. Wheatley/L. García Sanjuán, Antes de los mapas. Navegación y orientación terrestre en la Prehistoria Reciente Ibérica. Boletín del Instituto Andaluz del Patrimonio Histórico 19.77, 2011, 85–88.

Murrieta Flores et al. 2011b: P. Murrieta Flores/D. Wheatley/L. García Sanjuán, Movilidad, trashumancia y paisaje prehistórico. Estudio del paisaje arqueológico de Almadén de la Plata, Andalucía a través de un SIG. In: V. Mayoral Herrera/S. Celestino Pérez (eds.), Tecnologías de información geográfica y análisis arqueológico del territorio. Actas del V Simposio Internacional de Arqueología de Mérida (Mérida 2007). Anejos del Archivo Español de Arqueología 59 (Mérida 2011) 411–423.

O'Flanagan et al. 2011: P. O'Flanagan/T. Lasanta Martínez/M. Paz Errea Abad, Restoration of Sheep Transhumance in the Ebro valley, Aragon, Spain. Geographical Review 101.4, 2011, 556–575.

Ojeda Rivera/Silva Pérez 1997: J. F. Ojeda Rivera/R. Silva Pérez, Dehesas de Sierra Morena y políticas agroambientales comunitarias. Estudios Geográficos 58.227, 1997, 203–226.

Parsons 1962: J. J. Parsons, The Acorn-hog Economy of the Oak Woodlands of Southwestern Spain. Geographical Review 52.2, 1962, 211–235.

Pérez-Embid 1990: J. Pérez-Embid Wamba, Las haciendas locales en las sierras de Aroche y Aracena (Siglos XI–XVI). Huelva en su Historia 3, 1990, 195–212.

Pérez-Embid 1999: J. Pérez-Embid Wamba, Aracena y su sierra. La formación histórica de una comunidad andaluza (siglos XIII–XVIII) (Huelva 1999).

Pérez López 2006: J. M. Pérez López, Presencia británica en las minas de Rio Tinto 1873–1954. In: A. Delgado Domínguez (ed.), Catálogo del Museo Minero de Riotinto (Sevilla 2006) 105–110.

Pérez Macías 1996: J. A. Pérez Macías, Metalurgia extractiva prerromana en Huelva (Huelva 1996).

Pérez Macías 1997: J. A. Pérez Macías, Anotaciones sobre el Bronce del Suroeste. Necrópolis de cistas en el entorno del Embalse de Aracena. Huelva en su historia 6, 1997, 67–81.

Pérez Macías 1998: J. A. Pérez Macías, Las minas de Huelva en la antigüedad (Huelva 1998).

Polanyi [1944] 2001: K. Polanyi, The Great Transformation. The Political and Economic Origins of our Time (Boston [1944] 2001).

Rodríguez Blanco 1993: D. Rodríguez Blanco, Ganados y señores en la Extremadura medieval. In: S. Rodríguez Becerra (ed.), Trashumanica y cultura pastoril in Extremadura (Mérida 1993) 69–88.

Rodríguez Serrano 2012: C. Rodríguez Serrano, Siruela, capital de la Mesta. In: Federación de Asociaciones Culturales de La Siberia (ed.), La Serena y las Vegas Altas (SISEVA). IV Encuentros de estudios comarcales (Badajoz 2012) 55–90.

Rosa 1861: A. de la Rosa, Memoria de la manera de transhumancia (Madrid 1861).

Ruiz-Gálvez Priego 1998: M. Ruiz-Gálvez Priego, Settlement Pattern and Socio-Economic Changes in the Bronze Age/Iron Age Transition of the Spanish Meseta and Southwest. In: B. Hänsel (ed.), Mensch und Umwelt in der Bronzezeit Europas (Kiel 1998) 441–448.

Sáez Fernández 2001: P. Sáez Fernández, Los agrónomos latinos y la ganadería. In: J. Gómez Pantoja (ed.), Los rebaños de Gerión. Pastores y trashumancia en Iberia antigua y medieval (Madrid 2001) 159–175.

Sánchez-Corriendo Jaén 1997: J. Sánchez-Corriendo Jaén, ¿Bandidos lusitanos o pastores trashumantes? Hispania Antiqua 21, 1997, 123–154.

Sánchez Gómez 1989: J. Sánchez Gómez, De minería, metalúrgica y comercio de metales. La minería no férrica en el Reino de Castilla 1450–1610 (Salamanca 1989).

Sánchez Meseguer/Galán Saulnier 2004: J. Sánchez Meseguer/C. Galán Saulnier, El 'Cerro de La Encantada'. In: M. R. García/J. Morales (eds.), La Península Ibérica en el II Milenio A.C. Poblados y fortificaciones (Cuenca 2004) 115–172.

Sánchez Moreno 2000: E. Sánchez Moreno, Releyendo la campaña de Aníbal en el Duero (220 a.C.). La apertura de la meseta occidental a los intereses de las potencias mediterráneas. Gerión 18, 109–134.

Schattner et al. 2012: T. G. Schattner/G. Ovejero Zappino/J. A. Pérez Macías, Munigua, ciudad y territorio. In: J. Beltrán Fortes/S. Rodríguez de Guzmán Sánchez (eds.), La arqueología romana de la provincia de Sevilla: actualidad y perspectivas (Sevilla 2012) 207–234.

Sorre 1932: M. Sorre, Nomadisme agricole et transhumance dans la Sierra Nevada. Annales de Géografie 41, 1932, 301–305.

UN 1992: United Nations, Convention on Biological Diversity, <https://www.cbd.int/doc/legal/cbd-en.pdf> (last access 17.09.2020).

Valenti 1950: J. V. Valenti, Una encuesta sobre la transhumancia en Cataluña. Pirineos 6.17/18, 1950, 405–442.

Vidal-González 2009: P. Vidal-González, Los estudios y la investigación sobre etnografía pastoril. Estado de la cuestión. Ager 8, 2009, 9–24.

Violant/Simorra 1948: R. Violant/R. Simorra, Notas de etnografía pastoril pirenaica. La transhumación. Pirineos 4.8, 1948, 271–286.

Walker 1983: M. J. Walker, Laying a Mega-Myth. Dolmens and Drovers in Prehistoric Spain. World Archaeology 15, 1983, 37–50.

Wheatley et al. 2010: D. W. Wheatley/L. García Sanjuán/P. A. Murrieta Flores/J. Márquez Pérez, Approaching the Landscape Dimension of the Megalithic Phenomenon in Southern Spain. Oxford Journal of Archaeology 29.4, 2010, 387–405.