TRADITIONAL PASTORALISM IN THE FAGECA AND FAMORCA VILLAGES (MEDITERRANEAN SPAIN): AN ETHNOARCHAEOLOGICAL APPROACH

Thesis submitted for the degree of Doctor of Philosophy at the University of Leicester

by

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To my parents and to Emi Pastor, In Memoriam
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ABSTRACT

This thesis develops an ethnoarchaeological approach to the study of traditional Mediterranean pastoral economies through a case-study of two mountainous village territories in eastern Spain. The research has two main aims: first to rescue an important corpus of ethnographic data from a rural community whose traditional economy is being eroded; and secondly, to provide insights into how pastoral economies in antiquity can be studied archaeologically. The thesis adopts an interdisciplinary methodology, synthesising oral, documentary and archaeological data sources, and applying the techniques of landscape archaeology. The research ultimately examines two aspects of the pastoral economy that leave signatures in the archaeological record: herd management strategies and pastoral sites. Throughout, it is emphasised that a pastoral economy based on sheep and goat herding is intricately linked - socially, economically and physically - to an agricultural landscape of terrace cultivation.

Chapter 1 defines the scope and purpose of the research and Chapter 2 presents the geographical, historical and archaeological setting for the case-study. Chapter 3 explores aspects of traditional pastoral land-use and examines linkages between terrace agriculture and herding. Chapter 4 is concerned principally with ethnographic data relating to herd management strategies and develops a model of kill-off pattern analysis through computer simulation. Chapters 5 and 6 address pastoral sites within the study area: the former analyses structural and spatial aspects, whereas the latter deals with abandonment processes and site taphonomy. Chapter 7 draws the conclusions of these chapters together and Chapter 8 explores the wider implications of the study. Appendices I-III contain primary documentary and archaeozoological data and Appendices IV-V comprise a gazetteer of pastoral sites within the study area.

'Ethnoarchaeology stands at the interference between traditional societies, and those long changes in human behaviour which are the concern of archaeology.'

Nandris (1984: 13)
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Glossary

Alqueria: Farm, the most representative form of the historical pattern of Muslim rural settlement within the study area

Amillaramientos: 19th century tax records.

Barranc: Ravine

Cabra blanca/negra: Types of goat breeds

Carrasca: Oak tree

Carrascal: Oak tree woodland

Cobert: The roofed section of a corral

Esparto: Esparto grass

Esbardal: Unroofed enclosure usually of square or rectangular plan

Font: Water source

Manso: A male goat or sheep used to lead a flock

Maquis: Mediterranean scrub vegetation

Ovella alcarreña/segureña/roja: Types of sheep breeds

Pallissa: Storage area, generally located at the top of a house and/or corral

Parats: A terrace built inside a ravine

Pinar: Pine tree woodland

Ramat: Herd

Rambla: Dry riverbed

Ras: The unroofed section of a corral

Separador: An internal division within a pen site
CHAPTER 1

MEDITERRANEAN PASTORALISM AND ETHNOARCHEAOLOGY

1.1. INTRODUCTION
This is a thesis fundamentally concerned with the archaeology of pastoral activity, in particular pastoral activity within the Mediterranean. It adopts an ethnoarchaeological approach, using as a case study ethnographic research on traditional shepherding activity in a mountainous area of Mediterranean Spain. The aim of this chapter is to introduce the research programme by defining its theoretical framework, detailing its main objectives, justifying its geographical location and explaining its design.

1.2. A THEORETICAL FRAMEWORK

1.2.1. Pastoralism
From a social perspective on production and distribution, the essential characteristic of pastoralism, differentiating it from hunting, is the fact that the value of the animals in a pastoral economy starts from the moment of their birth, whereas in a hunting context it is the dead animal which has economic value (Ignold, 1980:144). Additional criteria, such as the existence of ownership over the animal, can be added in defining pastoralism in contrast to hunting, but beyond this, a more precise definition of pastoralism is a difficult task. Throughout history, and arguably throughout prehistory, the nature of pastoralism has been sensitive to a number of factors. Environmental conditions, but also very often socio-economic or even political aspects, seem to have been the basis for the development of different ‘varieties’ of pastoralism or at least to have had a role in the way people manage animals.
Khazanov in his book ‘Nomads and the Outside World’ has attempted a classification, and thus a definition, of what he has termed ‘the basic forms of pastoralism’ (1980: 17). His classification specified the existence of:

- a pastoral nomadism devoid of agricultural practice;
- semi-nomadism with a complementary role of agricultural activities;
- semi-sedentary pastoralism, herdsman husbandry, yalag (transhumance) pastoralism and sedentary animal husbandry, all varieties of economic systems where there is a clear predominance of agriculture, with pastoralism constituting a complementary activity.

Khazanov’s is a socio-economic classification, thus of considerable value for anthropological research, but of debatable value when dealing with archaeology. As Chang and Koster (1986:99) rightly point out, this type of classification model can be sterile for archaeological purposes. Pastoralism needs to be defined in different terms when it is trying to be understood through archaeology in order to allow adequate scope both for variation between cultural-environmental zones and diachronic change. In this sense, archaeologists should attempt approaches to ethnographic pastoral information through study of material remains, or those aspects of land use which have the possibility of being archaeologically detectable.

(i) A Mediterranean pastoralism

Since the first Neolithic communities spread across the North Mediterranean Basin from their original centres in the Near East, pastoralism has become an integral part of the landscape and economy of the Mediterranean. Domestic animal bone samples are found in most of the Neolithic sites excavated from the earliest stages of occupation (Bernabeu et al. 1993). From stories in the folklore to the routine of everyday activity, the Mediterranean is impregnated with the presence of a myriad of shepherds and their flocks.

The great importance that transhumance activity was assumed to have in medieval times in some parts of the Mediterranean made it an obligatory topic when referring to shepherds’ activity in the Mediterranean. Klein’s (1920) economic study of the Spanish Mesta or Braudel’s (1972) classic book The Mediterranean and the
Mediterranean world in the Age of Philip II made scholars aware of the world of Mediterranean transhumance pastoralism. Since, archaeologists and historians have taken two approaches in their study of transhumance: environmental and historical. Using one or other or both in combination academics have tried to explain when and why this economic strategy of pasture exploitation began. The environmental approach invokes debate about the existence in prehistory of the summer highland pastures which allow transhumant activity to take place, thus effectively increasing the carrying capacity of the lowland pastures which are very dry in the summer months. Directly related to this is the issue of the beginning of highland deforestation, which is normally linked to the presence of shepherd activity (Geddes, 1983). It is, however, true that the importance of medieval transhumant movements like the Spanish Mesta or the Italian Dogana seems to have over-dominated the views that archaeologists and historians have about transhumance. It was relatively recently that the point had been suggested among archaeologists interested in prehistoric pastoralism (Barker, 1989), that what may be more interesting is to focus on the study of those short distance transhumance movements which are less dependent on political circumstances than those of large scale movements documented in medieval times (Chang and Koster 1986; Barker, 1989).

Although important, transhumance is however just another characteristic of the complex economic system than Mediterranean pastoralism has came to be through its existence. Ethnographers, geographers, historians and particularly ethnoarchaeologists, have began to uncover the full range of cultural, economic and social aspects related to this activity. Perhaps the most essential among these aspects is the relationship that links Mediterranean pastoralism and agriculture. The terms of these relationship have been viewed as a competition for land use (Lewthwaite 1981, 1984) or as a well articulated relationship (Chang and Koster, 1986: 102; Koster, 1977; Halstead, 1987; 1990). Whatever the perspective, what seems to be clear is that when we look into Mediterranean pastoralism we are inevitably looking as well into agriculture, the total dissociation of both activities often being problematic. How far into history and maybe prehistory we can project this relationship as we know it today is still an unsolved problem.
There is, and there has been, an essentially Mediterranean pastoralism. The combination of geographical and environmental characteristics as well as cultural and economic factors have defined the pastoralism of this geographic unit through time. Standing between the nomadic pastoral systems that dominate vast regions of the Near and Middle East as well as the African territories (in particular the North), and the intensive, more sophisticated, sheep and cattle herding economies that reign across temperate Europe, Mediterranean pastoralism has developed its own raison d'etre. Academics' knowledge of the extent and particularities of this pastoralism is far from being in an underdeveloped stage, but nevertheless lacks the intimate cognisance that has been achieved in other spheres of traditional Mediterranean economy, as such agriculture. The ethnographic data gathered for this thesis may serve to close this gap.

1.2.2. Ethnoarchaeology

The research here introduced will be developed within the theoretical framework of a sub discipline of archaeology: ethnoarchaeology. Oswalt defined ethnoarchaeology as ‘the study, from an archaeological perspective, of material culture based on verbal information about artefacts obtained from persons, or their descendants, who were involved with the production’ (1974:30). In similar vein, Kramer pointed out that ‘ethnographic research investigates aspects of contemporary socio-cultural behaviour from an archaeological perspective’ (1979:1). The reason for this lies in the need for the archaeologist to provide themselves with as many hypotheses as possible so as to better understand and then explain the archaeological remains (Watson 1979:277). Thus, the final goal of ethnoarchaeology is archaeological knowledge. However ethnoarchaeological methods have normally nothing to do with digging sites (Oswalt,1974:3); in fact, the ethnoarchaeologist records the information as an anthropologist, although thinks as an archaeologist.

The development of ethnoarchaeology is the history of the gradual realisation of the potential of ethnographic information, and at the same time, the improvement of the use of that information for archaeological purposes. The making of comparisons between primitive peoples’ cultures and their archaeological remains appeared in Europe as early as the 17th century, but it was not until the latter part of the
nineteenth century that ethnographic parallels were commonly used to explain past stages of human behaviour (Stiles 1977: 88-89). Throughout the first decades of this century, several studies of native American Indians conducted in North America created the proper intellectual atmosphere to consider ethnographic analogy as an important part of archaeology (Hodder, 1982:35). In fact, interpretation of archaeological data in the United States has always had a strong dependency on ethnography and ethnohistory (Charlton 1981:137). In this sense the development of ethnoarchaeology as a subdiscipline is definitely linked with the development of North American archaeology. As Stiles (1977: 89) points out, formerly North American anthropologists could be considered as ethnoarchaeologists.

However, despite its importance in American archaeology, at the beginning of the forties the theoretical body of ethnoarchaeology was still lacking a proper definition. There were two main points which needed urgent attention: firstly the clarification of which aspects of the ethnographic record could be the most useful for archaeology and secondly a better definition of how to apply this information to archaeology. As a response, intensive discussion was carried out in the fifties, with special reference to the use of ethnographic analogy (Stiles, 1977:89). It was then that ethnoarchaeology as we know it today began to emerge (Gould and Watson, 1982:355). During the sixties and seventies ethnoarchaeology developed to its maturity, and was finally recognised as a subdiscipline of archaeology.

Kramer (1979:11) defined the aims of ethnoarchaeology as the scientific description of relationships between behaviour and material culture on one hand, and the part of the behaviour which can be recognised in the archaeological record on the other. Any ethnoarchaeologist will necessarily work with ‘analogies’ which archaeologists use in order to try to get direct or indirect explanatory information. The advantages and disadvantages as well as the boundaries of their use in archaeology have been intensively discussed by several archaeologists (Chang, 1967; Peterson 1971; Stiles, 1977; Binford, 1977; Charlton, 1981; Gould and Watson, 1982). In his article about the use of analogy in archaeological reasoning, Binford (1967:1-12) stated that ethnographic data, when used by archaeologists, should be understood as a source of information from which to open new ways to infer the archaeological record, rather
than be used in the interpretation of 'archaeologically observed phenomena'. In this thesis 'analogy' will be understood under the same conception, in other words, as the process of formulating hypotheses which archaeologists may later test against the archaeological record.

When working with practical cases, ethnoarchaeologists normally distinguish two types of approach, the direct historical approach and the general comparative approach (Gould and Watson, 1982: 371-372; Chang, 1967:229; Gould, 1974:37). The first refers to those areas where there is a cultural continuity between past and present (for instance the aborigines in Australia). This approach offers many possibilities to apply the analogies, because of the cultural link between the people who created the archaeological remains in the past and the people studied in the present. The second approach used ethnographic information gathered in areas which are different from those being studied, or where there is no cultural link between the past and contemporary societies. This is a problematic approach because it implies greater possibilities of cultural, economic and social diversity which are often difficult to assess.

(i) Ethnoarchaeology and Pastoralism

By the beginning of the seventies ethnoarchaeological studies had already opened up several fields of investigation, but pastoralism was not yet included. During this decade and the next, several new topics were included in the field of ethnoarchaeological studies such as pottery technology or site formation processes (Hill, 1978; Nicholson and Patterson, 1985; Beatrice Annis, 1985; Schiffer, 1972, 1983). In 1978 the first article referring to pastoral activity appeared in a publication devoted to ethnoarchaeology. This article was Frank Hole's study of the Baharvand, a nomadic tribe of Western Iran. Hole's investigation was of great influence on later studies of the ethnoarchaeology of pastoralism and the first to begin to satisfy a need that archaeologists were starting to express: the desire for a better understanding of pastoral economies, and especially of the archaeological remains that they generate. The existence of many human groups throughout the world that were still practising a traditional pastoralism as the main base or as an important part of their economies was
beginning to be used as source of information to overcome this deficiency of knowledge.

Since Hole's pioneering work other studies have added further ethnoarchaeological information concerning shepherds' activities. There have been two main foci to these studies. On the one hand there are those concerning the Near East, where pastoral economies have been always important and where there are still many peoples practising nomadism or traditional pastoralism. On the other hand, there are those concerning the Mediterranean, where the imperative was to record the last vestiges of its traditional pastoralism, condemned to disappear within the modern economy, in order to advance the still poor understanding of pastoral economies in prehistoric and historical times.

First links between ethnographic data concerning Mediterranean pastoralism and archaeological data, were inevitably related to transhumance activity. Some early papers argued for the possible prehistoric use of sheep ways in Spain that are still used by contemporary herders (Higgs, 1976; Chapman 1979; Davidson, 1980; Walker, 1983). However, from the early eighties ethnoarchaeological approaches to Mediterranean shepherding soon adopted a more diversified perspective. Ethnographic data referring to pastoral activity was used by archaeologists in two different ways: some studies were trying to reinforce their corpus of archaeological and documentary data with the gathering of ethnographic information about pastoral activity (Lewthwaite, 1984; Halstead, 1987; Barker and Grant 1991; Grant, 1991; several papers in Maggi et al. 1991; Hitchner, 1994); others have focussed their studies directly on the ethnographic record, practising a more pure ethnoarchaeology, by trying to establish the range of potential archaeological traits created by contemporary husbandry systems, mainly in terms of structures and land use (Koster, 1977; Chang, 1981; Chang, 1984; Chang and Koster, 1986; Chang 1992; Chang and Tourtellotte, 1993).
1.2.3. Towards an Archaeology of Pastoralism

The once common view that pastoral peoples leave very few traces in the archaeological record has now been challenged (Banning and Khöler-Rollefson, 1992). The identification of traces of pastoral activity has gradually become an important element of archaeological projects throughout the world, involving research on past economies which undertook some kind of herding activity (Robertshaw and Collett, 1983; Bar-Yosef and Khazanov 1992; Barker and Grant, 1991).

Archaeological interest in the study of the inter-relationship between animals and man is a phenomenon of the past 40 years (Clutton-Brock, 1989). Throughout this period and until quite recently, the investigation of this interrelationship has been dominated by the discipline of archaeozoology (Chang and Koster, 1986: 97). Animal bone analysis has greatly increased our understanding of forms of animal exploitation and consumption through historic and prehistoric times. However, other aspects of pastoral economies, such as land use and spatial organisation, potentially exploitable by archaeologists, have not received enough attention.

Thus, contemporary animal enclosures, pens or corrals have attracted relatively little archaeological interest. They have however been defined as key elements in the identification of pastoral peoples and their activities within the archaeological record (Chang, 1981; Chang and Koster, 1986:115). From simple pens made out of bushes to large corrals solidly built, the ‘enclosure space’ used by shepherds constitutes an essential reflection of herding activities, archaeologically legible.

Claudia Chang’s assumption that the archaeology of pastoralism is still in gestation (1992: 67) is certainly based on the fact that archaeologists have yet to begin to be fully aware of the fact that, as an economic activity, pastoralism needs to be analysed from a wider point of view than that of the study of the remains created by the killing and consumption of the herded animals. The study of pastoral land use and spatial organisation needs to be expanded, and techniques of landscape archaeology should be fully applied. As has been shown by previous ethnographic studies in the Mediterranean region, shepherds’ usage of the landscape can potentially create a wide range of archaeologically detectable traces (Chang, 1992; Chang and Tourtellote
1993; Beavitt et al. 1998). Pastoralism is a mobile economy, flocks are moved from one place to another inside an area. Within their territory shepherds build pens or storage facilities or use rock shelters or caves for the animals and themselves. So far, the recognition of this and other aspects of shepherds' land use in the archaeological record has been quite poor; some archaeologists have used simple parameters, such as the paucity of artefacts or highland locations, to attribute a seasonal pastoral use to a site (Cocchi Genik, 1990). In other cases the presence of archaeological remains in a cave has been directly interpreted as its use by shepherds without any further explanation.

As work on this area seems to demonstrate (Barker and Grant, 1991), in any archaeological study of pastoralism the best approach will surely be an interdisciplinary one. Alongside archaeozoology and site analysis perspectives, archaeobotanical analysis can be of surprising help, and has a wide range of application possibilities; paleoenvironmental reconstructions are certainly needed to understand pastoral strategies better. Analyses of dung deposits have just begun to show the range of what they can offer in terms of animal diet and patterns of vegetation exploitation by shepherds (Rasmussen, 1993; Brochier et al. 1993). Simultaneously, geomorphological studies of the impact of contemporary shepherd activity on the landscape (Beavitt et al. 1998) appear to be an interesting avenue of investigation ignored by archaeologists until just recently.

The understanding that archaeologists now have of Mediterranean pastoralism is much wider than a decade ago. However, there is a clear need to extend further lines of investigation related to this aspect of the traditional Mediterranean economy; particularly vital is to develop ethnographic research. Equally, intensive field walking and excavation data are needed to improve our knowledge about past economic strategies, especially land use and animal killing patterns. The challenge lies in how archaeologists can link both sources of data in order to improve their understanding of pastoral economies in past stages of human history.
1.3. THE RESEARCH

1.3.1. The Research Area

The study area is defined by the districts of two mountain villages of Mediterranean Spain, Fageca and Famorca. Several factors influence the choice of this particular section of the long Mediterranean coastal territory of Iberia. From a geographical point of view, the area exemplifies a classic Mediterranean landscape: it is a mid-height mountain territory located close to the coastal plains. From a socio-economic point of view, it represents a relatively isolated corner where remains of traditional farming and shepherding coexist with modern agricultural methods and machinery. Additionally, the writer has an intimate knowledge of both communities and their territory, as well as the experience of similar previous research in a neighbouring area (Segui, 1995).

1.3.2. Aims and Purposes of the Research

The research has a two-fold objective dimension. On the one hand it is the study of the area of the North Mediterranean Basin where it is based. Spain, and in particular its Mediterranean coast, represent a largely neglected territory in relation to studies of traditional shepherds' activity. On the other, is the need to further clarify the analogical potential that some aspects of traditional Mediterranean pastoralism have for archaeology. These aspects are, primarily, pastoral sites and methods of animal husbandry, and secondarily, the economic inter-relationship between traditional shepherds and their surrounding landscape.

Most of the ethnographic studies of traditional shepherding in Spain are framed within a tradition of popular literature (Elias and Grande Ibarra, 1991) which although helpful, lacks academic consistency and is generally descriptive. There are just a few of these studies which are objective enough to be used as basic references without the fear of essential information being missed under the uncritical veil of popular accounts. One of these was published by Martínez in the early nineties, and gives a detail summary of his ethnographic research on cultural, social and economic aspects of traditional shepherding in the Valencian region, the part of Mediterranean Spain where the study area is located (Martínez, 1991).
The shortage of solid ethnographic research on Spanish pastoral activity becomes a desperate need in terms of ethnoarchaeological approaches. Unlike Italy and especially Greece, where a group of scholars, largely belonging to the Anglo-Saxon world, have been for at least two decades now developing ethnoarchaeological approaches to traditional pastoral activity, Spain remains almost virgin territory in this area of knowledge. This situation contrasts sharply with the extraordinary development of modern academic archaeological research that the country has undertaken since the seventies. It is important, if not essential, for the development of ethnographic and archaeological research in the Mediterranean, that the vast field of Spanish pastoral ethnography develops an ethnoarchaeological strand of research.

There is also some urgency: the informants are mostly elderly, as elsewhere in the Mediterranean, and the potential for gathering the under-exploited document of local experience and knowledge on traditional pastoralism in Spain is being eroded by time. Thus, it is a question of the utmost priority to undertake data collection under rigorous research conditions.

A three year research project could not hope to embrace traditional pastoralism as a whole, and so the focus of this thesis is on two specific lines of inference. Firstly, the analysis of structure and location of sites related to pastoral activity. Secondly, the exploration of traditional ovicaprine management strategies. For reasons of consistency the thesis finally takes a slightly wider perspective, and information on pastoral land use is brought into the main description and discussion.

Across the North Mediterranean rim pastoral structures are being eradicated from the landscape or altered beyond recognition with increasing rapidity. Ethnographers, historians and ethnoarchaeologists have devoted some attention to this form of Mediterranean vernacular architecture (Rizzelo, 1991; Chang, 1981). In general terms however, the study of pastoral-related structures has been overshadowed by that of more morphologically complex and stylistically impressive rural buildings such as farm houses (Mallé, 1990). The research programme for this thesis aims to improve this situation, even on a regional scale.
The use of an archaeological and ethnographical ‘site-oriented approach’ was claimed by Gould (1974: 41) to be most profitable. However, Peterson (1971) pointed out, referring to what he called ‘ecological ethnoarchaeology’ (Peterson, 1971: 245), that it is an area framework which allows a more valuable insight. Taking into account both of these views, this research will aim to embrace the middle ground. From one perspective, pastoral penning structures are studied individually, and their intra-site structure is analysed and discussed. From another view, a landscape archaeology approach is undertaken by describing locational factors in respect of penning sites. Pastoralism is essentially a mobile economy and it was thus felt that to excessively focus at an intra-site level would obscure the correct understanding of the structural nature of pastoral sites and their relationship to the surrounding landscape.

Ethnoarchaeological research on pastoral sites in Greece (Chang, 1981, 1984) has shown these simple structures to be used in a complex way for the management of the flock, separating different units of production. Detailed analysis of their dimension and morphology has been shown to be related to differences in type of breed kept, and to have the potential to supply information about numbers of animals kept (Chang, 1984). Although, as this thesis will demonstrate, the information exists, similar types of approach to pastoral sites are difficult to find in Italy and Spain. For the Spanish case, some original, but isolated, ethnoarchaeological analysis has been undertaken on the structure and location of these sites, with an emphasis on their manure production role (Seguí, 1995).

Adding to the intra-site perspective, an inter-site approach is also taken. This sort of analysis is necessary in a landscape like the Mediterranean region defined by sharp contrasts, particularly when referring to a mobile economy such as pastoralism. The approach essentially embraces two main strands of pastoral land use which are intimately related: location and seasonality. The value of this analytical perspective is that it allows the generation of patterns of land use which may be of great utility for future landscape archaeology projects.

The development of ethnoarchaeological methods in relation to flock management has been demanded by archaeologists as an important source of information data for
animal bone studies (Grant, 1991). The gathering of ethnographic data on traditional husbandry systems in the Mediterranean has been shown to be vital for the development of the analytical perspectives on past husbandry economies across the basin (Barker and Grant, 1991; Halstead, 1996). One of the main foci of these studies has concentrated on the investigation of mortality profiles generated by contemporary flocks under different or sometimes similar circumstances of management and market demands (Payne, 1973; Nandris, 1984; Barker and Grant, 1991; Segui, 1995). The analyses of these contemporary mortality profiles refines our understanding of flock dynamics in response to different production goals (i.e. meat, wool or milk), but also permits us to follow the whole management process, including sale and consumption. In this sense, it can help the archaeozoologist to understand other aspects of bone assemblages better. For instance, in terms of location, Grant noted, from her ethnographic data on flock management in Cicolano (Italy), that it was very difficult to find any animal bone remains that showed a complete profile of flock mortality and that towns might in that case be the best places to get the most accurate indication of those profiles (1991:76).

The ethnographic data on traditional ovicaprine husbandry recorded for this thesis is presented in two ways. First, a more descriptive one, comparing recent and modern husbandry systems, and detailing aspects of seasonal flock management and herding production goals. Second, a more critical approach, particularly in respect of kill-off patterns. This approach aims to test ethnographic data against the assumptions of traditional archaeozoological inference. To do so, the data gathered in traditional strategies of flock husbandry in the Fageca and Famorca villages are used to generate kill-off patterns and further assess their validity as an archaeozoological tool to understand past herd management strategies. Prior to being described and modelled in the form of mortality profiles, the data are examined from a socio-economic, historical and environmental point of view. When necessary, the information is also examined within a regional context, developing the argument in relation to the cultural and economic relationships between the study area and its surrounding territories.

The complexity of shepherds' land use is considerable. However, this thesis focuses on those aspects which were felt as important to give a clear frame for the main
research aims. Analysis of the way shepherds exploited the landscape is necessary in the definition of pastoral sites, especially when referring to locational factors. Equally, flock management strategies are often connected with land use, for instance, the arrangement of seasonal lambing in relation to the availability of pasture.

1.4. THE RESEARCH DESIGN

1.4.1. Structure of the Text

Although the academic scope of this research is ultimately wide-ranging, this thesis is not a synthetic work. On the contrary, it is framed as a particular case-study: traditional pastoralism, ethnographically recorded, in a mountainous area of Mediterranean Spain. This well structured geographical frame is maintained throughout the thesis as the fundamental source of data. In turn, these data have clear boundaries in time, defined by the informants' living memory, with the addition, occasionally, of some documentary information dating back to the mid 19th century.

Following an introduction to the subject matter and its theoretical approach (Chapter 1), Chapter 2 provides a geographical, archaeological and historical framework for the study area. Chapter 3 details aspects of traditional shepherds' land use in the Fageca and Famorca villages, which were felt as important for the overall understanding of the research. Chapter 4 focusses on the critical issue of herd management strategies. In an initial section, this chapter describes in detail the ethnographic data on both traditional and, for comparative purposes, modern sheep and goat husbandry within the research area. A later section of the chapter is devoted to the assessment of kill-off patterns through computer modeling of ethnographically informed flock dynamics.

Chapter 5 addresses a description and subsequently an ethnoarchaeological approach to the structure and location of pastoral sites. The chapter relies on detailed plans of pastoral sites to analyse structural aspects and even suggest possible chronologies for penning sites. It also integrates landscape archaeology methods to analyse the pattern of distribution and seasonal use of these sites. The discussion at the site level begun in Chapter 5 is complemented by the research on abandonment processes (Chapter 6) as they affect a particular type of the pastoral sites under research in the Famorca village.
district. This research brings a completely new perspective to the ethnoarchaeology of pastoral sites within the Mediterranean. It essentially takes the analysis a step further: from the evidence of the site and its material assemblage in their original shape and functionality, to the transformation of both by the cultural and economic process of abandonment.

Chapter 7 summarises the main discussion points and suggests analogical lines of inference with reference to archaeological data. Finally, Chapter 8, proposes a number of conclusions and key recommendations for future research. The study is completed by a series of Appendices that summarise supporting data, properly referred to in the text.

1.4.2. Data Sources

Information is drawn from other key data sources. These are briefly described below.

(i) Archaeological Data

Each of the pastoral sites identified within the Fageca and Famorca village districts was carefully planned at a 1:100 cm scale. All sites were recorded under their local name. A detailed description of the site location, environment and surrounding features as well as structural details was also completed. This information is given in Appendix IV. For Chapter 6, a particular methodological approach to field data collection was undertaken and this is described in that chapter.

Due to the lack of historical, and especially archaeological information, and although it was not the original aim of the research project, extensive fieldwalking was undertaken across particular sections of the districts. As a result a number of new archaeological sites were identified on the surface; their chronology and location are specified in Chapter 2.
(ii) **Documentary Data**

Documentary research was undertaken in the Fageca and Famorca council archives. The data available were mainly in the form of yearly taxation records, dating back to the mid-19th century (*Amillaramientos*). Poor preservation of the documents up until the recent past explains the loss of many entries, so the actual data available were relatively few, with many years missing. The available record sheets provided the name of the flock owner and the number of sheep/goats he was being taxed for. The taxes were imposed for grazing rights within the district boundaries for a year at a time. These data are summarised in Appendix I.

(iii) **Oral Information**

There are now few active sheep and goat herders in both villages. Most of the informants were people who are retired and no longer working with the flocks. The research combined a very detailed recording of the activity of those still active shepherds, with several series of interviews with those who are no longer working. Interviews with shepherds from neighbouring villages outside the research area were occasionally also carried out. To gain a broader perspective, interviews were also carried out with active and retired farmers, some of whom had never had any direct experience with flock management.

A questionnaire for the interviews was designed, but rarely taken into the field as it was soon revealed as intimidating. Most of the interviews were developed over natural conversations about traditional shepherd life, their flocks and everyday problems. With those shepherds who are still active, fieldwork was arranged so that several hours, often complete journeys, were spent accompanying them during their working time. Numbers of sheep/goats, as well as lambs and kids in the flocks were carefully noted, as well as any relevant information or field observations. Details such as fertility and mortality rates, age at first lambing and male/female ratios were rigorously and consistently recorded.

Overall, the study area and data sources provided the necessary tools to design and undertake a confident research approach to a fast disappearing aspect of
Mediterranean traditional shepherding. It is the intention that the ethnoarchaeological analysis carried out for this thesis will mirror both the breadth of the data available, in particular the oral information data, and the geographical character that makes the study area such a good starting point for the study of the ethnoarchaeology of pastoralism in Mediterranean Spain.
CHAPTER 2

THE STUDY AREA: GEOGRAPHICAL, ARCHAEOLOGICAL AND HISTORICAL FRAMEWORK

2.1. INTRODUCTION

This chapter aims to provide an outline of the geography, archaeology and history of the research area. On the one hand, the geographical information provided seeks to place traditional herding activity within its correct biogeographic framework. On the other, archaeological and historical data aim to provide the reader with an overview of the development of cultural and socio-economic aspects of the territory upon which this thesis research is focused. In addition, and as an introduction to the ethnographic data described in Chapter 3, the available published historical information on pastoral activity in the area is outlined in the last section of the chapter.

The marginality of the research area means that specific geographic, historical and archaeological information was generally found only within publications on the wider territory. This was particularly problematic for the historical and archaeological data. To partially overcome this problem, general archaeological information has been complemented with the data gathered by the author through extensive fieldwork.

2.2. THE NATURAL LANDSCAPE

2.2.1. Relief and Geology

The research area comprises the political districts of two mountain villages, Fageca and Famorca. Geographically they are located in the north of the Alacant province, eastern Spain, within the mountains of Alcoi (see Fig. 2.1). From a landscape point of view this northern part of the Alacant province, like many other coastal areas along
the Mediterranean basin, is generally defined by its geography. Within a relatively narrow space close to the coast line, a series of mid-height mountains, generally orientated SW-NE, and often rising to altitudes over 1000 metres a.s.l, define narrow and irregular valleys that extend towards the sea, opening up into small plains.

Both village districts are located on one of the highest sectors of these mid-height mountain areas. The Fageca village district has an extension of 10.2 square kilometres, whereas the Famorca village is slightly smaller at 9.7 square kilometres. The two villages are only 3 kilometres apart, and their districts are very similar; the only dissimilarity is that the Fageca district includes a section of the Seta valley at its western edge. Their territories extend through the northern side of the Serrella mountain, including its highest elevations (1313 metres a.s.l) (Fig. 2.2), and part of the southern side of the Alfaro mountain (with locations over 1000 metres a.s.l) (Fig. 2.3). The narrow valley area created by these mountains comprises an intensively terraced landscape criss-crossed by the irregular course of the Famorca river (lower down named Gorgos). This small water course runs towards the west and is seasonally dry, hence the locals refer to it as the rambla (dry riverbed).

The settlement pattern of this part of Spain shows a succession of small villages, sometimes of less than one hundred inhabitants, usually positioned facing south, on the change of slope between the mountain side and the narrow strip of the valley bottom. The Fageca village, situated on the lower slopes of the Alfaro mountain, overlooks a small plateau which defines the only portion of open farmed territory within both districts. The Fageca plain acts as a mid-height (some 700 metres a.s.l) transition plateau in between the Seta valley and the Famorca river valley. The Famorca village which somewhat atypically faces north, stands on the low slopes of the Serrella mountain spreading along one of the many hills created by the ravines running down the mountain.
Fig. 2.1: (A) Location map of the study area. (B) The Fageca and Famorca village districts.
Fig. 2.2: Two views of the Serrella mountain, the slopes falling within (A) the Fageca village district and (B) the Famorca village district. Note the intense terracing on the lower slopes.
Fig. 2.3: A view of the Alfaro mountain. Note the lack of soil and vegetation.
Geologically, the area is classified as part of the oriental section of the *Beticas* mountain range, and more particularly of its *Prebetic* zone. Fig 2.4 shows a geological map of the research area; the geological strata of the study area are mainly limestone and marls. The Alfaro mountain has the oldest materials, originating during the Cretaceous period. The rest of the area is geologically dated to the Tertiary period, most of it Miocene materials, though some Paleogene are also present in the highest areas of the Serrella mountain. Structurally, the area is a succession of sinclines, that constitute limestone mountains, and anticlines, that constitute valleys and depressions filled with miocene marls and clay, materials which have been exploited by the farming terraces that characterised its landscape (López Gómez, 1988; Nebot *et al.* 1993:25; Dávila Linares and Sánchez Pardo, 1996a:4).

### 2.2.2 Vegetation and Climate

The climate is the classical Mediterranean one, characterized by a summer drought, even temperatures in winter and maximum precipitations in the autumn, with local variations. Several topographic factors such as height, sun exposure and a more or less continental location, influence individual local characteristics in respect of the temperature and rainfall pattern. The annual average temperatures range between 11°C and 15°C (in contrast to the 17° to 19° celsius found in the neighbouring coastal regions) (Table 2.1).

<table>
<thead>
<tr>
<th>Station</th>
<th>annual average</th>
<th>maximum average</th>
<th>minimum average</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alcoi</em></td>
<td>14.6</td>
<td>20.3</td>
<td>8.8</td>
</tr>
<tr>
<td><em>Alcoleja</em></td>
<td>13.5</td>
<td>16.9</td>
<td>10.0</td>
</tr>
<tr>
<td><em>Cocentaina</em></td>
<td>15.6</td>
<td>21.6</td>
<td>9.6</td>
</tr>
</tbody>
</table>

Table 2.1: Average temperatures, in degrees celsius, recorded at three stations located near the study area (From Nebot *et al.* 1993:30).

When referring to rainfall patterns within the Alacant province, an imaginary line crossing through el Cabo de la Nao (see Fig. 2.1) marks a local division in rainfall patterns: it rains considerably more to the north than to the south of this line, which is
Fig. 2.4: The geology of the research area. ('Facheca' is the Castillian spelling for Fageca).
protected from the NE storms due to the change of orientation of the coastline (Nebot et al. 1993:31). At the local level, the rainfall is equally strongly influenced in the area by the topographic characteristics. There are significant rainfall differences between the sides of the mountains exposed to north and those exposed to south, with maximum rainfalls recorded on the northern slopes. These differences greatly determine the characteristics of the vegetation cover. Thus, within the research area, the Serrella mountain site has a northerly exposure and as a consequence generally greener vegetation than the drier south-facing side of the Alfaro mountain where vegetation tends to be more sparse¹. These variations were very well known by the local shepherds as they were essential for traditional herding activities which relied greatly on local grazing.

Rainfall is concentrated in the spring and especially the autumn months, and there is significant variability in rainfall from year to year (Nebot et al. 1993:31), though the area overall has a rainfall above the average for the Alacant province (Table 2.2).

<table>
<thead>
<tr>
<th>Station</th>
<th>J</th>
<th>F</th>
<th>M</th>
<th>A</th>
<th>M</th>
<th>J</th>
<th>JL</th>
<th>A</th>
<th>S</th>
<th>O</th>
<th>N</th>
<th>D</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcoi</td>
<td>47</td>
<td>28</td>
<td>48</td>
<td>56</td>
<td>44</td>
<td>30</td>
<td>9</td>
<td>12</td>
<td>32</td>
<td>79</td>
<td>38</td>
<td>68</td>
<td>491</td>
</tr>
<tr>
<td>Alcoleja</td>
<td>71</td>
<td>39</td>
<td>63</td>
<td>48</td>
<td>72</td>
<td>42</td>
<td>5</td>
<td>20</td>
<td>38</td>
<td>101</td>
<td>71</td>
<td>76</td>
<td>647</td>
</tr>
<tr>
<td>Cocent.</td>
<td>50</td>
<td>32</td>
<td>70</td>
<td>56</td>
<td>55</td>
<td>40</td>
<td>9</td>
<td>33</td>
<td>32</td>
<td>92</td>
<td>46</td>
<td>73</td>
<td>588</td>
</tr>
</tbody>
</table>

Table. 2.2: Monthly and annual rainfalls recorded at three stations near the study area. (From Nebot et al. 1993:32).

In terms of natural vegetation, the impact of human activity has greatly reduced the original oak tree (*Quercus rotundifolia*) woodland coverage². A degraded form of this original woodland is occasionally found in the area, the so-called *Garriga*, which includes *Quercus coccifera*, *Daphne gnidium* and *Juniperus phoenicea*, amongst

¹ However it is also true that the Alfaro mountain has been affected more intensively by soil erosion than the Serrella mountain.
² Kermes and holm oak trees are considered as the original vegetation of the area, although the original woodland distribution has been strongly reduced by millennia of human activity. Both oak trees grow in territories above the 500 metres a.s.l., and are considered dominant at heights above 1000 metres a.s.l. (VV.AA, 1985:74-75). There are, on the other hand, within the research area several toponyms using the name *carrascal* (oak tree woodland). This may indicate that the population expansion of the 17th and 19th centuries had very possibly played an important role in the reduction of the original oak woodland areas.
others. However, the most commonly found vegetation community within the research area is the Rhamno-cocciferetum formation, often identified in the central areas of the Valencia country at heights between 400 and 1000 metres a.s.l (Panareda i Clops, 1992:66). This formation is characterised by sparse scrubs such as rosemary (Rosmarinus officinalis), heath (Erica multiflora), thorn bush (Ulex parviflorus) and the steppe (Citrus albidus). Other types of vegetation also found in the region are the riverside trees, such as Populus alba or Ulmus campestris, as well as dry river bed species (rambla), such as Nerium oleander. Replanted areas are a quite common, relatively new phenomenon, and are generally dominated by pines (particularly Pinus halepensis). Finally, on the slopes of the Serrella mountain, at the highest elevations in the area -over 1100 metres a.s.l- the main plant species include amongst many others Salvia lavandulifolia, and Erinacea anthyllis (VV.AA, 1985 79-81; Nebot et al. 1993:33-40).

2.3. HISTORICAL AND ARCHAEOLOGICAL FRAMEWORK

2.3.1. A Regional Framework

Several sites with remains from the mid Paleolithic (Mousterian) have been identified around the city of Alcoi and in neighbouring village districts, such as Muro (see Fig.2.5). These sites (El Salt, L'Abric del Pastor, Cova de Beneito) have provided important evidence of Neanderthal hunting activities and lithic implements as well as traces of possible lithic quarrying and processing (Penella) (Aura Tortosa, 1996a; Torró, 1993; Galvan Santos, 1992; Iturbe et al., 1993). The more specialised hunters of the late Paleolithic period, especially during its last stages (Magdalenian) and periods of transition (Epipaleolithic), found in the broken landscape of the Alcoi mountains a particularly suitable scenery for their activities. Sites such as El Tossal de la Roca, Gorgori and Santa Maira caves (Aura & Pérez Ripoll, 1992; Aura, Fernández et al. 1993; Aura, 1996b; Iturbe and C.E.C, 1982), all bear witness to the traces of a very intense activity; on the other hand they are often difficult to recognise, especially at open sites, after millennia of human activity disturbance on the landscape.

3 During 1998 some 10,000 pines were planted in the section of the Serrella area that belongs to the Famorca village district.
Period | Chronology in the Area (BP)
--- | ---
Mid Paleolithic | 120,000-35,000
Late Paleolithic | 35,000-10,000
Epipaleolithic-Mesolithic | 10,500-7,000
Neolithic | 7,000-3,800
Bronze Age | 3,800-2,700
Iron Age | 2,700-2,300
Roman Period | 2,300-1,500
Early Medieval and Muslim rule | 1,500-700
Christian reconquest and colonisation | 700-400

Table 2.3: Regional chronological table for the prehistoric and historic periods (up to the last stages of the Christian colonisation following the Muslim expulsion in 1609 AD) (sources: Aura, 1996a, 1996b; Pasqual Benito, 1996; Trelis Martí, 1996; Torró, 1993; Olcina Domenech, 1996; Grau Mira, 1996a, 1996b).

The arrival of the first farming colonisers in the area (about 7,000 BP: Table 2.3) gradually introduced into the local archaeological record all the items generally characteristic of the new cultural and economic system. Perhaps one of the most significant of these items is the so-called Cardial ware, a type of pottery associated with the earliest neolithic settlers in the area and which has a characteristic decorative style made with the edge of a *Cardium edule* shell. The l’Or cave site, in the Beniarres village district, is one of the most significant sites of this period of transition (Bernabeu, Aura and Badal, 1993; Torró, 1993; Martí Bernat et al., 1980).

It was during these millennia (7,000 to 4,000 BP) that one of the most outstanding archaeological manifestations in the area made their appearance. This is the rock art defined by several styles of paintings which are mainly located in open air rock shelters found mostly across Mediterranean Spain, and which are particularly abundant in the north of the Alacant province. This rock art has been seen by archaeologists not just as an important cultural manifestation of the first farmers and the last hunters in the region, but also as an essential reflection of the interaction that for centuries must have taken place between both groups while living close to each other (Hernández Pérez et al., 1988).
Fig. 2.5: (A) The location of the main Valleys mentioned in the text. (B) The location of the cities and villages mentioned in text.
Fig. 2.6: Archaeological sites within the study area and its immediate surroundings.
With the Bronze Age (dated in the area from approximately 3,800 BP) the settlement pattern shifts to fortified, easily defensible sites. Thus, important sites such as La Mola D'Agres and el Mas del Corral in the Alcoia region (Peña Sánchez et al., 1996; Trelis Marti, 1992), are found in neighbouring territories of the El Comtat area, where, so far, finds are rather scarce (Pasqual Benito, 1990). Fewer, but larger sites, occupied during longer periods of time, define the settlement pattern of the Iron Age period (500 BC-50 BC). The main site in the area is La Serreta, a large settlement situated at the top of a prominent limestone hill which had a sanctuary and occupied a dominant location with reference to a group of smaller sites that crowned several hills in the surrounding valleys (including the Seta Valley) (Llobregat Conesa et al., 1995). Late in this period, classical sources referred to the territory within which the study area is located as the Contestania (land of the contestanos tribe). Iron Age sites in the area have revealed the existence of an extensive production of decorated pottery, a wide range of iron items (from weapons to farming tools), terracotta figures, and some more recently discovered sculptures (Olcina Domenech, 1996; Moratalla Jávega, 1994).

From the end of the Iron Age up to the Islamic period from the Alcoi and Comtat regions lack of archaeological data inhibits any accurate description of the settlement pattern, economy and material culture for the Roman and Visigothic periods. One of the main reasons for this lack of substantial archaeological information very possibly lies in the fact that during the Roman period the area was bypassed by the new main line of communication, the via Agusta, that ran along the coast and beside which the main settlements flourished, a pattern that has been largely retained to the present day (Grau Mira, 1996b).

Better archaeological and historical information is available for the area during the centuries under Islamic domination and cultural influence. El Comtat area was included within the territory Arab geographers denominated as the Thugûr Tudmid (the limit of the modern Alacant province) (Torró, 1993:54). North African Berbers settled in this zone, quickly Islamising the local population. Sites in lower areas of the valleys developed gradually, along with the settlement sites located at higher elevations. The classic type of Islamic rural settlement was the so-called Alqueria,
based on an extensive family unit exploiting a specific plot of land. This type of settlement survived through the Christian conquest, though many were abandoned after the general expulsion of the Muslim population in 1609 AD; most of the villages of the area, including Fageca and Famorca, developed from one of these Alquerias.

The Christian reconquest (which took place in the area during the first half of the 13th century) led to the substitution of the dominant elites but kept, especially in the rural areas rather than in the towns, the pre-existing Islamic population, a population subjugated and forced to pay high taxes. Christian domination brought the introduction of the feudal system into which Muslims (the so-called Mudejares) were forced, along with the new Christian settlers who were slowly arriving in the area⁴.

The expulsion of the Islamic population at the beginning of the 17th century brought an important demographic crisis: many places were deserted and some of them were never again repopulated (Torró, 1990; C.E.C, 1992). The new settlers, mostly from the surrounding regions but also from more distant places such as the Balearic islands, were often insufficient in number and had to face strong taxation demands from the lords. The inevitable economic crisis that the expulsion triggered took a few decades to be overcome and it was not until the second half of the 17th century that a revival of the economy could be seen.

The 18th century is characterised by a demographic expansion and the beginning of the industrial development of which Alcoi was one of the main nuclei. Industrialization, mainly of woollen cloth-making, strongly influenced the development of the economy and population shifts within the area during the 18th and 19th centuries. Social conflict, related to over-exploitation of factory workers, affected the urban centres of Alcoi and Cocentaina during the second half of the 19th century. Meanwhile in the surrounding valleys the increase in population led to the cultivation of marginal lands, expanding the previous terracing to its maximum possibilities and creating the very intensively farmed landscape still recognisable today.

⁴ Mudejares was the name given to the Muslim population living in Christian territory.
The increase of social conflict and general political instability reached its culmination with the beginning of the Civil War. Though Alcoi suffered constant bombing, as much of its industrial infrastructure was re-adapted to weapon making, in general terms the area went through the war in a relatively peaceful atmosphere.

During the decades following the end of the war and until the 1970s, emigration from the villages to the urban centres such as Alcoi or Cocentaina was very active, gradually bleeding the rural demographic resources. Most of the villages in the area today have a very small all year-round population (the largest being a few hundred), mostly of elderly people. Some revival, however, occurs during the weekends and holiday periods as the villages are becoming a preferred destination for relaxation and short breaks from the busy life of the cities.

2.3.2. Archaeology and History of the Fageca and Famorca villages

The broken landscape of the Fageca and Famorca districts offers limited attractions to human settlement, particularly farming settlement. Apart from the Fageca plain there are few open areas, and there is also the disadvantage of low winter temperatures (easily reaching below zero) due to the altitude. The route that the Famorca river follows through the eastern side of the Fageca district and the whole of the Famorca district, creates one of the less open valleys in the area, more inconvenient as an access route to the inland regions from the coast than the neighbouring Guadalest, and especially, Gallinera valleys (Fig. 2.5).

(i) Prehistoric Period

Within the village districts, archaeological traces of human activity are first detected in cave sites, such as the Bernat cave (Fageca) with a lithic industry belonging to the late Palaeolithic period (35,000-10,000 BP) (Aura, 1996b). The Santa Maira cave located within the Castells de Castells district, but very close to the border with the Famorca district, has traces of occupation from the late Palaeolithic, showing the transition to the Epipalaeolithic period (10,000-7,000 BP). For the Neolithic period, traces of occupation have been found in the Santa Maira cave, but no other sites of this period have so far been located within the Fageca and Famorca district areas. However, there are in both districts examples of rock painting. Thus, rock paintings
of Esquematic style can be identified in the Salema ravine (Fageca), and rock shelters with Esquematic paintings and rock carvings have also been found in the Rotes ravine (Famorca) (Hernández et al. 1991). Chronologically and in parallel with designs found in pottery sherds, these paintings can be placed in the Neolithic period, particularly the Early Neolithic period (Hernández et al. 1991). Finally, Macroequematic and Levantine style paintings are also present in the immediate surroundings of the Santa Maira cave (Hernández et al. 1988).

Although no Bronze Age site has so far been located within the district boundaries, one, now totally destroyed, was identified in a rock outcrop in front of the Santa Maira cave. Some rock carvings discovered in the Alfaro mountain near Fageca, overlooking the plateau, have been suggested as dating to the Bronze Age (Hernández et al. 1988). For the Iron Age, however, the fieldwork undertaken as part of this thesis has located some concentrations of pottery in two areas within the Fageca district. The first of these areas, called Brovalet, opens to the Seta valley and was already known by the locals as an area where an unusual quantity of pottery was found while ploughing. This area is well known among the locals as excellent farming land. The second area is located in a dominant position over the Fageca plateau. The Iron Age pottery recovered in both sites generally dates back to the 5th century BC, although some fragments of imported Greek pottery dated between the 6th and 5th centuries BC have also been located at the Brovalet site (Israel Espf, personal communication).

(ii) Roman and Early Medieval Periods
As previously stated, the beginning of the Roman domination left the area in a marginal location in relation to the main centres of activity. This is clearly reflected in the impoverished local archaeological record for this period. However, a Roman presence has been traced through the collection of some pottery sherds in the same areas described above for the Iron Age period, implying settlement continuity. These fragments have shown several datings covering the period in between the 1st BC and the 3rd AD centuries (Israel Espf, personal communication). A possible Roman graffito with the word VITA has also been identified on a rock sheet close to the area where the Roman ware sherds were collected on the Fageca plateau.
No archaeological remains dating to the centuries between the late Roman empire and the first Muslim presence are so far known within the study area. During the first centuries of Islamic domination (8th and 9th centuries) we can refer to a find of possible 9th century pottery sherds (Torró, personal communication) in the Brovalet area within the Fageca district. Finds belonging to this period are generally related to fortified sites; thus, the remains of a watchtower and pottery sherds were identified at the highest elevations of the Serrella mountain (Fageca district) and dated between the 11th and 13th centuries (Cortell and Abad, 1983). Again in the Serrella mountain and also within the Fageca district, are located the remains of a small pre-Christian conquest fortification dated towards the end of the 12th and the beginning of the 13th century, the presence of which archaeologists believe to be evidence of concern among local population fearing an imminent invasion. Finally the recovery of two Islamic funerary inscriptions (not dated) in Fageca in the last century is also known, although these were never deposited in any local museum and are now lost (Azuar, R. 1989).

(ii) Late Medieval and Post-Medieval Periods

The settlement pattern developed during the Islamic period was generally retained during the post-conquest period along with the local Islamic population. The villages of Famorca and Fageca were originally formed as *alquerias* at an unknown date. As with many others in the area, both villages kept their Islamic population (*moriscos*) until the general expulsion in 1609. After the expulsion, both sites were deserted for a few years until settlers from Mallorca were brought in to repopulate them.

The 18th century botanist, Cavanilles, visited the villages and gave a brief and rather negative impression of the villages. He referred to the harshness of peasant life, mainly due to the result of overtaxing by the landlords, and very briefly to aspects of geography and farming in the village districts at the time:

"...unfortunate settlers who work, sweat and collect the fruits (harvest) for a very small number of rich men, owners of the valley."

"...the northern side of the Serrella mountain is quite cold, due to the height of the
mountain, covered in snow for many months; however it is not sterile, and shows vineyards, sown fields (cereals) and some olive trees.”

Cavanilles, 1797 (From Lacan et al. 1997:194)

Population growth was seen in both villages during the 17th and 19th centuries. The demographic levels of both villages rose to their maximum during the last century. At the mid-century, Famorca had circa 270 inhabitants and Fageca circa 310 inhabitants (Fageca village Council Archive and Famorca village Council Archive). They have, however, suffered a considerable reduction in the last fifty years due to continuous emigration to cities such as Alcoi, Cocentaina or the more distant Valencia, Alacant and even Barcelona. This has gradually left the villages with an elderly population that farms a gradually reducing proportion of the terraces. Depopulation has reduced Fageca to the current 123 inhabitants and Famorca to 67 (Dávila Linares and Sánchez Pardo, 1996b:15).
2.4. ECONOMY AND LAND USE

2.4.1. A Regional Framework

Within the Valencian countryside, the essential feature which defined and continues to define the agricultural landscape is the dichotomy between irrigated and unirrigated lands (dry farming). Irrigated lands are mainly situated in the coastal plains, and around the main river systems. The increase in the extent of irrigated farming has been one of the most characteristic features of the process of modernisation of Valencian farming. This increase has mainly been boosted by the commercial success of citrus crops, especially oranges, which have gradually replaced the more traditional garden plot crops.

Unirrigated lands, on the other hand, are mainly situated across the mid-height valleys, hills and mountains near the coastal zone as well as the high plateaux and interior mountains. Unirrigated landscapes are usually defined by terracing; these are wider with lower walls on more gentle gradients, and narrower with walls with heights of up to two metres or more on the steeper slopes.

Generally speaking there has been an evolution of crops on the unirrigated land in the Valencian region, which at first meant the substitution of cereals by vineyards, and later, the disappearance of cereals and vineyards in favour of fruit trees, particularly almond trees, which are highly commercialised (Majoral, Pérez and Salva, 1993:180). Today, dry farming production is a mixture of olive, carob and almond tree agriculture and small areas of fruit trees such as peach, apples and cherries.

In the Alcoi and Comtat regions the development of an, at times very successful, industrial activity has co-existed with an unirrigated agriculture of low productivity. The stepped and broken geography, the predominance of marls often affected by significant erosion due to torrential rains, the lack of important river courses and the frequency of frosts, leave few possibilities for profitable farming (Dávila Linares and Sánchez Pardo, 1996a:17). Farming exploitation is characterised by small properties (between one and five hectares) scattered across the districts with a predominance of
almond and olive cultivation, both, but especially almonds, having a highly irregular productivity.

Historically, industrial activity is an essential aspect of the economy of the area. Although industry already existed in the 15th century, it was not until the 18th century that an important development in the industrialisation process took place, turning the area into one of the leading industrial regions in the country. Textile making was the main industrial activity from the beginning, but paper and metal industries were also important (Torró, 1993). The outworking system that characterised the early textile production slowly changed the economic structure of the farming population in the surrounding villages, gradually increasing their dependence on industrial work. In the middle of this century industrial activity in the area suffered an important crisis as equipment became obsolete. Retooling and a significant black economy have allowed it to survive until today. Industrial production is still important but it has lost the buoyancy that it once enjoyed. The social and economic impact of industrial activities in the region as a whole since the late Medieval period is, in any case, essential. Today, some 60% of the region’s population is in some way involved in industrial production (Dávila Linares and Sánchez Pardo 1996b:21). Activities related to industrial production, whether legal or part of a black economy, often have a key complementary role in the economy of many households in the villages.

2.4.2. Economy and Land Use in the Fageca and Famorca Villages

Both villages can be defined as typical mountain farming villages within the settlement pattern predominant in the mountain areas of the Alacant province. The pattern is of relatively small villages of few hundred inhabitants, located at short distances from each other and which, with exceptions, tend to control small district areas of just a few square kilometres of extension.

The extremely broken topography of both village districts, carved and recarved by ravines and small water courses, and defined by stepped slopes, especially on the Serrella mountain side, has historically led to the arrangement of the cultivation areas
in terraces (see Fig. 2.2). Terrace walls act today as an outstanding landscape marker and are seen all over the narrow valley area and along the hillsides of the mountains. During the periods of maximum demographic expansion, particularly during the second half of the 19th century (Garrabou, 1985), the terraced landscape of both village districts expanded to its maximum. Narrow, short terraces were then built along the stepped hillsides of the Serrella mountain wherever there was a possibility of cultivating some soil. This low productive, marginal terracing can still be recognised around the highest altitudes of this mountain (over 1,100 metres a.s.l) where the topography often allows small plateaux and gentle slopes. In the Alfaro mountain, on the other hand, the lack of soil limited the terraces to the lowest section of the hillsides. However some terracing can also be seen here in depressions or shallow ravines where a technique, known as parats, was used to create terraces. This technique, often seen in narrow ravines and water courses all over the districts, consisted of building a new terrace by taking advantage of the occasional water flows through the ravine. Farmers would lay the stone rows gradually, one or two each year, and so every water flow (very irregular in the Mediterranean rainfall regime) would deposit some soil against the stone rows, eventually filling up an area that would define the new terrace. As a terrace wall building technique, the construction of parats needed special skills, as the wall had to be built in a manner that would resist destruction by the sometimes torrential water flow.

Nowadays, farming is still the dominant economic activity but the average age of the active farmers is well over fifty. Traditionally, farming in the Fageca and Famorca villages was dominated by the classical Mediterranean trilogy of cereals, vines and olive trees. Almond trees and several fruit trees, primarily fig trees, but also cherries, peaches, pears and apples, were also cultivated. On the other hand, the lack of proper water courses reduced irrigation to small garden plots, where a variety of home-consumed vegetables were grown. These plots took advantage of water sources, in many cases spontaneously emerging along the ravines crossing the foothills of the Serrella mountain.

Traditional cultivation systems included the rotation of crops, thus, for example, cereals one year, pulses the following year. The mixing of bush and tree crops in the
same field, the so-called *coltura promiscua*, was also practised. Manuring was necessary to maintain productivity on the relatively poor soils.

During this century, patterns of land use within the village districts have been re-orientated dramatically from traditional crops to reliance on market-oriented crops. Both villages have witnessed an expansion in olives, fruits (mainly cherries, plums, apples and peaches) and especially almond production. At the same time, among the traditional crops in the area, cereal production has disapeared. Equally, there are very few vineyard terraces still farmed and many garden plots have been abandoned. Olive trees are the only traditional crop that has improved its representation in the local milieu of crop husbandry.

The expansion of almond production relates to the growth of the nougat industry in the province (particularly in the village of Xixona) which ensured reasonable prices. Olive oil production has also spread, partly because of the encouragement brought by EU funds, partly because of the improvement of commercial prospects (though these still vary greatly on yearly basis). In general terms, olive oil is now subject to better marketing and also to better organisation of the production process.

The selling of the almond harvest has constituted the main economic base, though never the only one, of many households. The altitude of the area and the exposed location of many of the terraces means that there is danger of the loss of part, or less often, the whole, of the harvest due to frosts (particularly between January and April). The insecurity created by this factor has stimulated emigration to local and regional urban centres (Alcoi, Alacant or València), and the development of a black economy, generally womens’ labour, in most cases related to the clothing industry, which brings an extra income often vital for the survival of the household economy. On the other hand, the need for urgent economic reorientations (to rural tourism, for instance) has been often claimed. Some positive advances in this direction have been put forward either supported by official development programmes (such as the EU LEDER programme) or else based on individual initiatives.

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5 During the last few years there has been an attempt to concentrate the olive oil production in the area through the creation of a regional cooperative. This cooperative ensures a far more sophisticated mechanisation of the production and serves as a platform to commercialise the oil under a trade mark.
2.5. SHEPHERDING IN THE ALCOI MOUNTAINS: ARCHAEOLOGICAL AND HISTORICAL EVIDENCE

2.5.1. From Prehistory to the Roman Period.

The introduction of domesticated species by the first Neolithic settlers in the Alcoi and Comtat regions began the history of pastoralism in the area. Early Neolithic faunal remains excavated in the Or cave indicated sheep and goats as the commonest domesticated animal, followed by pigs (Bernabeu, 1994). Bone analysis from the open air Neolithic sites of Les Jovades and Nuet (3rd millennium BC) has revealed the herding of cattle and their use in different working activities (Bernabeu et al., 1990:163).

During the Bronze Age, the dominance of sheep and goat bone remains in archaeological sites is maintained. Pig, cattle and horses are also documented in sites across the Valencian country; cattle and horses were probably used for transport and ploughing, though there also is evidence for the consumption of their meat (Palomar, 1995). Pastoralism during this period would have been the main economic activity of those sites which were less accessible. On the other hand, occupation in caves during the Bronze Age has often been directly related to pastoral activity. Cheese making vessels and other materials associated with shepherding activities have been found in caves (Palomar, 1995; Trelis, 1996).

Less intensive but similar pastoral use of caves has also been proposed for the Iron Age in the Valencian country (Gil Mascarell, 1975). During this period, finds such as shearing scissors at sites of the Alcoi and Comtat regions have added to our picture of the early pastoral economic activities in the region (Olcina Domenech, 1996:139).

For the Roman period, the lack of important sites in the area prevents any profound analysis of the relevance of herding activity. As seen above, the settlement pattern adopted by the Romans gave priority to the coastal plains, leaving the inland mountainous areas within a marginal location with reference to the main urban centres. The marginality of mountain areas such as the Comtat region would, however, have been ideal for the development of herding activities. Archaeologists tend to speculate
that pastoralism would in fact have been the base of the economy of the area during the Roman period (Grau Mira, 1996b).

2.5.3. Medieval and Post-Medieval Periods

In general terms and within the relatively low economic importance of pastoral activity within the Valencian country, the Alcoi and Comtat areas seem to have been, historically at least, one of the regions where herding played a more principal role (García Cárcel, 1977). The broken geography of the area along with the relatively high altitude and low temperatures has strictly limited the extension of good cultivated areas. At the same time, the herding of sheep and goat flocks has been the ideal means of exploiting such a landscape. The development of a clothing industry in the main urban centres since the Medieval centuries, did nothing but help the development of local pastoralism, particularly the rearing of sheep flocks.

No data are yet available about the importance of herding activity among the early Berber settlers in the area, though the predominance of elevated settlements during these early stages of the Muslim occupation would suggest the importance of herding. This importance increased during the post-conquest period (Torró and Ferrer, 1996b). The new Christian settlers, and especially their aristocracy, focussed their economic interest in sheep herding upon the local wool trade. The precocious development of the clothing industry in the main urban centres led to an increasing demand for wool. As a consequence, the development of the pastoral economy in places like Alcoi as early as the 14th century, has been considered by some historians as "exceptional" (Hinojosa Moltalvo, 1992:163). On the other hand, the Mudejar population in the area, which had an important shepherding tradition, seems to have been less focussed in the lucrative exploitation of sheep wool, which they considered to be a byproduct of their flocks (Torró, 1996b:207) predominantly raised for their meat. However, Mudejar farms (Alquerias) are reported during the 15th century as one of the main wool suppliers for the industry of the regional urban centres (Mira Jódar, 1996:251), thus suggesting the increasing attractiveness of the local wool trade, which was undoubtedly expanding.
Census data for the 16th century allowed García Cárceles (1977) to draw a picture of the quantitative importance of herding activity across the Valencian country at that time. In general terms, García demonstrates a clear dominance of sheep and goats over cattle and horses and a predominance of small flocks, of less than 100 head, over larger ones. For the Comtat region as a whole, the herding of some *circa* 33,000 head is indicated. The Seta valley (very possibly including the Fageca and Famorca villages) and the village of Gorga are referred to together, and would have had a total of *circa* 11,606 head, which may have included not just sheep and goats but also cattle and horses (García Cárceles, 1977:87). These data, along with the figures shown for the city of Alcoi, which had in its own *circa* 11,840 head, would point to the area as the main herding area within the Alacant province at the time.

During the medieval period, sheep herding seems to have been the predominant pastoral activity, making an important economic contribution (Hinojosa Montalvo, 1992:168). Goats were also numerous but played a complementary role (for example supplying milk as they did during the present century); poultry and especially pigs were the main meat source for Christian families. Cattle were also present, and particularly ploughing cattle, although they were gradually replaced for ploughing tasks by mules from the 16th century onwards (Ardit, 1993:61). Cattle, mules, donkeys, and to a lesser extent, horses were all used for traction and as pack animals during this period.

The post-medieval centuries saw a local decrease in stock numbers. At the end of the 18th century the number of sheep in the Valencian country appeared reduced to some 600,000 head; this is some 300,000 less than two centuries earlier. The expansion of the cultivated areas reduced the availability of pastures and consequently restricted the number of flocks that could be managed. This expansion of the farmed land equally restricted even more the free movement of flocks; strict laws regulated the movement of flocks in intensive farmed areas at least from early in the 17th century (Ardit, 1993:59). Many villages had areas specifically devoted to pasture, the so-called *bovalars* (already documented in the previous centuries), in some cases reserved for the exclusive use of the local flocks (Ardit, 1993:53; Hinojosa Montalvo, 1992:169).

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6 Ardit (1993) similarly points out that during the 18th century, ploughing cattle were still used in the first plough of the year (so called *rompiuda*), when the soil could be too hard for mules, and to plough the more difficult soils of the inland mountain areas.
Conflicts between farmers and shepherds increased as it became more difficult to find enough pasture areas and, inevitably, damage to crops was done by flocks struggling for pasture. The local council laws and regulations of the more general Valencian laws (Furs) all referred to some extent to this matter (Ardit, 1993:59).

From the 17th century pastoral activity in the area began to decline. The predominance of farming as the main economic activity and the fluctuation of the clothing industry, amongst other factors, gradually reduced the number of herds exploited. During the 19th century, flocks of sheep and goats were still recorded in nearly all villages and towns in the area. The mountainous geography, the desperate need for manure for farming and the proximity of important meat markets (such as the coastal cities, or Valencia and Alcoi itself) has always ensured the existence of an active pastoral activity. In villages such as Fageca and Famorca, where an important part of the district areas were mountains, and cultivation was only possible through terracing and very low productivity farming, herding of sheep and goats maintained its traditional economic importance until very recently. A complex system of land use, implying mutual economic benefits between shepherds and farmers, underlined the prolongation of traditional shepherding in the mountains and the survival of particular land exploitation strategies as transhumance.
CHAPTER 3

SHEPHERDS’ LAND USE AND TRANSHUMANCE ACTIVITY IN FAGECA AND FAMORCA VILLAGES: ETHNOGRAPHIC INSIGHTS

3.1. INTRODUCTION

The previous chapter has described the geographical and historical framework of the study area and its pastoral activity in general. The aim of this chapter is principally to present a more detailed scenario in which to place traditional herding as it was experienced by the informants in the villages of Famorca and Fageca. In order to do this, the chapter briefly explores a corpus of ethnographic data that could constitute in itself the core of a different thesis. These data refer chiefly to aspects of the land use of the Fageca and Famorca traditional shepherds. They are necessary to provide a context for the detailed analysis of herd structure and herd management strategies, as well as the discussion of pastoral sites that constitute subsequent chapters of this thesis.

Although the villages of Fageca and Famorca, in common with most of the villages found in the north Mediterranean basin, can, from a socio-economic point of view, be categorized as agro-pastoral communities, their inhabitants see them as essentially farming villages. Only a few of the informants referred to themselves as ‘shepherds’, although many who considered themselves as ‘farmers’ when interviewed, had actually been full time shepherds for several years at some stage of their lives.
3.2. THE EXPLOITATION OF PASTURE AREAS WITHIN THE VILLAGE DISTRICTS: THE UNCULTIVATED AND THE CULTIVATED LANDSCAPE.

Traditionally, shepherds in the villages exploited two major types of grounds within the district areas:
1- the communal, mostly owned by the councils; these are uncultivated territory, geographically defined by the mid to high elevations of the Serrella and Alfaro mountains in both districts;
2- the privately owned, generally cultivated areas.

Access to each of these grazing grounds had very different implications. Thus, access to the communal pasture owned by the councils was obtained through the payment of annual taxes on grazing, implying a purely economic exchange with no social aspect attached to it. However access to cultivated terraces, abandoned terraces, or any other part of the landscape with a well defined and strongly perceived ownership, implied more than just an economic transaction; it involved a network of social links within the community.

3.3.1 The Uncultivated Landscape

The non-cultivated landscape was essential to the traditional economy of the villages. Apart from grazing, other uses included the picking of aromatic plants for cooking or medicinal use, mostly for home consumption although some of these plants were gathered to be sold in the local market. Equally, the uncultivated environment also provided the Fageca and Famorca people with fuel, mainly in the form of scrub, and much needed limestone for use in building activities. However, villagers still regard the uncultivated environment as mainly the domain of herders, and more occasionally, hunters.

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6 The 'productivity' of the uncultivated landscape for Mediterranean economies tends to be forgotten in historical and archaeological works, at least as an individual matter. Some light on the issue has been shed by Forbes (1995) who described the variety of uses the uncultivated landscape has in modern Greece and projected some of this information into classical antiquity.
The payment of the grazing tax allowed shepherds to exploit communal grasslands at any time during the year. However, the geographical variety of the mountain landscape where the villages are located, as in other Mediterranean mountain territories, led to seasonal exploitation. Shepherds concentrated their winter grazing on low altitude, sunny exposed locations. In the study area these are mainly the low and mid slopes of the Alfaro mountain and the areas surrounding the dry river sites. Spring and summer grazing on the other hand, took place in the mid and high areas of the Serrella mountain, where it was easier to find fresher pastures for the flock as well as water sources and shaded locations to provide shelter from the midday sun.

For as long as the informants could remember, grazing in uncultivated areas was always the subject of vigorous competition amongst local shepherds. Although the size of traditional flocks was relatively small (most flocks would have had less than 60 animals and many between 20 and 40) they were numerous. Thus for data collected in 1859 (see Appendix I) nineteen flocks of sheep and goats were reported to have been grazing within the Famorca district. Equally, during the first decade of the present century, there were some fourteen flocks grazing in the Fageca district. On the other hand the intrinsic poverty of the pasture land available within the village districts and in general throughout the whole of the Valencian country (Martínez, 1991; Sánchez Belda and Sánchez Trujillano, 1978) was exacerbated by the intensity of the cultivation and over-exploitation of the mountain resources (i.e. fuel, fodder, limestone).

Traditional herders maximised the exploitation of this uncultivated territory by using their intimate knowledge of the landscape. This knowledge allowed them to rationalise grazing strategies. Hence, areas of generally recognised good quality vegetation (e.g. the dozillo plant -Aphyllanthes monspeliemis-) were well known and intensively exploited. On the other hand, shepherds used some strategies to improve the pasture, the most common one consisted of setting fire to patches of maquis during the winter time with the intention of providing fresh grass on these patches during the summer period. This strategy unavoidably implicated shepherds in mountain fires in popular belief and as a consequence of this, in recent years shepherds have often been

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7 These aspects are further developed in chapter 5 where location factors of pastoral sites within the study area are described.
mistakenly accused by the Spanish Institute of Nature Conservation of being responsible for disastrous summer fires. However, Forbes and Koster's (1976:123) work on Greece revealed that the well planned burning strategies of traditional shepherds caused only limited damage. These authors demonstrated that the damaging effect of ovicaprine grazing was small in comparison with other traditional activities exploiting the mountain environment such as the cutting of firewood or charcoal production (Forbes and Koster, 1976:121-122).

(i) Woodland Areas

An important part of the uncultivated environment exploited by the Fageca and Famorca traditional shepherds was the woodland areas. As elsewhere, original woodland coverage would have been reduced within the study area in the past by the extension of the cultivated land (see Chapter 2)\textsuperscript{8}. In fact, according to the informants, in the early and middle decades of this century, within the uncultivated territory of the village districts, woodland covered a relatively small area. However, traditional shepherds often supplied examples of the particular ways they exploited these small patches of woodland.

In general terms, woodland areas do not provide pasture of the comparable quality and quantity of other plant communities in the Mediterranean. The lack of light in woodlands prevents pasture from growing properly (Rackham, 1980:179; Rackham, 1986:119-120); shepherds interviewed in the villages confirmed the shortage of pasture these areas provided. However the same informants pointed out that the patches of woodland they recalled were never ruled out as pasture areas and that they occasionally drove their herds into them to feed.

\textsuperscript{8} Some idea of the extension of these areas in the period after the Muslim expulsion (1609) can be traced from Catalan place names still surviving in the modern toponymia. Thus, the Catalan names \textit{carrascal} meaning kermes oak woodland or \textit{bosc} meaning simply woodland, are found naming several areas within the districts that would have been brought into cultivation some time after the repopulation of the area by Christian settlers. In fact some of these woodland patches were turned into farming areas at the end of the last century or during the first stages of the present one; some informants still recalled, from their own experience or from their parents', the location and extension of some of these woodland areas.
Feeding within woodland patches particularly occurred during the acorn season (autumn). As in other parts of the Mediterranean such as Greece (Forbes, 1998:24), acorns were considered by shepherds as a highly valued food for sheep and goats. They were occasionally collected, but shepherds generally seemed to have preferred to allow the flock to feed off them while they were spread all over the floor beneath the oaks.

However, the main perception shepherds had of woodland areas was of an inexhaustible source of fodder, mainly in the form of tree branches. Thus, tender oak branches were pruned all the year round and hung out in the corral for the animals to eat as a supplement to their daily grazing. Leaf fodder production in these areas was mainly obtained from riverside species such as *Ulmus minor* and *Populus alba*. Both activities -pruning of branches and leaf fodder production- have been described as part of the normal management of woods documented in post-medieval Italy (Moreno and Raggio, 1990) within a well organised system of woodland management.

3.3.2. The Cultivated Landscape

Sheep and goat herding within the Fageca and Famorca village districts revealed the need for and broadly speaking, the achievement of, a close reciprocal economic relationship between farming and pastoralism. As previously seen, population increase triggered the expansion of terracing, thus drastically reducing the uncultivated land within the districts. Only the extremely broken topography of the Serrella mountain and the lack of soil on the Alfaro mountain limited this expansion. Traditionally the herds, particularly those which remained all year round within the village districts, were to an important extent sustained by access to the pasture available in these terrace areas as well as by the use of farming by-products as fodder.
(i) Flock Access to Terraces

Access to terrace areas was established through verbal agreements between the shepherd and the owner of the terrace(s). Factors such as friendship, family relationships or just professional trust (some shepherds were known to take good care to avoid damage to trees, walls and so on, while they were within the terrace with the flock), often determined to whom the permission was given by the farmer. In most cases, the agreement did not involve any payment in money. Access might be granted for purely altruistic reasons or could involve more complicated arrangements. A common type of agreement required the use of particular corrals owned by the same farmer that owned the terraces, so that he could use the manure the flock left after its visit. Equally some kind of labour could be expected from the shepherd, for instance, helping in the pruning and collection of tree branches or in general weeding activities carried out on the terraces.

Occasionally, shepherds would venture into a terrace without having been given explicit permission by the owner. These actions were the main source of conflict between farmers and shepherds in the villages. Complaints from farmers against shepherds due to crop damage (eating the regrowth of trees, biting the tender branches and so on) or any other kind of damage such as the removal of stones from the terrace wall, were very common. These conflicts were normally resolved via the city council, through the payment of an amount of money determined by a third party who would have priced the damage.

The exploitation of terraces as pasture areas followed a seasonality that was ultimately dependent on the type of crops cultivated in the terrace. Terraces where cereals and pulses were planted were generally used as pasture areas during the summer, once the harvest had finished. Mostly flocks of sheep rather than goats (which were thought to be more difficult to control and so more capable of causing damage) were allowed to pasture on the grass grown in between the stubble; shepherds refer to this practice as grazing the rostoll. Apart from the grass, when grazing in the stubble, flocks also took advantage of any grain farmers left behind while harvesting.

9 The assessment of the damage caused was popularly known as aferrassament, and was carried out by a 'good man', an impartial individual from the community. Similar conflicts between farmers and shepherds for grazing on cultivated land are described by Forbes in Greece (1982:224).
Fig. 3.1: (above) A sheep flock grazing in a terrace next to the village of Famorca. (below) A shepherd piling olive tree branches after taking the dry leaves off.
In terraces planted with trees, sheep flocks were allowed to pasture for longer periods of time, generally any time when the soil was dry, other than the harvest. Informants described it as specially damaging for the field if a flock went in after it rained, as it made the soil very hard to plough once it dried out.

Apart from the occasional manuring of their fields, allowing the flocks into terrace areas was perceived by farmers as advantageous in other ways. Thus, most of the informants noticed that the use of animal manure produced an extraordinary growth of weeds in the fields. Ploughing these tall weeds was a difficult task just using the traditional plough and animal traction; letting a flock graze the weeds just before ploughing made it much easier, as the flock would level the weeds to the ground. Terrace grazing was seen by farmers and shepherds in the villages as a mutually productive practice which although leading to occasional conflicts had, in practical terms, an important range of advantages.

(ii) Use of Farming By-Products as Fodder

An essential aspect of the exploitation of the cultivated landscape by traditional shepherds in the villages lay in the obtaining of farming by-products for fodder use. Flocks staying all year round in the villages relied on the availability of fodder supplies and particularly farming by-products. Winter days are short and bad weather conditions are common in the mountain area. Daily grazing was often insufficient and animals had to get some supplementary feeding during the night hours. On the other hand, every year there were a few days, perhaps weeks, when hard rain and particularly snow forced the flock to be kept inside and fed exclusively with fodder.

Most of these products were procured through deals with farmers or from the terraces owned by the shepherds themselves. Nearly all full-time shepherds owned land and worked in their terraces when they had some spare time or otherwise hired some labour. When obtained through deals, farming by-products were, like the access to terraces, often exchanged for some kind of labour. For example the prunings would be given in exchange for help in the pruning of the olive trees.

10 Farmers interviewed did not consider the presence of flocks in their fields as an essential form of manuring.
Table 3.1 summarises the main kind of farming by-products referred to by the informants. Among the fodder products shown in the table, dry olive leaves were the most popular, and every shepherd would have had a good provision of them in the storage room at the top of his house (*pallissa*) before the winter. Along with these, chickpea and lentil leaves were also considered nutritious and were in fact more widely available. Storage capability and nutritional value were the two key factors shepherds mentioned when referring to fodder. Processing, when needed, was generally reduced to drying or threshing; shepherds would in any case invest a significant amount of time and effort in insuring that enough fodder supply was available.\(^{11}\)

Storage generally took place in the village houses, although some corrals had their own storage area. Each shepherd carefully managed his fodder availability throughout the winter period. Buying and selling of fodder reserves may have occurred but it was rarely mentioned by the informants; most of the shepherds would have had some reserves left at the end of the winter period. There was a general agreement that although occasionally there were problems (one year the snow lasted for a month), the herds usually survived reasonably well.

On the other hand, no fodder crops were specifically grown to feed sheep and goats. However crops such as barley and vetch were grown to feed the mules and donkeys used as pack and ploughing animals. Occasionally lambs or sick animals would be fed with what was considered higher quality fodder such as maize or even wheat.

Farming by-products used as fodder constituted an essential feeding base of the herds kept all year round within the village districts. In other parts of the Mediterranean such as Greece, archaeologists have already noticed how flocks subject to relatively stable management strategies developed a closer relationship with arable farming (Forbes, 1998). The traditional herding economy in the Fageca and Famorca villages

\(^{11}\) A Famorca shepherd said he invested not less than an hour daily gathering or sorting out fodder for his flock of 30 animals.
<table>
<thead>
<tr>
<th>Type</th>
<th>Harvest Time</th>
<th>Processing</th>
<th>Storage</th>
<th>Calorific Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>olive tree leaves</td>
<td>spring onwards</td>
<td>pruned olive branches are left to dry out; once they dry, shepherds separate the leaves by beating the branches, so the leaves fall off.</td>
<td>long lasting</td>
<td>good, shepherds point out that they make the animals drink a lot, thus increasing their weight faster</td>
</tr>
<tr>
<td>fig tree leaves</td>
<td>autumn</td>
<td>none</td>
<td>generally kept in sacks; do not last long.</td>
<td>average</td>
</tr>
<tr>
<td>almond shells</td>
<td>September</td>
<td>none</td>
<td>short</td>
<td>good</td>
</tr>
<tr>
<td>corn (maize)</td>
<td>September</td>
<td>none</td>
<td>a year; it lasts longer if kept on the cob</td>
<td>good</td>
</tr>
<tr>
<td>cabbage</td>
<td>January-February</td>
<td>only tender leaves are used.</td>
<td>short</td>
<td>good; some shepherds described it as good for stimulating the production of milk.</td>
</tr>
<tr>
<td>figs</td>
<td>August-September-October</td>
<td>left to dry</td>
<td>relatively long</td>
<td>very good; it is not advisable to give too many at the same time</td>
</tr>
<tr>
<td>barley straw</td>
<td>June-July</td>
<td>threshing</td>
<td>one or two years</td>
<td>good; mainly used for males.</td>
</tr>
<tr>
<td>chickpea and lentil leaves</td>
<td>June-July</td>
<td>picked and left to dry</td>
<td>long</td>
<td>very good; normally given during winter</td>
</tr>
<tr>
<td>grape stalk</td>
<td>autumn</td>
<td>left to dry and slightly beaten</td>
<td>long</td>
<td>good; given in small doses.</td>
</tr>
<tr>
<td>oats straw</td>
<td>June-July</td>
<td>threshing</td>
<td>one or two years</td>
<td>good; more frequently used in the summer as it is not as dry as other straws.</td>
</tr>
</tbody>
</table>

Table 3.1: Some of the most common farming by-products used as fodder in the Famorca and Fageca villages.
was dominated by small herds whose movement was restricted within the district areas. Such a herding economy must have found itself under tremendous pressure with, on the one hand the increase of population and consequent expansion of cultivated land, and on the other the number of flocks. This pressure seemed to have reached its maximum from the second half of the 19th century until the first decades of the 20th. This would have produced further development of the economic interdependence between farming and herding, the existence of which was already documented during previous centuries (Ardit, 1993:50-75; Hinojosa Montalvo, 1992:169; Daigo Hernando, 1992:198) but which now probably reached its maximum complexity during this period. High specialisation in exploiting the feeding possibilities of the cultivated ground were however not always enough to maintain the large number of sheep and goats that traditional mountain shepherds owned. For some of them, generally the very few big owners, transhumance to the coastal planes was the easier solution to overwinter their flocks.

3.3. TRANSHUMANCE

3.3.1. Introduction

The environmental, socio-political and economic aspects of the origin and mechanisms of transhumance, have been discussed from a variety of perspectives. However, no attempt will be made here to engage in this discussion. Instead, the ethnographic information collected in the villages of Fageca and Famorca will be used to shed some light on the way these mountain shepherds used transhumance as part of their traditional herd management strategies.

3.3.2. A Framework: Transhumance and the Valencian Country

The Valencian country as a whole can be defined in relation to the rest of Spain as a winter pasture area. However, there are important differences in terms of height and climate between the inland mountains and the coastal plains. As a consequence, the

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12 A variety of approaches can be found based either on purely archaeological grounds or else using more ethnographic or documentary data. A sample of the bibliography that refers to transhumance is: Barker, 1989; Lewthwaite, 1981, 1984; Geddes, 1983; Halstead, 1987; Fotiades, 1980; Davidson, 1980; several papers in Maggi, Nisbet and Barker, 1990.
region really contains both summer and winter pasture areas (Piqueras and Sanchís, 1992; Fernández et al. 1996).

It is a widely known fact that the vegetation that grows in the Valencian Country is of a poor quality: there is a predominance of scrub and a serious dearth of good grazing. Within this, the Alacant province shows the worst situation (Martínez, 1991:238). Poor pastures are thus characteristic of the physical environment of the Famorca and Fageca district areas together with the cold winter conditions classical of the mountainous environment. The rigours of the winter and the shortage of pasture led to the traditional transhumance movement of some of the local flocks to the neighbouring coastal areas.

Historically, transhumance flocks moving into the Valencian coastal plains had their home base in a variety of inland areas (Cuenca, Albacete, Andalucía, Teruel). The largest representation comes from the Iberian mountain ranges of Cuenca, Albarracín, Gúdar and Javalambre (see Fig.3.2). These transhumance movements involved the displacement of relatively large flocks: an average of more than 700 animals per flock has been quoted by Piqueras and Sanchís (1991) for the 16th and 17th century. Among these flocks, sheep and goats would have made up the main animal contingent, but cattle, horses and mules were also involved (Piqueras and Sanchís, 1991:3-7).

The coming and going of these transhumance flocks had two important economic consequences for the Valencian area. Firstly, it stimulated the development of commerce between the coastal communities and the shepherds, trading meat, spun wool and cheese in exchange for Valencian wine and olive oil. Secondly, the manure produced by the flocks became so vital to Valencian agriculture, particularly in the coastal areas, that the farmers often built corrals for the shepherds to utilise (Fontavella, 1951:781; Castán Esteban, 1994:305; Piqueras and Sanchís, 1992:116).

Today transhumance movements to the Valencian area have been significantly reduced. Data collected for the years 1993-1994 showed about 60,000 sheep coming to the
Fig. 3.2: Location of the main areas of origin of historical transhumance flocks overwintering in the Valencian coastal plains
Valencian area, north Murcia and south Tarragona (Fernández et al. 1996:47-48) to spend the winter in the coastal areas, this being a low number when compared with historical data; circa 268,000 animals would have come into the Valencian area at the beginning of the 17th century (Piquerás and Sanchís, 1991:38). Nowadays, transhumance flocks have their home base in the provinces of Cuenca and Teruel with just one flock based in Granada mentioned (Fernández et al. 1996:48). On the other hand, transhumance from the coastal plains to the interior upland areas seeking summer pastures is still carried out today. This movement involves a much smaller number of flocks, just eleven were documented, from the Valencian central planes and the meadows of the Segura river to the Cuenca and Albacete plains (Fernández et al. 1996:49). Both movements imply changes in altitudes varying between 1500 and 500 metres a.s.l, as well as important variations in terms of topographic, climatic and agronomic conditions.

3.3.3. Transhumance in the Villages.

With reference to the Alacant province, the southern part of the province will receive transhumance flocks from the Valencian area itself and from other outside areas such as Albacete or Teruel. The northern side of the province, where the study area is located, is however defined as an area in which pastures have historically been exploited by local flocks (Fernández et al. 1996:37). No records of the presence of transhumance flocks from outside the Famorca and Fageca villages have in fact been found, either ethnographically or through historic documentation. The journey of transhumance flocks on their way to the nearby coastal plains is however documented for some of the neighbouring districts (i.e. Tollos). Transhumance is consequently perceived in the villages as a phenomenon involving some native shepherds in a twofold yearly movement, as follows:

1 - a displacement from the village to the summer mountain pasture areas of each district. The Fageca and Famorca district areas contain a variety of heights between 700 and 1300 metres a.s.l, this height variability occurring in combination with important differences in sun exposure. Thus, despite the limitation in movement that the district boundaries imposed, physical geography allowed the seasonal exploitation
of what were upland pastures in the Serrella and Alfaro mountains (800 to 1300 metres a.s.l), and what could be considered as an area of mid-height pastures, that is the lower heights of the district areas (700 to 800 metres a.s.l). Both the pastures are within a narrow geographical framework of 16 square kilometres. This displacement was a short movement in reference to both time and distance; flocks could get to the very top of the mountain within two or three hours, sometimes even less. This movement took place from May until late September. Shepherds involved in this kind of movement tended to return home daily, generally spending the hot midday hours in the villages and coming back to the flock in the late afternoon to stay until the late evening hours or even overnight.

2 - a movement seeking winter pasture areas leading from the village to the coastal plains (see Fig.3.3). In this case flocks travelled an approximate distance of 50 to 60 kilometres over two days. This displacement generally took place during early October, though it could vary in relation to the weather conditions, but never occurred later than November. Flocks from the villages traditionally stayed in the areas around and in Cabo de la Nao. Shepherds stayed in this area until the spring when they returned to the villages. Again, the essential fact here is the relatively short distance covered to reach new pastures. In two days shepherds and their flocks from the villages moved from a location over 700 metres a.s.l to sea level. This is a low energy consumption strategy that allowed a contingent of the mountain sheep and goats to survive during the restrictive winter period.

This winter transhumance involved the movement of only a few large flocks from the villages. Informants seem to agree that a minimum number of 60 animals for these flocks were involved in this displacement. One shepherd, however, was said to have made the journey with a smaller unit of 35 animals. This was explained as a rather exceptional case. Large flocks were difficult to feed during the winter periods in the mountain area, especially if there was snow. Winter transhumance to the coastal areas removed the pressure of far too many animals to feed within the narrow mountain district areas.
Fig. 3.3: Winter transhumance movement from the Fageca and Famorca villages to the Cabo de la Nao coastal area.
Moreover, the presence of transhumance flocks from the Fageca and Famorca villages had a particular effect on the coastal villages in social and especially in economic terms. These flocks supplied manure for the farmers and meat and wool for the local markets. They also brought cash into the coastal villages for the renting of the pastures. These pastures were often privately owned areas which tended to otherwise have a low farming value. In return, mountain shepherds got to sell some of their lambs, kids or even some mature animals, and were able to properly feed flocks that would have otherwise been very difficult to keep running through the winter in the mountains. In social terms transhumance implied the establishment of friendships and often marriages between mountain and coastal peoples.

By May, those transhumance flocks which had spent the winter in the coastal areas would return to the mountain villages. After a few days in the village, these flocks then moved to the top areas of the Serrella and Alfaro mountains where they exploited summer pastures. Some of the smaller flocks that had spent the winter in the villages would also be moved to this area during the summer period. However the tendency was for those flocks with just some twenty or thirty heads, to stay in the surroundings of the village or around the foothills of the mountains. It was during this period, with the cessation of the agricultural labours, especially the cereals harvest, when cultivated fields offered the best possibilities for feeding small flocks.

3.3.4 Conclusions

Ethnographic information shows that the main axis of traditional shepherds' land use in the study area was the balance between the exploitation of the cultivated versus the uncultivated landscape. Traditional shepherds from the Fageca and Famorca villages developed a wide range of socio-economic strategies to fully utilise the feeding possibilities of the mountain landscape. On the one hand, they exploited an uncultivated environment which could be considered as their ground par excellence, but which, in the informants' view, was an overexploited landscape due to excessive grazing, fuel collection and so on. On the other hand, they made use of a cultivated land which provided a much needed additional resource to compensate for the feeding limitations of the uncultivated ground. It is the exploitation of this cultivated
landscape that may prove the most stimulating fact for archaeological research (see for instance Charles et al., 1998). It mirrors a fundamental aspect of traditional, historic and very possibly prehistoric, Mediterranean economies: the intrinsic relationship between farming and shepherding.

This relationship of stock-raising to sedentary agriculture as recorded in the villages could be summarised as follows: the shepherds' need to take maximum advantage of any pasture available in the cultivated areas and to use a wide range of farming by-products to raise the standards of nutrition required, especially during the winter months; on the other hand, the farmers' need for animal dung to improve, or to just maintain, the productivity of their soils. Both of these are related to a series of economic activities that would potentially leave traces in the archaeological record. Thus, for instance, production of manure as recorded in the villages implied bringing several kinds of brushes and plants into the pen area to reduce the acidity of animal droppings and, ultimately, to increase the volume of manure produced. Similarly, fodder was stored and given to the flock within the penning site and so fodder remains were incorporated into the dung. The importance of these and similar activities from a paleo-environmental perspective has been explored by several authors (Brochier, 1991; Brochier et al., 1992; Chang and Koster, 1986; Charles, Halstead et al., 1998; Rasmussen, 1993).

Transhumance activity as traditionally perceived and performed in the villages appears far from being the dominant aspect and distinctive way of life that some literature describes (see for instance Brisebarre, 1978; Klein, 1920). The ethnographic accounts recorded in the villages show a herding system which to a great extent did not simply rely on transhumance for the maintenance of the majority of the flocks.

The key to understanding the high degree of self-contained capability of traditional shepherds in the villages lies in the geography of the village districts. This was fundamentally varied enough to provide grazing possibilities throughout the year. Summer movements to the high areas are described in this chapter as transhumance, but never took more than two or three hours journey time in each direction. These

13 More detail in traditional manure production is given in Chapter 5.
movements thus are comparable to the movement of sheep seeking pastures across the low and mid steppes of the Alfaro mountain during the autumn and winter months, which involved little vertical movement.

The relativeness of such definitions underlines a clear fact. The geographic variability, along with the political and socio-economic complexity that the Mediterranean regions offer, unavoidably led to shepherds developing a broad range of mobile strategies to exploit the feeding possibilities of such regions. The spatial extent of such strategies seems to be directly related to the question of how many animals were being maintained within such a highly competitive environment. The cultural and economic impact seems to be related to the relative importance that shepherding as an economic activity had in relation to farming within a particular area. The following chapter will add further clarification to both aspects by introducing specific descriptions of the structural and economic management of traditional flocks in the villages.
CHAPTER 4

HERDING ECONOMIES IN THE FAGECA AND FAMORCA VILLAGES

4.1. INTRODUCTION

In this chapter ethnographic data gathered from shepherds in the study area will be used to define the economic profile of traditional flock management and to discuss its possible archaeological implications. The chapter describes in detail herd dynamics of traditional and modern flocks managed within or in the surroundings of the study area. Structural aspects such as sex and age composition are here described along with information on management strategies.

The first section discusses traditional herding in the villages of Fageca and Famorca, with particular reference to culling strategies and the mortality profiles that result from these management strategies. Kill-off patterns are then modelled for a series of five flocks for which ethnographic information was obtained. The following section of the chapter uses computer simulation to model the development of a given flock throughout a period of time and under different management strategies. This computer programme has been specifically created to model the long term effect of culling patterns of animal flocks and to test the economic viability of the traditional herding strategies. Four flocks also studied in the ethnographic record are used as a base for this modelling exercise14. The final section of the chapter incorporates ethnographic information on killing and consumption of animals within the villages' context.

14 To avoid confusion Table 4.2 gives information on all the flocks referred to in the chapter.
4.2. TRADITIONAL HERDING

Traditionally the herding of flocks of goats and sheep formed an important economic base for people living in the mountainous area in the north of the province of Alacant. A broken topography, an intensively cultivated landscape, low availability of grazing areas and a large number of flocks, led, at least in recent historical times (with security from mid 19th century until mid 20th century), to the herding of rather small flocks and the favouring of resistant and hardy types of sheep and goat breeds.

4.2.1. The Types of Breed

When interviewed, shepherds were unanimous about the types of sheep and goat breeds traditionally managed in the districts of the Fageca and Famorca villages. With little or no exception, the sheep breed preferred was the *ovella roja* (red sheep), found in the zoological bibliography as *oveja roja levatina, raza guirra, rotxa, roya* or *sudat* (Sánchez Belda and Sánchez Trujillano, 1979:435). Two breeds of goats were kept, the *cabra valenciana* (valencian goat) and the *cabra negra* (black goat).

The *ovella roja* breed is of North African origin, resistant to hot temperatures and a good walker in broken landscapes. Their distribution strongly indicates they were a local breed, and are ethnozootechnically defined as a rare breed (Sánchez Belda and Sánchez Trujillano, 1979:435). The *ovelles rojes* breed is a good meat and milk producer, and although they are not considered as a wool breed, they produce a good quality wool (Sánchez Belda and Sánchez Trujillano, 1979:437-41). In the Fageca and Famorca village areas, flocks of *ovelles rojes* were managed principally for their lambs, but milk was rarely exploited, whereas shepherds claim they got reasonably good incomes from selling their wool.

The *cabra valenciana* breed is also well adapted to mountainous landscapes. Shepherds claim it was the ideal breed for the exploitation of the mountain area, and of areas with dense scrub where sheep would not be able to graze. These animals were traditionally managed for their meat as the females dried up quickly once the kids were taken away.
Kids' meat was, and is today, more appreciated than lambs', and so often commanded higher prices in the market.

The other goat breed present in the traditional economy of the Fageca and Famorca villages, the *cabra negra* breed, was a specialised milk producer. Nearly every household would have kept one or two *cabra negra* goats, from which the family obtained their milk supply. Additionally, some occasional income was obtained from selling the kids as either live or dead stock. *Cabra negra* flocks, on the other hand, tended not to be herded in the mountains where their large udders could easily be damaged, especially in periods of high milk production; they were normally herded in the surroundings of the village or in areas with easy topography or where there was little scrub present (Seguf, 1995).

### 4.2.2. Animal Products in the Traditional Herding System

As highlighted above, the two main products of the sheep and goats kept in the villages of Famorca and Fageca were milk and especially meat. Although some milk was sold occasionally (also noted in the neighbouring Gallinera valley: Seguf, 1995:22), milk was mainly consumed within the household. An average *cabra negra* goat could produce about 2 to 3 litres of milk daily for most of the year, while shepherds claim that a good producer will have yields of 3 to 4 litres for a reasonable period.

Sheep and goat meat was not an essential item in the traditional diet, but raising lambs and kids for meat found its *raison d'être* in the economic benefits of their sale. When looking into the traditional diet in the villages, an average household would have eaten sheep or goat meat only once a week, normally on Sunday, and generally no more than 1/4 of a kilogram per household. Rather, the main meat supply came from pigs and more occasionally rabbits, chicken or hunted birds (see section 4.6).

Other products were also obtained from sheep and goat herding: wool, cheese, manure, skin and wineskin. These were a secondary, non-specialised production whose importance varies in the ethnographic record even between neighbouring villages.
Although they are shown as minor and sometimes occasional products in the ethnographic record today, it is possible to assume a greater importance for them in the past when the local economy of the mountain villages was more self-sufficient.

As has already been mentioned, wool did supplement the income obtained from the sale of meat. A *ovella roja* ram could produce some 4 to 5 kilograms of wool yearly, and an adult female would have produce some 2 to 3 kilograms. However none of the informants remembered there being any wool spinning; the only local processing was restricted to washing and drying wool for use as the filling of mattresses.

Traditional cheese making processes were certainly known in the Famorca and Fageca villages, but cheese making was not regular and rarely existed as an economic activity, although one of the villages in the Seta valley seems to have specialised in cheese production. On the other hand, as described in the Gallinera valley (Seguí, 1995), shepherds used to make their own custard by boiling the milk and adding some vegetable coagulant.

Although some craft work using sheep and goat’s skin has been documented, no real knowledge of, or organised activity related to, skin manufacturing survives in the villages. Shepherds pointed out that it was the butchers who dealt with the skins and made profit from their sale. Neither were wineskins produced in the villages themselves; nevertheless, informants often confirmed that on occasions a shepherd would have kept a castrated *cabra valenciana* male kid for 2 or 3 years in order to sell its skin for a wineskin.

Manure was a highly valued product. Within an agriculturally-orientated area with poor soils, the availability of manure was essential, and the need to have a regular supply of manure was cited as one of the main reasons for landowners to keep herds or built corrals to shelter them.
4.2.3. Modern Pastoralism

Modern pastoralism is defined here as the way most flocks are managed today as part of the modernised economic system predominant, not just in the study area, but over most of Spain. Modern pastoralism is consequently developed under very different technological and economic circumstances to those of traditional herding. It has different production goals and therefore shows changes in the structure and dynamics of the flocks. The most obvious of these changes is a much larger flock size, more specialised meat production and a shorter time period for keeping the lambs and kids due to the market requirements for very tender meat.

No flocks which could be described as being purely typical of a modern pastoral exploitation are currently being herded in the villages. The flocks recorded in Fageca and Famorca were too small in size, and although they were generally managed to meet modern market requirements, their owners still used a good deal of traditional management strategies in their everyday work. The reason for this was that these were elderly shepherds whose activity was more motivated by simply carrying on an occupation they enjoyed than for strict economic reasons.

In the Seta valley, modern pastoralism is confined to the management of three large flocks of between 300 and 500 animals. These flocks are kept in large farms specially built for them with concrete blocks and corrugated tin roofing; they normally have mechanical feeding and milking facilities. Shepherds also use tractors with which they move big bales of straw or any other type of fodder; they normally buy enormous quantities of fodder. Two of the modern flocks in the valley are mainly composed of sheep of the *segureña* and *alcarreña* breed types, both of which are specialised meat producers (*alcarreña* is also a good milk producer). Additionally, they include a few individuals of the *cabra negra* goat, mainly as extra milk suppliers for the lambs. The *alcarreña* breed derives from the *entrefino* genetic group, which finds its origins in the *Ovis aries ligeriensis* (Sánchez Belda and Sánchez Trujillano, 1979:80,117). Originally found in the Alcarria region, this breed later spread to other areas, probably through
transhumant shepherds. This type of breed is mainly exploited for its meat; however, there are flocks of _alcarreña_ sheep kept for specialised milk production (Sánchez Belda and Sánchez Trujillano, 1979: 120). The _Segureña_ sheep also derives from the _entrefino_ genetic group and it is closely related to one of the most well-known Spanish sheep breeds, the _manchega_ sheep, of which it has been defined as the mountain version. Its original setting was the area located at the head of the Segura river, although its current extension is much wider; today this breed can be found in an extensive area within south-eastern Spain (Sánchez Belda and Sánchez Trujillano, 1979: 453-456).

Both sheep breeds in the Seta Valley are exploited exclusively for their meat. Secondary products have largely lost their importance. This is clear in the case of wool and especially manure. Wool commercialisation has declined considerably since the sixties because of the appearance of foreign, more competitive, wool types in the traditional markets where this product was sold (Sánchez Belda and Sánchez Trujillano, 1979: 43-47). Today, shepherds complain that the sale of wool often does not even cover the expenses of shearing. Although farmers still assert its advantages, manure production ceased with the introduction of chemical fertilisers. As for cheese making, hygiene controls have precluded any possibility of home manufacture. Wineskins are no longer produced, although skins are still processed, but on a much larger scale, as slaughter is now carried out by specialised abattoirs in the towns. Abattoirs can be found in major cities such as Alcoi, Alacant or Valencia.

The third flock currently managed in the Seta valley is a flock of _cabra negra_ goats from the village of Balones. This enterprise has a milk-orientated production. The farm where the goats are kept has modern milking facilities and milk is produced on a relatively large scale. Some sheep are also kept and extra profit is obtained by selling the lambs. Old sheep and goats from this enterprise are often sold for meat at a Safari Park located in the tourist area near the coast.

The availability of fodder, the improvement of communication links, a more competitive market, state hygiene control and subsidies from the European Community (of about
£10 per animal per year) have considerably changed the face of pastoralism in the valley. Current pastoralism has increased the traditional specialisation in meat and milk, turning it into a far more organised production system. Despite this, shepherds often complain about the lack of young labour, the emigration to industrial urban centres and the other socio-economic changes that have left the herding economy at its minimum in the valley.

4.3. HERD DYNAMICS: PAST AND PRESENT OF AN EXPLOITATION SYSTEM

Until half a century ago, shepherds working in the mountains of the north of Alacant province were managing their flocks using rather different strategies to those used today in the modern pastoral exploitation system just described. Factors such as particular meat preferences, a high level of competition for grazing resources, the impossibility of obtaining fodder apart from the local farming surplus, and the predominance of an economic system based on old traditions which were often close to self-sufficiency, led to a pastoral system with rather low productivity. When compared with modern herd management systems, the main differences were the size of the flock herded, the control of the mating period, culling strategies practised on lambs and kids, and the extent to which practices such as castration were employed.

4.3.1. Flock Size and Ownership in the Past

Traditional enterprises were significantly smaller than modern flocks. The shepherds questioned explained that no flock would have had more than 70 or 80 animals and those of such a size were rather rare\(^\text{15}\). Most flocks would have had fewer than 60

\(^{15}\) City council data for the second half of the 19th century and the first half of the present century, generally confirm these data, although some flocks appeared to have had up to a hundred animals (see Appendix I).
animals, and many between 20 and 40 animals. The reasons for the small size of traditional flocks were:

-the vigorous competition for grazing resources. The intrinsic poverty of the pasture land available throughout the whole of Valencia (Martínez, 1991; Sánchez Belda and Sánchez Trujillano, 1978), was exaggerated by the intensity of cultivation and an over-exploitation of the mountain resources (i.e. fuel, fodder). For data collected in 1859 (see Appendix I) nineteen flocks of sheep and goats were reported to have been grazing in the Famorca area. Equally, during the first decade of the present century, there were some fourteen flocks in the Fageca district;

-the restricted availability of fodder. Although farming by-products were an important fodder resource, this was by no means sufficient to feed the large quantities of animals in periods of grass shortage or bad weather conditions (mainly snow);

-finally, the intensive cultivation of the landscape that forced flock size down to a manageable number of animals in order to prevent crop damage.

The small size of the herds was even reflected in the way shepherds referred to their herds; they did not talk about flocks (ramat in Catalan), but about sections of a flock (puntos or puntes de ramat). Significantly, cabra valenciana goat flocks tended to be larger than ovella roja sheep flocks. The reason for this lies in the fact that sheep flocks would generally have been herded within the farming territory, where due to the intensity of cultivation it was not possible to manage large flocks without serious risk of crop damage. However, some herds of 20 or even 10 cabra valenciana goats have been reported, and these would have grazed within the cultivated area. Traditional cabra negra goats flocks rarely exceeded 40 individuals. The way these goats were herded reflected particular deals made between different owners and a shepherd. Although some flocks of cabra negra goats owned by a single person have been recorded in the Gallinera valley (Seguí, 1995), in the Famorca and Fageca villages each household kept
one or two *cabra negra* goats. When they needed to be taken to grazing areas, a full time shepherd would agree to herd a group of these goats along with his own flock in exchange for the *cabra negra* goat owners' permission to exploit the pasture available in their terraces after the harvest period, or, more rarely, for the payment of wages. In Famorca a flock of about 34 of these goats, belonging to different households, was herded by a shepherd. Each morning the shepherd would collect the goats from each of the households involved in the deal, and take them with his flock to the pasture areas, bringing them back at the end of the day.

The ownership particularities of the *cabra negra* goats contrast with the ownership of the other sheep and goat flocks in the research area; those were normally owned by a single shepherd who worked full time in shepherding. However, other situations were also recorded. One owner with several flocks would employ full-time shepherds to work for him. In this case, the shepherds were normally paid in relation to the benefits obtained from the flock. For example, a young shepherd, without money to buy his own flock could take on one of these flocks, making a one-for-one deal with the owner (usually completed on St John's day, 24 June), which meant that at the end of the year, the owner would have one lamb (or the cash equivalent if it was sold) for each one the shepherd had. The shepherd had a duty to replace any losses in the herd, so that the owner kept his original investment. These types of deals allowed young shepherds or poor people with no money to build up their own flocks by working for a period of time for a richer owner. Shepherds interviewed claimed that from the middle of this century onwards, this type of deal became more and more favourable for the shepherds because there were fewer and fewer people interested in shepherding. The owner might retain only 1 to 3 (one for the owner three for the shepherd) or made even more unequal deals. Occasionally, and due to the fact that most of the flock owners were also landowners themselves (see Appendix I), two or three people involved in both shepherding and farming their own land would work together and manage a flock part-time, usually on a weekly basis, dividing the benefits in equal parts.
4.3.2. Traditional Flock Structure

(i) sex ratio and flock composition

Traditionally flocks of *ovella roja* sheep would have been composed mainly of mature females with one male per 20 to 25 females. However, shepherds claim that more rams are needed for *cabra valenciana* goats, and for goats in general, and so a proportion of 1 ram to 10 females was usual. Similar data were obtained for the neighbouring Gallinera valley and Plà de Llacuna (Seguí, 1995:21; Beavitt, Christie *et al.* 1995:236). Table 4.1, illustrates this point with data collected from city council tax records at Fageca for the years 1942/43.

<table>
<thead>
<tr>
<th>species</th>
<th>males</th>
<th>females</th>
<th>total</th>
<th>% males</th>
</tr>
</thead>
<tbody>
<tr>
<td>sheep</td>
<td>2</td>
<td>45</td>
<td>46</td>
<td>4</td>
</tr>
<tr>
<td>sheep</td>
<td>2</td>
<td>39</td>
<td>41</td>
<td>5</td>
</tr>
<tr>
<td>goat</td>
<td>3</td>
<td>29</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>goat</td>
<td>2</td>
<td>9</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>goat</td>
<td>1</td>
<td>14</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>goat</td>
<td>2</td>
<td>17</td>
<td>19</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 4.1: Examples of traditional sheep and goat flocks' sex composition. (source: Fageca City Council, *Libro de Cuentas y Corrientes del Ganado de Vida y Adulto*. Archive box 40; file 40/9).

However, understanding the composition of a flock should take into consideration the fact that the basic structure was partially obscured for an important part of the year due to the presence of lambs or kids in the flock, grazing along with the adults. In the traditional herding system, lambs and kids were kept with the rest of the flock for longer periods than today, some of them for as long as 9 months (from September to June). They were a real part of the flock as they were grazing from a very early age, normally a few weeks after birth, along with the mature individuals of the flock. It could be said from this information that traditional flocks were in fact flocks dominated by young...
animals under one year of age, for several months of the year (see Fig. 4.1).

On the other hand the ethnographic record also reports the existence of mixed flocks and of flocks composed only of kids and lambs. Mixed flocks, the herding of sheep and goats together in the same flock, are so far only recorded for sheep based flocks. Shepherds managing a sheep flock would keep a few goats (normally *cabra negra* goats) along with the main group of sheep. The main reason for this practice, is that goats can provide a supplementary milk supply for the young lambs as well as for human consumption. Finally, shepherds also pointed out the value of goats as flock leaders, a necessity when managing flocks throughout cultivated areas. However, some informants explained that although there are benefits of herding a mixed flock, the particularities of both breeds often created problems of co-existence, and so from their experience they felt it better to herd flocks composed of sheep or goats alone.

On the other hand, flocks composed exclusively of lambs and kids are often found in the ethnographic record. A shepherd would buy a number of lambs or kids, normally during the first weeks after they were born, and manage them for a certain period of time, normally for no more than a few months, with the purpose of selling them for meat after that period of time. This kind of economic transaction was thought of as convenient because although not giving the same amount of benefit as was obtained when managing a mature flock and keeping and selling the lambs and kids yearly, it had the advantage that the shepherd did not have to work with the mature flock on a regular basis. Butchers, rather than proper full-time shepherds, were generally those involved in this practice; they would save money by buying the animals at a very young age and managing them themselves until they reached the appropriate weight to be butchered for meat.
Fig. 4.1: The year round calendar for some of the herd management activities ethnographically recorded in the Fageca and Famorca villages.
(ii) Flock Age Structure

In traditional herds a female sheep would have been kept for a maximum of 8 or 9 years, whereas the life span of males is said to be a year or two shorter. Goats may follow the same pattern, although on occasions seemed to be kept for shorter periods and removed from the flock when they were about 7 or 8 years of age in the case of females, and 6 or 7 in the males. To illustrate a typical flock age structure, the age structure of a traditional sheep flock in the study area was carefully recorded. The flock chosen had 30 animals, 29 females and one ram. The ram was three years old, and the age structure of the females is shown graphically in Fig. 4.2.

![Age Composition of a Traditional Herd](image)

Fig. 4.2: Age composition of a traditional herd (number refers to the number of sheep; m=months and y=years).

The majority of females are found in the 4-6 years group. This is not a young flock; it has been managed for several years and the shepherd tries to keep the ewes for a reasonable period while avoiding an excess of old animals. Eventually, a second ram, two years old, was also brought into the flock to encourage cross-breeding. This could be considered as a typical age structure, found in most of the traditional flocks studied.
(iii) Breeding Period

As Figure 4.1 shows, lambs were present in the flock from September to June, although the shepherds gradually sold them off throughout the year. The gestation period for sheep and goats is about five months long. Females were generally allowed to mate from February and March onwards, so traditionally lambing in the study area took place mainly during the autumn months. Autumn lambing has been described by Ryder (1983:11-12) as the breeding season for wild sheep, and it seems to be the main breeding season, along with spring, for most domesticated sheep breeds in the Mediterranean. Shepherds from Famorca and Fageca claim that they preferred autumn lambing because this avoided the problem of summer grass shortages. In addition, there were also important economic reasons for preferring an autumn lambing: lambs born in September and October are ready for sale at Christmas (2 to 3 months old), and those born during November and early December would be ready to sell for the Easter market (4 to 5 months old). This lambing calendar is also reflected in the way lambs were named, not just in the study area but also throughout Valencia: lambs born in September or October were called primerenques (from primeres, the first), lambs during December were also called diverènyes (unknown origin) and lambs born after Christmas were called tardanes (from tard, late).

(iv) Fertility Rates and Reproduction Control

When asked about fertility rates, shepherds explained that in the past sheep and goats gave birth just once a year. They also point out that twins were not very common, and triplets were rather rare. This is significantly different in modern flocks. People currently shepherding in the area claim that twin births are now common, and triplets also occur occasionally. Moreover in the modern pastoral systems, shepherds indicate that three pregnancies every two years are possible. Sánchez Belda and Sánchez Trujillano (1979) described the same birth rate. Shepherds explained that these differences between modern and traditional flocks are due to the fact that traditional flocks of sheep and goats were herded under conditions of grass and fodder shortage,
and so this forced them to restrict births to one per year to avoid adverse effects on the animals' health\textsuperscript{16}. Shortage of food and more stressed conditions also explain why there were fewer double and triple births in the past than today.

Most of the traditional shepherds avoided mating from September to the end of February or early March (see Figure 4.1). This system meant that the first lambs were born by September. Traditionally in the Fageca and Famorca villages three different strategies were used to control the mating period.

- the separation of the rams from the rest of the flock, either by using special enclosures in the corrals (see Chapter 5) or by taking them and herding them separately. A small island by the coast of Xabia has been reported as having been used by transhumant shepherds from Fageca to keep their rams separated from the rest of the flock; rams were taken to the island by boat and left there grazing freely during the winter months;

- often, rams were kept with the rest of the flock but wore \textit{planeta}, a type of protection made out of \textit{esparto} that covered most of the lower part of the rams' body, preventing them from mating;

- when lambs and kids were kept for a relatively long period, castration was practised as a means of both preventing mating and also stimulating growth. This avoided loss of weight due to the mating activity and helped to maintain the tenderness of the meat. The meat did not have the strong smell of sexually active males. Castration was practised for both lambs and kids, although it seems to be specially favoured for kids, because the meat of entire males has a tendency to become tough quickly after the first month or two of life. Kids kept to produce a wineskin were always castrated, and often a castrated sheep or mature goat was kept to be used as guide (\textit{manso}) for the rest of the flock.

\textsuperscript{16} The verb \textit{recordinar} was used when referring to an ewe or a goat pregnant for the second time during the same year. Shepherds explain this was not desirable because it often affected the health of the animal in the long run.
4.3.3. Modern and Traditional Slaughter Patterns and the Derived Mortality Profiles

Both traditional and modern slaughter patterns of flocks in the villages of Famorca and Fageca and in the Seta Valley are very similar: a high percentage of animals under one year of age are killed, mortality then drops among young and mature animals rising again for animals of seven, eight and even nine years of age, when ewes and goats are removed from the flock and replaced with younger animals. The main changes from past to present seem to be the age, within their first year of life, at which lambs and kids were and are slaughtered. This reflects changes in market requirements for meat. Figure 4.3 shows the annual pattern of killing for kids and lambs. Although this figure represents the pattern for one particular flock, it can with confidence be generalised for all flocks in the area. The calendar is equally applicable to kids and lambs, as their birth period coincides, and although kids grow slower than lambs, they tend to be sold at a lower weight because their meat gets tough sooner than lambs' meat. Castration allowed the maintenance of the kids for longer periods without seriously affecting the quality of the meat. As the graph shows, the selling and slaughtering of the young animals is concentrated at Christmas and Easter.

The ethnographic data gathered in the study area on culling ages, animal replacement, age at first lambing and sex ratios, have been used to model mortality profiles for traditional and modern herds in the study area. Data for eight different flocks was recorded; seven of these flocks are or were herded by shepherds from the Famorca and Fageca villages, one of them (Flock 1) is a modern flock herded in the neighbouring village of Quatretondeta. Some of these flocks have been used in this section of the chapter, some others in the following one; to avoid confusion and as different numbers and letters have been used to label them, Table 4.2 provides a summary.
Fig. 4.3: Annual killing pattern for one of the flocks researched.
Flock 1 (4.3.3) | circa 500 sheep; village of Quatretondeta
Flock 2 (also Flock A)(4.3.3 and 4.4.3) | 31 sheep; village of Famorca
Flock 3 (4.3.3) | circa 35 sheep; village of Fageca
Flock 4 (4.3.3) | circa 110 goats; village of Famorca
Flock 5 (4.3.3) | circa 100 goats; village of Fageca
Flock B (4.4.3) | 11 sheep; village of Fageca
Flock C (4.4.3) | 3 goats; village of Famorca
Flock D (4.4.3) | circa 110 goats; village of Famorca

Table 4.2: A summary of the flock sample used in this chapter.

For this section, Figures 4.4 to 4.8 show percentages of animals killed in each year-group for individual flocks (kill-off patterns). The percentages were calculated for year periods for the total flock, which includes the base flock plus the total number of lambs/kids born during the year\textsuperscript{17}.

Flock 1 is a large modern sheep enterprise presently managed in the village of Quatretondeta (Seta valley). This flock has about 500 sheep of the alcarreña and segureña breed types, and it also has a few cabra negra goats. The flock is kept in a modern farm specifically built for it. The farm has good feeding facilities, and some of the animals, especially the lambs, are kept there. The flock is owned by a single shepherd who has his residence in the village of Quatretondeta. The shepherd divides his time between taking care of the animals he keeps in the farm and herding the rest (normally mature females and some rams) in the area surrounding the village during winter and in the mountain during summer. Lambs from this flock are sold in several local markets; occasional consumption occurs locally. Tough slaughter regulations have in recent years restricted the activity of small local butchers, as animals have to be killed

\textsuperscript{17} The base flock is composed of the mature ewes, rams and the young individuals of around a year kept for replacement.
in large slaughter houses, often located at relatively long distances from the place where the flocks are herded.

For this flock (Fig. 4.4), the majority of lambs born during the particular year were sold for meat. Only 53 animals were saved in 1997-1998; among these, 50 were females kept to replace those taken out the flock because they were too old (older than 7/8 years), some 38 to 40, and the rest to replace individuals lost through health problems or accidents, including 2 that died from bites by poisonous animals. The lambs sold were all under three months of age; there was no real market for the old or ill animals, though some occasional sales of older animals could have occurred.

Flock 2 is a small sheep flock currently being herded by a traditional shepherd in the Famorca district. This is a flock of 29 female sheep and 2 rams. Due to the size of the herd and the age of the shepherd (circa 75 years of age), he makes little use of modern facilities, for example, fodder, and manages his flock in a rather traditional way, although his management strategy is influenced by modern market requirements. Most of the lambs from this flock are sold (Fig. 4.5), and just a few females and, occasionally, not every year, a male is also saved to replace the ram. The main reason for replacement is old age; however illness and accidents also affected this small flock.

Flock 3 is a traditional sheep flock herded during the fifties within the Fageca district area. The flock had at the time between 30 and 35 animals of ovela roja type. It was owned by a full-time young shepherd, who built it up from an initial flock of 10/12 animals over a period of some three years. This flock was herded all the year round within the district area. The majority of the lambs (males and females) were sold for meat to butchers from towns in the area during their first year of life (Fig. 4.6). Only 2 or 3 lambs a year were kept for replacement of old or injured animals. Mature females were taken out of the flock when they reach some 7 or 8 years of age, although a small percentage (0.3%) was kept longer (in one exceptional case a sheep was kept until 14 years of age). Due to different meat tastes and the fact that many people could not afford the price of lamb, old animals had an occasional market in the past, especially
during periods of high meat demand such as local festivals; old goats were also often sold for sausage making. Rams were kept until they were six or seven years old; one ram was used for the 30 ewes that composed the flock. Occasionally another ram would have been brought into the flock for cross-breeding, or a young ram from the flock would have been kept along with the old one for a period.

Flock 4 is a flock of *cabra negra* goats managed during the early seventies and based in the Famorca village. Due to its size, 110 animals (base flock), it is a rather unusual flock of *cabra negra* goats. As has already been mentioned these goats tended to be herded collectively, as each household would have owned one or two goats, in flocks seldom exceeding forty individuals. The data were recorded for the first years of the flock's existence, when there was no goat older than five years. The larger size of this flock is explained by the fact that at the time this flock was herded, the pastoral and agricultural systems were already in decay and so those herds remaining found more available pasture land and less competition. As a consequence, shepherds tended to increase their flock size. This flock was involved in the transhumance movement which took animals to the coast during the winter months. The information collected for this flock refers to the first stages of the flock's life; percentages are displayed for animals up to four years of age (Fig. 4.7), the oldest age group in the flock described by the informant. Again mortality is concentrated in the first year of life, with 50% of the total flock (base flock plus lambs), all of them female and male kids, sold to butchers in local towns. Just 6% of the year's kids were normally kept, for two main purposes: to replace possible losses through accident or illness, and to carry on building up the flock. However, this flock was not primarily managed for growth, as the shepherd initially bought the number of animals approximating to the flock size he was aiming for.
Flock 5 is a traditional flock of *cabra valenciana* goats, herded in the fifties in the Fageca district area. The flock size was of *circa* 100 goats managed by a single shepherd within the mountainous area of the district during summer and taken down to the coast to spend the winter months. This flock would have produced an average of 115 kids per year. The mortality pattern (Fig. 4.8) shows that some 46% of these kids were slaughtered annually, whereas there was a very low mortality among mature goats of between 2 and 6 years of age, and this was mainly due to injuries or illness. A few animals were slaughtered for particular purposes, such as 2 to 3 year old castrated goat males for wineskin making. Mortality rises again after the seventh year of age when goats tend to start to be removed from the flock.

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**Fig. 4.4:** Kill-off pattern for a large modern sheep enterprise currently managed in the village of Quatretondeta (Flock 1).

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**Fig. 4.5:** Kill-off pattern for a small sheep flock currently herded in the Famorca village (Flock 2).
Fig. 4.6: Kill-off pattern for a small sheep flock herded in the fifties in the Fageca village (Flock 3).

Fig. 4.7: Kill-off pattern for a large traditional cabra negra (Black goat) flock herded in the Famorca village during the seventies (Flock 4).

Fig. 4.8: Kill-off pattern for a large traditional Valencian goat flock herded in the Fageca village during the fifties (Flock 5).
The use of mortality profiles to infer herd management mechanisms is an important aspect of the archaeological study of bone assemblages. Archaeozoologists often use these profiles to reconstruct the production goals of animal management systems for particular sites, areas or periods of time. For example, mortality profiles with a high number of young animals slaughtered may be indicative of meat or milk production goals. If most of these young animals are killed at a very young age, for instance less than six months of age, then it may be assumed that the herd is managed for its milk in particular, because by killing lambs or kids at a very early age herders insure a reasonable period of milk exploitation from the ewes. Equally, a kill-off pattern dominated by adults may be reflecting wool as the principal production goal of the flock because the main wool production period in sheep is said to be from the second to the sixth year of age (Rackhman, 1994:49; Payne, 1973:281).

The mortality profiles shown in Figures 4.4 to 4.5 show a homogenous pattern. Mortality is concentrated in the first year of life, dramatically decreasing for individuals between 2 and 6 years of age, and rising again, although only slightly, for individuals older than 6 years of age. These kill-off patterns are typical of a modern meat-orientated herding strategy. Ethnography confirms meat production as the main goal in herding economies recorded in the study area. However, as seen in previous sections of this chapter, traditional flocks were also exploited for their wool and less regularly, for their milk. Specialised production systems are a relatively modern trend in economic terms; for past societies a broader, more flexible approach to animal product exploitation seems more likely.

The ethnographic information recorded in the villages highlights some differences between flocks exploited today and those exploited in the past. Modern flocks are subject to a more specialised meat production. Market forces lead to lambs being slaughtered before they reach the third month of age, but in the past they were allowed to survive, on occasions, up to ten months. In archaeozoological terms such changes in the slaughter pattern could be detectable. Establishment of the age of death within the first year is shown as feasible from the sequence of molar eruption, so animals
first year is shown as feasible from the sequence of molar eruption, so animals slaughtered before they have reached the sixth month of live could be distinguished from animals slaughtered after their sixth month of life (O’Connor, 1998). However, the relationship between the killing of a high proportion of lambs under six months of age and a milk-orientated herding strategy that has been suggested by authors such as Payne, is not confirmed in this study. Market requirements for tender meat and not for milk are the major influence on the orientation of the modern herding systems within the study area.

Ethnography also shows how old animals (7, 8 and 9 or more years of age), which today are thrown away or given to zoos, found a market in the past. Thus, as traditionally such animals were regularly eaten, they would have been better represented in the kill-off patterns generated from the household refuse of thirty years ago than in the modern ones.
4.4. MODELLING FLOCK DYNAMICS FROM ETHNOGRAPHIC DATA

4.4.1. Introduction

For some time now, archaeozoologists have been using computer support as an aid in their investigation. The nature of archaeozoological studies often involves dealing with large data sets, and the computer is a powerful tool to help analysis of these data. Several computer programmes have been specifically designed for the needs of animal bone studies. These programmes have helped animal bone specialists throughout different stages of their investigative tasks, from the analysis of basic information, such as the bone type, its size, state of epiphyseal fusion, fragmentation and so on, to more complex analysis of the interactions of various parameters (see, for example, Gifford and Crader, 1977; Klein and Cruz-Uribe, 1984; Campana and Crabtree, 1987).

Computers have also shown themselves to be especially useful for archaeology when used in the simulation of complex processes. Computer simulation was defined by Doran (1970) as *the use of computer programmes to simulate evolving systems*. It has been particularly helpful in, for example, the study of settlement processes (Hamond, 1978) especially through the use of GIS techniques within landscape archaeology.

Within archaeozoological studies, however, simulation has not been applied a great deal. An important contribution has been made by Roger Cribb (1984, 1985, 1987) who has used computer simulation to infer the relationship between ancient herd structures and the kill-off patterns obtained from excavated animal bone samples. Cribb warns archaeologists about the differences between the kill-off patterns derived from archaeological assemblages and the mortality profile derived from a death population of a complete flock or herd (1984: 161). A flock is a dynamic system, it reproduces and can decrease or increase in the number of individuals within a relatively short period of time. It is also a system sensitive to different factors, from environmental to economic or socio-cultural, which can alter its dynamics. The animal bone collection is only a static reflection of this dynamic system. Generally, this static reflection is seen in kill-off patterns, from which management strategies used in ancient flocks are often inferred. As Cribb argues,
the difficult step lies in recreating the complete mortality profile of the flock from the kill-off patterns obtained from the animal bone samples. His use of computer simulation attempts to reproduce a given archaeological kill-off pattern from several flock "set ups" which the computer monitors under specific birth and mortality rates thought to be "biologically plausible, demographically viable, and economically efficient" (1984:163). From these simulations he then expects to be able to argue whether or not any kill-off pattern is in fact representative of the mortality of a complete herd.

Similar simulations directly made from ethnographic data can also be found in Dahl and Hjort (1976), who used data for cows, camels and sheep and goat flocks, mainly collected from Africa, and Flannery, Marcus and Reynolds (1989), who used data from the llama herders on the Punas of Achacuyo in Peru. So far, however, little work of this type has been done using data collected in a Mediterranean context, with the exception of a small scale study from Central Italy (Grant, 1991). The simulations shown below aim to begin to fill this void, but also to reinforce a warning for archaeologists working in the Mediterranean area warning about the potential differences between archaeological kill-off patterns and mortality profiles from ancient flocks.

In this section of the chapter the ethnographic data gathered in the Fageca and Famorca villages (precise information about age structure, sex composition, mortality and birth rates and so on) are used to test, through computer simulation, how different management strategies, under specific market requirements, types of sheep and goat breeds and environmental constraints, affect the mortality profiles that a given flock generates throughout a period of years. Furthermore, simulation is also used to test the effect of several variations in management strategy. These changes are again mainly described from ethnographic information, and are directed to insure the viability of the flock. Viability is here mainly understood as the flock increasing or maintaining its original size.
4.4.2. Methodology

The computer programme used in the flock’s simulation was originally designed by Dr. Annie Grant using the EXCEL spreadsheet and database program. EXCEL was thought suitable because it has a wide range of applications for handling numerical data. Data entered in the spreadsheet cells can be mathematically manipulated and numerically related through different functions. EXCEL also has a charting function to generate charts from data entered into the spreadsheet. This function is used here to create charts showing the evolution of flock size over time, and most importantly to display graphically the mortality profiles for the flocks used in the models.

The female and male components of the flock are analysed separately, and for each of them the live herd (referring to the numbers of the total flock) and the mortality (referring to the numbers of animals slaughtered or dead) are displayed. The age categories used are set up in year groups, except in the model for flock A, where the first year animals are divided in a 0 to 3 months group and a 3 months to 1 year group because of particular slaughter patterns. For both goats and sheep, animals considered immature are those under one year of age, mature animals are those between one and seven years of age, and old animals all those over seven years of age (see Appendix II).

The programme simulates the annual development of a given flock according to a number of specific variables described below. Four different flocks are modelled: the first one (Flock A) is Flock 1 in the previous section (see Table 4.2). This particular flock is referred to again because very detailed information on age structure and general management is available for it; information was collected through regular visits (every two weeks) so that the data provided by the shepherd could be complemented with direct observation.

The other three flocks, one of sheep (B) and two of goats (C and D), are all flocks herded in the past within the village district. Flocks B and C were chosen because both represented, in terms of size and age structure in particular, fairly typical cases which were
good examples to model. Flock D was a relatively large goat flock, although also typical of traditional goat flocks.

The programme was set to run over a period of 39 years, which is some five generations of sheep or goats. Numbers of individuals in each age group within the flock are updated every year, and, depending on the variables set, the flock will increase, decrease or maintain its size over time. The parameters used are described below.

- **Base flock**, the number of juvenile and mature animals in each flock and their age distribution. Base flocks are described from the ethnographic data gathered from shepherds in the villages. The base flock will represent the 'Total Number of females plus the 'Total Number of males' (see Appendix II).

- **Birth, survival and mortality rates**. These are the key factors in understanding the simulation of the flock dynamics. The first refers to the number of lambs (or kids) born per ewe/goat, per year; the second to the proportion of lambs/kids and sheep/goats surviving each year for each age group. Finally, the mortality rate represents the proportion of animals killed or dying in each age group each year.

- **Females of breeding age**. This refers to the number of females able to give birth. First lambing is assumed to take place at around 18 months of age.

- **Live births**. The number of lambs or kids that are born alive and also survive the first days after birth.

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18 The *Birth rate* is not described in Appendix II as it is introduced through a complex procedure which was difficult to represent graphically.
4.4.3. Modelling Traditional Flocks

(i) Flock A

A description of the size and age structure of this flock is given on page 81. This flock is mainly grazed in the area around the villages; this includes some abandoned terraces, areas of low vegetation of the Alfaro mountain, the lower slopes of the Serrella mountain and the surroundings of the dry river bed. The quality of these grazing areas is relatively poor and the flock is constantly moved among them in order to gain best advantage. However, the lack of competition for these grazing areas and the abundance of fodder (either farming by products or fodder brought from the market) ensures a good level of nutrition. Lambs tend to be kept in the corral area and fed with fodder until they are slaughtered; only those kept to replace older individuals in the flock are taken to graze with the rest of the flock from an early age (normally a few weeks old).

The flock is made up of *segureña* and *alcarreña* animals. *Alcarreña* sheep are a breed adapted to difficult grazing areas in broken landscapes. Sánchez Belda & Sánchez Trujillano (1979) described it as a breed able to specialise in either meat or milk production. The same authors also point to its good reproduction capability under reasonable feeding conditions: with sufficient food, at least 90% of the mothers give birth more than once a year, with an average of three births every two years. First lambing takes place about the 18th month of the ewe’s life (1979:120-121). On the other hand, *segureña* sheep are described as a meat producer breed. They can easily achieve 50% twin births yearly (1979:461).

Production is meat orientated; the market demands young lambs of no more than 25 kilograms in weight and less than 3 months of age. Overweight lambs or mature animals are very difficult to sell for human consumption. Milk and wool do not bring any additional income.

In this flock mating was not planned and occurred spontaneously. There was a high birth rate, with about 50% of doubles, 10% of triples and 40% singles annually. The ratio of
males to females among the newborns was said by the shepherd to be of 1:1; the same ratio was quoted by other informants when referring to past flocks. The fertility rate for this flock was estimated as about 1.9 lambs per ewe, per year. However, this high fertility rate was in real terms reduced to 1.4 per ewe per year because of high neonatal mortality, which affected as many as 32% of the newborn lambs. The veterinary that assisted the flock claimed that the high neonatal mortality was mainly due to the presence of poison in the milk from the poisoned grass eaten by the mothers. Many newborn lambs refused to suckle or were born very weak, and so died within the first days after their birth. Of the survivors, nearly all the male lambs and a high proportion of female lambs were sold for meat before they reached the third month of life, so the main mortality occurred here. Between 3 months and 6 years of age, mortality was revealed as very low. During the year the information was recorded, losses among females aged between 3 months and 6 years of age were 70%. The causes of death were: bites by poisonous animals (scorpions or vipers), death by illness and one case of a fatal attack on a ewe by a dog. Between the sixth and the eighth year of age 50% of the ewes died (the incidence of illness increases at that age) or were replaced by young animals. Finally, no ewe was kept for more than eight years.

Male mortality, like that of the females, is concentrated in the group under 3 months of age, many of which were killed for meat. After that stage the mortality rate drops, to increase again when the sixth year of age is reached. Male mortality rate increases after their sixth year, first to 0.50%, and then to a full replacement for males older than 7 years of age. Mortality for the flock as a whole was therefore concentrated in the group of lambs under 3 months of age. For immature animals (under one year of age) the mortality rate is 93%.

The simulation for flock A was set to run under the variables described. The results are:

- the females live herd decreases in size. Figure 4.9 shows how the decrease begins after the fourth year. At the end of the run, the total number of females in the live herd would have been reduced to 3.
-the *male live herd* decreases even more rapidly and by the 23rd year there are no males and consequently no reproductive capability.

As a preliminary conclusion it can be said that the fertility and mortality rates observed for Flock A during the year of study, were not necessarily typical for a longer period. As the graphics clearly show, if the fertility and mortality ratios recorded in the period of study were maintained, the flock would have died out. Thus, variations needed to be introduced to reverse this negative tendency. To do so, the simulation was re-run several times, each introducing specific variations based on information provided by the shepherds, as follows:

-1 an improvement of the fertility rate;
-2 a reduction of the mortality rate, particularly the mortality rate of lambs under three months of age;
-3 the addition of extra females into different age stages, simulating animals brought into the flock.

The fertility rate was first improved from 1.4 to 1.5 lambs per ewe per year. Ethnographic and documentary records show that under good feeding conditions, 1.5 lambs per ewe per year (three lambs every two years) could be expected. This improvement alone was not enough to stop the decline in the flock. However, a fertility rate of 1.5 lambs per ewe per year combined with a lower mortality rate for lambs under 3 months of age did result in a gradual increase in the flock size. This could be achieved just by changing survival rate for lambs under 3 months of age from 0.16% to 0.25%. In real terms that means saving just one more female lamb every year. The total flock would then increase to 130 animals at the end of the programme run (Fig. 4.10).

However, if the aim was to maintain the flock size with roughly the same number of females (some 30) then slightly different variations should be introduced. For example, keeping a fertility rate of 1.4, if the mortality rate for lambs under 3 months of age is between 0.22% and 0.23%, the flock size would be maintained (Fig. 4.11). This suggests that for the year the information was gathered, the shepherd kept fewer female lambs than
he would normally, if he wished to maintain his flock size. Another possibility would be to increase the fertility rate from 1.4 to 2 lambs per ewe per year. However, without the availability of intensive farming methods it would be very difficult to achieve this fertility rate.

Finally, ethnographic information often reports that the flock size and viability can also be improved by importing animals, particularly females, into the flock. Contact with other shepherds in the area (Seta Valley) is maintained and movement of animals from one flock to another occasionally occurs through selling or borrowing. The programme was run again adding females of different ages. Adding 3 females of between 1 and 2 years of age or 8 females between 2 and 3 years of age brought little overall change. The best improvements were obtained by adding females of between 1 and 2 years of age, which meant young ewes with a full reproduction capability.

(ii) Flock B

Flock B is a flock of eleven ewes and one male herded during the sixties within the Fageca district area. Most of the ewes were aged between one and three years, with none older than four years; the ram was one year old. This flock was bought by a young shepherd as the base flock upon which he was aiming to build. An average sheep flock at the time could have between twenty and fifty animals; the shepherd said his aim was to build a flock of some thirty to thirty five ewes.

As has already been described, competition for grazing resources was intensive and fodder availability restricted. The flock was consequently herded under stressed feeding conditions. The type of breed for this flock was the most common at the time: ovella roja sheep. Production was mainly meat-orientated. Lambs were gradually slaughtered within their first year of life; the market favoured older and heavier lambs than today, often over 30 kilograms in weight.

The fertility rate was set as 1.0 lambs per ewe per year. Shepherds claimed that under the circumstances of food shortage faced at the time, most of the ewes of breeding age gave
Fig. 4.9: The evolution of the female herd with the initial parameters set.

Fig. 4.10: The evolution of the female herd with the parameters introduced with the first variation set.

Fig. 4.11: The evolution of the female flock with the parameters introduced during the second variation set.
Fig. 4.12: The evolution of female flock with the original parameters set.

Table 4.3: Summarises the number of years required to built the flock to a given size, under different survival rates (from 1 to 0.4) for an original flock of 11 females.
birth just once a year, and care was taken to prevent further pregnancies within that period of time. Twins and triplets are claimed to occur with less frequency than nowadays, with poor feeding conditions again quoted as the main reason for this. The survival rate for mature ewes was set at the same as for Flock A (0.99) because very similar causes of death were described (illness, bites by poisonous animals, accident and so on). Mortality for old ewes was also set at 0.5. The shepherd stated that he wanted to build up the flock as fast as possible, so a very high survival rate of 1 was set for female lambs. On the other hand, neonatal mortality in Flock B is set much lower than in Flock A. This is justified by the shepherd's explanation that in the past the absence of chemical fertilisers and far fewer occurrences of double and triple births significantly reduced the number of deaths among neonatal lambs.

Bearing in mind that the shepherd's aim was to build the flock up to some 30 to 35 ewes, the idea was to test how many years would it take for the base flock to reach that size. The female herd survival rates were brought gradually closer to 1 (which would imply keeping all the female lambs) to determine the mortality rate that would produce the desired outcome. The simulation suggested that if all the female lambs were kept each year the shepherd would have needed a minimum of between four and five years to build up a flock of between 30 and 35 females (Fig 4.12). If that annual growth rate (of around 30% of the existing flock) was maintained, within ten years the flock would increase to some 132 ewes. This would be too large a flock, not desirable within the herding strategies practised at the time. Moreover during the period of growth the income produced by sales of young lambs would be limited, and so most shepherds could not afford to maintain such management strategies for a long time. It is expected that after reaching the desired flock size the shepherd would have begun to sell off some of the female lambs and the mortality rate would have been similar to that of other flocks for this age group. Table 4.3 summarises data from the modeling by showing the number of years required to build a herd of 30 to 35 animals with survival rates varying from 1 to 0.4.

These results suggest that five to six years were needed to build up a flock of average size from a small base flock. However several shepherds have claimed a shorter period of two
to three years as the usual build up time. They have also pointed out that base flocks used
for that purpose usually just had some six or seven ewes. Where does this discrepancy lie?
Are the shepherds exaggerating the reproduction capability of their flocks, or their ability
to manage their flocks successfully? Or is it other factors such as a different age structure,
an improved fertility rate due to better environmental conditions, or even particular
economic factors such as the easy accessibility to unlimited fodder supplies due to the
introduction of industrial fodder, that allowed a more rapid increase in flock size? In an
effort to answer these questions, the simulation programme was used to look at the effect
of different variations in the base flock size, age structures, and mortality and fertility rates
on Flock B growth rates.

Flock B is mainly composed of ewes older than one year. When enquiries were made
about ideal age structures for a flock acquired with the purpose of building an established
flock, most shepherds said that a flock of lambs would be best. However, in reality, other
factors influence choice of the number and age of the initial animals. For example, when
the owner of herd B was asked why he bought a flock of mostly mature ewes and no
lambs, he explained that the price was an important factor, and that he felt that the flock
still had enough years of productivity ahead to allow him to build up a larger one.

The first variation was introduced by simulating the growth of a flock composed of 6
female lambs. This was because similar base flocks have been widely documented. No
other variable was changed, which means that the fertility rate was still set at 1.0. The
simulation demonstrated that there was no improvement in the rate of flock growth with
this type of base flock. There were 26 females by the 5th year, and 35 by the 6th. To make
it more comparable to the actual Flock B, the number of female lambs was increased to
11. For this variation, the same number of years with the same mortality rate were
applied, the base flock composed of lambs only produces an average medium of 7 females
more than the original Flock B. The main differences lie in the slow rate of growth in the
first three years.

A final variation introduced the possibility of a higher fertility rate such as might occur
with an improvement in diet, or if a different sheep breed with better fertility were kept. However the rate of growth did not significantly improve.

These simulations suggest that the information provided by the shepherds in respect of the time taken to build up the flock may have been exaggerated. However it is perhaps important to be aware that a combination of different factors such as an improvement of the fertility rate, some ewes giving birth at earlier ages or the bringing in of lambs or kids from another flock, could have made it possible to build up a flock to the desired size within the two or three years that shepherds claimed as the average build up time.

(iii) Flocks C & D

Flocks C and D are two hypothetical goat flocks recreated on the basis of the ethnographic data collected in the villages. Flock C is a very small group of 3 *cabra negra* goats. As already described, small numbers of *cabra negra* goats were kept in private houses for their milk; these animals were either grazed in the surroundings of the village or fed with farm products. A ram was not always kept with these very small flocks, although the owners usually borrowed a ram at least once a year for mating. Kids were normally sold for their meat, and very rarely consumed in the household.

In modelling Flock C, the fertility rate is again set as 1.0 kids per female per year. From the information provided by the shepherds, the survival rate for female kids is set as 0.26. Male kids would have all been killed or sold. The mortality rate for mature animals is in this case somewhat lower than the mature mortality we have been using so far. This is explained by the fact that these goats, although being just as likely to be affected by illness as the other goats and sheep, had less chance of being bitten by a poisonous animal or having an accident in the mountains, because they were kept in the house corral or in the surroundings of the village, and never, or very rarely, taken to graze in the mountainous area.

As Figure 4.13 shows, under the effect of these variables the size increases slightly for a few years and then shows a steady decline to extinction. If a lower 0.22 survival rate for
the kids was established, and an increase of the female fertility rate from 1.00 to 1.20 was introduced, the flock would however maintain its size for the whole of the programme run (Fig. 4.14). This variation is justified as shepherds recorded that very few kids were saved, and also that a small increase in the fertility ratio would have been normal in animals kept mainly in corrals and not forced to constantly move for grazing.

Flock D is a large 110 *cabra blanca* goat flock. Because of their large size, these flocks had to endure even more stressful feeding conditions than the average sheep flock described in the model for Flock A. However, these food shortages were mitigated to some extent by the ability of goats to feed on nearly any kind of brush or plant. They grazed mainly in the mountainous area during the summer and were forced to transhum to the coastal grazing areas during the winter.

For this flock, the fertility rate is also 1.0 kids per goat per year. The shepherd claimed that approximately 13% (some seven or eight individuals) of the female kids were saved for replacement, and some 3% (two kids) of the male kids. Survival rates for kids were consequently set up in reference to these percentages. For the rest of the flock an average survival rate of 0.99 was kept. Under those parameters, Flock (D) increases until the 4th year and then starts to gradually decline, ending the programme run with just 3 goats (Fig. 4.15).

A survival rate for the female kids of about 0.23 (which means keeping some 12 female kids in the first year) will reverse the negative tendency of the flock (Fig. 4.16). To maintain the flock stability it was concluded that some 10 or 11 kids should be kept; this number represents approximately 10% of the base flock, which is what shepherds generally claim as an average percentage of animals kept for replacement.
Fig. 4.13: The evolution of the female goat flock with the original parameters set.

Fig. 4.14: The evolution of the female flock with the parameters of the first variation set.
Fig. 4.15: The evolution of the female flock with the original parameters set.

Fig. 4.16: The evolution of the female herd with the parameters of the variation set.
3.4.4. Conclusion

The computer simulation displayed here provides insights into ethnographic and archaeological data sets. From an ethnographic point of view, the simulation reveals that some of the herding strategies recorded were discovered to be non-sustainable. This is, if the way that the flock was managed at the particular moment of time that the study was sustained, it would have become extinct. However, it has been shown that the introduction of variations on the original management strategy could correct negative tendencies. These variations were checked against the ethnographic data to confirm that they could have realistically been applied within the traditional herding system as practised in the villages. It is consequently assumed that traditional flocks, even if managed within relatively stable market requirements and environmental conditions, were subject throughout their existence to a range of variation in the management strategies that were applied to them. These variations were shown as mostly related to increases and decreases in the survival rates affecting the individuals under a year of age on the one hand, and the fertility rates that the overall female flock had on the other. The former is the factor over which shepherds had the greatest control, and which is thus likely to have been most influential.

Summarising, the ethnographic record makes archaeologists aware of the existence of both situations: non sustainable herding strategies and the potential introduction of management variations to correct them, or to meet particular herding goals (e.g. building up flocks). The key issue here is would any of these situations be recognisable in the archaeological record? The analysis of the mortality profiles generated by the programme run should offer an insight into this matter.

Mortality models were generated by the programme run under the original herding strategies and after the introduction of the variations. These kill-off patterns were generated by the programme by summarising the number of sacrificed individuals throughout the programme run and converting these data into percentages. The results show that a very similar, if not identical, picture emerges when comparing the kill-off
patterns generated by the programme under the original parameter values and after including the variations. Figures 4.17 to 4.19 represent mortality profiles for Flock A under the three different sets of parameters. Mortality profiles for all other flock variations were very similar and are shown in Appendix III.

Moreover, these mortality patterns do not differ from those referring to the static killing patterns of a particular moment in time shown at the end of the previous section (see Figures 4.4 to 4.8); the programme run has not introduced significant alterations. Most importantly, it is here seen that when the overall production goal remains the same, particular management variations ultimately lack any critical effect on the general kill-off patterns, and would be very difficult to trace through the archaeozoological analysis of these patterns.

The explanation for this lies on the one hand, in the fact that all these management strategies were applied to relatively small flocks and for a short period of time (a few years in the best cases). On the other hand, the variations in management strategies introduced to correct non sustainable management as recalled by the informants, basically represented quantitative alteration of the components of the herd, but not a qualitative change in its general structure or economic way of exploitation, which are the type of variations that would have a clear reflection in the mortality models that are recorded in the archaeological record.
Fig. 4.17: Kill-off pattern of Flock A at the end of the programme run with the original parameters set (where \( m \) equals months and \( y \) equals years).

Fig. 4.18: Kill-off pattern of Flock A at the end of the programme run under the first variation set.

Fig. 4.19: Kill-off pattern of Flock A under the second variation set.
4.5. THE QUESTION: WHERE ARE THE BONES?

4.5.1. Introduction

In the previous section, general kill-off patterns artificially generated by the computer over a period of years have been shown as theoretically immune to two sets of factors: on the one hand, the time factor and on the other, the introduction of relatively minor alterations in the herding strategy. The resulting kill-off patterns show a clear structural consistency: a concentration of mortality during the first year of life, particularly for males, low mortality for juvenile and mature animals and an increase in mortality after the seventh or eighth year of age.

So far, the kill-off patterns discussed in this chapter have been dealt with as if they were complete units. However animal bone samples are affected by a great variety of taphonomic agents (see for instance: Andrews, 1992; Binford and Bertram, 1977b; Binford, 1981; Cadee, 1990; Gifford-Gonzales, 1989; Lyman, 1987; Turner, 1984) which would cause distortion in the type of information ultimately available to archaeozoologists. The ethnographic data recorded in the Fageca and Famorca villages provided insights into the potential disturbances of the original, complete, kill-off patterns generated from culling strategies in traditional flocks.

O'Connor (1996: 6) described two main factors to be understood when attempting the analysis of animal bone assemblages: the integrity of the assemblage and the quality of data recovered, the later referring to different aspects of the data analysis, the former referring to circumstances of deposit creation and recovery. Ethnographic data collected through study of traditional societies does not in itself provide a full understanding of any of these factors or any other taphonomic questions that archaeozoologists may pose, but ethnographic data concerning animal killing and consumption seems to be especially useful as an aid to the understanding of depositional processes, and of the human activities, socio-cultural or economic, that created bone assemblages.
This section seeks to derive from the ethnographic information on traditional pastoralism, how herding strategies and economics links may affect the distribution of animal bone samples (and so potential kill-off patterns) within a regional context.

4.5.2. A First Step: Defining Assemblages

Three main lines of inference can be developed. Firstly, analysis of the historical and ethnographic information related to the *life assemblage*, defined by Klein and Cruz-Uribe as ‘the community of live animals in their *natural* proportions’ (1984:3); this would broadly help understanding of the social and especially the economic value of traditional sheep and goat herding within the villages. Secondly, analysis of the data referred to as the *death assemblage*; this involves looking at the kill-off patterns, mainly through the mortality profiles we have described in the previous section, and so determining how the villagers selected animals for food or for sale to be consumed by other people. Finally data related to the *deposited assemblage*, here referring to the primary stages of the formation of archaeological animal bones assemblages (Klein and Cruz Uribe, 1984: 3).

The discussion of these aspects, applying the ethnographic and documentary data gathered at the Fageca and Famorca villages, will be used here to confront the validity of a hypothetical archaeozoological study in the area.

(i) *Life and Death Assemblages*

Two main sources of information have been used to assess this life assemblage for the Fageca and Famorca villages district: ethnographic data, and data collected from the city council records of both villages (see Appendix I). As previously mentioned, Segura i Mas (1990:239) notes that *amillaramientos* data for the number of animals herded could easily be an underestimation due to concealment by shepherds of the true figure in order to avoid paying tax. This has also been pointed out by Chang (1981), who applied a correction factor to similar data. However the data presented in the Appendix I have not been altered mainly because they match fairly well with the ethnographic record, and also because accurate numbers of sheep and goats are not essential for this research. In any case, it may be worth noting that underestimation of sheep and goat numbers seems to be
particularly in relation to hiding lamb and kid numbers, as well as in not declaring the *cabra negra* goat individuals known from the ethnographic record as present in nearly every household\(^\text{19}\).

**Even if the numbers are underestimated, sheep and goats constituted a significant part of the life assemblage in the villages during the past.** Using the data in Appendix I, an average of 326 sheep and 522 goats was calculated for Famorca and Fageca in the first quarter of the present century. Although not at all comparable with the numbers herded in other areas within the Valencian area or especially in other parts of Spain (Sánchez Belda and Sánchez Trujillano, 1978; Martínez, 1991) the sheep and goat life assemblage traditionally present in both villages was important in relation to the number of other animals. Only chickens would have occasionally been more numerous. Ethnographic data suggests that between three and four hundred chickens for each village may have been kept at some point in time. Pigs, rabbits, mules, donkeys, dogs, cats and hunted animals, mainly birds, defined the complete animal life assemblage of villages.

It has been seen how the selling of lambs and kids provided an important additional income for the villagers; shepherding also allowed people without possessions or without the possibility of acquiring any, to build up their own capital: manure production played an important role within the farming activity of the area. However in the diet of the inhabitants of Fageca and Famorca, sheep and goat meat was rather seldom consumed. Instead, chicken, rabbit, pigs and hunted birds supplied the majority of the meat consumed. Thus, although outnumbered by sheep and goats in the life assemblage, these latter animals made up the majority of the death assemblage of both villages.

**Fig. 4.20 graphically shows that fact by displaying in percentages the number of chickens, pigs, sheep and goats slaughtered each year and consumed in the villages.** The death

\(^{19}\) Ethnographic data mentions 2 to 3 *cabra negra* goats per household and also occasionally larger groups of this type of goat (a shepherd specialized in milk production managed a flock of 30 in the Gallinera valley and some small groups of 8 or 12 have been also recorded, but they were not common). *Amillaramientos* data indicates small scale goat exploitations (9, 12, 19 animals) in flocks of both type of goats. Groups of 3 goats, on the other hand, would very possibly be referring to *cabra negra* goats.
assemblage showed that the highest proportion was of chicken; each household would keep and kill several during the year. Pork was the second most commonly consumed meat, whereas sheep and goat meat formed only a small percentage.

(ii) The Deposited Assemblage

When attempting to analyse the variation between the sheep and goat deposited assemblage and the sheep and goat life assemblage in the Fageca and Famorca village, the first questions raised are: where did those thousands of sheep and goats, lambs and kids born in the area go? Where were they slaughtered and consumed? Where are their bones or where were their bones first deposited? Is there or is there not a single depositional location where enough evidence for the archaeological reconstruction of the complete kill-off patterns was accumulated? The key factor in answering all these questions lies in the differentiation between producers and consumers. As Reid (1996:49) points out, it is very likely that any local pastoral economy carried on within a politically complex society does not manage its herds, and in particular, slaughter all its animals, at a single site.

![Species killing proportion](image)

Fig. 4.20: Proportion of domestic animals traditionally killed in the villages.
4.5.3. The Market Effect

Different articles on animal bones have stressed the importance of taking into consideration economic complexity when attempting the analysis of an assemblage. In the same way, the value of the bone assemblages has been pointed out as an important data set from which to infer economic complexity (Clark, 1986; Maltby, 1984; Reid, 1996). In a paper examining bone assemblages from an Early Saxon village (West Stow) and three Middle-Saxon sites, one urban (Ipswich) and two rural (Brandon and Wicken Bonhunt) in East Anglia, Crabtree (1996) described differences between producers and consumers of animal products as a significant change between the Early and Middle Saxon sites. While the data from the fauna assemblage in West Stow demonstrated a good degree of self-sufficiency, at the Middle Saxon sites, data suggested the development of economic links between the rural sites and the emporia. For instance, pig mortality profiles based on MWS (Mandibular Wear Stages) and tables based on epiphyseal fusion data for the Middle Saxon rural site of Wicken Bonhunt show a disparity in the ageing data (with MWS showing a low proportion of very young pigs, and epiphyseal fusion data showing a higher presence of these age stages). Crabtree explained this discrepancy as the reflection of the involvement of the site in a network of trade and exchange of animal products. On the other hand mortality profiles based on MWS for West Stow show more even representation of the different age stages of pigs age, suggesting a more self-sufficient economy (Crabtree, 1996:69-70).

Ethnographic and city council data confirm the importance of sheep and goat husbandry for the economy of the Fageca and Famorca villages; but it is only the existence of records on the scale of the herding system and the access to oral information that has allowed an accurate description of the scale of sheep and goat herding. An archaeologist involved in an hypothetical excavation in the villages, may find it more difficult to find evidence for such herding. Archaeozoologists have already realised the fact that animals which are economically important for a community may not be as important for the same community in terms of their food supply (Uerpmann, 1973:311; Greene, 1983). Thus the hypothetical excavation might recover an assemblage that would give an accurate picture of animal
meat consumption (as will be seen in the next section), but a very inaccurate impression of the economic importance of sheep and goat herding for the villages.

The area of the Famorca and Fageca villages has traditionally been a sheep and goat production area supplying the markets of larger villages and local towns. Lambs and kids mainly, but also old sheep and goats, found their market in towns and villages such as Alcoi, Cocentaina, Ondara and other surrounding places. All these villages and towns are located in the Alacant province, and within a radius of sixty kilometres (longer distance trade was more rare but occasionally also took place). As a consequence of these market relationships, the general kill-off patterns described in previous sections of this chapter would in real terms be found dispersed over the area where those animals were sold and consumed.

The dispersion of the different elements of the mortality profiles is a first step towards answering the question where are the bones? To illustrate this, Figures 4.21 and 4.22 show the dispersion of the mortality profiles for Flocks 3 and 5 (for details of these flocks see section 4.5). Percentages for the mortality profiles are now calculated in reference to the total number of animals slaughtered or dying during the year to which the information refers. For Flock 3 (Fig. 4.21), a flock of sheep grazed all year around within the Famorca district, the mortality profile expected for the area where the flock is herded (Famorca district) has a low percentage (10%) of young animals under one year of age. The animals are either those sold to the local butcher, to be slaughtered and consumed within the village, and a small number that were occasionally consumed by the shepherd; such consumption would normally take place on a special occasion (a local festival, a wedding or other similar kind of celebration). All other age groups with the exception of 7 and 8 years age are also represented. As explained previously, mortality among mature sheep and goats is recalled by shepherds as being rather low, although some may have occurred due to illness, accident (shepherds often recall the accidental falling of a sheep or goat from one of the numerous rock edges present in the landscape) or bites from poisonous animals. The animals that died in these latter circumstances were not sold for meat or consumed at all, but thrown out for foxes to eat. The absent 7 and 8 years age group are
those taken away from the flock and replaced by young ones. These old animals may be found in the village of Cocentaina where informants said old sheep of these ages were sold for meat. Equally, it is in this village where a high percentage of young sheep from Flock 3 (50%) was sold to the local butchers for meat. Finally, a group of lambs from the flock was slaughtered and consumed in the town of Alcoi.

For Flock 5 (Fig.4.22), a transhumant flock of goats based in Famorca, kids and mature individuals were dispersed to four separate points where they were slaughtered, consumed or died:

1. In the Famorca district area, the home base of the flock where it spent its summers, the mortality profile includes a very low percentage of slaughtered kids, and no animals of any other age group;

2. Other animals are concentrated in Xabia, in the district where the flock spent its winters. The mortality profile for this place has a low percentage of young animals, reflecting local selling and occasional consumption by shepherds; equally, a low percentage are mature death, related to normal loss of mature animals from accident or illness, and old mortality, reflecting the fact that for this flock, the shepherds did the yearly culling of elderly animals before returning home sometime in May.

3 and 4. These are the villages of Ondara and Benissa where most of the kids were sold on the way back to the mountains to local butchers; mortality patterns in those villages would therefore only include kids. Transhumant flocks such as this one sold their lambs and kids either in the lowlands or in the villages and towns of the mountain area (i.e. Alcoi, Cocentaina, Lorxa), although shepherds seemed to prefer to sell their animals in the lowlands so that they could travel back to the mountain villages with just the base flock, and thus avoid the difficulties of managing a large flock of mature and young animals in the difficult mountainous landscape.
Fig. 2.21: Dispersion of the mortality profile for Flock 3, a sheep flock grazed all year around within the Famorca district.
Fig. 2.22: Dispersion of the mortality profile for Flock 5, a transhumance flock of goats based at the Famorca village.
4.5.4. Conclusions

Ethnography here confirms the need for archaeologists in general and archaeozoologists in particular, to expand their approach and begin to look at market landscapes. The analysis of pastoral economies' territorial exploitation should, when possible, avoid restriction to the mere definition of grazing territories and pastoral features, and attempt to infer the market relationships in which shepherds in the study area were involved. Movement is an essential and often unavoidable aspect of traditional shepherding; in the Mediterranean the need for transhumance necessitated shepherds herding their flocks over a wide territory, and ultimately stabilising social and economic relations across that particular territory which would have involved the selling of their animals. Nevertheless, the dispersion of mortality profiles from traditional sheep and goat herds in the villages, is here shown as not solely related to those flocks involved in the practice of transhumance. This thesis research highlights how mortality profiles generated from those traditional flocks managed through less mobile herding strategies, those herded within the district boundaries all year around, are equally affected by dispersion. Ultimately, when pastoralism is practised within a well developed exchange network, identifying those areas which have turned into production and supply territories as opposed to other areas (villages or towns) that are consumption points, becomes of crucial importance. Mortality profiles from flocks involved in a market economy, even a poorly organised market economy, are biased by the selling and buying of individuals from the base flock and their killing and consumption in areas or places often many miles from the home base of the flock.
4.6. KILLING AND CONSUMING ANIMALS IN THE VILLAGES

4.6.1. Introduction

As seen above, complete kill-off patterns are subject to alteration through regional redistribution mainly fuelled by economic forces. Dispersion of the complete mortality profiles makes it difficult for archaeologists to assess socio-economic importance of sheep and goat herding locally.

However, the complexity surrounding hypothetical inferences about the traditional economies of the villages does not stop with the difficulties surrounding the understanding of the dispersion of mortality profiles. The ethnographic data gathered provided information that goes a step further in the process of creating a more detailed ethnoarchaeological picture of some of the complexities involved in the creation of animal bone assemblages. These data have been partially introduced in the previous section and refer principally to cultural and economic aspects of the killing and consumption of animals in the villages.

4.6.2. Traditional Social Aspects of Animal Consumption in the Villages

The importance of social aspects in relation to how animal bone assemblages enter the archaeological record is seen as essential in understanding the archaeozoological assemblage, particularly when referring to pre-market societies where ritual social factors may have a strong determination in the patterns of husbandry, slaughtering and consumption (Noddle, 1986:34-35; Schuster, 1994). The ethnographic data recorded in the Famorca and Fageca villages clearly revealed the need to consider socio-economic aspects of animal slaughter and consumption when attempting to understand the creation of animal bone deposits in both villages.

Animal raising, slaughtering and consumption in the villages had traditionally a deeper social significance than nowadays. The family unit played an essential role in articulating this significance. As recorded in contemporary society within the study area, the family can be defined on two levels: the nuclear family which involves the parents and their
children, and the broad family which involves the grandparents, sisters and brothers, cousins, uncles and so on. Domestic animals were mostly slaughtered and consumed within both family frameworks. However, meat was also shared and consumed at social events involving family and friends, or just friends, such as marriages, baptisms, picnic meals and the annual festival that took place in every village during the summer time.

Table 4.4 attempts to summarise the social context in which domestic and hunted animals were traditionally slaughtered and consumed within the villages. Pigs were slaughtered within the broad family; occasionally, close friends could also get involved in these communal pig killings. On the killing day, all the participants gathered together to help out in the slaughtering and processing of the meat; that day a large meal was prepared and a part of the pork meat consumed. The rest was processed mainly into sausages and generally redistributed among the nuclear families taking part in the killing, to be consumed throughout the rest of the year.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Social Context of Slaughter</th>
<th>Social Context of Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>pig</td>
<td>broad family</td>
<td>broad family and nuclear family</td>
</tr>
<tr>
<td>chicken</td>
<td>nuclear family</td>
<td>nuclear family</td>
</tr>
<tr>
<td>kids</td>
<td>butcher/broad family</td>
<td>several nuclear families</td>
</tr>
<tr>
<td>lambs</td>
<td>butcher/broad family</td>
<td>several nuclear families</td>
</tr>
<tr>
<td>hunted birds</td>
<td>nuclear family</td>
<td>nuclear family/friends</td>
</tr>
<tr>
<td>wild boar</td>
<td>individual/ nuclear family</td>
<td>nuclear family/friends</td>
</tr>
<tr>
<td>pigeons</td>
<td>nuclear family</td>
<td>nuclear family</td>
</tr>
<tr>
<td>rabbit</td>
<td>nuclear family</td>
<td>nuclear family/friends</td>
</tr>
</tbody>
</table>

Table 4.4: The traditional social context of animal slaughtering and consumption in the villages.

Small corral animals such as chicken, rabbit or pigeons, were normally consumed by the nuclear family. It was often on Sunday that the meal incorporated some chicken or rabbit. However, on a special occasion some friends might have gathered together to eat a rabbit or a chicken. Lambs and kids were, on the other hand, normally slaughtered by a butcher (at some stage there were two or three butchers working between both villages) and sold in portions. These portions were rarely more than 1/4 of a kilogram, and were
generally bought and consumed on a weekly basis within a *nuclear family* context. However, for special occasions such as weddings or the annual festival, a lamb or a kid was often slaughtered, and consumed among several people (the *broad family*, or just several households).

*Wild* birds or wild boars were occasionally hunted by individual hunters. Their importance in the diet was rather low, although certainly more important than nowadays as they supplemented the generally low level of meat present in meals in the past. Their social context of consumption could vary and was not attached to any specific social rules.

It has to be noted that meat was an expensive item, and so different economic situations among the households or individuals in the village would have a marked impact on the amount of meat consumed throughout the year. It should also be borne in mind that with a lack of artificial refrigeration, meat conservation was always a problem. This factor often encouraged and reinforced communal consumption to insure that little meat would remain and so be wasted.

The archaeological importance of the ethnographic information so far displayed lies in the fact that it would ultimately regulate the disposal patterns created throughout the village deposits. Table 4.5 summarises from this information the location of slaughter, consumption and primary deposition within the villages.

The majority of the bones from slaughter and consumption ended in the household corrals. Slaughter processes and meat processing (of which detailed description is beyond the scope of this chapter) defined which bones actually were deposited in the household corrals. Complete skeletons of chicken, rabbit and pigeons, for instance, were probably deposited in single household corrals, as these animals were generally slaughtered and consumed within that social and spatial context. For kids and lambs, on the other hand, strong dispersion of bone should be expected as their meat was processed by a butcher and then redistributed through sale. Pig skeletons could be found fairly complete in a single location, with the exception of the extremities and ribs. As seen above, pigs were
slaughtered and partly consumed in a single location, and as most of the meat processing that took part in that location involved the separation of the meat from the bone, redistribution of the processed meat would have not affected the primary deposition of the bone.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Slaughter</th>
<th>Consumption</th>
<th>Primary Deposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>pig</td>
<td>household</td>
<td>main meal / several households</td>
<td>several household corrals</td>
</tr>
<tr>
<td>chicken</td>
<td>household</td>
<td>household</td>
<td>household corral</td>
</tr>
<tr>
<td>kid</td>
<td>butchery/household</td>
<td>several households</td>
<td>butchery trash area/ several household corrals</td>
</tr>
<tr>
<td>lambs</td>
<td>butchery/household</td>
<td>several households</td>
<td>butchery trash area/ several household corrals</td>
</tr>
<tr>
<td>rabbit</td>
<td>household</td>
<td>household</td>
<td>household corral</td>
</tr>
<tr>
<td>pigeons</td>
<td>household</td>
<td>household</td>
<td>household corral</td>
</tr>
</tbody>
</table>

Table 4.5: Spatial location of slaughtering, consumption and primary deposition of animal remains as described by informants in the villages.

4.6.3 Conclusions

Cultural and economic patterns of animal consumption (diet preferences, family base or communal consumption and so on) were an active taphonomic agent in the spatial disposal of animal refuse within the villages. Within a relatively isolated and self-sufficient traditional community, these patterns operated as main agents responsible for the location and definition of the bone deposited assemblages. These data reinforce for archaeozoologists the importance of awareness of the need to incorporate a more socially orientated perspective in their research as well as of the need to get a more intimate knowledge of traditional butchery practices.
4.7. GENERAL CONCLUSIONS TO THE CHAPTER

Data on traditional Mediterranean herding economies should provide archaeozoologists working in a Mediterranean context with a rich reservoir of ideas to shed some new light on their particular samples. The information on herding economies gathered in the villages of Fageca and Famorca aims mainly to contribute to this theoretical background. Thus, and for instance, the description of traditional herd structure and management strategies shown in the early sections suggests homogeneity in aspects such as culling strategies whereas equally implying variability in others such as flock sizes and the relation between different types of breed and particular production goals.

On the other hand, the computer modeling programme informs archaeozoologists of particular limitations related to the type of economic information that kill-off patterns are able to provide. Further warning about the nature of kill-off patterns is also revealed by the demonstration of how herding movement strategies and market links introduced a dispersion factor which necessarily redefines mortality profiles as a partial as opposed to a complete, reflection of the kill-off pattern to which a particular flock was subjected.

Overall, archaeozoologists hypothetically dealing with the animal bone samples that traditional sheep and goat herding created in the Famorca and Fageca villages, could identify the selective culling of young lambs and kids, and very possibly describe meat as a production goal. The main misjudgement might come from the fact that sheep and goat bone samples in the villages indicate the existence of a pastoral system but fail to show the real scale of the system. To describe on an archaeological basis a more accurate picture of the real economic importance of sheep and goat traditional herding, additional data such as the number and extension of penning related sites, should be considered.
5.1. INTRODUCTION

This chapter will address aspects of the construction, location and function of pastoral sites found within the Fageca and Famorca districts. For the purpose of this study, pastoral sites are defined as those structures either isolated in the landscape or found in conjunction with natural rock shelters, which were used and perceived by the Famorca and Fageca shepherds and farmers as an essential part of everyday land use. Chiefly, these sites fulfilled two essential functions: shelter and storage capability, although as important symbols of agro-pastoral life they also had a deeper social and cultural meaning.

Research on pastoral sites within the study area was undertaken firstly by locating and structurally describing the sites, and secondly by planning each of them. Oral information on their seasonal use, building techniques and, occasionally, chronology, was also gathered. Finally the Fageca and Famorca council archives provided chronological references for some of the corral sites researched.

5.2. PENNING STRUCTURES IN THE FAGECA AND FAMORCA VILLAGE DISTRICTS

5.2.1. L'Arquitectura en Pedra Seca: Dry-Stone Architecture

Essentially, dry-stone architecture represents a classic vernacular form: "....the architecture of everyday activities conducted by ordinary people according to traditions
varying with different parts of the country" (Brunskill, 1987: 15). It is an architecture with no architects (Chiva and Dubost, 1990) that represents a long established tradition within the Mediterranean basin. The suite of pastoral sites found within the Fageca and Famorca districts can be conceptualised as part of this line of architecture: a relatively restricted range of structural forms of limited complexity which are related stylistically to a range of similar sites found across the Valencian landscape.

Examples of similar architecture have been outlined in ethnographic and ethnoarchaeological studies within the Mediterranean generally (for example Rizzelo, 1991; Chang, 1981,1984; Chang and Tourtellotte, 1993; Cristofini et al., 1978; Blitzer, 1990; Barker, 1991; Scotti, 1951), within a Spanish context (Garóca Fernández, 1991; Sanchéz, 1986), or within an explicitly Valencian region framework (Garóca Lisón and Zaragozà Catalan, 1983; Besó Ros, 1998; Del Rey Aynat, 1989; Martínez, 1991; Beavitt et al. 1995, 1998; Seguí, 1995).

Across the landscape, terrace walls, boundary walls, ramps, water-collecting structures, wells, several types of shelters and penning sites were built and repaired constantly by farmers and shepherds, as activities embedded within everyday pastoral land management. The range of techniques used, and the complexity of the construction work employed were diverse. A generalised knowledge of those techniques within the community is apparent, as the majority of farmers and shepherds were able to perform them with more or less success, thus ensuring that the structures fit firmly within the vernacular zone. Other types of maintenance relationships are, however, also apparent, as specialised workers were hired occasionally - generally when affordable.

This chapter will commence with a description of pastoral site typology and certain aspects of their structure, and will subsequently analyse aspects of their function and location within the particular landscape of the Fageca and Famorca districts. It is imperative, however, to emphasise that aspects of typology are the means and not the goals of this research on pastoral sites.
5.2.2. A Typology of Pastoral Sites

Several types of penning structures for sheep and goats are found in the Fageca and Famorca village districts (Fig. 5.1); these comprise:

**Corrals**

Within the area of study, corrals can be defined essentially as animal enclosures. A number of distinct sub-types can be distinguished:

(a) free-standing structures, built specifically to pen either sheep or goat flocks;

(b) part of the structure of the traditional houses, generally occupying the lower level of the house (underground) or forming an ancillary structure to the rear.

The first category of corrals is found in a variety of locations across the landscape. They were functionally related to the herding of sheep and goat flocks. Within the research area, these buildings were traditionally considered to be the main structures within a distinct hierarchy of pastoral sites.

Corrals which fall into the second category were primarily areas where domestic animals were kept (including sheep and goats in small numbers), and where domestic refuse was deposited. This research focuses primarily upon free-standing corral structures, as they are more closely related to the activity of shepherds, and also for practical reasons, as they are more accessible than those within, or attached to, private dwellings.

**Rock Shelters (cesters)**

These are unroofed enclosures, generally comprising a dry-stone wall which delimits an enclosure abutting a natural rocky cleft.

**Esbardals**

These are a type of unroofed enclosure, usually of square or rectangular plan, with dry-stone walls. They are distinguished from rock shelters by the fact that they are not
related in any way to a rock cleft, and from corrals by the fact that they have no roofed section and are generally of less solid construction.

The local names and codes used in the rest of this text for the corrals, rock shelters and esbardals located within the study area can be seen summarised in Appendix IV. Specific information on location and structure, along with the plan and section of most of the structures researched are also displayed in this Appendix.

5.3. CHRONOLOGICAL APPROACHES TO CORRAL SITES IN FAGECA AND FAMORCA

The lack of precise studies on pastoral sites within Spain in general and the Valencian region in particular, has a clear reflection in the absence of a precise chronological framework referring to such sites. In this section of the chapter an attempt will be made to solve this problem partially by developing a chronological framework for some of the corral sites researched within the Fageca and Famorca village districts. Esbardals and rock shelter sites are extremely difficult to date because of their crude structures, lack of associated material culture, and absence of any documentary evidence referring to them.

For corral sites the evidence combines to suggest a date for the majority of structures falling in the 18th and 19th centuries. This assumption is based on the absence of demonstrably older techniques of wall construction. Torró (1996a) and Torró and Ivars (1987; 1990) have defined construction techniques used in farm buildings by Muslim farmers in the area during the three centuries preceding their general expulsion in 1609. Both authors also refer to the conversion of a number of Muslim sites into corrals by Christian landlords (Torró and Ivars, 1990: 74). The sample of corrals studied for this thesis shows, however, just a single case where the remains of an Islamic wall (tapial), datable before the 17th century, can be identified: Co.6 in Fageca. This particular site also contains walls datable to the 17th century (Josep Torró: personal communication).
Fig. 5.1: The three types of penning sites found in the Fageca and Famorca village districts; (A) corral, (B) rock shelter and (c) esbardal.
Corral sites show a marked uniformity in their style of construction. With such a narrow margin of variation, more specific chronological observations are difficult to make on the basis of archaeological data alone. Fiscal data drawn from council archives, used in conjunction with field observations has, on the other hand, enormous potential for understanding the chronological development of corrals in both villages. Data such as corral names, approximate dimensions, ownership details, and information relating to the ownership of surrounding properties are included within the public records.\(^2\)

In the case of Famorca, the earliest fiscal records relating to corrals sites are dated 1880. The following corrals were recorded at that date:

- Roig (Co.13)
- Fora II (Co.18)
- De les Coves (Co.26)
- De les Fontetes (Co.11)
- Solana (Co.14).

In Fageca, the earliest records of corrals are dated 1879. The following sites are mentioned:

- Conde (Co.9)
- Salema (Co.6)
- Cagadur (Co.8)
- Nou (Co.5)
- Cantalar (Co.7)

\(^2\) The Famorca data on corrals was taken from the Contribución Territorial Urbana folder for 1879/80. (folder 94). The Fageca data was obtained from the Contribución Territorial Urbana folder for 1879. (folder 130/4). Both folders can be found in the respective council archives.
In most cases, corrals are named more than once, because different parts of the same building were owned by different people; for instance there are six mentions of Co.9. This is due firstly, to the fact that the corral had already been subdivided several times by this date and secondly, to the fact that there was another corral with the same name immediately in front of this one which was dismantled recently.

Assuming that the council archive reliably recorded all the corrals existing at the time, we can suggest that at the beginning of the last quarter of the 19th century, the corrals listed above were the only ones extant. The remainder can thus be dated as post-1880: Co.1, Co.2, Co.3, Co.4, Co.10, Co.12, Co.15, Co.16, Co.17, Co.19, Co.20, Co.21, Co.22, Co.23, Co.24 and Co.25.

An important question can now be raised: can any archaeological evidence be found in the structure and morphology of these later sites to support this assumption? A close analysis of corrals structure may shed some light, but it is only when these data are related to the situation of these sites that a more solid chronological sequence can be proposed.

First, it is possible to distinguish a particularly characteristic group of corral structures within the pre-1880 sample. This group is defined by the existence of a diagonal wall (Fig. 5.2) which seems to be an earlier feature and is found in other post-1609 sites in the neighbouring valleys (Torró and Ivars 1990: 78). Additional characteristics of this group of corrals comprise: the use of mortar in all original walls (dry-stone walls are clearly the result of later reorganisations of the space), and the large dimensions of the sites. In terms of location, these corrals are generally located at the edge of, or even within, non-marginal farming areas. This group of corrals comprises: Co.11, Co.18 and Co.26 (Famorca) and Co.9 (Fageca).

On the other hand, and when attempting to describe the overall assemblage of pre-1880 corrals, including the ‘diagonal wall’ group, some general characteristics common to them all, but not exclusive to them, can be described. In all cases but one, Co.5, these
characteristics are: the area of the corral (including unroofed and roofed areas) exceeds 100 square metres; mortar tends to be more commonly used (especially in the walls of the unroofed section) than in the more modern structures; and some 60% had a second floor, in contrast to just 20% of the post-1880 structures (most of these are located in the Famorca district area).

In general terms, it is the non-essential structural variations that provide a differentiation, but in all cases the basic similarities in construction style are maintained. Nevertheless, and although we are working with a restricted assemblage of sites and a more general perspective may be needed, it may be possible to conclude that the earlier corrals, probably built during the late 17th and 18th centuries, were generally bigger and better built and thus may have housed larger flocks, or may perhaps have been built to take a more important role in agricultural activities.

5.4. STRUCTURAL AND MORPHOLOGICAL ANALYSIS

Structural and morphological analysis of pastoral sites is a vital tool of ethnoarchaeological investigation; the results provide information regarding both the local style of vernacular architecture involved, and information concerning the idiosyncracy of traditional shepherds' spatial organisation, flock management and environmental exploitation.

5.4.1. Corrals

Structurally, corrals in the Fageca and Famorca district areas are always square-shaped structures which are subdivided into two main areas: a roofed section (or cubert) and an unroofed enclosure (or ras) (Aura and Seguí, 1998). Roofed areas are generally defined by a single rectangular space which may show internal subdivisions. Roofs are, in the vast majority of cases, of a lean-to type; they were built from beams, generally of local pine (Pinus halepensis), but occasionally oak (Quercus rotundifolia) and juniper (Juniperus communis) were also used. Beams are covered with a surface comprised of
Fig. 5.2: The diagonal wall (pointed with an arrow) as it appears in the plans of two of the corrals (Co.11 and Co.9).
canes bound together with string, on top of which a further layer of mortar and tiles is fixed.

Unroofed areas, on the other hand, are normally appended to the long axis of the roofed structure. Those areas are generally interconnected by one or two entrances, thus allowing the constant movement of the animals between the two spaces. The main point of access into corrals is generally located in the roofed section.

The building materials used in the construction of pastoral sites in Fageca and Famorca reflect the nature of the environment in which these sites are located; namely a limestone landscape. Limestone rock (and limestone conglomerate) of a type suitable for building is extremely abundant and accessible (López Gómez and Roselló, 1978; García Lisón and Zaragozà Catalan, 1983). Rocks of limestone were found loose in the cultivation fields, and were traditionally removed and piled by the side in order to form clearance cairns. Limestone could also be obtained from natural scree slopes or quarried from the outcrops found all over the landscape (Beavitt et al. 1998). Mortar was used irregularly, depending upon the type of structure. Occasionally, however, isolated elements of the structure were mortared, such as stones in key sections of walling, or the area between the roofed section and door. Finally, beams, canes and tiles comprised the remainder of the building materials identified in the pastoral sites researched; all were used primarily within the roof structure.

In the majority of cases, stones used to build walls which supported roofed sections were bonded with mortar, as a more solid wall was needed to support the roof structure. Mortar was less commonly used to build the walls of the unroofed enclosure, but was still recorded in more than 50% of corrals under study. A small number of examples can also be identified which display a total absence of mortar in any of their walls (roofed or unroofed areas): Co.20 and Co.23 are good examples. At other sites, mortar has been applied randomly to different parts of the walls, or more commonly to the door frames: Co.4, Co.10, Co.15, Co.17 and Co.24 exemplify this trend. Ethnographic insights have revealed a number of factors which limit the use of mortar within corrals. Of these, the most significant is the need to minimise expense, as the production of mortar implied the
use of extra, often specialised, labour. In addition, the limited availability of time can be identified as a crucial variable which prevented the fuller use of mortar.

Second floors (pallises) are related functionally to the storage of fodder and, less often, to the provision of shelter for shepherds and farmers. In plan, they tend to occupy the same area as the ground floor underneath, and are generally constructed as a single nave without internal divisions. When they are used as shelter, a chimney may be found in one of the corners. Second floors are not present in all the corrals studied; they have been noted in approximately half the examples in the Famorca district, and in a mere two cases in the Fageca area. Variability in the existence of second floors was also noted in the nearby Gallinera Valley; here, pallises were generally absent in sites located in the immediate village hinterland, yet often present in those corrals situated at some distance from the village, which were generally occupied during spring and summer. What is perhaps surprising is that this variability is unrelated to the needs of fodder provision; rather, the determining factor is the multifunctional characteristics of corrals as buildings which were not only used by shepherds, but often also by farmers (Seguф, 1995: 36-39).

5.4.2. Rock Shelters and Esbardals

Structurally, rock shelters and esbardals are simple dry-stone enclosures which define, in the case of rock shelters, an irregular penning area associated with a rock cleft, and in the case of esbardals, a free-standing rectangular structure. Roofs are totally absent in both types of structures. Some form of shelter, normally against excessive sunlight, is provided in the rock shelters by the natural rocky cleft against which they stand. In contrast, esbardals lack any form of protection against extreme heat or rain.

Both structures tend to enclose a single space without internal subdivisions, although a number of exceptions can be noted. For instance, Rs.14 in Famorca and Rs.22 in Fageca contain internal dividing dry-stone walls, whilst Rs.14 is a more obvious case of
Fig. 5.3: Plan and section of a corral with a second floor functionally used as storage area. (co.14)
subdivision (see Fig. 5.4). Internal divisions, locally called *separadors*, were commonly found in corrals yet rarely in rock shelters and never in *esbardals*. Functionally these spaces were used to separate specific individuals from the flock and give them special treatment (e.g. young lambs that required a specific type of fodder, or rams outside the mating season). Shepherds explained this lack of internal divisions in rock shelters and *esbardals* in terms of the fact that flocks could more easily be treated as a single unit during the summer months, as kids and lambs would have already been sold and the mating season was in progress. If necessary, temporary subdivisions could be created using branches or other kind of items; for instance, in site Rs.3 ethnographic accounts recall the use of an old door for this purpose. Additional structural variations include the existence of two terrace levels in Rs.12 and Rs.20; these are undoubtedly a response to the sloping physical topography of the sites.

The construction of these types of pastoral structures required little effort or skill; dry-stone walls are rarely very elaborate and stones were always readily available. In general, the walls tend to be thicker and more irregular than those in the corral sites, especially those corrals where mortar was used (see Fig.5.5). However, the basic technique appears to have been broadly similar, employing two parallel rows of medium and, occasionally, large stones, with the intervening cavity filled with smaller stones or pebbles.

### 5.4.3. Variability in the Form of Pastoral Sites

Appendix V displays the data gathered concerning structural measurements of pastoral sites studied in the Fageca and Famorea districts. Within corrals, four key variables can be defined:

(i) the width of walls within the roofed area. There is relatively little variation in this respect; most walls have a width of c. 0.4-0.55 metres (see Appendix V). The extensive use of mortar in walls associated with roofed sections (due to their structural role) may explain this homogeneity; the main variability noted (Co.4, Co.10, Co.22 and Co.23) is related to the use of mortar in the bonding of their wall stones.
Fig. 5.4: Two examples of rock shelters with internal divisions: Rs.14 (A) and Rs.22 (B).
Fig. 5.5: A comparative view of the wall width between an *esbardal* and a corral where mortar was used.
(ii) the width of walls within the unroofed area. There is a relatively high level of variability here, possibly because of the less common use of mortar in wall building, and because less care is taken in their construction due to a limited function as enclosure walls;

(iii) the dimensions of the roofed area. Roofed area dimensions vary between c. 10 and 50 square metres;

(iv) the dimensions of the unroofed area. Unroofed area dimensions vary between c. 14 and 84 square metres.

When looking at the relationship between roofed and unroofed areas in individual sites, the unroofed section is, in general terms, much larger. The overall unroofed space (attached to roofed areas) is bigger than the total roofed space to which it relates. Data collected from informants suggests that this fact could be explained by the need to maximise manure production capability. Taking into consideration the close relationship between corrals and manure production (Martínez, 1991; Seguí, 1995), unroofed areas could be interpreted as a relatively easy and cost-effective way to increase the enclosed area and, consequently, the volume of manure produced in them. This argument is substantiated by the fact that peaks of manure production are concentrated during the winter months, the period of the year when corrals were most intensively used.

For rock shelters and esbardals, three key variables can be identified:

(i) the width of walls. There is a great degree of variability in the width of dry-stone walls within rock shelters and esbardals. Sites such as Rs.8 have a wall c. 1.5 metres in width, whereas in other cases such as Rs.26, the walls attain little more than c. 0.55 metres in width;

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21 Besides being pivotal within the pastoral economy, corrals were an important focus of farming activity as the place where manure was produced and purposefully manipulated. From this perspective corrals can be defined as 'manure factories'. This idea appears fully developed in Seguí (1995).
(ii) the maximum interior height of walls. Again, important diversity in the height of the walls can be identified among the structures studied, with measurements varying in the region of c. 0.5-2.4 metres;

(iii) the area enclosed. The enclosed areas never exceeded c. 80 square metres; the majority of sites enclose an area of between c. 30 and 60 square metres.

Taking these factors into consideration, an explanation of the dynamics of structural variation can be advanced. Among pastoral sites in the villages, corral morphology is usually defined as the most dynamic, and these structures are usually characterised by constant rebuilding, including episodes of contraction, as well as growth through additions. This model is in sharp contrast to esbardals and rock shelters; once constructed, these structures tend to retain the same plan and remain unaltered.

Accordingly, a basic typology of corral alteration has been developed. These structural variations, once detected archaeologically, may serve as an interpretative basis for identifying different building phases. Essentially, two key categories of alteration to corrals can be identified in the ethnoarchaeological record:

(i) alterations performed while the corral is still in use; these comprise three basic types:

(a) dividing of spaces;

(b) blocking of entrances;

(c) opening up of entrances;

(ii) variations performed once the structure is abandoned:

(a) deconstructing roofs and re-use of tiles and beams;

(b) deconstructing structures, and re-use of the stones.

The first group of alterations is described below; aspects of the second category are addressed in detail in the following chapter.
The internal sub-division of corrals is the most important structural variation they go through during their working lives. There are several ways that partition within a penning structure could be created: some were built using cane fences or just branches, others comprise dry-stone walls, or even mortar-bonded stone walls. Secondary partition walls can be recognised in most of the corrals studied, although cane division, are more difficult to recognise and often impossible to distinguish in sites following abandonment.

The blocking of entrances and windows has also been observed in several of the corral sites. Rather than the main door being blocked, it is common to observe the blocking of one of the entrance ways linking the unroofed and the roofed areas: this was explained by the shepherds as a way of keeping the roofed area warmer by avoiding the excessive entrance of cold winds. Blocking was also performed when restructuring corral spaces for other reasons. The creation of new entrances is far less common; when it occurs it is usually the opening of a hole little bigger than an average lamb, thus precluding the admission of larger animals. This activity is also carried out on internal walls, with the sole purpose of allowing lambs or kids to get freely in and out of a particular area where a particular type fodder is provided for them.

Informants provided two main explanations for these trends: reasons associated with inheritance, and functional reasons. Unlike rock shelters and esbardals, the ownership of corrals was very clearly established in the minds of the community. Most of the corrals within the Fageca and Famorca districts have been affected by multiple changes of ownership, or endured several inheritance processes. In some instances these processes have led to the sub-division of a structure in line with new conditions of ownership. Traces of structural variation related to inheritance patterns can be found in the following structures: Co.6, Co.7, Co.9, Co.11, Co.17 and Co.26. In most of these cases structural alteration has been performed through the erection of partition walls. These were usually of the dry-stone type, although walls with mortar are also present. The blocking of doors can only be confirmed in one case (Co.6).

Sub-division due to functional change is well defined by the ethnographic accounts. Corrals were used flexibly as tools of flock management. Consequently, shepherds
organised the internal space of corrals in order to ensure particular treatment for different production units within the flock.

A number of key uses for partitions can be noted:

a) to provide better feed for mothers and - especially - lambs and kids;

b) to separate the lambs or the kids at the beginning of the day when they are still suckling and the shepherds want to keep them in the corral, rather than taking them to the grazing areas;

c) to allow lambs to suckle calmly at the end of the journey;

d) to separate the rams from the rest of the flock outside the mating season; or

e) to separate ill or injured animals from the remainder of the flock.

Rock shelters and *esbardals* are simple penning spaces, and although internal divisions or features (like shepherd’s bed) may be found in them, these tend to be occasional. In the case of corrals, the bulk of a flock would be penned within the main enclosure, whilst specific sub-units of the flock, such as new born lambs, injured animals or rams, could be isolated in separate internal spaces for particular periods of time. In addition, separate containment structures were occasionally built alongside the structure, although cane fences provided a cheap and effective alternative means of providing additional accommodation space at a time of particular need.
5.5. THE LOCATION AND SEASONAL USE OF PASTORAL SITES

As just seen, structural factors bring information from an intra-site level, in particular aspects of flock management and environment exploitation. Scholars have, however, already drawn attention to the need to frame typological data on vernacular architecture with topographical analysis of the area where the sites are recorded (Pearson, 1998). The exploitation of the landscape of the villages by traditional shepherds thus seems to come into clearer focus when the location factors of corrals, esbardals and rock shelters within the district areas are analysed.

The location of pastoral sites reflects the way shepherds perceived and used their landscape. Shepherds used these sites daily, and decisions about the day grazing routes were always taken bearing in mind where the flock was going to stay overnight or during the mid-day in the hot summer months. The location of pastoral sites also reveals interesting aspects related to the changing equilibrium between farming land and pasture land. It also offers data about the economic links between traditional forms of farming and shepherding.

To frame the more specific location factors later described, some general location aspects can be introduced.

Firstly, for the majority of shepherds the main grazing territory used was the district area of each village (see Chapter 3); occasional incursions into neighbouring district areas were not rare but the main rule was to graze within the village district area. In most of the cases relations of land ownership were equally tied to the village district area. In a broad sense, both factors lead to the fact that village district boundaries defined the main spatial framework within which pastoral sites used by the local shepherds could be located.

Secondly, every district has specific aspects of physical geography which exert a controlling influence on the location of pastoral sites. These include: good sunlight exposure; differences in the quality of pasture areas; and the location of water sources. The location of the village stands also as essential, as it is the only human settlement
where shepherds have a home base. The convenience of a situation close to the village, especially for those sites used during winter, was often quoted by the informants.

Thirdly, and as pastoralism is an economic activity that traditionally implied constant movement and seasonal use of pasture areas, the location of pastoral structures was highly influenced by this factor. Within the Fageca and Famorca districts, corrals as the pastoral structures mainly used during autumn and winter months have, in general terms, different locations in relation to those of the spring and summer-used sites, esbardals and rock shelters.

5.5.1. Location of Pastoral Sites within the Study Area

In terms of physical geography, the Famorca district is characterised by two mountains which, together, enclose a narrow valley where the prime farming area is concentrated. Overpopulation has ensured that the zone of terracing extends to marginal areas on the stepped slopes of these mountains. The maximum extent of this terracing can still be recognised in the form of the horizontal lines of relict terrace walls, particularly on the north side of the Serrella mountain (see Chapter 2). The physical geography of the Fageca district is in general terms very similar to that of Famorca, the main difference between both districts’ geography being the fact that the west side of the Fageca village district opens up to the Seta Valley. On the other hand, mountain pasture is less common in the Fageca district than in the Famorca district, due to the greater extent of cultivable land, especially in the west side of the district.

Figure 5.6 refers to the location of esbardals. The five recorded esbardals within the area demonstrate a homogeneous pattern of location: all are located in a similar band of altitude (800-900m above sea level), on the northern side of the Serrella mountain. This pattern means that esbardals lie mid-way between the summer pastures and the village, and thus avoid direct contact with the terraces under cultivation.

Figure 5.7 illustrates the distribution of rock shelter sites in the area. The majority of these sites is located on the Serella mountain, although their location follows a more varied pattern relative to esbardals. Rock shelters have been recorded within a band of
altitude ranging from 700-1200 metres a.s.l, although the majority lies between 800-1000 metres a.s.l. Again, these locations reflect the needs of sites from which easy access to summer pastures is essential, whilst also demonstrating a relatively close proximity to the village.

*Esbardals* and rock shelters represent the quintessential summer pastoral site. Their location reflects this point well, as they lie close to the pastures which shepherds identify consistently as for summer use. Perhaps the most striking aspect of their location within the area of study is their general absence from the Alfaro mountain, which ethnographic sources define as mainly winter pasture area, although the upper levels were undoubtedly visited during the summer months. Several points are of relevance in explaining this pattern. First, the Alfaro mountain lacks any permanent water sources, so, even if occasional summer exploitation took place, daily return to the village was essential. Secondly, pockets of cultivation on the Alfaro mountain are both small and sparse, and it seems that there was not an excessive need for manure production. A lack of areas of intensive cultivation ensured that daily return to the village, where flocks could be better looked after and made secure, was easy and convenient, with less risk than on the Serrella side of the district.

Corrals within the Famorca district (Fig.5.8) are located predominantly on the sunny side of the Alfaro mountain, especially along the lower slopes (never in excess of 800m above sea level), and generally close to the dry riverbed (Co.12, Co.13, Co.14, Co.16, Co.17, Co.18, Co.19). This pattern of location can also be noted for corrals found on the Serrella side of the district (Co.10, Co.11, Co.20, Co.21, Co.23, Co.24, Co.25, and Co.26). There is only a single case, Co.16 on the Serrella mountain, of a corral located in excess of 1000m above sea level.

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22 The few water sources identified in the Alfaro mountain, had pastoral sites present in their surroundings. Two examples of this are the *Arjup* cistern, with the *Arjup* cave as a penning site, and the *Basetes* water point with two rock shelters.
Fig. 5.6: Location of esbardal sites (○) within the study area.
Fig. 5.7: Location of rock shelter sites (▲) within the study area.
Fig. 5.8: Location of corral sites (■) within the study area. (★) Olvits water source.
In the Fageca district, the flanks of the Alfaro mountain have relatively few corrals in comparison to the area around Famorca: only three sites are found in this area, Co.8, Co.30 and Co.31. Co.3, Co.5 and Co.9 are all located on the slopes of the Serrella mountain. The remainder are found on the western side of the district; these comprise Co.1, Co.2, Co.4 and Co.6. It is notable that none of these corrals are located in excess of 900 metres a.s.l.

(i) Areas of Concentration of Pastoral Sites

Within the Famorca district, two major areas can be defined where corral sites are concentrated: the Barranc Fondo (deep ravine) and the Solana (sunny side) areas.

The Barranc Fondo is located on the low northern slopes of the Serrella mountain. It comprises a shallow ravine where little soil is available and the main landscape features are rocky outcrops, although intensive terracing, involving the building of tens of terrace walls, took place here, most probably during the 19th century. Almond trees and pulses were grown in this area until the first half of this century, although today most of the terraces are abandoned and only the most fertile, at the base of the ravine, are currently in use. The area lies some ten to twenty minutes walk from the village; access was via a mule track (today transformed into a tarmac track). Running by the side of the ravine was the old road to the village of Beniarda, in the Guadalest valley, which was also used traditionally as a sheep track.

The Barranc Fondo, on the northern slopes of the Serrella mountain, was regarded by shepherds as a resource which was exploited primarily during the spring and summer months. A total number of five corrals is located in the area immediately surrounding the ravine. Corrals 23, 24 and 26 are located along the central axis of the ravine, Co.22 and 25 are a short distance to either side, whereas Co.22 stands in an area close to the top of the ravine. Co.24 and Co.26 were located within the general zone under cultivation, although an area immediately surrounding the structure was kept clear in order to allow the free movement of stock without the risk of crop damage.
Two esbardals and two rock shelters were also located along the ravine. At the bottom of the ravine, the Les Coves (Rs.29) site demonstrates an extremely significant and peculiar concentration of penning structures within a rock shelter. Because of its size and the number of structures present (eleven individual penning areas), this site is unusual not only within the study area, but within the region. The reason for such particular concentration was very possibly the excellent sheltering possibilities offered by the impressive limestone rock cleft carved at the bottom of the ravine. In addition, several other rock shelters were recorded along scarps on this side of the Serrella mountain and along the neighbouring ravines in the vicinity of the Olvits water source. Overall, this area contains a remarkable concentration of pastoral structures.

The Solana area is situated opposite the village on the low and sunny south-facing slopes of the Alfaro mountain. This area is characterised by a general absence of vegetation, with only a scattering of bushes and scrub, and a lack of soil. Occasional pines and oak trees punctuate the slopes, which also contain a small number of terraces where almond trees are grown; a threshing floor has also been identified in this area.

The following corrals were found in this area: Co.12, Co.13 (this is a composite structure comprising two corral units) and Co.27 and Co.28. All of these sites have relatively easy access to mountain pastures and were, without exception, located on the edges of a narrow strip of terraces extending between the river bed and the lower slopes of the Alfaro mountain. These corrals were exploited primarily during the winter months. No sites associated with summer occupation, such as rock shelters or esbardals, have been recorded in this area, although ethnographic sources indicate that some of the higher cliffs on this side of the valley were used occasionally as points for mid-day shelter in the summer season.

Respectively, these two areas represent notable examples of dense concentrations of pastoral sites where different factors have combined to influence complex decisions of site location. These individual factors merit consideration in their own right. In the case of the Barranc Fondo, shepherds have given the following reasons as explanations for the concentration of structures:
• the exceptional quality of pasture in the area;

• ease of access to upper areas of the Serrella mountain. This area, in particular the Canal (channel) area in the Beniardà district, played an important role in patterns of summer grazing, and was frequently visited by flocks from Famorca during the summer months;

• the proximity to an important source of water, the Olvits. The regular supply of fresh water becomes increasingly important during the summer months when the pasture is very dry and animals require daily access to water.

In the case of the Solana area, the following factors can be identified:

• the short distance that separates this concentration of corrals from the village ensures ready access for the shepherds, thus increasing security against possible thieves;

• easy access to the southern slopes of the Alfaro mountain, which were used mainly for winter pasture. Exposure to sunlight here ensures higher day-time temperatures than on the Serrella side of the district, ensuring the rapid dispersal of frost which can make the land unsuitable for winter pasture; snow also melts quickly in this area. This final consideration is of great importance, as in areas covered with snow, flocks may be forced to stay under shelter for long periods of time (some shepherds commonly recall such episodes in excess of a week).

In the case of the Fageca district, no significant concentrations of pastoral structures can be identified; rather, the distribution maps demonstrate a dispersed pattern (Figs. 5.6, 5.7 and 5.8). As a consequence, it was markedly more difficult to obtain consistent explanations from shepherds regarding the location of pastoral sites. As a general rule, however, easy access to pasture and water points (especially in summer sites) was commonly cited as a key factor, as well as a perceived need to avoid areas of intensively farmed land.
5.6. DISCUSSION

Two key factors can be identified relating to the interpretation of the structure and morphology of pastoral sites. First, pastoral sites as recorded within the Fageca and Famorca village districts can be treated as archaeological sites in their own right. This underlines how the post-medieval archaeology of pastoral economies, whilst comparatively well established in northern Europe, is in its infancy in the Mediterranean basin. Essentially, pastoral sites across the North Mediterranean Basin have been seen as being too recent to merit the serious attention of archaeologists with few exceptions (Chang, 1981; 1984; Chang and Koster, 1986; Chang and Tourtellotte, 1993; Seguí, 1995; Beavitt et al. 1995, 1998; Barker, 1989; Barker and Grant, 1991), this situation being particularly underdeveloped in the Spanish case. Secondly, ethnographic accounts of structural aspects of contemporary pastoral sites within the study area suggest that the understanding of the structural logics and morphological development of such sites may provide the archaeologists with a valuable tool to assess the economic status and functionality of similar structures in the past.

Structural aspects of pastoral rock shelters, esbardals and corral sites identify particular patterns of economic exploitation: on the one hand, of the surrounding landscape, on the other, of the flocks penned in such sites. Thus, building materials used in the construction of pastoral sites mirror limestone quarrying activities, wood cutting for beams and tile production. Existence of storage areas underlines the occurrence of periods of grazing shortage, and herding strategies implying the local maintenance of the flock all year round. Dividing units within the main corral space shed some light on flock management strategies. Overall, structural variability of pastoral sites within a small territory such as these two districts reflects the seasonal character of the pastoral land use of such territory.

Location of the pastoral sites has been examined here on two scales of analysis. First, a general model has been proposed which has sought to relate corral location to the seasonal exploitation of pasture resources and the historical expansion and contraction of the cultivated zone. Secondly, the immediate setting of individual corrals indicates that a
degree of opportunism and individualistic pragmatism also played an important role in corral location. As with other aspects of agro-pastoral land use, the location of corrals could display idiosyncracies on behalf of key decision makers, thus demonstrating the weaknesses of a purely empirical approach to corral location.

During the cold months of the year, flocks based in the villages predominantly grazed pastures on the southern side of the districts (especially the Alfaro mountain), the immediate environs of the villages, or areas located in or around the dry riverbeds (Seta and Famorca rivers). In addition, the Famorca shepherds used the Famorca dry riverbed and boundaries of cultivated fields. During summer months, however, flocks tended to concentrate their grazing on pastures on the north side of the districts (especially the Serrella mountain and those in higher locations), whilst the high areas of Alfaro mountain were also grazed in summer.

In attempting an archaeological approach to pastoral land use, the key indicators of summer/winter sites can be defined as altitude and orientation. Overall, sites exploited primarily during the summer months relate well to summer mountain pastures. In general, they occupy higher locations and are more abundant on the Serrella northern side of the study area. Winter sites, on the other hand, tend to be located at lower altitudes. Although more abundant in areas with maximum exposure to sunlight, these sites are also present in areas that could have been exploited as summer pastures, as well as winter grazing areas.

However, the available evidence also indicates a considerable degree of flexibility in the location and seasonal/daily use of pastoral sites. Perhaps the most important factor which gives rise to this flexibility is the varying intensity of human activity, and particularly herding activity, in the districts. The need for spring and summer penning space ensured the widespread use of rock shelters, whereas corral sites could be occupied for longer periods if manure was required, or to provide shelter. In addition, the location of corrals could be influenced by more specific economic or cultural factors such as land ownership, personal interest in manure production for a particular area, the re-use of extant structures, or personal idiosyncracy.
In conclusion, it can be suggested that a truly integrated approach to the identification of seasonality within pastoral sites should combine the analysis of spatial data relating to site location with structural and material information. In particular, the existence of spaces dedicated to fodder storage and the construction of roofed sections identify pastoral sites - mainly corrals - which were exploited primarily during the winter months. Equally, sites exploited primarily during the winter tend to demonstrate more extensive inventories of associated material culture, from troughs to agricultural tools (see Chapter 6).

Conversely, among the pastoral sites analysed within the study area, corrals can also be identified as the most flexible structures in terms of seasonal use. Although they are often found at a common altitude, corrals are found in areas with different sunlight exposures, and their roofed structure allowed potential use at any time of the year. Rock shelters and esbardals seem to have been tied more specifically to a single mode of seasonal exploitation. These sites, primarily used during the spring and summer months, could not be exploited during colder seasons due to the lack of sheltering capability, especially against rain or snow. Finally, caves can be defined as pastoral sites with an all-year capability, especially those located in areas of favourable sunlight exposure.

By definition, a pastoral site will avoid intensively farmed land: within both districts under study, corrals tend to be located at the edge of terraced areas. The reason for this pattern is to avoid infringing upon potentially cultivable soils, and thus to avoid potential conflict with farmers. However, due to the changing dynamics of the cultivation patterns, a significant proportion of these sites has been gradually encroached upon by the terraced zone, and thus appear within the cultivated zone. In both districts, a number of corrals appear, in terms of their siting, to be less marginal than others, and seem certain to antedate the terracing that surrounds them. The advance of the terraced zone was a progressive phenomenon which created cultivable land on terrain which had previously been exploited less intensively, usually as pasture or woodland. Some of these terraces, such as those in the Barranc Fondo area, were raised in areas with relatively unproductive
soils, thus creating marginal areas of terracing which were soon abandoned in response to episodes of population decline.

Fig 5.9 represents an aerial photograph of the Barranc Fondo, Famorca, and exemplifies well the complex interrelationship between terracing and corrals. A pair of demonstrably older structures (Co.24 and especially Co.26) is located near the terraces which remain under cultivation. Expansion of the terraced zone, probably occurring sometime during the last century, enveloped these corral sites, whilst a number of secondary corrals, built \textit{a posteriori} to this expansion (Co.22, Co.23 and Co.25), occupied a marginal location relative to the area under cultivation at the time they were constructed.

In archaeological terms, the marginal location of corral sites relative to the cultivated zone is potentially of immense significance: corral sites, or at least a significant proportion of them, constitute an important indicator of periods of terrace construction.

For instance, a potentially valuable area in which to build a corral during the 17th century will invariably subsequently become part of an intensively cultivated arable zone, and thus become less suitable for the corral. Early corrals will thus tend to occupy positions which may today appear surrounded by cultivated fields (abandoned or in use), whereas later structures will usually be located in rather more marginal areas. This model is especially applicable to the Serrella side of the districts, and is especially important in Famorca, where conditions of soil availability ensured a more dynamic pattern of terracing than on the rocky slopes of Alfaro mountain. It is essential, however, to emphasise that the location of corrals cannot be used as a dating method in isolation; rather, it is important to combine such spatial information with other data relating to the structure and morphology of sites.
Fig. 5.9: Terracing expansion in the Barranc Fondo area.

The oldest corrals, Co.24 and Co.26 (2 and 1 in the picture) were enveloped by the expansion of cultivated land.

The more recent sites, Co.22, Co.23 and Co.25 (5,4 and 3) were built after the expansion and, consequently, located outside the new terraced area.
The existence of discrete areas where pastoral structures are concentrated relates primarily to the proximity of accessible pastures and water resources. However, such concentrations also relate to other aspects of the cultural landscape, such as the location of permanent settlements, whilst the distribution of cultivated areas also influences site location. Thus, lack of significant concentrations in the Fageca case may be answered by the more intensive cultivation within the district, and the non-existence of well located open areas with low agricultural potentiality such as the Barranc Fondo area, that could have attracted corral concentration. On the other hand the position of the Fageca village on the Alfaro mountain slopes seems to have diluted the penning space created to access the Alfaro pastures within the village structure, whereas in the Famorca case, with the village still on the Serrella slopes, this penning space emerged separated.

Spatial analysis of corrals and their settings has indicated several points of potential interest to archaeologists and ethnographers. First, corrals are in many ways located on the margins of cultivated areas: the majority lay at the interface between the inner core of terraces and the extensive peripheral zone of rough grazing. This characteristic of corral location can be explained, on the one hand, by the need to cultivate terraces intensively, and on the other, by the important relationship between the corral and farming activity. The key factor here is the role of corrals as centres for the production of manure and as nodal points from which manure could be distributed. Thus for practical reasons it was expedient to build corrals close to the terraces where manure could potentially be spread\[2\]. Secondly, good access was essential for a corral to function effectively. In all the cases studied, corrals were situated close to a sheep track which would have ensured access to and from the cultivated zone. In addition, an open area of variable size is always found around the main entrance to the corral site. This allowed the flock to gather before entering or leaving the penning structure. Thirdly, research in the neighbouring area of the Serra del Almirant has provided an interesting explanation of corral location. Here, detailed fieldwork has demonstrated the use of surface water flow in corral sites through the construction of cisterns, and indicated that certain corrals were

\[2\] This does not mean that manure from a specific corral was always spread in the immediate surrounding terraces; it could be use in other terraces located in a totally different area.
sited specifically to take advantage particularly of slopes, in order to capture runoff (Beavitt et al. 1998).

Rock shelters and esbardals are distributed more randomly, due to the fact that they were generally built in areas with less cultivation pressure. In the case of rock shelters, the exposure of a given site to sunlight is the essential factor in explaining its use by shepherds. As they were generally occupied during the hottest hours of summer days, most rock shelters were used with the intention of keeping the flock out of direct sunlight, and thus tended to be oriented northwards.

Finally, and as Chang (1992: 66) also noted in Greece, the ethnographic record shows that shepherds often use places in the landscape, such as natural shelters or watering points, without the need for the erection of structures of any sort. Within the research area, these sites were mainly related to herding during the summer months. Shepherds identified shady rock shelters which were improvised using barriers of branches, as well as natural water sources or pools in river beds that never dry out during the summer. They will, a priori, be invisible to the eyes of the archaeologists although they were an essential part of the shepherds' pattern of landscape exploitation.

Five essential points have thus been raised within this discussion.
(a) The seasonal use of pastoral sites relates directly to their location, particularly in terms of their altitude and exposure to sunlight.
(b) An archaeological approach to the question of seasonality should incorporate structural data. Prime indicators of seasonality include: the existence of storage areas, roofed sections and internal walls (winter sites), and lack of a roof structure and internal sub-divisions (summer sites).
(c) Ethnographic data shows a degree of flexibility in the location and seasonal use of these pastoral sites which should be also considered. The main reason for this flexibility in the study area is the intense nature of human activity which has reduced the scope for corral building and forced farmers to be flexible in their seasonal activity.
(d) Within the study area, corrals could potentially be used as chronological indicators of the advance of terracing. This observation relates to the fact that corrals are never located within the terraced areas, but at the edge of the cultivated zone. As terracing is clearly a dynamic phenomenon, its advance or retreat will respectively envelop or isolate corral sites.

(e) The existence of areas where pastoral sites seem to be concentrated is explained ethnographically by the seasonal exploitation of high-quality pastures and the proximity to watering points.

5.7. CONCLUSION

An attempt to understand pastoral sites requires constant reference to the landscape within which they are set, as noted within many similar ethnoarchaeological studies (Chang 1984, 1992; Chang and Tourtellote, 1993; Segui, 1995). In particular, the information presented in this chapter has emphasised that the mountainous landscape of the Fageca and Famorca districts is a dynamic agro-pastoral system which has constantly been adapted in response to complex social and environmental stimuli. Whilst the present landscape - characterised by precipitous slopes, occasional pockets of terracing and a tiny cultivable zone - outwardly appears stable and timeless, this obscures a long history of progressive agricultural advance and contraction and, in particular, a subtly changing balance between the cultivation of terraces and the exploitation of pastoral resources.

In summary, we can conclude that pastoral sites are not isolated features which are alienated from their surroundings; instead, they are structures in many ways defined by their settings and their complex interrelationship with the human and physical landscape. From a strictly archaeological point of view, such inter-relationships, along with the process of abandonment of many of the Fageca and Famorca pastoral sites, are acting as agents of alteration of the original structure of these constructions on the one hand, and on the other, the shepherds' material assemblage that defined the original functionality of such sites.
CHAPTER 6

ABANDONMENT AND POST-ABANDONMENT BEHAVIOUR OF CORRAL SITES\textsuperscript{24}

6.1. INTRODUCTION

The analysis of structural and locational aspects of pastoral sites presented in the previous chapter has reported useful data to better understand the functionality of these sites. However, the research has been carried on structures which are mainly no longer in use. Inevitably, this led to question the ways and the extent to which their abandonment could have affected their original status in terms of structure and material assemblages. This chapter aims to take advantage of the ethnographic research undertaken to gain an understanding of the effects of the abandonment processes on Mediterranean pastoral sites. Availability of time restricted the collection of data related to abandonment to the group of corral sites located within the Famorca district.

The material remains of abandonment sequences at pastoral sites found across the Mediterranean basin have been given little attention by archaeological research projects. Fragments of isolated data on abandonment derived through casual contact as an external observer may have been gathered during fieldwork, serving to supply a 'living context' for an often all too narrow focus on antiquity (Seeden 1985: 289). An example of this has been described by Lloyd \textit{et al.} (1997: 38) when referring to the perishable nature of shepherds' milking installations in the upper Sangro valley (Italy). However, what is still needed is a detailed description and analysis of the actual cultural processes underlying abandonment, and structuring the material remains archaeologists might find in these sites. So far, study of site abandonment has remained largely a domain of American archaeology, with the American Southwest

\textsuperscript{24} Some of the information and graphics included in this chapter have been published in Creighton and Segui (1998).
being the traditional testing ground; indeed the only collection of papers tackling the issue of abandonment as a site-formation process (Cameron and Tomka 1993) contains a single European case-study, from western Portugal (Lillios 1993).

Many recent ethnoarchaeological studies of abandonment behaviour have tended to examine the material remains of abandonment in the period immediately after deposition (cf. Hayden and Cannon 1983). This mode of study is essentially a source of information about the pattern as opposed to the processes of abandonment (Tomka and Stevenson 1993: 192). The research conducted in Famorca was directed towards present pastoral abandonment as an evolving, diachronic process; thus responding to Gorecki's (1985) suggestion that ethnographic studies of abandonment must evolve to construct an archaeology of ethnography.

Abandonment behaviour at these corral sites is examined through this chapter at three scales of analysis:

1. the abandonment of the pastoral landscape within the Famorca village district;

2. patterns of structural and functional variation related to abandonment;

3. the material assemblages of abandonment, including corral 'furniture' and portable material culture.

Due to the impracticality of observing abandonment within the Famorca district over a sufficient and archaeologically valid time-period, the research focused on exploring the potential of examining a range of corral structures at different stages of abandonment within the same territory. In this sense, the corral assemblages found within the Famorca district represent an almost ideal set of structures for abandonment research. They are represented both within the 'systemic' (living) and on the very threshold of the 'archaeological context' (Schiffer 1972). This allows a wide perspective for timescale analysis. An attempt will be made to measure the effect of the abandonment process on the original artefact assemblage found in the corrals studied. Moreover, ethnographic research, whilst aiding behavioural interpretation of abandonment assemblages, also adds an additional dimension of temporality - idiosyncratic records
of abandonment sequences being preserved within the minds of the informants at the Famorca village.

6.2. METHODOLOGY

A sample of nineteen corrals located within the Famorca district was used; detailed research on a larger number of sites was not possible in the time available. The corrals were firstly classified into three main groups:

(i) corrals permanently abandoned - those corrals which were, when the survey was carried out, no longer used as penning sites at any time during the year;

(ii) corrals episodically used - corrals used by the shepherds on an occasional basis, most of the time without any previous planning;

(iii) corrals in full use - corrals which are still fully integrated within the traditional system of pastoral use; that is, they are periodically occupied by the herd following grazing strategies to seasonally exploit different pasture areas within the district.

Next, for the process of data collection, three main areas for each corral were defined:

(i) the roofed area;

(ii) the unroofed area;

(iii) the surroundings. These were defined as an area of twenty metres around the actual corral, which subjectively marked the edge of the find collection area.

Finally, finds were classified firstly into two main groups, items and material buildings; in archaeological terms both groups define the presence of a site.

(i) The *items* (artefacts) group includes any kind of tools or material, other than building materials, related to human activity at the site. In methodological terms, the scheme proposed for Famorca attempts a functional classification of artefacts as recommended by Ward *et al.* (1977) and Rothschild *et al.* (1993), as opposed to a classification based on the condition and point of manufacture of artefacts, proposed by Tomka (1993). Thus the finds collected were functionally or culturally allocated to
four item groups, shepherds, farmers, hunters and others (that is, not clearly related to any of the others). Each of these groups, apart from others, identifies the presence of a particular activity within or in the surroundings of a site which is ethnographically defined as a pastoral site. Whereas a functional relationship was assumed between shepherds' artefacts and the corral, the presence of any of the rest (those attributed to either hunters, farmers or others) was understood in terms of the alteration of the corral's original material assemblage triggered by the abandonment process.

The ethnographic information collected made it possible to relate some of these items to a particular activity. Table 6.1 shows a list of items that ethnographic research has identified as functionally related to pastoral activity. Some of these items are part of the usual corral furniture, others were referred to by shepherds as an active part of everyday herding activities. All of them were referred to as exclusively pastoral items.

(ii) Building materials are those materials belonging to the corral structure and which, due to the semi-ruinous state of many corrals, appear scattered all over the place (such as nails, fittings, beams and so on). From among these, tiles have been selected to further the main analysis and discussion. The selection of tiles as an individual research item within the building materials category was based on the recognition that they are the prime artefact recovered from sites of this type in the archaeological context. The analysis aimed to monitor how different abandonment stages could alter their presence at the site.
<table>
<thead>
<tr>
<th>Type of Tool</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>sling</td>
<td>esparto grass</td>
</tr>
<tr>
<td>belt closer</td>
<td>wood</td>
</tr>
<tr>
<td>pouch</td>
<td>leather (sheep or goat skin)</td>
</tr>
<tr>
<td>branding iron</td>
<td>iron</td>
</tr>
<tr>
<td>shear scissors</td>
<td>iron</td>
</tr>
<tr>
<td>sheep bells belt</td>
<td>leather (goat skin), cannabis plant*</td>
</tr>
<tr>
<td>sheep bells</td>
<td>copper</td>
</tr>
<tr>
<td>cheesemakers*</td>
<td>wood</td>
</tr>
<tr>
<td>troughs</td>
<td>wood</td>
</tr>
</tbody>
</table>

Table 6.1: a list of items that ethnographic information relates exclusively to herding activity; (*) indicates those items or materials not recorded within the research area but in neighbouring areas of Mediterranean Spain. Ethnography in these areas shows that shepherds created a wide range of other tools, from spoons to flutes, mostly from wood, some of which had very elaborated decorations (Atienza Peñarrocha, 1991: 29-44; Martínez, 1991: 215).

6.3. ABANDONMENT OF CORRAL SITES WITHIN THE FAMORCA DISTRICT AREA

6.3.1. The Current Pastoral Landscape

The current interaction of three main activities - two economic, farming and shepherding, and one seen as a free time activity, hunting - in a small area such as the Famorca village district, underlies the mechanisms behind the abandonment of sites outwardly appearing 'pastoral' in nature, and structures the material assemblages of abandonment. To properly understand the process of abandonment of such sites, an analysis of the later evolution and current role of those activities within the economy and general activity of the Famorca people needs to be carried out.
As already mentioned (Chapter 2), the decline of herding within the study area has been a gradual process, initiated and exacerbated by several key socio-economic factors including instability in meat and wool prices and rural depopulation. These factors seem to have played the central role behind the decision to abandon corral sites. In particular, the drop in population numbers which led to a selective abandonment of the less productive and accessible terraces. This factor was reinforced by the creation of a network of tracks for mechanised agricultural machinery as a substitute for animal traction. The new track network covered a much reduced area, denying mechanised access to wide sectors of the traditional farming landscape. This contraction of the cultivation zone had, on the other hand, the effect of increasing the availability of potential pasture for a progressively smaller number of flocks. This landscape reorganization underlines the reorientation of pastoral behaviour essential in understanding the abandonment sequences found in the area.

6.3.2. The Abandonment Process: Data Analysis

The research undertaken defined two levels of data analysis. The first one refers to the factors and effects related to the abandonment of corrals as individual features within the village district landscape; this is the relationship between abandonment and the particular location of each site on the one hand, and between abandonment and structural/functional alterations of the site on the other. The second level of analysis focused on the material assemblages recorded in the corral sites, finally attempting to assess to what extent the abandonment processes have altered the original assemblage composition of the corral sites under study.

(i) Location Factors, Structural and Functional Changes Related to Abandonment

The changing spatial relationship between corrals and the distribution and extent of grazing/arable resources appears to be the essential element dictating the total abandonment of certain corrals and selective episodic usage of others. Location factors described in the preceding chapter have shown how corral sites, when first built, tend to be located around the edge of the cultivated area, often in actual physical contact with the terraces. The contraction of the cultivated terrace zone has thus
resulted in the isolation of sites located at the spatial interface between grazing and arable land use (Co.24 and Co.26 being key examples, see Fig. 5.9).

On the other hand, increasing journey-time between a corral site and Famorca appears to be a conditioning factor, serving to decrease the chance of the site remaining in use, yet the ethnographic information gathered shows how shepherds retain an interest in maintaining a proportion of sites in areas of the village district they feel are still potentially exploitable as grazing zones. Elsewhere ethnography suggests the human variable as the only explanation; the episodic exploitation of Co.17 and Co.19 instead of Co.18, despite the fact that this latter site remains associated with a cultivated area of terraces and is closer to the village, is explicable only in terms of the idiosyncrasies of pastoral land management; the shepherd in question has a personal attachment to the first two sites.

Attitudes to re-use are, on the other hand, a key factor in structuring the abandonment assemblage (Stevenson, 1982). Evidence from the Famorca corrals demonstrates an important degree of flexibility in attitudes to return or re-use, clearly linked to the status of the structures as seasonal components within an economic activity such as pastoralism, which implies a high degree of mobility. However, and as pointed out by Tomka and Stevenson (1993:192), the process of abandonment in this more gradual mode does not necessarily exclude the potential for creating archaeological parallels from the ethnographic data collected.

The structural remains of abandoned and semi-abandoned corrals in Famorca support the thesis of gradual building deterioration seen in similar studies of the Maya highlands (Deal 1985: 264-68) and Syrian villages (Seeden 1985: 293-94). In the Famorca area, structural degradation, renovation and eventual abandonment could to some extent be considered part of the cyclical aspect of 'typical' agro-pastoral land management. The continuous presence of herding activity within a small territory such as the district area, and the flexibility in the ownership of the corrals, have promoted a wide range of post-abandonment structural variations. Data show that four clear phases of structural or/and functional variation can be noted, each characterised by a series of clear physical manifestations:
(i) structural variations or/and spatial restriction or re-orientation of corral-based activities. Typical examples of structural variations due to gradual abandonment include the re-building of structurally vulnerable parts of the corral, particularly the entrances. Spatial contraction of the area in use is exemplified by Co. 17, where the roofed area has been restructured and now occupies half of the original roofed extension, whereas the unroofed section of the structure is totally abandoned;

(ii) employment of corrals as storage facilities. Some of the corrals have been used to store crops or items such as agricultural tools or building materials. An example of this is Co.13, no longer used for pastoral purposes, with the conversion of a section of the site to an agricultural store and disuse of the remainder;

(iii) corrals as a 'quarry' for raw materials. Re-use of building materials, particularly tiles, from the corrals was detected in several sites;

(iv) corrals as abandoned structures. Corral structures are considered as totally abandoned when no trace of any of the above uses is detected.

Perceptions of what constitutes abandonment of a structure are equivocal within the local community; ethnographic research demonstrates that those members of the community defining their prime economic activity as 'pastoral' perceive roof removal as constituting 'abandonment', while those seeing themselves primarily as 'farmers' generally saw structures in such apparent disuse as fulfilling a useful function and 'in-use'.

Corral-owners and users suggested that an interval of six to eight years without seasonal renovation is sufficient to convert the site from full use to a downgraded function. In addition, and although conventional perspectives dictate that a fully abandoned structure ceased to play a role in pastoral land use, the Famorca evidence demonstrates the continuing role of a number of structures as territorial markers after abandonment. In real terms, however, and again due to the flexibility of the pastoral activity or other socio-economic factors, it could be pointed out that in sensu stricto as long as a corral stands as a structure there is some potential for use.
6.4. ABANDONMENT AND MATERIALS

Research on surface assemblages from abandoned sites is a relatively well developed archaeological theme. The theoretical basis for surface assemblages related to abandonment has mainly been laid by Schiffer (1972; 1976; 1983; 1987) along with other authors such as Ward et al (1977), Rothschild et al (1993) and Tomka (1993). However, the particularities of material assemblages associated with the abandonment of traditional Mediterranean pastoral activity are still little understood. Some preliminary approaches have been undertaken by Chang and Tourtellotte (1993: 260-61), and they underline the potential for such work in terms of clarifying the characteristic signs of pastoral abandonment.

De facto refuse can be defined as large items of refuse forming the 'abandonment cache' of disused sites (Tomka 1993: 15), whereas primary and secondary refuse implies the deposition of broken or exhausted items, respectively in the immediate vicinity of, or away from, the original point of use. The McKellar hypothesis states that primary refuse will comprise smaller items deposited on floor surfaces or their equivalents (Schiffer 1983, 694-95). It has long been recognised that these processes can operate independently or in isolation; the evidence gathered in the Famorca area supports the thesis of a 'stratigraphy' of depositional and post-depositional processes, combining to structure the material assemblage of abandonment.

6.4.1. Building Material

Here, analysis was focused on the spatial distribution of tiles and tile fragments associated or formerly associated with sites. The empirical analysis of tile assemblages in and around the Famorca corrals assessed the number of tiles in three states of destruction: (i) whole; (ii) partial (> 50%); and (iii) fragmentary (<50%). Analysis sought to compare the characteristics of the original roof tiles assemblage with the subsequent fragmentation and dispersal of the tiles in corrals at various states of abandonment (corrals permanently abandoned and corrals episodically used as opposed to corrals in full use). Figure 6.1 summarises the evidence.
In terms of analysis at the intra-site level, the distribution of tile fragments between activity areas in corrals which are at different states of abandonment shows the following patterns:

- a scatter of tile fragments across the surroundings of the corral is already formed in sites still in permanent use. This is most likely the result of the loss of a few tiles through agencies such as wind action;

- the number of fragments increases markedly in episodically exploited sites, but declines in permanently abandoned sites, the main factor here being natural processes such as increase of vegetation or soil accumulation that make the scatter less visible to surface scrutiny;

- the low average of tiles recorded in permanently abandoned corrals. This is partially a result of a proportion of dislodged tiles entering the archaeological context, and which then remain invisible to surface survey. Thus only two of the nine permanently abandoned sites showed any remaining tiles in situ (Co.19 and Co.22).

Ethnography shows that the salient factor explaining the overall decrease in tile numbers over time is clearly related to their perceived value as a flexible and recyclable building material, and consequent curation for re-use in other buildings. This process can be seen at corrals Co.11, Co.23 and Co.25, where roofs are entirely dismantled, and in corrals Co.19, Co.20 and Co.22 where the process is partially undertaken.

At the inter-site level, the scope of building material recycling has been linked to variables such as the distance to the settlement in which the materials will be used (Cameron, 1991); evidence from Famorca, however, demands a more flexible explanation:

- when comparing whole tiles between activity areas in corrals at different states of abandonment, a number of sites (Co.12 and Co.19) has collections of whole tiles piled against the walls. Informants emphasize that the tiles were not curated with the intention of immediate removal to another site, but were being preserved for a potential future re-use;
Fig. 6.1: Distribution of tiles within the three areas defined (roofed, enclosure, surroundings).

* Permanently abandoned
-overall, episodically-used corrals displayed a higher proportion of partial tiles and tile fragments on the surface. Those whole tiles that still remain at these sites are still in situ on the roof.

-the scope of tile-curation is deeply influenced by perceived difficulties in corral access. Several owners stated an interest in tile re-use, yet tile recovery becomes problematic due to difficulty of access without a mule for those sites now not reached by the modern track network. Accessibility is in fact largely responsible for the distribution of corrals with fully or partially removed roofs, although other processes such as the wind and less formalized activities introduce an additional element of variability into the number of tiles entering the archaeological context.

6.4.2. Material Assemblages

The categories of artefacts selected here comprised:

1. foodstuffs (discarded food containers, packets and boxes);

2. construction (architecturally-related items other than tiles, including nails, fittings, brackets etc.);

3. hunting items (cartridges, cartridge boxes);

4. pastoral items (wooden and metal troughs, sheep bells, cane fences; see Table 6.1);

5. agricultural items (tools such as ploughs and hoes, and storage containers such as sacks, fertiliser containers);

6. clothing (including boots, trousers and shirts);

7. other (non-classified items including wheels, car batteries and miscellaneous personal effects).

A brief description of the items found in each corral site researched is given below. Figure 6.2 summarises in percentages the data collected in each group of corrals: ‘permanently abandoned’, ‘episodically used’ and ‘in use’.
(i) *Permanently Abandoned Corrals*

Co.11. There was a total absence of items related to shepherding and hunting. Farming items were, on the other hand, found in all three areas (roofed, unroofed and environs). The location of this site can be described as atypical in relation to other pastoral sites in the area. It is located in a non marginal farming area, access to which has been improved by a new tarmac track. This fact may explain the predominant presence of farming items. The roof was totally dismantled soon after shepherds stopped using it, preventing an episodic use, at least during the cold months.

Co.10. Very few items were found in this corral and none of them clearly identified an activity. This is the only site researched where there has been a fire after abandonment; this could partly explain the small number of items found. The original difficult of access to this site is being increased by the growth of bushes and scrub in its surroundings.

Co.15. Just one item was located in this corral. This could be explained because of the extreme isolation of the structure.

Co.18. Although this corral lies in a rather active farming zone, no item related to that activity or shepherding was identified. Hunters’ items were, on the other hand, quite numerous; this is explained because of the use of the site as a hide for hunters. Access to the site is extremely easy as there is a track used by small tractors.

Co.19. The surrounding terraces, of low productivity, were abandoned early and the area is now integrated within the mountain zone. The items found in this site were all related to hunting activity.

Co.20. Originally at the edge of a cultivated zone, abandonment has ‘relocated’ this structure to a mountain zone. Although farming activity had an obvious presence in the immediate surroundings of this corral (threshing floor, terraces, etc.), there was not a single item related to farming. Shepherding or hunting items were not found either.
Co.23. Farming items were located within the roofed section of the corral. The second floor was occasionally used to store farming products from the surrounding fields, still exploited today. It appears from the ethnographic information gathered that this farming storage role continued for some time after the structure ceased to be used as an animal enclosure. The Fondo ravine area, where this corral is found, is one of the main foci of hunting activity within the district. There was an important presence of hunting items; one of the enclosure walls has been used to build a small semi-circular stone enclosure used by hunters as a shooting post.

Co.24. Very few items from any of the three activities have been found in this corral. It is also in the Fondo ravine area, but occupying a more marginal position than Co.23. The roof was totally dismantled after its abandonment.

Co.25. A very similar situation to Co.24, though in this case the structure was more integrated within the cultivation area; the number of items found is also larger than in Co.24.

Among the items which identify activity, the most common ones are related to hunting. They were found in corrals located in very different areas within the district boundaries. Although in just one case, Co.18, these hunting items were found within the structure itself, within the roofed area, in the majority of cases corrals are located in areas where farming activity has also been abandoned; terraces were often abandoned even before the corrals themselves. In these cases the structures became more isolated and this isolation could have been reinforced by the new network of tracks.

(ii) Corrals with an Episodic Use

Co.12. Shepherds’ items (fodder, cane fences) were found in the roofed and surrounding areas. Although not used anymore as a regular penning site, its second floor was currently used to store fodder and a large flock was recently penned in this site. Proximity to the riverbed and easy access from the village explain the high number of items found.
Co.13. There was a good representation of farming items (ploughs, hoes, bee hives). This is due to the use of the site for storage by a farmer from the village. Shepherds' items also had a good representation as the site was recently more intensively used by a shepherd. Although intensive, this use can still be considered episodic as there is a lack of consistency.

Co.14. A few shepherds' items related to punctuated occupation during winter months. Although adjacent to some currently cultivated terraces, no farming items were identified.

Co.16. This site occupies a marginal location in relation to the grazing territory used by the shepherd. Few representative items was found.

Co.17. The surrounding terraces are still in use, and the area is relatively distant from the village. For this reason, part of the roofed section has been converted into a shelter normally used by farmers. Farming and also herding items were located in this site.

Co.22. Although it conserves its structure reasonably well, the site is only occasionally visited during the summer months. Again a small number of shepherds' items were found.

Co.28. This site is currently being used by a shepherd as a storage area, and occasional penning site for one or two animals. This explains the majority of shepherds' items found in this structure.

Structurally, the maintenance of a roofed area or functional storage area, allows a continuity of use for the corrals. Generally corrals with an episodic use lose their functionality as areas to work with the flock and become areas of occasional shelter or storage (of fodder or other items). Within the group, those located closer to the village, near the riverbed or close to a site in full pastoral use, have a larger assemblage of items: visual control, easy access from the village, easy access to refuse materials that had been washed down the river from local rubbish dumps and were collected and re-used, and the maintenance of herding activity in the surrounding are responsible for this increase in items.
(iii) Corrals In Use

Co.27. All the items found were directly related to shepherding, and they were mostly located within the roofed area. However, due to its position close to the riverbed and to the village, there is a great variety of items in its surrounding area.

Co.26. This site was unusual in that just a section of it is actually still being used as a proper pastoral pen. The area still functioning as a corral presents a clear domination of shepherds' items, but the rest of the site and the surroundings have an important variation, mainly defined by a heavy presence of hunting items.

Corrals in use have a high similarity in respect of their material assemblage, especially in those areas - roofed and enclosure - which comprise the structural body of the site. A small number of items is found in the enclosure area as opposed to what happens in the roofed section. On the other hand, the type and especially the number of items found in the surroundings of these sites vary considerably, very possibly because of the greater influence of location factors and cultural behaviours, such as location near the village or the site being related to an active hunting area.
Figure 6.2: Percentages of artifacts found in each group of contexts: permanently abandoned, episodically in use, and in use.

The diagrams show the distribution of artifacts across different contexts for each of the categories: Foodstuffs, Construction, Hunting, Agricultural, Pastoral, Clothing, and Other. The x-axis represents the categories, and the y-axis represents the percentage of artifacts.

- Permanently abandoned: The chart shows the percentage of artifacts found in contexts that were permanently abandoned. The highest percentages are in the Agriculture and Construction categories.
- Episodically in use: This chart displays the percentage of artifacts found in contexts that were used episodically. The highest percentages are in the Construction and Agricultural categories.
- In use: The chart indicates the percentage of artifacts found in contexts that were in use. The highest percentages are in the Agriculture and Construction categories.
6.5. DISCUSSION

Corral 'furniture' as a category is relatively sparsely distributed. Only Co.28 exhibits the classic pastoral furniture of feeding troughs; elsewhere furniture functionally associated with traditional shepherds' activity has been adapted for pastoral purposes, but these were not the original function of the objects. These include a recovered sink used as a feeding trough (Co.13), a clothes horse deliberately recovered from the river as a door brace (Co.12) and gasoline drums used as water butts (Co.27). Identification of corrals containing such items indicates an association with the river as a quarry for ex-situ material culture curated to be recovered from its bed when dried up.

Permanently abandoned corrals normally occupy areas that had also been partly or totally abandoned for farming. The isolation of the structure, that the abandonment of the cultivated surroundings and the difficulty of access bring, explains the small number of most of the item types found in these abandoned corrals, in relation to episodically and fully used corrals. However, those items related to hunting and construction are well represented at these sites (see Fig. 6.2). Hunting activity tends to take place in areas where there is relatively little human presence, and so abandoned cultivation, pastoral and mountain areas within the district are now the most suitable for this activity. The hunters' usual technique is to stay in the same place for hours, and so the number of discarded hunting items they create tends to be high. Equally, most of the foodstuff items identified in these sites came from the hunters' picnic meals, often including small fires. More hunting items were found in the interior of corrals that had been permanently abandoned than in any other structure; this is due to the fact that permanently abandoned corrals have often partly lost their structural integrity and become open sites. Although they are still standing structures they are not private spaces any more. However, ruined walls can still serve for hunters as hunting positions, as was seen in Co.18.

On the other hand the ruinous state of many permanently abandoned corrals explains the presence of scatters of construction items. Re-use of tiles has been one the biasing factors in the archaeological record of formation processes for some of the corrals now
permanently abandoned. The removal of the roof structure could, on the other hand, be considered as an action which directly leads to permanent abandonment of the site. Farming and pastoral items in these corrals represent a discard rather than a storage behaviour. Those sites away from the village were never used as storage areas: the difficulty of access and the dismantling of the roof made further use impossible as episodically occupied sites.

Episodically abandoned corrals show, on their side, the highest number of items. These sites have often lost their specific functionality and have become storage areas for farmers which can also be used by a shepherd in a particular moment of need. This use for storage explains the high presence of agricultural items in the interior areas of these corrals.Locationally, most of them are close to the village, which gives them convenient access from the village and/or to farming land near by. Thus, when they are not longer in full use as pastoral sites they become appropriate places for storage of farming products or agricultural tools. Some of them Co.12, Co.13 and Co.27 are also located near the riverbed and the village, and both these location factors have strongly influenced their assemblage. In Co.12 several items that have been picked up from the river were identified, and at Co.13 (percentages - Fig. 6.2 - of ‘others’ ‘foodstuffs’ and ‘clothing’ are mainly explained through this factor). On the other hand, as there is a structure still standing at most of these sites, there is the potential for some activity to be carried on in them. However, little or no effort is generally invested in repairing these structures, so some of them, such as Co.12, will surely soon become permanently abandoned due to the ruinous state of their roof structure.

Corrals that are still in use have a high percentage of pastoral items, and they would give a realistic description of their functionality if they were described from the assemblage of items they contain. However, a number of different items also appear mainly in their surroundings; for example the hunting items in the surroundings of Co.26. Due to the location of the corral near a hunters’ house, where the major concentration of hunting items in the whole district is found, a high number of cartridges is present in the area around this corral. Moreover, some parts of this site are partially ruined, and this has encouraged discard behaviours which have introduced more variability than in Co.27; this explains the presence of ‘other’ and ‘clothing’
items. In any case, the surroundings are as rich in finds for Co.26 as they are for Co.27, because of its location close to the river bed and the village.

6.6. CONCLUSION

In general terms, the data collected from corral sites in the Famorca district indicated clearly that abandonment of corral sites is, at the inter-site level, the product of wider re-orientations in the landscape exploitation. This is, a contraction of the cultivated zone and corresponding expansion of the traditional shepherds' grazing domain. The decline in the extent of the cultivated landscape (see Chapter 3) has in recent decades resulted in the isolation of many corral sites from their original locational and functional context. At the intra-site scale, the abandonment process documented in the corral sample researched demonstrates that direct functional correlations between material culture and functionality are dubious. Abandonment appears here as a multi-phase process resulting in complex material assemblages that are not, in many cases, functionally related to the original economic role of the site. The way these material assemblages are created shows, however, some structural pattern which requires behavioural interpretation. Mediterranean ethnography is here revealed as a valuable tool to untangle the complexities of such patterns.
CHAPTER 7

AN ETHNOARCHAEOLOGICAL APPROACH TO TRADITIONAL PASTORALISM

7.1. INTRODUCTION

The ethnoarchaeological research into traditional modes of pastoral exploitation in the Famorca and Fageca villages has necessarily involved the analysis of several diverse strands of evidence. The intention of this chapter is to integrate these data and examine their potential implications within the broader context of Mediterranean ethnography and archaeology. The ultimate aim of this analysis must be to name the key indicators of pastoral exploitation that can be identified through archaeological survey and excavation.

Such analogies are here generally presented as useful for specific areas of the archaeological research of shepherding activity, in particular archaeozoology and site archaeology. However, as in other areas of archaeological research, it is not possible to properly discuss a particular set of data, without bringing into the discussion references to other complementary, and often necessary, approaches. Thus aspects of material culture and archaeobotany are mentioned in the text, as it will be difficult, and somehow non-rigorous from the analysis point of view, to leave them out.

The implications of this study for archaeological methodologies can be understood at two levels. First is the question of site visibility and recognition. It has been demonstrated that pastoral sites leave often ephemeral remains that can only be recognised in the archaeological record through intensive survey techniques allied with insights gained from ethnographic observation. Second is the issue of data interpretation. The study has underlined that analyses of pastoral sites or bone assemblages can only hope to be informative if carried out with an awareness of contemporary or historical patterns of pastoral exploitation.
7.2. TRADITIONAL FLOCK MANAGEMENT STRATEGIES IN THE VILLAGES

The ethnographic information on traditional herd management presented in this thesis provides insights into a number of crucial issues of traditional flock management; these are summarised below.

A. Production goals and kill-off strategies

- The culling patterns followed by traditional shepherds in the villages were primarily directed to the production of meat, which was mainly consumed in the local town markets.
- These strategies resulted in the killing of a high percentage of individuals under a year of age.
- The individuals killed included the majority of males born during any year and a high percentage of the females.
- The percentage of young females slaughtered every year varied depending on the replacement needs of the flock in respect of accidental deaths or elderly individuals.
- If the strategy was to increase the flock, a higher percentage of female lambs would be saved over a time span that depended on the ultimate flock size aimed for.
- The main changes in kill-off patterns that occurred the last thirty years are to be found in the age, within their first year of life, at which lambs and kids were and are slaughtered.
- Shepherds allowed mating from early spring; males were generally separated from the flock during the autumn and winter months.
- The main lambing period occurred in between September and November, although it could last until February.
B. Herd structure

- Traditional herding in the villages was based on small herds.
- The basic structure of the herd was defined by the mature females and a small number of rams accompanying them.
- Some variations occurred occasionally, such as flocks composed of only lambs or mixed flocks (sheep and goats).

C. Socio-economic aspects of traditional herd management

- Traditional herding in the villages was a complementary source of money for the low income generated by farming.
- Sheep and goat meat had a relatively low importance in the local diet, especially when compared with other domestic animals such as pig or chicken.
- Herding as a professional occupation was generally understood as a less qualified, less socially valued, activity.
- Professional mobility between herding and farming activities was common.
- Herding was a low productivity activity: poor availability of feeding resources led to the under-exploitation of sheep and goat flocks, and maximum breeding capabilities were restricted through the control of the mating (and thus breeding) seasons.
- The exploitation of the available grazing resources, particularly in respect of the cultivated landscape, implied the development of close socio-economic links between farmers and shepherds.
- Overall, neither herding nor farming, as ethnographically documented in the villages, could fully be explained in socio-economic terms without reference to each other. Both activities defined the two main economic strands of a truly Mediterranean agro-pastoral community.
7.2.1. Production Goals and Kill-off Patterns

The ethnographic research on traditional sheep and goat herding in the villages defined meat as the main production goal. However, when compared to the current herding system, traditional herding strategies in the villages were first of all, less specialised. Meat was the main but not the only product obtained from pastoral activity. The existence in the villages, up to the last thirty years or so, of an economic system that is highly self-sufficient, provided the possibility of commercialising (or producing for local needs) a wider range of shepherding, related products such as manure, wool and less frequently wineskins and milk. Hence, pastoralism played overall a much more important role for the local economy than modern herding.

(i) Kill-off Patterns: Analytical Problems

Archaeological inferences concerning sheep and goat husbandry systems tend to base many of their assumptions on the generation of kill-off patterns from the animal bone samples excavated. The kill-off patterns generated from the ethnographic data on traditional and current flock management strategies (see Figs. 4.4 to 4.8, pgs.84-85), suggest a duality in the validity of such patterns. On the one hand, they reflect clearly the selective slaughtering of young and old animals, with very low mortality among mature animals. This pattern defines correctly meat production as a main goal for the herding system. On the other hand, such a pattern has also being suggested for milk, orientated systems; this assumption has been made in particular when mortality is concentrated in the very young age group (i.e. less than six months of age) (see for example, Payne, 1973; Rackham, 1994). However, milk was a secondary product for the traditional and current herding systems of the villages, with a low value in economic and dietary terms. Equally, wool represented an important secondary product, and this would be masked by a kill-off pattern where mature animals are almost totally absent. In general terms, ethnography suggests that kill-off patterns provide a valid insight into the main exploitation goals of the herds, but may fail in detailing other products, particularly secondary products.
The computer simulation described and discussed in Chapter 4 had in essence a two-fold aim: first to test the validity of the ethnographic data gathered; secondly to bridge the ‘gap’ between a static reflection of the dynamics of a flock (i.e. the kill-off patterns) and those dynamics themselves. Overall, the validity of such simulation lies in the fact that it allows deeper inferences in respect of flock management strategies using the parameter of time. This is essential in understanding a dynamic system such as a flock. More importantly, it provides the opportunity to represent that data in the form of mortality profiles, which may be used for archaeological inference. The main problem of this simulation as presented in Chapter 4, is that it is based on data which has been gathered at a particular moment of time, and in so doing assumes that the parameters used do not vary significantly over time. To solve this the simulation should be tested against a set of ethnographic data gathered at a later date.

Further practical problems in respect of the interpretation of kill-off patterns emerge from the fact that Fageca and Famorca shepherds developed a trade web within their region, and thus there was a dispersal of the mortality profile generated by their flocks. Mobility and market links are key factors in the formation of bone samples (Grant, 1991). The traditional husbandry system practised in the Fageca and Famorca villages could not be archaeologically defined without understanding the market landscape in which the local shepherds operated. As the ethnographic information shows, this market landscape was found at a local and/or regional scale. In the absence of modern communication means such as trains or lorries, long distance markets were almost exclusively related to long distance transhumance movements.

It could have been often the case that Mediterranean shepherds would have traded their products in a fairly local or regional scale rather than over a wide territory (Jarman and Bay-Petersen, 1976). Such trade would have been developed through either short-range transhumance or deals with local shepherds who were keeping flocks in the same area all year round. The isolation imposed by the mountainous geography of the north Mediterranean basin would have helped in this respect. Thus, without denying the importance or questioning the scale of markets created through longer transhumance
movements, a remark is here made that the importance of local and regional trade of husbandry products should be noted. Trade was in any case, responsible for the dispersal of the kill-off patterns relating to traditional flocks within the study area.

Further distortion of the overall flock kill-off patterns can be aggravated by differential preservation biases. These biases could, for instance, favour the preservation of some bones such as the mandibles in relation to others, and of the bones of older animals and those of the very young. Equally, lateral variations in the deposition processes created by cultural activities need also to be considered (Maltby, 1982:81-82). Data described in Chapter 4 highlight this point by describing how kids and lambs eaten in the villages were generally butchered by professional butchers and sold and consumed in portions. This practise would have *a priori* fixed a particular pattern of bone deposition in the individual households. However, the picture gets more complicated as ethnography also shows the existence in the villages of other kinds of contexts for butchering and consumption, such as the traditional butchering of a lamb or kid during the annual festival; at such occasions the animal is killed and consumed at a single meal, with much of the skeleton entering the same household rubbish dump.

Finally, this research also points to the need for archaeozoological studies to use, whenever possible, historical data (Grant, 1984). Such documentation may, on the one side, clarify particularities of the mortality patterns found in archaeological contexts, and on the other, it may reveal details of the economic importance of those animals represented in bone samples (see for instance Barker, 1982), as well as the presence of animals that are not represented at all in the archaeological record. Thus, pack animals such as mules and donkeys, played an important role in the traditional economy of the villages: their labour was essential in everyday activities. However, they were never incorporated into the diet, and tended to be buried randomly in the terraces (as manure for trees). It is only ethnographic memory and historic records that allow scholars to properly understand their economic role within the mountain economy.
7.2.2. Size, Structure and Seasonality

Other aspects of the traditional herding system in the Fageca and Famorca villages such as herd structure and size were shown to be as difficult to recreate from archaeozoological evidence. Thus, reconstruction of the herd structure would be difficult; the distribution of the slaughtered animals alone would make the analysis of the bones deposited in the village household problematic for this purpose. Flock size, on the other hand, would be more securely guessed from the average sizes of penning sites, as discussed above, than from the faunal remains.

The size of flocks recorded in the villages seems to have responded to an equation combining several components (see Chapter 4). In particular, the broken geography of the districts and especially the intensity of cultivation, ultimately seem to determine the generally small size of the traditional goat and sheep flock in the villages. It would have been extremely difficult to keep control over a large flock within this geographically complex territory, without losing some of the animals or causing some damage to crops.

(i) Seasonality of Lambing

The effect that market demands had on seasonal lambing is an important point for archaeozoologists to be aware of. The main periods for selling and slaughtering lambs from traditional flocks in the mountains of Alcoi were Christmas, and the spring and early summer periods. The main selling peaks through the year reflected the big festivals of the Christian calendar, Christmas and Easter, although shepherds recalled an important peak in June when they traditionally make their deals (see Chapter 4 and Fig.4.3). Equally important local festivals such as the Alcoi festival (St. George, on 23rd April) would have represented crucial selling periods for the shepherds in the region. Lambing was planned in relation to these periods of maximum demand, introducing a pattern of seasonal slaughtering. How clear this pattern would be in archaeological terms is another matter. First, although main periods of consumption occurred seasonally, the presence of sheep and goat meat in the traditional diet was not seasonal. Thus, the wealthier households
could have eaten such meat once or twice a week, whereas the more modest ones could have easily had it once a month. Moreover, during the summer, the period shown as the one when less slaughtering occurred overall, was also the time of the year when many villages would have celebrated their festivals, and it was not uncommon that a family or group of friends would save a lamb to be sacrificed for that occasion.

O'Connor (1998) has already pointed to the difficulty of defining seasonality in archaeological samples. The problem is, he argues, not so much archaeozoologists' inability to specify the age of death, as the assumptions they have to make about, first, the lambing period, and second, the span of time represented in the sample (i.e. if the individuals represented in the sample were all sacrificed at once, or if the sample represents the result of seasonal slaughtering through a period of years). This research provides an ethnographic example of seasonal lambing, but also reinforces O'Connor's argument in relation to the complex nature of the samples. Although some seasonality in sheep and goat meat consumption existed, such meat was in reality incorporated into the Fageca and Famorca peoples' diet at different times through the year, and this alone would have introduced a very important biasing factor for the archaeological detection of the seasonal slaughtering patterns practised.

7.2.3. Traditional Farming and Herding

The majority of the herds found in the Fageca and Famorca villages spent all year round within the village district boundaries; for many shepherds to travel down to the coastal plains was both too expensive (they had to rent grazing areas) and also overall not necessary for the number of animals kept. Exploitation of the cultivated and uncultivated landscapes frames the patterns of mobility in herding strategies. Traditional shepherds' mobile strategies suggest that seasonal pastoral exploitation may be performed on a much smaller geographic scale than usually assumed. Within the study area, the geographic variability that the mountain landscape offers allowed the development of mobile herding strategies within a narrow territorial framework. The physical geography of the village districts, with differences of nearly 400 metres of altitude in between the lowest and the
highest altitudes, provides enough variability in temperatures and sunlight exposure to create the botanical diversity necessary to allow seasonality in grazing strategies.

The essential matter here is to assess the potential for a classical Mediterranean mountain landscape to maintain a fairly large number of sheep and goats flocks all year round. Because of the lack of historical documentation prior to the mid 19th century, it is difficult to know if the number of flocks that data describe as grazing within the district boundaries in the last 150 years, represent the maximum number of flocks historically herded in the area. In any case, what is certain is that those flocks recorded in ethnographic account, had to operate in the landscape surrounding the villages at or around the time that cultivation was at its maximum. Facing such an intensively cultivated landscape, mountain shepherds were forced to over-exploit the uncultivated territory, and refine their strategies to exploit all the feeding possibilities of the cultivated areas.

This cultivated landscape was dominated by cereal crops, often alternated with pulses, and vineyards, olive trees and few fruit trees completed the picture (see Chapter 2). In Spain, the complementarity between cereal and pulses cultivation and sheep flocks is well known in contemporary times (Sánchez Jiménez, 1975), and historical sources equally refer to it (Hinojosa Montalvo, 1992). The main features of such an interrelation are generally described as the flocks grazing on the stubble and the farmers obtaining a much needed manure (Martínez, 1991).

In the traditional agro-pastoral economy of the villages this was only partly the case. Ethnographic research shows that traditional mountain shepherds and farmers were cooperating on the basis of a complex socio-economic network, which implied the maintenance of a balance beyond the simple exchange of stubble grazing for manure. Thus, apart from stubble grazing and manure, this balance found other essential components: the provision of fodder in the form of farming by-products (mostly waste farming products); the facilitation of agricultural tasks such as ploughing by grazing on fields with tall weeds, saving essential time and energy; the obtaining of ‘free’ labour help by farmers as herders would pay off allowance into terraces by helping them in agricultural
tasks; the possibility of the free use of proper penning areas for the winter by shepherds with no cash to build their own, as farmers built corrals in order to collect manure; an overall source of cash for both farmers and shepherds, with low maintenance cost other than human labour\textsuperscript{25}. 

On the other hand, the uncultivated territory provided grazing and also fodder. Its grazing possibilities were intensively exploited but shepherds had to face competition from other uses (in particular fuel collection); the uncultivated territory would in any case have been insufficient to maintain alone the number of sheep and flocks herded, especially during winter. Fodder was mainly obtained from the small patches of woodland areas or individual trees (in particular oak, elm and poplar) found across the landscape. Relatively recent studies seem to some extent to disagree with the classical idea of an absolute confrontation between woodland areas and shepherding\textsuperscript{26}. Ethnography and historical sources in other parts of the Mediterranean and Europe (Raggio and Moreno, 1990; Austad, 1988) have recorded sophisticated woodland management strategies which in all cases are, to some extent at least, related to the production of fodder for stock. Shepherds in the Fageca and Fomorca villages also developed strategies to exploit patches of woodland. There, shepherds pruned tender branches to hang in the corral, collected and stored leaves, drove their flocks to them in the acorn season, and occasionally in other periods as well; additionally they provided shelter from the sun during the summer. Such strategies can only be the remains of a much more specialised woodland exploitation by herders, as woodland areas represented a wider portion of the landscape available for shepherds in the past.

\textsuperscript{25} Maintaining flocks of sheep and goats was not as expensive as maintaining pack and ploughing animals as donkeys and particularly mules (White, 1970:204), for which a proportion of land has to be planted with fodder crops. Even more expensive to maintain are oxen (Halstead 1995), which were extensively used in the Valencian region until the 16th century (Ardit, 1993).

\textsuperscript{26} Reinforcing this perception it has been the case in Spain (and especially in its Mediterranean provinces) that reforestation policies have overall been damaging for sheep and goat husbandry, as they have pushed herds out of the replanted areas (Obiol i Menero, 1997).
7.3. ETHNOARCHAEOLOGY OF PASTORAL SITES

The structural recording and spatial analysis of contemporary pastoral sites in the Fageca and Famorca areas have shown that the structure, location and functionality of these sites yield important information about the patterns of exploitation of the mountain environment. This aspect of the survey is summarised below and discussed in some detail in the following sections.

A. Structural factors

- Structural differences allowed the definition of three types of pastoral sites within the study area: corrals, rock shelters and esbardals.
- Among the structural specificities of these sites, there are several aspects, such as the existence of roofed sections or storage areas, which reflect their seasonal use.
- The internal lay-out of pastoral sites and, in particular, the degree of internal subdivision, allows inferences to be made regarding flock structure and management strategies.
- This type of analysis has also informed estimates of the average penning capability of these three key types of pastoral sites at various times during the pastoral calendar.

B. Location factors

- The location of pastoral sites appears closely linked to their seasonal use, which in turn reflects patterns of herders' land use (exploitation of grazing areas).
- The location of pastoral sites took into account specific geographic characteristics of the landscape such as sunlight exposures or proximity to reliable water sources.
- The contemporary cultivated landscape played an essential role in the final location of the penning site, particularly in the case of corrals.
- Other factors such as the nature of sheep tracks, the existent of well defined district boundaries, land ownership and personal idiosyncracy also affected location.

Within a relatively small, and apparently homogeneous territory, such as the Fageca and Famorca districts, pastoral sites present an important degree of structural and locational
variability. Morphological plan-analysis shows how traditional herding activity has
generated three main types of sheep and goats’ penning sites with different levels of
structural complexity. The reason for this variability lies primarily in the seasonal
exploitation of different grazing territories within the district area. None of the pastoral
sites researched was occupied all year round; they were all built and located bearing in
mind their seasonal use. Thus, clear structural differences emerge between spring-summer
sites and autumn-winter sites. The importance of this locational and structural variability
is that it ultimately reflects the particularities of the Fageca and Famorca traditional
shepherds’ land use, herd management and technological capability.

7.3.1. Structure

In the Fageca and Famorca villages district, sites used in the winter (corrals) show a more
complex structure than those used in summer. This reflects the fact that shepherds
performed more diverse economic activities within them, namely, herd management
strategies and storage activities. Herb management strategies performed in corrals
demonstrate that pastoral sites should not always be understood as mere penning areas for
the flock. The structure of corral sites researched for this thesis mirrored a microcosm of
particular herding strategies, in particular, the need to divide the flock into different
production units during the period of time from September (first lambing) to the beginning
of the mating season (usually early spring; see Chapter 4 for details). Divisions of the
main penning space accommodated different units of the flock such as the newly born
animals or the males during the non-mating period. These divisions were either part of the
permanent structure of the site, or created as required. Similar use of internal divisions
has been recorded in other parts of the Mediterranean Europe such as Greece, where
Chang even pointed to differences in the number of partitions in goat and sheep penning

27 Differences in structural complexity between seasonally occupied sites have also been noted in other
areas of the western Mediterranean (Lewthwaite, 1984, quoting Angioni).
The importance of this ethnographic data is that it reshapes the value of pastoral sites as potential sources of archaeological information. Thus, once identified in the archaeological record, pastoral sites move from their simple role as indicators of penning capability to the possibility of being used to infer more sophisticated flock management techniques performed by the shepherds who used them.

(i) Storage

Along with internal divisions, one of the fundamental devices found in some corral sites were the storage areas. These outwardly suggest the existence of strategies to prevent periods of grazing shortage. Mediterranean mountain territories, such as the Fageca and Famorca districts, although located near to the warm coastal areas, have relatively harsh winter conditions and snow and frost often make their appearance during the winter days. Shepherds needed to prevent those shortages by storing fodder supplies and, although the dynamics of fodder product storage are generally not subject to market requirements and/or the occurrence of successful harvests, as is the case for farming products (Forbes, 1982: 377-389), some kind of planning was still necessary. Essentially, storage areas made it possible to accumulate large amounts of fodder at any time, thus a maximization of the available resources.

However, ethnography here suggests that existence of storage areas can also alert ethnographers and archaeologists to the existence of other economic factors. The first is the presence of relatively stable pastoral economy in terms of movement, probably involving flocks kept year round within a restricted territory. Secondly, the existence of fodder provision networks may involve socio-economic relationships between farmers and shepherds. Thirdly, occasional use of storage areas to ‘bank’ farming products (as opposed to fodder crops) as recorded in this study, ultimately underlines the complexity of functionally defining sites operating within an intensively used agro-pastoral landscape such as the north Mediterranean basin. This particular fact is reinforced by socio-economic aspects undercovered throughout this research, for instance, that corral sites were mostly owned by farmers rather than shepherds. Finally, storage areas indirectly
suggest intensive land-use, and they may be understood as ultimately reflecting competition on the available grazing resources.

However, the location of similar storage areas in the archaeological record would a priori present some difficulties. As recorded in this study, they are found as a second storey and may consequently be difficult to recognise in an archaeological sites where usually just the foundations survive. However, second storey location is not necessarily to be taken as the general rule: ethnography in the Alpine region of Italy has demonstrated that storage areas in fairly similar buildings can also be created by partial excavation (i.e. cellars), and these are more easy to recognise archaeologically (Migliavacca, 1996). In relation to this it is important to note that cellars are more consistently used to store products which need dark and cool conditions for good preservation, and this is not the case for the overwhelming majority of products stored by shepherds.

(i) The Scale of Herding

General inferences on the scale of herding practised locally could be drawn from the size of the penning area in pastoral sites, as well as from the number of pastoral sites found within each of the villages' districts. Chang has already shown that pastoral shelter space within a defined territory was not reliable for inferring the total number of animals herded in that area (1981:86-87). In her thesis, she stated that flock sizes were not linearly related to the pen area dimensions in the Greek village of Dydima, and that only general parallels could be drawn. The structural research undertaken in the Fageca and Famorca pastoral sites confirms the lack of such relationship but stresses the validity of this approach as a valid guide to infer general flock sizes. Fageca and Famorca shepherds stated that a minimum of a square metre per animal is needed in terms of penning space. For the rock shelters and esbardals recorded, the penning space measured varies between 20 and 75 square metres, whereas corrals may enclose more than 100 square metres if the unroofed areas are included, but vary between 10 and 50 square metres if just the roofed areas are taken into account (see Appendix V). Traditional flock sizes from the study area relate well to these dimensions, with the exception of some goat flocks (see Chapter 4).
However obvious, this relation gives a further archaeological validity to the study of penning sites, first for highlighting the character of particular herding strategies (management of small versus large flocks), and secondly, in providing a general indication of the overall scale of a particular herding economy.

Taking a different view, a hypothetical attempt to reconstruct the scale of the herding economy within a particular territory in a particular moment in time, should necessarily involve consideration of socio-economic relationships within the community. Ethnography shows here that human activity in relation to the built pastoral environment is dependent on social and ownership relationships. In more specific terms, a difference between the extant and the available penning space can be demonstrated. Seasonal use and ownership determined the available penning space for herders' use during each season. As previously noted, rock shelters and esbardsals were very rarely considered to be useable spaces during the winter months, whereas most of the corral sites were effectively out of use during the summer months. Well-established ownership, particularly in the case of corrals, meant that a balance between friendship and economic convenience was often found to determine the use of many of the pastoral sites within the study area.

7.3.2. Locational Factors

Location factors of pastoral sites across the Fageca and Famorca village districts are determined by a combination of physical and human geography factors. From a physiogeographic point of view, winter/autumn occupied sites are located at lower positions across the valley (in between 600 and 800 metres a.s.l.). They lie closer to the village, surrounding the most intensively cultivated areas. Summer/spring occupied sites, on the other hand, were built at higher locations, more distant from the valley, where less intensive farming took place (areas over the 800 metres a.s.l.). A direct implication of this pattern of location is that the distribution of herding sites within the districts could legitimately be used to map in grosso modo the seasonal grazing territories.
Apart from the direct relationship to seasonally exploited grazing zones, other physical factors such as proximity to water sources were also important in determining site location factors, particularly, for summer sites. Thus, the relative lack of rock shelters and esbardals in the high locations of the Alfaro mountain, where summer pasture areas are situated over 1,000 metres a.s.l, may be partially explained by the scarcity of natural water sources in this mountain, especially when compared to the relatively easy availability of all year round water sources that the Serrella mountain provided.

Sunlight exposure represents an important location factor often referred to by the shepherds. Appropriate sunlight exposure meant warmer winters and cooler summers for the penned flocks. The extremely broken geography and the altitude variations within the districts implied, at times substantial, temperature variations. It was the shepherds' intimate knowledge of the geography of the village district that allowed them to take advantage of this variability by placing their sites at locations that ensured the optimum temperatures at the time of use.

An anthropo-geographic view of pastoral sites' locational factors within the research area would first stress the mutual exclusivity of the terraced landscape and the pastoral sites. By definition, a pastoral site was placed to avoid intensively cultivated land, as flocks were seen as a potential source of damage for crop areas due to uncontrolled grazing. The locational relationship between pastoral sites and the terraced landscape reveals itself as a valuable tool in the reconstruction of both cultivated territories and dynamics of the location of corral sites. On the one hand, the example of the Famorca and Fageca districts shows how corral site location helps in understanding the historical development of the farming landscape within the area. These sites signify the boundary of the extension of the terraced landscape at a particular moment of time.

On the other hand, when known, the analysis of the waves of contraction and expansion of the farmed territory would play an essential role in defining the locational ground for corral sites. This locational area is defined historically by the political boundaries of the village districts and the edge of the terraced landscape at a particular moment in time.
Thus, a shepherd attempting to build a corral was left with an *available territory*, broadly defined as the belt of land running between the terraced landscape and the district border. This approach is particularly feasible within the Mediterranean mountain territories. In those mountains, historical marginality and variability of population densities have fuelled a more dramatic expansion and contraction of terracing than in the neighbouring lowlands. Such dynamism of the cultivated landscape has constantly altered (as the research in abandonment described in Chapter 6 has shown) the territory that was available to shepherds for their corral sites.

In conclusion, the political structure of the territory plus the dynamics of the farming landscape (determined by socio-economic and demographic factors) are the essential anthropogeographic forces defining the locational framework of contemporary pastoral sites. From this perspective also, traces of herding activity within the Mediterranean landscape are thus invariably linked with traces of farming activity. It is important for the archaeology of pastoralism to understand the patterns of local land use and to infer the landscape history.

7.3.3. Abandonment

In a short time span, abandonment has profoundly reshaped the traditional pastoral landscape of the mountain area of this research. In landscape terms, the recent, rapid reduction in the number of flocks herded, along with the contraction of the terraced landscape, has forced the remaining active shepherds to rationalize the use of an excessive number of pastoral corral sites within an increasingly large grazing territory. As the potential grazing areas have expanded and the competition among flocks has decreased, the strategies for pastoral landscape exploitation have rapidly changed. In general, the most direct effect has been a gradual reduction of traditional mobile strategies (this helped by the increasing availability of industrial fodder resources). Thus, the seasonal cycle of pasture exploitation within these districts and the use of the coastal transhumance territory have gradually been abandoned as shepherds focus on the exploitation of the easily
accessible pasture areas around the villages. At another level, the contraction of the cultivated zone and corresponding expansion of the potential grazing areas have resulted in the isolation of corrals, separating them from their original 'girdle' context at the pasture-arable interface.

At the level of individual structures, abandonment revealed itself as an integral part of pastoral land use. The idiosyncracies of individuals' attitudes to land management, as much as any ecological variable, explained the distribution of abandoned as opposed to in-use corrals. A key aspect of corral morphology when affected by abandonment, was the ease with which these structures may have been adapted, allowing a rapid response to changing socio-economic and environmental variables.

On the other hand, further disturbance stands in the fact that abandonment processes may strongly distort the ultimate validity of items directly related to pastoral activity as archaeological clues identifying a pastoral site. Research on the abandonment of corral sites of the Famorca district suggests that, in general terms, no direct correlation can be drawn between the material assemblage found in the abandoned corrals and their original function. The spatial redistribution of shepherds' material culture throughout the abandonment processes acts as the main distorting factor. Thus, the village had an important impact on the material assemblages as the main focus of daily activity. A great deal of interplay between village and corral can be postulated. Items seen as valuable, such as roof tiles, were removed from the corrals and transported to other corrals or the village for storage. Equally, items from the village, such as farming tools or furniture, were taken to the surrounding corrals and left there. This redistribution generally results in the separation of pastoral items from their original place of use, making an archaeological correlation of the primary function of structures problematic.

To conclude, the data collected from corral sites in the Famorca district indicate clearly that abandonment of these pastoral sites was, at the inter-site level, the product of wider re-orientations in the landscape exploitation. At the intra-site scale, abandonment appears as a multi-phase process resulting in complex material assemblages.
7.4. FROM ETHNOGRAPHY TO ARCHAEOLOGY

7.4.1. Animal Bones

Research on animal bone samples from sites of the Neolithic to the Bronze Age in the Valencian region, demonstrates an overall predominance of sheep and goat husbandry, with pig and cattle having a secondary economic importance. The Neolithic sheep and goat kill-off pattern described for one of those sites, Cova de l’Or, shows a model which can often be found for this period across the Mediterranean: most of the animals were slaughtered before they reached their third year of life. Such a model has been interpreted as meat orientated, underpinned by a strategy to control the flock size by killing young individuals (Bernabeu, 1994).

For a small sample of bones excavated in Monte Irsi (Southern Italy) dated to the Iron Age and Early and Later Hellenistic Periods, sheep and goats are again killed during their first three years of life. Barker notes here that the spread of deaths over the first years of life is a pattern often found in Italian archaeology for prehistoric and early historic period sites (Barker, 1977). Similar sheep and goats kill-off patterns are presented by Halstead from Greek sites (7th to 2nd millennium BC) with important levels of juvenile and sub-adult deaths (Halstead, 1996). The general opinion is that such patterns represent a non-specialised production, as flocks in subsistence economies are not generally geared to just one product (Payne, 1973). Specialisation does not come until the development of state based economies such as the Mycenaean palaces or the Roman state, with the appearance of increasing demand for a particular product, often wool (Halstead, 1992; Barker, 1995:204).

In general terms, it seems very possible that the development of a local or regional trade network would have been the more usual case, often with the mountain territories acting as a reserve of meat for the more populated coastal plains, at least since Roman times. On the other hand, this is not to say that economic systems that lead to the dispersal of parts of the flock just prior to slaughter did not occur during the early stages of the
Mediterranean history of sheep and goat husbandry, but very possibly on a less consistent basis and at a smaller scale. The ethnographic data from traditional Mediterranean shepherds seem to show that they balance both scales of production, the self-sufficient and specialised (Halstead, 1996). Traditional mountain shepherds in the Fageca and Famorca districts primarily provided for a meat market, but their herds were also kept for wool and other secondary products, some of which were sold, some of which were consumed locally.

The coexistence between well-established market demands and self-sufficient production seems to be the general rule in traditional Mediterranean oviaprine husbandry. Periods of expansion (increase of specialization) and contraction (increase of economic self-sufficiency) of the market economy, would have made their appearance periodically, and often regionally, determining the level of specialisation of the husbandry system in a particular area. Mountain territories, especially, seem to have followed this trend closely as a larger proportion of their local economy has been based on shepherding. There, agriculture has limited possibilities for expansion and there has always been room for flocks. The production of those flocks was sold, and complemented the poor yields of local farming. Equally, geographic isolation meant the existence of a precarious supply system, and some level of economic self-sufficiency was necessary, with sheep and goat herding playing a vital role in the maintenance of that self-sufficiency.

Archaeozoologists should thus be prepared to face this coexistence between part-specialised, part-subsistence husbandry patterns, as well as to determine the dominance of one of them. In this sense, the level of dispersion of mortality patterns detected in animal bone samples is an important factor. Ethnography shows market specialisation and a degree of self-sufficiency as key redistribution factors of mortality profiles at both the intra-site and the inter-site level, particularly in meat-orientated production systems.
7.4.3. Archaeobotanical Remains

In archaeological terms, the exploitation of the cultivated and the uncultivated landscapes seems to be best recognised through the archaeobotanical analysis of micro and macro plant remains. The archaeology of fodder has so far relied very much on such studies, although not exclusively (Mainland, 1998), with at times impressive results (see for instance, Rasmussen, 1993). The ethnographic record is only expanding the perspective of the potential of such studies.

Particularly interesting is the exploitation of woodland areas as fodder sources. In archaeological terms, the need to understand this exploitation is fundamental, as early farmers would have developed their economic activities in a forest-dominated landscape, within which cultivated land would have occupied just a small area. However, one of the basic problems encountered when attempting to understand the economic relationship that traditional shepherds established with woodland areas in the past is that, with few exceptions, these areas have now disappeared in the Mediterranean. As previously mentioned, in the study area the only remains are small patches of woodland and clumps of a few trees here and there across the landscape.

The exploitation of trees, tree branches or leaves as fodder has so far been archaeologically documented in some parts of the Mediterranean (Maggi et al. 1991). Badal has analysed the botanical remains, dating from the Early Neolithic to the Bronze Age, of three caves in the Alacant province (one of them is St. Maira Cave, see chapter 2). All three caves have shown what have been called 'corral levels'; these are archaeological layers containing manure with traces of burning. Her archaeobotanical analysis describes a general dominance of pine (Pinus halepensis) and wild olive (Olea europaea), whereas there is a little representation of oak, or riverside trees (Badal, forthcoming). Traditional shepherds in Fageca and Famorca made extensive use of olive tree leaves for fodder, but

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28 Chang and Koster neatly summarised the wide range of possibilities in which the analysis of the process of 'depositional and post-depositional geochemical changes of animal dung' can provide not only the identification of animal enclosures but also the study of local 'paleovegetation, season of use, range of grazing and possibly intensity of pasture' (1986: 117).
they also very often used tender oak branches and leaves from riverside species. The use of pine as fodder was never mentioned by these shepherds (although pines were and are more numerous than oaks); however such use is mentioned by Martínez when referring to the Valencian region shepherds in general (1991:243).

7.4.1. Pastoral Sites

Whether discussing transhumance or pastoral activity in a more general framework, Mediterranean archaeologists still assume that pastoral sites are defined by a paucity of archaeological materials and the absence of habitation or penning structures. However, the ethnographic study of traditional Mediterranean pastoral activity has for some time now challenged both assumptions, but particularly the absence of structures.

Archaeologists' knowledge of settlement occupations since the Neolithic has advanced greatly in the Mediterranean. However, and when compared with the amount of archaeological work undertaken, it is still uncommon to find references to animal husbandry-related pen or work spaces in past settlement areas or individual structures (see for instance Bernabeu, Aura and Badal 1993, for a summary of data available for the Neolithic across the North Mediterranean Basin). Does this reflect a real absence? There are a few references that seem to contradict such an assumption.

Thus, Hitchner describes archaeological evidence for what he argues were animal pens (rectangular, often unroofed structures), dated to Roman times in several sites recorded in the Tunisian high steppe (1994). Barker briefly refers to existence of possible animal quarters in farmstead sites belonging to the Samnite period in the Biferno valley, Italy (1995:195-196). Migliavacca has carried out an extensive analysis of Iron Age sites in the eastern Alpine region. Here, she identifies different work spaces through ethnographic parallels, and although no corral areas are identified, she gives a list of structural factors to identify animal quarters (particularly cow stables). Hence, she agrees that subsoil alteration must have occurred in those parts of the buildings where animal were penned, and that paved pebble floors would probably be also present (1996:50). Rendu et al.
researched several pastoral sites in the Enveig mountain (Eastern Pyrenees) with a chronology varying between the 11th and 20th centuries. The sites they describe combine penning facilities with habitation and work areas (i.e. cheese making areas) (1995). Overall, these studies shed some light on the existence of pastoral structures in the archaeological record. However, they tend to fail to reinforce their interpretations of structural functionality with ‘hard’ archaeological data, for instance, soil analysis (some is done in Rendu et al. 1995). Archaeological soil analysis has been shown as essential to prove pastoral occupation of cave sites and, less often, rock shelters (Badal, forthcoming; Maggi et al. 1991; Brochier, 1991). Structural analysis should be, when possible, combined with micromorphological soil analysis, as manure layers should be identifiable in open air pastoral enclosures as well as in cave sites. Thus, Brochier et al. refer to the identification of spherulites and phytolites in Early Neolithic deposits found related to a stone wall circular enclosure in Southern Italy (1992:83).

It is also difficult to find archaeological references to the location of pastoral sites. These references tend to adopt a broad perspective, such as location in mountain areas versus lowland territory in relation to seasonal use (see for instance Barker and Grant, 1991). A more detailed site location pattern, such as the one suggested by the ethnographic records is clearly missing. Thus, and apart from height situation, factors such as sunlight exposure and aspects of structural complexity (eg., storage areas), shown as intimately related to location, are still to be fully incorporated in landscape settlement archaeology across the Mediterranean.

Pastoral sites described in this thesis were part of the cultural and economic development followed by the Christian settlers that arrived in the area after the Muslim expulsion. From the cultural point of view, such sites represent a particular corner of the vernacular architecture of those settlers, and from the economic point of view an essential tool of the local herding, but also farming, activities. Among the three types of pastoral sites researched, corrals are the ones that fall most easily into this time frame, whereas esbardals and rock shelters, with a far more simple structure, could very possibly have
existed in a similar form in previous historic and prehistoric periods. All three types of sites had particular structural characteristics, contained manure deposits, and were placed according to specific locational factors. Historic and prehistoric herders in the area would have found similar protection in rock shelters and a similar convenience of location in relation to proximity to water sources that traditional modern herders did.

However, during the research undertaken for this thesis, archaeological surface materials were located in only one of the rock shelters recorded (Rs.1). Such scanty archaeological traces should not in any case be discouraging. First, there is no need to assume that historic and prehistoric shepherds would have necessarily chosen the very same spots that traditional shepherds did to place their rock shelters. The geography of the high areas of the Serrella mountain offers a wide variety of locations for the positioning of rock shelters. On the other hand, the main prehistoric archaeological traces so far located in this area are found within caves (e.g. Bernat and Santa Maira caves), and such sites also were in all cases seasonally used by traditional shepherds from the villages.

Archaeological materials related to pastoralism described through ethnographic study, although numerous, are generally of a perishable nature. With reference to material culture, ethnography has here shown that traditional herding activity can be accompanied by a relatively wide range of material culture. From neck bells to troughs, a whole range of items is shown as intimately related to active traditional herding within the research area. Shepherds fashioned most of these items themselves, using various types of wood or other vegetal materials. Some, such as bells and pouches, were obtained through local trading. These items, along with similar ones recorded in other ethnographic contexts along the Mediterranean coast of Spain, are specifically related to herding activity, and could be claimed as legitimate indicators of its presence. But what chances do archaeologists have of finding these items unaltered in the archaeological record? Firstly, research on the abandonment of corral sites in the Famorca district warns archaeologists about the ‘disturbing’ effects on original material assemblages that abandonment processes may have. A future archaeologist digging those corral sites in Famorca would probably
derive the wrong conclusions about the functionality of the sites from the material culture alone. Secondly, many of the items functionally related to shepherding were made of materials of perishable nature, so their presence would be difficult to detect unless special preservational conditions occurred. However, there are items which could potentially be found, such as sheep bells or shears. In fact the archaeological record of this part of the western Mediterranean has already provided some examples of shepherds' material culture. For instance, ceramic cheese makers have been identified at the Neolithic site of Niuet in the Cocentaina district (Pasqual Benito, 1996) and shears have also been identified in Iron Age contexts (Olcina Domenech, 1996). However, no direct relationship has been proposed between these finds and any kind of pastoral structure. So far, a relationship between portable material culture and potential pastoral use of a site has only been postulated for caves (see for example, Gil Mascarrell, 1975).

In general, the archaeology of pastoral sites seems to lack a synthetic approach. Several lines of inference suggest that the richness shown in the ethnographic record may also be reflected in the archaeological record. However, archaeologists tend to treat aspects of structure, location and pastoral material culture in a somewhat isolated manner. There is a general lack of context, which is equally extendible to archaeozoological studies. The conclusions drawn up in the next chapter have consequently to be framed within the context of a need for a more synthetic archaeology of pastoralism, able to contextualise, to bring together and to test the different research approaches suggested from ethnographic studies.
CHAPTER 8

CONCLUSIONS

8.1. INTRODUCTION

The focus of this thesis has been to adopt an archaeological perspective in order to investigate certain aspects of the traditional pastoral economy in two mountain villages of Mediterranean Spain; the aim has been to achieve an holistic understanding of how traditional shepherds interacted with the landscape, developed a characteristic style of vernacular architecture, and managed their flocks. The methodology has been fundamentally interdisciplinary, combining structured anthropological observation and analysis of the present landscape with site location studies.

Conclusions can be drawn from this study at two levels: general implications for ethnoarchaeological research in the Mediterranean basin as a whole; and specific matters relating to patterns of pastoral exploitation in the study area.

First, the northern rim of the Mediterranean basin can still provide scholars with valuable ethnographic data, the structured recovery of which holds manifold implications for archaeological research frameworks (Nandris, 1985: 267). Secondly, a case-study of pastoralism in eastern Spain adds an important piece to the puzzle of traditional animal husbandry in the north Mediterranean basin, especially as comparative studies in Greece and Italy are well advanced relative to Iberia. Thirdly, the trends identified and models proposed within this study are inevitably informed by current academic fashions and the cultural perspective of the author, and must therefore be treated as interim statements as opposed to definitive conclusions.

In terms of the specific type of ethnoarchaeological research conducted, a detailed case-study of the Fageca and Famorca territories has highlighted three separate issues of significance to archaeologists. First, key trends have been identified in terms of how seasonal activities manifest themselves in material terms, mainly through the distribution and morphology of structures, but also through the deposition of artefacts
and ecofacts. Secondly, archaeozoological research frameworks are refined in terms of the scale and potential of data inference. Thirdly, these data form the basis for developing analogies which can provide archaeologists with a realistic basis for identifying shepherds in the archaeological record.

Finally, this research underlines both the overall coherence of Mediterranean pastoral practices, and the existence of regional particularities related to shepherding activities. Outwardly, these activities and in particular pastoral land management may appear highly idiosyncratic and unstructured, especially to observers who have limited cultural familiarity with the communities involved. Inwardly, however, pastoral economies are highly regulated by custom and tradition, and balanced intricately with other forms of land use.

8.2. ARCHAEOZOOLOGICAL DATA ANALYSIS, TRADITIONAL HUSBANDRY SYSTEMS AND MARKET LANDSCAPES

This thesis uses ethnographic data to draw particular attention to the utility of the assessment of the integrity and information potential of bones assemblages. Subsistence and highly specialised herding strategies represent two extremes within a broad range of Mediterranean husbandry systems. Although rural economies in the north Mediterranean basin have traditionally featured both extremes of production, ethnography suggests that an intermediate level of husbandry is the rule and not an exception. Data from the mountains of Alcoi reveal that rural communities have adopted ‘commercial’, as opposed to ‘consumption’ or ‘work production’ attitudes to the practice of animal husbandry (see Chapter 4). Several important issues have also been raised that relate to the relative importance of sheep and goat husbandry within a particular community. The balance between these two key species is determined by two major factors: first, external demand as determined by regional market networks; and secondly, internal demand as dictated by the dietary requirements of a community. In essence, products derived from husbandry practices can thus enter one of two distinct economic spheres.

The economic roles of ovicaprids are, in real terms, extremely complex (see Chapters 3 and 4), although certain general trends can be noted. In general, ovicaprids are
generally market-based items, whereas pigs are intended predominantly for internal consumption, and mules or donkeys for traction and transport. However, exceptions occur within this broad cultural and economic classification; for instance, certain individuals raise pigs to sell, and the consumption of sheep and goats by farmers will occur in certain circumstances. What is defined here is thus a general pattern of human-animal relationships that are likely to have dominated Mediterranean rural economies since, at least, early historical times.

Although these assumptions may not be a novelty, so far they seem to be the domain of ethnoarchaeologists rather than archaeozoologists. Animal bone studies in the Mediterranean region need desperately to expand their explanatory frameworks. The complexity of traditional Mediterranean husbandry systems and, in particular, ovicaprine husbandry, as revealed by the ethnographic record, cannot in any way be solely the product of 20th century rural developments. There is a need to conceptualise animal bone samples not only in terms of the bones present within them, but also those that are absent. Equally, there is a need to frame these bone assemblages within the social, economic and environmental context of the complete farming systems that ultimately generated them.

(i) Kill-off Patterns

The development of the theoretical framework related to the validity of kill-off models as tools to infer slaughtering strategies is taken one step further through computer simulation. The essential idea was based on gaining control over the time factor in the evolution of a herd as a dynamic system. The main implication of this work is that archaeozoologists can potentially use kill-off patterns as relatively accurate indicators of production goals. However, secondary products are not reflected in the same way, as they as they do not always require variations in the slaughter pattern. Equally, common husbandry management strategies (e.g. the piecemeal growth of flocks) are invisible in the mortality profiles, as they do not require changes in the slaughter pattern. These management strategies result in numerical variations on a time-scale which are sufficiently small to be invisible archaeologically.
(ii) Regional Approaches

An urgent need for cross-referencing between animal bone studies and other sets of archaeological and historical data has been suggested. Furthermore, such approaches can be most useful when conducted at a regional scale. Thus, regional frameworks seem the ideal scale of analysis at which to integrate intra-site and comparative analogies of kill-off patterns. Regional market landscapes are easier to research and are definitely a more common way of trading animal products than long distance exchange networks. The shortage of urban faunal studies in the Mediterranean region has been a major problem in this line of research (Grant, 1991).

On the other hand, documentary work is of the utmost importance for this type of research. Historical connections between the mountain villages and Alcoi, the key urban centre in the region, would be simply essential if the relationship between animal bone assemblages from households in both the city and its hinterland were to be fully understood. Similarly, the equation ‘average penning space = average flock size’, however simple, illustrates well the need for cross-referenced data sources, in this case between the structure of penning sites and the scale of related husbandry practices.

8.3. PASTORAL SITES, LANDSCAPE USE AND THE ARCHAEOLOGY OF SHEPHERDING

The study has explored the intimate relationship between pastoral structures, geographical landscape and shepherding management strategies. Within a seasonal exploitation of the landscape, shepherds adapted their sites both structurally and topographically to the grazing strategies and management needs of a flock unit. This constant process of adaptation characterises a historical type of pastoral settlement which, while relatively recent, provides inspiration for understanding agro-pastoral land use patterns and intra-site structure in antiquity.

From one perspective, the sharp relief and vegetational characteristics of a mountainous landscape are the key determinants of pastoral site location; it is tempting to propose models of site location that relate solely to physical geographical criteria. However, it is a mistake to consider aspects of physical geography in
isolation; as Roberts (1996: 44) points out, ‘vast pitfalls are present in uncritical correlations between physical conditions and settlement’. First, the economic complexity that defines the north Mediterranean basin ensures that the intensive development of the human landscape is also an important factor that must be considered in explaining the location of pastoral sites. Secondly, we must acknowledge the importance of particular historical factors, such as the location of district boundaries and the personal idiosyncracy of members of the pastoral community, as influences that demand recognition.

From another perspective, this research also reveals that the traditional architecture related to pastoral activity deserves recognition as more than a generic form of Mediterranean vernacular architecture. The differentiation between, for instance, summer and winter corrals, is a fundamental key in the reconstruction of Mediterranean agro-pastoral economies. Pastoral architecture provides information regarding flock management strategies, yet also tells us much about building technology and forms of landscape exploitation. More importantly, although corrals, esbardals and rock shelters are, by definition, herding sites, they also occupy a pivotal position within local economic systems at the interface between farming and shepherding.

This observation raises an extremely important point with implications for the reconstruction of past animal husbandry as well as agricultural strategies in the Mediterranean basin. It is logical and accepted that an archaeological site such as a farmstead or villa can hold important information for the reconstruction of related farming systems, which may well have included herding. It is vital, however, that archaeologists come to realise that the converse is also true: a ‘pastoral’ site such as a corral or rock shelter can provide much information relating to many other aspects of an agro-pastoral economy other than simply herding.

Finally, a time is being reached when a significant amount of ethnographic data on pastoral sites has been described across the north Mediterranean basin. These data have been often manipulated within the framework of ethnoarchaeological interpretation which has suggested a wide range of analogies for archaeologists. However, the archaeological record of pastoral sites remains almost deafeningly
silent. The suspicion must remain that such data await recovery using appropriate methodologies informed by ethnographic insights and related anthropological observation. The husbandry of ovicaprines has been a constant feature of the Mediterranean landscapes for several millennia; structural traces of it must be present somewhere in the archaeological record awaiting recovery and analysis. In order to achieve this, it is the task of archaeologists to refine their methodologies and interpretative frameworks when dealing with archaeological sites in a rural context, particularly within mountainous territories.

8.4. FUTURE RESEARCH

The future priorities for pastoral site archaeology and archaeozoology, as indicated by ethnoarchaeological research in the Fageca and Famorca villages, have been summarised among the conclusions above. On the other hand, it is clear from recent studies (e.g. Charles et al. 1998; Brochier et al. 1992) that the archaeology of pastoral activity in the Mediterranean is already greatly expanding its horizons to encompass the fields of geoarchaeology and archaeobotany. There is enormous potential for the identification of pastoral paleosols (Chang and Koster, 1986), not only for indicating site functions, but for opening research avenues into the reconstruction of past environments and how humans interfaced and interacted with them. Ethnographic data are particularly valuable here, as there are still some areas (i.e. the exploitation of woodland areas by shepherds) which are critical in the understanding of economic interactions between Mediterranean farming communities and the landscape.

Furthermore, there are many other aspects of Mediterranean pastoralism which are related closely to sheep and goat husbandry, and to which neither ethnography nor archaeology have so far paid much attention. In this sense we may point to certain aspects of pastoral land use, such as the exploitation of sheep tracks and water sources (wells, cisterns and various watering points), as deserving attention. Both these activities constituted an integral part of traditional pastoral land use dynamics and left clear marks on the landscape. The mobility that characterises traditional shepherding has generated the need for sheep droveways, many of which are still visible in the Mediterranean landscape and may be very useful for the reconstruction of past landscapes. Scholars have wondered about the archaeological potential of sheep...
routes, in particular those related to long-distance transhumant movements. Studies such as that by Soutou (1959) on the sheep drovers of Aubrac (Draille D'Aubrac), located in the Languedoc region, south-east France, have used a wide range of evidence - topographical, ethnographic and archaeological - in order to establish chronological evidence for the ancient use of the route. In a later paper, Higgs (1976) discussed the spatial relationship between sheep droveways and dolmens in north-eastern Spain, and with recognised Neolithic and Bronze Age sites for Italy. However, his arguments have been criticised by Chapman (1979) for attempting an excessively broad scale of analysis. Further correlations between sheep droveways and monuments such as Megaliths and Bronze Age stelae have more recently been noted in Spanish studies (Vegas Aramburu, 1991; Ruiz-Galvez Priego and Galan Domingo 1991).

Most of these studies have, however, lacked the accuracy of an integrated landscape approach on a small geographic scale. In Spain, at least, an important corpus of data on sheep droveways has been gathered (Mangas Navas, 1992), and the primary routes followed by drovers across the country are known in some detail. There is, however, a complex web of secondary regional and local tracks that acted as links between the more important sheep droveways. Relatively little is known about these more minor routes, and they have yet to be analysed empirically. The routes followed by these local tracks are usually known only known by elderly shepherds and have often been obscured by the expansion of farming land, encroached upon by housing development, or simply forgotten. The spatial coincidence between some of these tracks and archaeological sites, as detected by this thesis and other fieldwork projects in the Valencian region (Piqueras, personal communication), may suggests that such routes, when mapped at a regional or local scale, may be extremely important for the reconstruction of settlement landscapes. The study of such routes is therefore of the utmost interest, and represents a priority for landscape archaeologists across the Mediterranean. The starting points for related study must be the gathering of oral information, and the mapping of droveways within small geographic areas or regions.

Equally interesting is the location and use of watering points such as wells, cisterns or simply semi-permanent puddles. The Mediterranean climate makes such points,
especially during the summer period, important nodal features within the pastoral landscape. Some of these sites are structurally very elaborate, and may include troughs, small pools and other independent features, although Mediterranean archaeology has often neglected them. Their location, in particular for cisterns, has been demonstrated to reflect the shepherds' intimate knowledge of local topography (Beavitt et al. 1998). Most importantly, water points traditionally represented meeting points and important activity loci for shepherds.

Finally, and although not related directly to the main theme of this thesis, ethnography demonstrates how poorly developed the archaeology of Mediterranean terracing is. The critical issue of the origins and dynamics of terraced cultivation, while often avoided by archaeologists, has been the subject of geographical studies (e.g. Spencer and Hale, 1961; Humbert, 1975). Although archaeologists have recently begun to appreciate the importance of this issue, especially for landscape archaeology (see Treacy and Denevan, 1994), some attempts are already being made to examine their chronology and socio-economic context (see Foxhall, 1995 for the Classical period). However, a subject with vast potential remains under-exploited. The archaeology of terracing, and the detailed recording of droving networks and watering points, are thus essential tools for the future development of agro-pastoral landscape archaeology in the Mediterranean.

(i) Towards an Archeology of Mediterranean Pastoralism

Ethnoarchaeological studies of Mediterranean pastoralism are a cost-effective and fruitful line of research; their conclusions, however, remain to be reflected adequately in archaeological research designs. It is ultimately the task of archaeologists, rather than ethnographers, to convert ethnoarchaeological studies into useful archaeological tools.

Analysis of the variety of archaeological traces created by contemporary Mediterranean shepherds suggests two basic ways in which the shepherds of the present may tell us about their pastoral predecessors. First, we may draw inferences about traditional shepherding management strategies, such as slaughter patterns. Secondly, we may draw analogies which relate to the structure and distribution of
pastoral sites. An important conclusion of this study is that archaeologists must not only heed the findings of independent ethnographic research, but reflect this in the design of research projects which are truly interdisciplinary and integrate ethnographers. This study has, however, also highlighted the immense potential for archaeological specialists such as archaeobotanists and archaeozoologists, to contribute to fieldwork focused on contemporary pastoral societies.


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| Growth rate: | breeding females | -6 | -7 | -9 | -16 | -17 | -9 | 0  | 5  | -3  | -9 | -8 | -7 | -5 |    |    |    |
| Growth rate: | female herd      | 8  | 2  | -5 | -12 | -14 | -12 | -5 | 0  | -2  | -4 | -8 | -8 | -7 | -6 |    |    |    |

The computer programme is here reproduced from zero to the 15th year of the run. This section represents the female live herd. The variables are: (1) Age, in this case from 0-3 months to 8-9 years; (2) Survival Ratio (SR), defined as percentage of individuals in each group of age that survive every year; (3) Total Female, defined as the total number of female individuals in the flock; (4) Breeding Age, the number of females of breeding age; (5) Live Births, the number of live births per year; (6) Growth Rate: Breeding Females, the percentage of annual increase, or decrease, in the number of breeding females; (7) Growth Rate: Female Herd, the percentage of growth affecting the female component of the herd. In this particular example, if the variables were kept as set, the flock would die out as the total number of females gradually decreases from 29 to 13 at the end of the run.
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This section represents the male live herd. The variables here are: (1) Total Adult Males; (2) Growth Rate Male; (3) Male-Female ratio; (4) Total Herd, total number of females and males in the flock; (5) Growth Rate Herd, percentage of growth affecting the whole herd.
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This section represents the overall mortality affecting the flock. % immature, gives the percentage of immature death (less than a year) within the whole flock.
APPENDIX III

Kill-off patterns for flock B at the end of the run with the original parameters.

Kill-off patterns for flock B, after the first variation.

Kill-off flock B, after the second variation.
Kill-off pattern for flock C, at the end of the programme run with the original parameters.

Kill-off pattern for flock C with the variation parameters.

Kill-off pattern for flock D at the end of the programme run with the original parameters.
Kill-off pattern of flock D with the variation parameters.
## APPENDIX IV

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<th>Site</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORRALS</td>
<td></td>
</tr>
<tr>
<td>De Fullana</td>
<td>Co.1</td>
</tr>
<tr>
<td>Socarrat</td>
<td>Co.2</td>
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<tr>
<td>Maia Matxos</td>
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<td>Pinar Demetrio</td>
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<td>Conde (I, II and III)</td>
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<tr>
<td>Maia Verda</td>
<td>Co.10</td>
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<td>Batiste</td>
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<td>Forans</td>
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<td>Racó Fora I</td>
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<td>Racó Fora II</td>
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<td>Del Mellat</td>
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<td>Maia Sevines I</td>
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<td>Maia Sevines II</td>
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<td>Maia Sevines III</td>
<td>Co.25</td>
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<td>De les Coves</td>
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<tr>
<td>ROCK SHELTERS</td>
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<tr>
<td>Penya Noger I</td>
<td>Rs.1</td>
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<td>Penya Noger II</td>
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<td>Carrascal I</td>
<td>Rs.3</td>
</tr>
<tr>
<td>Carrascal II</td>
<td>Rs.4</td>
</tr>
<tr>
<td>Maia Blanca</td>
<td>Rs.5</td>
</tr>
<tr>
<td>Coveta Magre</td>
<td>Rs.6</td>
</tr>
<tr>
<td>Barranc Fondo</td>
<td>Rs.7</td>
</tr>
<tr>
<td>Penya L’Edra</td>
<td>Rs.8</td>
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<tr>
<td>Terra Nova I</td>
<td>Rs.9</td>
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<tr>
<td>Terra Nova II</td>
<td>Rs.10</td>
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<td>Canal I</td>
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<td>Rs.12</td>
</tr>
<tr>
<td>Les Basetes I</td>
<td>Rs.13</td>
</tr>
<tr>
<td>Les Basetes II</td>
<td>Rs.14</td>
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<td>Ximo el Moro</td>
<td>Rs.15</td>
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<tr>
<td>Noger</td>
<td>Rs.16</td>
</tr>
<tr>
<td>Racó dels Teixos</td>
<td>Rs.17</td>
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<tr>
<td>Coveta l’Ampelt</td>
<td>Rs.18</td>
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<tr>
<td>Coveta Gat</td>
<td>Rs.19</td>
</tr>
<tr>
<td>El Passet I</td>
<td>Rs.20</td>
</tr>
<tr>
<td>Salema</td>
<td>Rs.21</td>
</tr>
<tr>
<td>Collao Cosme</td>
<td>Rs.22</td>
</tr>
<tr>
<td>Font del Cuquero</td>
<td>Rs.23</td>
</tr>
<tr>
<td>Barranc Salema</td>
<td>Rs.24</td>
</tr>
</tbody>
</table>
Cantal de Gil Rs.25  
Coves Campos Rs.26  
Cantal Cornut Rs.27  
Penya Maia Rs.28  
Les Coves Rs.29  

ESBARDALS  
Barranc Fondo I Es.1  
Barranc Fondo II Es.2  
Font dels Olbits Es.3  
Del Passet III Es.4  
Del Passet IV Es.5  

Note. A number of sites in both village districts were not recorded in plan due to inaccessibility. They may however, be referred in the text. These are:

**Famorca district**  
Sento I (Co.28)  
Sento II (Co.29)

**Faseca district**  
Casetes (Co.30)  
Conxa Barrina (Co.31)  
Brovalet (Co.32)
A: SITE DETAILS
Structure Type  Corral
Name  Fullana  Code  Co.1

B: LOCATION
District  Fageca
Location Details
On the same hill as the hunters' cottage and Demetrio corral. Located along one of the terraces on the southern face of the hill. Access to the site is via the Fageca-Quatretondeta road. Height c. 700 metres a.s.l.

Environment
Almond and olive trees planted within terraces surround the site. Natural pools by the ravine, east of the site are the nearest water source.

Surrounding Features
The hunters cottage and the Demetrio corral stand in the same hill, the Socarrat corral is located just in front (SE), on the other site of the road.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2)  135  Roofed Area  35  Unroofed Area  0

Structural Description
A rectangular shaped structure. Although today there are just three remaining walls, originally this structure had a roofed and unroofed section; the roof and the walls of the unroofed section have been dismantled. At some point a second level was built using bricks, an access ramp to this level can still be seen. Entrance faces S.

Other information
A: SITE DETAILS
Structure Type  Corral
Name  Socarrat  Code  Co.2

B: LOCATION
District  Fageca
Location Details
The site lies in a terraced area a few metres south of the local road from Fageca to the village of Quatretondeta, in the Brovalet area. Height c. 700 metres a.s.l.

Environment
Olive and almond trees within terraces surround this site. Natural pools within the ravine are the nearest reliable water source.

Surrounding Features
The hunters cottage, the Fullana corral and the Pinar Demetrio corral site stand in the hill opposite the Socarrat corral.

C: STRUCTURAL DETAILS
Gener. Dimensions (m²)  62  Roofed Area  24  Unroofed Area  38

Structural Description
Approximately half of the roofed section was a two leveled structure. On the lower level a corral area for the draught animals (donkey and mule) had been built, with a mortar feeding trough. The upper level was a shelter for the shepherd or farmers, it had a chimney and other living facilities (as chairs or a table) can still be seen. The rest of the roofed area was a one level room. The entrance has a NE orientation.

Other information
Scatters of Islamic pottery can be found near the corral site, especially in the area at the top of the hill.
A: SITE DETAILS

Structure Type  Corral

Name  Maia Matxos

B: LOCATION

District  Fageca

Location Details

The site is next to the Fita ravine on the southern slopes of the Serrella mountain in the Maia dels Matxos area. Access can be achieved from the Òlivar track, off the Fageca -Quatretonda road. Height c. 800 metres a.s.l.

Environment

Patches of pine trees, with maquis vegetation. Around the northern edge of the site there are terraces with almonds and olive trees. Nearest watering point is the Campos well.

Surrounding Features

There are some farming houses in the area. The Brovalet and Nou corrals would have been the closest herding sites to this corral.

C: STRUCTURAL DETAILS

General Dimensions (m²)  71  Roofed Area  35  Unroofed Area  36

Structural Description

The roofed section of the corral has a lean-to roof built in two stages, so the actual roofed area was larger than usual in this kind of site. Most of the roof was still standing when the site was recorded though it had a generally ruinous state of conservation. There was a trough in the SW corner of the building used for feeding mules or donkeys. The unroofed section comprises a single space with nearly the same dimensions as the roofed area. All the walls of this site were built using mortar and dry-stone; some repairs using modern bricks have taken place in the walls that divided the roof and the unroofed area. Entrance facing the S.

Other Information
**A: SITE DETAILS**

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Pinar de Demetrio</td>
</tr>
<tr>
<td>Code</td>
<td>Co.4</td>
</tr>
</tbody>
</table>

**B: LOCATION**

| District       | Fageca |

**Location Details**

In the Pinar (pine woodland) area known as De Demetrio, a few metres behind the hunters' cottage. Access to the site is via the Fageca-Quatretondeta road. Height c. 700 metres a.s.l.

**Environment**

The site lies within an area of pine woodland; a deep ravine runs a few metres south of it. Natural pools within the ravine are the nearest water source; these appear to be permanent.

**Surrounding Features**

The hunters cottage stands a few metres away, the Fullana corral a few metres down the same hill, and the Socarrat corral lies opposite.

**C: STRUCTURAL DETAILS**

<table>
<thead>
<tr>
<th>Gener. Dimensions (m2)</th>
<th>Roofed Area</th>
<th>Unroofed Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>71</td>
<td>36</td>
<td>35</td>
</tr>
</tbody>
</table>

**Structural Description**

A rectangular structure, today totally unroofed but which originally had a small roofed and unroofed sections. The state of preservation is poor, some remains of mortar can be seen in the roofed section, while the walls in the unroofed area were made of dry-stone. The entrance faces W.

**Other Information**

A deposit containing Roman and Islamic pottery was found on the steps of the hill where the corral stands, but no sign of other remains or structures have been located yet.
A: SITE DETAILS

Structure Type | Corral
---|---

Name | Corral Nou
Code | Co.5

B: LOCATION

District | Fageca

Location Details

Northern slopes of the Serrella mountain, in the Olivar area. Access can be achieved from the Olivar track, off the Fageca-Quatretonda road. Height c. 800 metres a.s.l.

Environment

The corral is surrounded by olive and almond tree planted terraces. A few metres south of the site there is an area of pine trees that spreads over the pre-dominant maquis vegetation of the Serrella mountain slopes at this height. Nearest watering points for flocks staying in this corral would have been the Campos well.

Surrounding Features

The Conde and Maia de Matxos corrals lie at a similar height across the northern slopes of the Serrella mountain.

C: STRUCTURAL DETAILS

| Gener. Dimensions (m²) | 71 | Roofed Area | 35 | Unroofed Area | 36 |

Structural Description

Although still maintaining its original basic structure this site has been considerably altered by recent building reforms and refurbishment to adapt it to leisure use. The corral had an open air and a roofed area (with a lean to roof) comprising a rectangular shaped structure. Movement between both areas took place through three entrances. All the walls were built using mortar to bond dry-stones. Entrance faces S.

Other information
A: SITE DETAILS

Structure Type: Corral
Name: Salema
Code: Ca.6

B: LOCATION

District: Fageca
Location Details:
In the Salema area, by the track that connects the main road with the terraced area. Height c. 600 metres a.s.l.

Environment:
Almond and olive tree terraces planted within terraces surround the site. The corral is located a short distance from the Seta riverbed, and lies near the carrascal woodland area which was burned within recent memory. The nearest water source was the riverbed, although the corral also has a cistern.

Surrounding Features:
At some distance SE is the Cantalar corral site, and the Barranc Salema and Salema rock shelters.

C: STRUCTURAL DETAILS

Gener. Dimensions (m²): 202
Roofed Area: 108
Unroofed Area: 83

Structural Description:
The original building appears today divided into two different spaces. Structure 1 has a roofed and unroofed section; the roofed section was divided by a wall of bricks to create a room used as a shelter and magazine by a farmer, the rest of the section remained as a penning area, with the unroofed section also divided into two spaces; the roof is lean to and mortar was used in all the walls. Structure 2 is a single rectangular roofed space (although the roof has been dismantled), it was originally connected with the unroofed section of 1 and also had a arch doorway (now blocked) facing a sheep track.

Other Information:
The name Salema has an islamic origin, this is in fact the only site where some small remains of a islamic wall can be seen. On the other hand, at least the norther wall, is very possibly a post-expulsion (17th century) wall (J.Torró, personal communication).
A: SITE DETAILS

Structure Type: Corral
Name: Cantalar
Code: Co.7

B: LOCATION

District: Pageca
Location Details:
Located in the Cantalar area, overlooking the Seta river. Access to the site is via the track that connects the village with the Cantalar and Costera areas. Height c. 700 metres a.s.l.

Environment:
There are some abandoned terraces with almond and fruit trees around the site, which otherwise surrounded by maquis vegetation and pine trees. The river runs along east base of the hill on the top of which the site is situated, providing an easily accessible source of water.

Surrounding Features:
There is an old water mill and some farming houses by the river, eastwards the site location. The Salema and Pinar de Demetrio corral were the closest pastoral sites.

C: STRUCTURAL DETAILS

General Dimensions (m2): 139
Roofed Area: 105
Unroofed Area: 34

Structural Description:
An originally single structure with two levels; a roofed area and an unroofed section. It appears now divided into two areas. It shows some unusual building features. Thus section 1 was clearly roofed with a vault, a form not often found in corrals, and it is possible that this solution was also used for the rest of the roofed section, although this is not as clear. There are no remains of flooring in the second level, but the windows can still be seen. The unroofed area was divided up by a mortared wall, probably before the structure had two owners. Mortar found in most of the walls. Main entrance faces N.

Other Information
A: SITE DETAILS

Structure Type  Corral
Name  Cagadur  Code  Co.8

B: LOCATION

District  Fageca
Location Details
On the western slopes of the Alfaro mountain, by the road that links the villages of Fageca and Tollos, at the Cantera area. Height c. 750 metres a.s.l.

Environment
Pines and some oak trees, along with now abandoned terraces where almond trees and some olive trees once were grown. Shepherds used the river Seta as the nearest watering point.

Surrounding Features
The area was a quarry (cantera) for the extraction of rock, and there is still a workers hut, made with bricks and a tin roof.

C: STRUCTURAL DETAILS

Gener. Dimensions (m²) 172  Roofed Area 45  Unroofed Area 127

Structural Description
The structure had a rectangular shaped roofed section connected to an unroofed area through two entrances (now blocked). The unroofed area was (probably later) divided into two different spaces by a dry-stone wall; this wall along with the blocking of one of the entrances are the only elements of the structure with no trace of mortar. The roof has been totally dismantled. In one of the corners of this roofed area are the remains of a brick built trough. The walls of the unroofed section have nearly disapeared; the road linking Fageca and Tollos villages runs over the SW corner of the site. Entrance faces S.

Other information
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Conde</td>
</tr>
<tr>
<td>Code</td>
<td>Co.9</td>
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</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Fageca</th>
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</table>

**Location Details**

At the end of the Conde track, on the mid-slopes of the Serrella mountain bordering the cultivated zone. Height c. 800 metres a.s.l.

**Environment**

Terraces with almond and olive trees surround the site; some of these have been abandoned and planted with wheat to feed wild partridges. The lower slopes of the Serrella mountain in this area are covered with maquis vegetation intermingled with a small number of oak and pine trees. The nearest water source was the communal village fountain in Fageca.

**Surrounding Features**

There was another corral standing just infront but it was demolished some years ago. The site stands now quite isolated, with the nearest corral located towards the east; Corral Nou.

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>236</th>
<th>Roofed Area</th>
<th>145</th>
<th>Unroofed Area</th>
<th>91</th>
</tr>
</thead>
</table>

**Structural Description**

The current form of the structure comprises three different enclosures, very possibly the result of successive divisions of an original construction. Two of the three enclosures have an eastern orientation with the main entrance facing the Conde track, the last enclosure has a southern orientation and faces the Serrella mountain. The east corner of the building shows the remains of a diagonal wall, also seen in Les Fontetes and Les Coves corrals in Famarca. All three enclosures have just one level and a lean-to roof. There is an extensive use of mortar, it is present in nearly all the walls.
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Maia Verda</td>
</tr>
<tr>
<td>Code</td>
<td>Co.10</td>
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</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location Details</td>
<td></td>
</tr>
<tr>
<td>North side of Serrella mountain, close to the Terra Nova area, further south the Fontetes corral. Height c. 800 metres a.s.l.</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td>Maquis vegetation with some sparse pine trees. Some abandoned terraces, probably used for cereal.</td>
<td></td>
</tr>
<tr>
<td>Surrounding Features</td>
<td></td>
</tr>
<tr>
<td>Ximo el Moro rock shelter and Fontetes corral.</td>
<td></td>
</tr>
</tbody>
</table>

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>40</th>
<th>Roofed Area</th>
<th>18</th>
<th>Unroofed Area</th>
<th>22</th>
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</thead>
<tbody>
<tr>
<td>Structural Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A rock outcrop is used as part of this side (W side); the structure combines dry-stone and mortar bound stone walls. A reinforcing terrace wall was built at the east side. Fire destroyed the roof and damaged the structure to the extend that it was abandoned. Entrance faces S.</td>
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</tbody>
</table>

### Other Information
A: SITE DETAILS
Structure Type | Corral
Name | Les Fontetes  
Code | Co.11

B: LOCATION
District | Famorca
Location Details
Adjacent to the local road that links Fageca to Famorca, by the side of the river, in an area of irrigated land known locally as Les Fontetes. Height c. 750 metres a.s.l.

Environment
Abandoned terraces and some still in use with almonds and olive trees. The dry riverbed runs a few metres north of the site.

Surrounding Features
Maia Verda corral.

C: STRUCTURAL DETAILS
Gener. Dimensions (m²) | 241  
Roofed Area | 88  
Unroofed Area | 153

Structural Description
From the original structure, probably comprising two naves in 'L' shape, an open air space, just a section has traditionally been used as a corral. This includes a roofed area, with two levels, and an open air enclosure, subsequently subdivided (section A). The walls are all of dry stone bonded with mortar, except those, (1 and 2) that were built in dry stone to divide the original open air space. Entrance faces the south. The roof and second level structures have been dismantled.

Other information
A: SITE DETAILS
Structure Type: Corral
Name: Batiste  Code: Co.12

B: LOCATION
District: Famorca
Location Details:
One of the corrals located on the southern-facing slopes of the Alfaro mountain, immediately in front (N) of the village. Access from the main road is provided by the same path that leads to the village graveyard. Height c. 800 metres a.s.l.

Environment:
The dry river bed runs within a few metres of the structure. There are no terraces in this particular part of the Solana, and the area contains some oak and pine trees. Watering for the animals penned here was mainly from the Nogorets water source.

Surrounding Features:
Corrals de Sento I and II.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2) 103  Roofed Area 53  Unroofed Area 50

Structural Description:
Rectangular building with a two-storey lean-to roofed area, and an open air section. All walls were built using irregular stonework bonded with mortar. The roofed ground floor contains several internal divisions, which allowed the shepherd the possibility of isolating three areas within it; the upper floor used as a storage area, being accessed from an outside ramp. There are small ventilation windows in both levels of the roofed part. The entrance faces the E; outside this main entrance there is a 'gathering' space.

Other information:
It was built sometimes during the twenties, and it is currently in a ruinous state (the roof has fallen and part of the west wall of the covered area fell down during winter of 97).
A: SITE DETAILS

Structure Type | Corral
---|---
Name | Del Roig
Code | Co.13

B: LOCATION

District | Famorca
Location Details | One of the corrals located in front of the village on the lower slopes of the Alfaro mountain. It is located within the main group of corrals around the graveyard path, separated from the riverbed by a terrace. Faces S. Height c. 700 metres a.s.l.

Environment | There are a few terraces with almond trees. The Alfaro mountain is devoid of vegetation other than maquis growth. The Nogerets water source is the closest point at which flocks would have been watered.

Surrounding Features | The Batiste and Vicent I and II group of corrals are located in the immediate surroundings of this site, and there is an abandoned threshing floor next to the site.

C: STRUCTURAL DETAILS

Gener. Dimensions (m²) | 180
---|---
Roofed Area | 99
Unroofed Area | 81

Structural Description | Nowadays this site comprises two corrals (Del Roig I and Del Roig II), with roof and unroofed sections and storage areas. It originally could have been a single structure, subsequently divided and enlarged for a variety reasons (inheritance, structural needs and so on). All the walls, included those in the unroofed sections were built with dry-stone and mortar. Both corrals have second floors used as fodder storage areas. Roig I entrance faces SW and Roig II entrance faces NE.

Other Information |
A: SITE DETAILS
Structure Type: Corral
Name: Solana
Code: Co.14

B: LOCATION
District: Famorca
Location Details:
This site stands at the edge of the cultivated zone on the lower slopes of the Alfaro mountain. Facing S. Height c. 700 metres a.s.l.

Environment:
There is some maquis vegetation along with terraces, some still in use, which support almond cultivation. The nearest water source is the Nogerets site, west the village.

Surrounding Features:
Riu corral.

C: STRUCTURAL DETAILS
General Dimensions (m2): 135
Roofed Area: 62
Unroofed Area: 39 (24)

Structural Description:
The roofed section of this structure is a two-storey area. The walls supporting the roof are made with dry-stone and mortar. The unroofed areas are comprise two separated pens (C) and (D), and a third one (E), that connects with the roofed spaces of the corral. Walls in these unroofed areas are made just with dry-stone. The entrance faces E.

Other Information:
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Font del Noger</td>
</tr>
<tr>
<td>Code</td>
<td>Co.15</td>
</tr>
</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
</table>

**Location Details**

Serrella mountain. In the Font del Noger area. Height c. 1100 metres a.s.l.

**Environment**

The site lies on a scree slope and is surrounded by abandoned terraces, on which pulses and occasionally wheat would have been cultivated. A small number of walnut trees and nearby areas of scrub shown signs of extensive and recent burning. The Nogers water source provides a permanent supply; this was a summer site.

**Surrounding Features**

Penya del Noger (I and II) and Noger rock shelters.

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>47</th>
<th>Roofed Area</th>
<th>29</th>
<th>Unroofed Area</th>
<th>18</th>
</tr>
</thead>
</table>

**Structural Description**

Structurally this site would have originally had both, a roofed and an unroofed section, with mainly dry stone walls although there are indications of mortar in the walls of the roofed area. The structure was integrated in a small rock shelter that defines the north and part of the west sections of the site. At present, the roof has totally disappeared and the walls are collapsed. The entrance way possibly located in the south wall.

**Other information**

Abundant tile fragments, some plastic bags and cartridge cases were also found in the surroundings of this site.
**A: SITE DETAILS**

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Forans</td>
</tr>
<tr>
<td>Code</td>
<td>Co. 16</td>
</tr>
</tbody>
</table>

**B: LOCATION**

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location Details</td>
<td></td>
</tr>
<tr>
<td>Southern slopes of the Alfaro mountain, in the Forans area. There is no particular path that leads to the site, but access can be made from the road that links the Famorca and Castells villages; leaving this road, a few metres before arriving at the Pontets area, and walking towards the Alfaro mountain towards the North. The site is located some four to five hundred metres from the road. Height c. 700 metres a.s.l.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are several rows of abandoned terraces surrounding the corral, in some of them almond trees can still be seen, whereas in others, possibly from an earlier abandonment, vineyard and cereals would have been the grown. The slopes of the Alfaro mountain appear rather bare; limestone rock carved by the water and just partially covered by randomly spread maquis vegetation. There is a cistern at the edge of a terrace towards the east of the site.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surrounding Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Mellat and Riu corral is located a short distance from this site.</td>
</tr>
</tbody>
</table>

**C: STRUCTURAL DETAILS**

<table>
<thead>
<tr>
<th>Gener. Dimensions (m2)</th>
<th>156</th>
<th>Roofed Area</th>
<th>28</th>
<th>Unroofed Area</th>
<th>126</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Structural Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Although the site was probably in origin a single structure, different areas can be now distinguished. Area 1 is the only sector of the structure still in use, and has an open air section connected to a roofed area (with a lean to roof). Area 2 has no roofed sections remaining and appears now as three different spaces connected with access from the East. Finally area 3 is described by a single space roofless. The lay out of the walls suggests the original existence of a rectangular shaped structure involving a roof section (area 3 plus the northern section of area 2) attached to an open air area (the currently roofed part of area 1 plus the middle space of area 2), the rest would have subsequently added. Current entrance faces SW.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other information</th>
</tr>
</thead>
</table>
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Racó de Fora (I)</td>
</tr>
<tr>
<td>Code</td>
<td>Co.17</td>
</tr>
</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
</table>

**Location Details**

In the Fora area. In a location surrounding the terraces of this area, some hundred metres north the Racó de Fora II structure. Height c. 700 metres a.s.l.

**Environment**

Terraces with almonds and olive trees are still farmed. There are also pine woodland patches next to the site.

**Surrounding Features**

Racó de Fora corral.

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>General Dimensions (m2)</th>
<th>131</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roofed Area</td>
<td>53</td>
</tr>
<tr>
<td>Unroofed Area</td>
<td>80</td>
</tr>
</tbody>
</table>

**Structural Description**

The original roofed area of this site had partially collapsed at some point in the past and today only a small part of it is still used. Some of this original roofed area had a second storey, which could be directly accessed from outside. Main entrance faces S.
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Racó de Fora (II)</td>
</tr>
</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location Details</td>
<td>In the Fora area. A short distance from the riverbed, amidst the terraces.</td>
</tr>
<tr>
<td>Environment</td>
<td>Olive and almond terraces.</td>
</tr>
<tr>
<td>Surrounding Features</td>
<td>Racó de Fora (I) corral.</td>
</tr>
</tbody>
</table>

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>177</th>
<th>Roofed Area</th>
<th>Unroofed Area</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Structural Description</th>
<th>Just a few walls remain of this site. Looking at its position amongst cultivated terraces it was probably abandoned during the 19th century. It shows traces of a diagonal wall.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Information</td>
<td></td>
</tr>
</tbody>
</table>
A: SITE DETAILS

Structure Type: Corral  
Name: Mellat  
Code: Co.19

B: LOCATION

District: Famorca  
Location Details:

Located a short distance south from the road between Famorca and Castells de Castells, on the lowest slopes of the Serrella mountain, near the council rubbish dump at the pontets area. Faces N. Height c. 600 metres a.s.l.

Environment:

There are a few abandoned terraces in the immediate vicinity of this site, along with pines, oak trees and maquis vegetation. A few metres SE of the structure lies a cistern where surface water was collected. This comprises an artificial hole in the rock, covered by a dome-like structure constructed with mortar, and surrounded by a perimeter wall. Sheep or goats penned in the corral would have watered there.

Surrounding Features:

Corral del Tossal.

C: STRUCTURAL DETAILS

Gener. Dimensions (m2) 57  
Roofed Area 28  
Unroofed Area 24

Structural Description:

A classic corral structure with one side roofed (lean-to) and an open air side. Use of dry-stone for the open air section an dry-stone with mortar for the roofed section; this is partially collapsed, with just the beams and the eastern tiled section still standing. One of the internal doors was blocked at some point, and the west wall of the roofed section has been "rebuilt" using dry-stone. The existence of an significant slope probably required the building of a reinforcement in the manner of a terrace wall (0.5 m width) at the S wall. The entrance faces W.

Other Information:

There is at least one stone-made trough around the cistern. Within the corral piles of tiles denote a intention of moving them away for reuse at some point.
A: SITE DETAILS
Structure Type Corral
Name Corral del Tossal Code Co.20

B: LOCATION
District Famorca
Location Details
Middle slopes of the Serrella mountain some distance further south of the Corral del Mellat. Close to the border with the Castell de Castells village district. Height c. 850 metres a.s.l

Environment
Abandoned terraces, some patches of pine woodland and maquis vegetation.

Surrounding Features
Corral del Mellat.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2) 36 Roofed Area 9 Unroofed Area 27

Structural Description
Small roofed section attached to an unroofed enclosure. The roof has now collapsed and the site is in an advanced state of abandonment. Entrance faces the SE.

Other information
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Maia</td>
</tr>
<tr>
<td>Code</td>
<td>Co.21</td>
</tr>
</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
</table>

**Location Details**

At the top of the fondo ravine, on the east side. Height c. 800 metres a.s.l.

**Environment**

Maquis vegetation, often burnt. Extensive areas of scree.

**Surrounding Features**

Corral de les Fontetes and Barranc Fondo esbardals I and II.

### C: STRUCTURAL DETAILS

| Gener. Dimensions (m²) | 70 | Roofed Area | 20 | Unroofed Area | 50 |

**Structural Description**

A dry-stone side. Roofed section with two unroofed areas attached to it. An original entrance to the roofed section has now been blocked, and entrance is due through one of the unroofed areas. The roof has totally collapsed. Main entrance faces N.

**Other Information**
A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corral</td>
<td>Co.22</td>
</tr>
</tbody>
</table>

B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Loc. Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Famorca</td>
<td>In the Barranc Fondo (north exposure of Serrella mountain). At the edge of the abandoned terraces on the east side of the ravine. Height c. 800 metres a.s.l.</td>
</tr>
</tbody>
</table>

Environment

Abandoned terraces surround the site. These are planted with almond trees which lie at the edges of the terrace walls, as the central zone was used to grow pulses or cereal. Maquis vegetation. Occasional areas of scree lie nearby; these are covered with rather small stones (some of these areas have been deposited by farmers clearing the field of stones). The nearest water source lies in the Olbits ravine.

Surrounding Features

Corral de la Maia and Barranc Fondo esbardals are located in the same side of the Barranc Fondo ravine.

C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>Roofed Area</th>
<th>Unroofed Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>33</td>
<td>29</td>
</tr>
</tbody>
</table>

Structural Description

This is totally dry-stone made corral, apart from the application of a little mortar in the door way. It has a classic structure with a roofed area and attached enclosure. The roof is a lean-to roof and it is partially collapsed. Entrance faces E.

Other information
A: SITE DETAILS

Structure Type: Corral

Name: Maia Sevines I

Code: Co.23

B: LOCATION

District: Famorca

Location Details:

In the Barranc Fondo area (northern side of Serrella mountain), on the W side of the ravine and close to its edge, occupying a position between the Maia de Sevines (II) and Maia corrals. Height c. 800 metres a.s.l.

Environment

Abandoned terraces associated with almond trees surrounding the site. Open landscape, predominance of maquis with some sparse oak and pine trees. The nearest water source is at Olbits.

Surrounding Features

Maia de Sevines II and III and De la Cova corrals; Barranc Fondo rock shelter.

C: STRUCTURAL DETAILS

Gener. Dimensions (m2): 70

Roofed Area: 50

Unroofed Area: 20

Structural Description

Structurally, this is a particular site, the entrance way leads into an unroofed area which in turn is linked to a section divided between an open and a roofed section. The walling was made using mainly dry stone, although some mortar can be recognised in the walls that supported the roof structure. The roof structure has been totally dismantled. The entrance faces the W.

Other information
A: SITE DETAILS
Structure Type: Corral
Name: Maia de Sevines (II)
Code: Co.24

B: LOCATION
District: Fomorca
Location Details:
In the Barranc Fondo area, close to the edge of the ravine, between the Barranc Fondo (I) corral and the Maia de Sevines (I) corral. Height c. 750 metres a.s.l.

Environment:
Olive and almond trees terraces remain in use, along with other abandoned terraces. Maquis vegetation, occasional oak and pine trees. Animals penned here were taken for watering to the Olbits water source.

Surrounding Features:
Barranc Fondo rock shelter; Maia Sevines (I and III) and Foietes corrals.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2): 67 Roofed Area: 23 Unroofed Area: 44

Structural Description:
This site had a two-storey roofed side (second floor devoted to storage, first floor penning area) with dry-stone and mortar walling, and an unroofed area, with dry-stone walls. Most of the roof and the second store floor have now collapsed. Some work using modern brick was carried out over and on the entrance door to the roofed section. Main entrance facing E.

Other information:
Once abandoned as an animal pen this corral was used for a while as a place for crop storage, mainly almonds, until the roof structure fell.
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Corral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Maia de Sevines (III)</td>
</tr>
<tr>
<td>Code</td>
<td>Co.25</td>
</tr>
</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
</table>

**Location Details**

In the Barranc Fondo area (northern exposure of Serrella mountain), near the Maia de Sevines (I) corral. Height c. 800 metres a.s.l.

**Environment**

Abandoned terraces surround the site, many of them still supporting almond cultivation. Maquis, occasional oak and pine trees. Watering took place at the Olbits water source.

**Surrounding Features**

Maia de Sevines (I and II) and Maia corrals.

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>178</th>
<th>Roofed Area</th>
<th>53</th>
<th>Unroofed Area</th>
<th>125</th>
</tr>
</thead>
</table>

**Structural Description**

This is an unusual corral; all of its walls were built entirely in dry-stone, and some of them are specially thick and particularly irregular. Structurally it consists of an independent unroofed area (A) similar to an Esbardal, attached to another section defined by an unroofed and a roofed spaces (B) and (C). The roof has now disappeared, and severe collapse is affecting several walls. Main entrances facing the E.
A: SITE DETAILS

Structure Type: Corral

Name: Les Coves
Code: Co.26

B: LOCATION

District: Famorca

Location Details
At the lower edge of the Fondo ravine. This is the closest corral to Les Coves rock shelter. Height c. 700 metres a.s.l.

Environment
Terraces, both abandoned and in use, surround the site. These are mainly cultivated with almond and olive trees, although wheat and pulses would have been cultivated originally. The Barranc Fondo area, especially on this side, is characterised by loose boulders and outcropping limestone; the vegetation is of maquis type, with some pines and oak trees. The nearest water source is at Olvits.

Surrounding Features
Les Coves rock shelter and Maia de Sevines II corral.

C: STRUCTURAL DETAILS

General Dimensions (m²) 299  Roofed Area 88  Unroofed Area 210

Structural Description
Structurally one of the most complex corrals within the study area, it shows several phases of construction and has been transformed and divided until delimiting a total of 3 individual corral enclosures. It has the characteristic feature of a diagonal wall. Several dry-stone walls were laid out to define internal divisions. Most of the roofed areas, apart from the one in corral 1, are now collapsed. Entrance ways are orientated to the north and south of the structure; there is one to the west and none to the east (facing cultivated land on this side).

Other Information
A: SITE DETAILS

Structure Type: Estardal
Name: Barranc Fondo I

B: LOCATION

District: Famorca
Location Details:
Serrella mountain. Located in the Plà de la Cova area, on the E side of the Barranc Fondo ravine. Height c. 800 metres a.s.l.

Environment:
Abandoned terraces where mainly almond trees but also cereals and pulses were cropped; maquis vegetation has gradually taken over, some sparse oak trees. Nearest watering point found in Font dels Olvits.

Surrounding Features:
Corral de les foietes is located in the immediate surrounding, several other corrals are found around the Barranc Fondo area.

C: STRUCTURAL DETAILS

Gener. Dimensions (m2): 62
Roofed Area
Unroofed Area

Structural Description:
Dry-stone walling defining a relatively regular construction with a maximum width of some 6 metres and maximum length of 12 metres. The wall, made out of local limestone, has collapsed at several points; where it is still standing, interior heights between 1.3 and 1.7 metres, and exterior heights between 0.3 and 2 metres were recorded. The SE wall works as part of a terrace wall of one of the many abandoned terraces in the area. The entrance has a NE orientation. Inside the entrance, on the right a hunters’ hut has been built by laying a semi-circle of stones against the wall.

Other Information
A: SITE DETAILS
Structure Type: Esbardal
Name: Barranc Fondo II
Code: Es.2

B: LOCATION
District: Famorca
Location Details:
Serrella mountain. Plà de la Cova area, on the E side of the Barranc Fondo. Height c. 800 metres a.s.l.

Environment:
Abandoned terraces with almond trees. Some maquis vegetation, some flat limestone rock outcrops occur in the area. Font dels Olvits would have been the nearest watering point for a flock sheltered here during the summer.

Surrounding Features:
Foietes corral and Barranc Fondo I esbardal in the immediate surroundings.

C: STRUCTURAL DETAILS
Gener. Dimensions (m²) 44
Roofed Area
Unroofed Area

Structural Description:
A rectangular shaped structure with dry-stone walls and no internal divisions. Collapse is taking place in several sections of the walls which are up to 1.5 metres high internally and between 1.2 and 1.8 metres in height externally, enclosing an area with a maximum width of 3 metres and maximum length of some 13 metres. The entrance faces the E.

Other information:
A: SITE DETAILS

Structure Type: Exhardal

Name: Font dels Olvits
Code: Es.3

B: LOCATION

District: Famorca

Location Details:
On the hill which raises above the Olvits water source. Height c. 850 metres a.s.l.

Environment:
There are some abandoned terraces with no trees. Open vegetation with traces of recent burning. Nearest water sources: Font dels Olvits and Font dels Porxis.

Surrounding Features:
There is a small farming shelter a few metres to the SW of this site.

C: STRUCTURAL DETAILS

General Dimensions (m²): 34

Structural Description:
The dry-stone walling enclosures an area with a maximum 4.5 metres width and 8.5 metres length, subdivided into two sections (A) and (B), by an internal wall (dry-stone). The SE wall stands on a marl outcrop and is built and levelled against the hill slope. Collapse has especially affected the NE and the S walling of the structure. On the other hand, and although the lay out may suggest that one of the sections, (A), may have originally had a roof, no fragment of tile was identified at the site, and the information provided by the shepherds suggests that it always was an open air site. Entrance facing the NW.

Other Information:

297
**A: SITE DETAILS**

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Esbardal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Del Passet (III)</td>
</tr>
<tr>
<td>Code</td>
<td>Es.4</td>
</tr>
</tbody>
</table>

**B: LOCATION**

<table>
<thead>
<tr>
<th>District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pageca</td>
</tr>
</tbody>
</table>

**Location Details**

On the north side of the Serrella mountain, at the top of the hill east of the main path from the village to the mountain top. Height c. 850 metres a.s.l.

**Environment**

No trees, mainly burnt maquis vegetation. There is an important slope in the surroundings of the site, with narrow abandoned terraces (from vine, pulses and cereal cultivation) and extensive areas of scree.

**Surrounding Features**

Passet rock shelters and esbardal (I, II and IV). The nearest watering point was the Cuquero water source.

**C: STRUCTURAL DETAILS**

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>55</th>
<th>Roofed Area</th>
<th>Unroofed Area</th>
</tr>
</thead>
</table>

**Structural Description**

Partially collapsed dry-stone wall enclosing a square area with a maximum width of 8 metres and a maximum length of 7 metres. The entrance way was probably located on the eastern side of the structure.

**Other Information**
A: SITE DETAILS

Structure Type: Esbardal

Name: Passet (IV)  Code: Es.5

B: LOCATION

District: Fageca

Location Details:
Located next (W) to the main path from the village to the top of the mountain, on the low slopes of the northern exposure of the Serrella mountain. Height c. 850 metres a.s.l.

Environment:
Abandoned terraces, now overtaken by pines, oak trees, oak bushes, occasional juniper and maquis vegetation. Nearest watering points were the village's main fountain and summer persisting puddles in the Moros ravine. This site was mainly used during the summer and spring periods.

Surrounding Features:
The Passet I rock shelter and Passet (III)esbardal.

C: STRUCTURAL DETAILS

Gener. Dimensions (m2): 92

Structural Description:
Partially collapsed dry-stone wall enclosing a rectangularly shaped area. Maximum width is about 8 metres and maximum length is about 12 metres. Entrance located at the SE corner.

Other information:

A: SITE DETAILS
Structure Type Rock Shelter
Name Penya del Noger I
Code Rs.1

B: LOCATION
District Famorca
Location Details
At the foot of the Penya del Noger outcrop, in the font del Noger area, Serrella mountain. The site faces W-SW. Height c. 1100 metres a.s.l.

Environment
Abandoned terraces where wheat and pulses were cultivated early this century. The site lies within a relatively open limestone landscape with few trees, mainly walnut trees, and extensive burnt vegetation due to recent summer fires. The Font del Noger provides a permanent water supply, whilst Font de l’Edra and Font del Tort provide ancillary sources of water.

Surrounding Features
Immediately NW of this site, also using the shelter of the Penya del Noger rock, is situated another rock shelter (Penya del Noger II). The remains of a poorly-preserved corral can be also found in the Font del Noger area. A small cave which may be man-made, has been used as an occasional shelter.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2) 46
Roofed Area
Unroofed Area

Structural Description
A relatively well preserved dry-stone wall. The maximum width of the structure is c. 3.5 metres, and the maximum length c. 17 metres. There is no evidence of mortar within the wall. The entrance faces SW.

Other information
Three flint flakes (not defined tools) were found in the terraces at the bottom of the rock shelters (Penya Noger I and II).
### A: SITE DETAILS

**Structure Type**  | Rock Shelter
---|---
**Name**  | Penya Noger II
**Code**  | Rs.2

### B: LOCATION

**District**  | Famorca
**Location Details**

At the base of the Penya del Noger rock, next to Penya Noger I rock shelter. In the Font del Noger area, Serrella Mountain. The site faces W-SW. Height c. 1100 metres a.s.l.

**Environment**

See Penya Noger I.

**Surrounding Features**

Penya del Noger I rock shelter lies immediately adjacent to this site; other surrounding features are as described for Penya Noger I.

### C: STRUCTURAL DETAILS

**Gener. Dimensions (m²)**  | 60
---|---
**Roofed Area**
**Unroofed Area**

**Structural Description**

A dry-stone wall delimits a wide area of c. 10 x 13 metres. A number of large rocks detached from the rock shelter have fallen within the pen area. The wall is poorly preserved. The shelter has suffered a considerable degree of collapse throughout. Entrance faces SW.

**Other information**

see Penya Noger I.
**A: SITE DETAILS**

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Rock Shelter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Carrascal 1</td>
</tr>
<tr>
<td>Code</td>
<td>Rs.3</td>
</tr>
</tbody>
</table>

**B: LOCATION**

**District** Famorca

**Location Details**

The site lies within the Serrella mountain area, at the bottom of one of the rock shelters in the carrascal area located at the top of the Famorca village. It faces N. Height of c. 800 metres a.s.l.

**Environment**

A small number of oak trees lie immediately adjacent; these may be the vestiges of a small oak forest that ethnographic accounts recall until early this century. Terraces stretch a few metres further down the rock shelter, olive trees being the predominant crop. A shallow ravine passes by the SE side of the rock shelter, draining water from the Serrella mountain slopes towards the rambla. The north-facing topographical situation ensures a rather humid microclimate and a green appearance, suitable for summer pasture.

**Surrounding Features**

There are a number of rock shelters in the same area. A small water source emerges from the rear of the rock next to this site.

**C: STRUCTURAL DETAILS**

**Gener. Dimensions (m²)** 50

**Roofed Area**

**Unroofed Area**

**Structural Description**

A dry-stone wall delimits an enclosure of c. 4 metres width and a maximum length of c. 13 metres. The wall is well preserved; it is in excess of c. 2 metres height in places. Entrance facing N.

**Other Information**

The site has been used recently by a Famorca shepherd, leaving several items (e.g. door, saucepan, plastic material).
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Rock Shelter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Carrascal II</td>
</tr>
<tr>
<td>Code</td>
<td>Rs.4</td>
</tr>
</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
</table>

**Location Details**

Serrella mountain. On the other site of the ravine from Cester del Carrascal I, it has a similar position and orientation (N); it is an ideal summer sheltering point. Height c. 800 metres a.s.l.

**Environment**

Fewer trees than in Carrascal I, the surrounding terraces are now abandoned. Terracing still in use starts a short distance further down the slope. Mainly low vegetation in the immediate surroundings. The nearest water source is Carrascal I, and, occasionally, within the ravine itself.

**Surrounding Features**

Penya del Carrascal I, Penya l’Edra and Terra Nova rock shelters.

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m$^2$)</th>
<th>46</th>
<th>Roofed Area</th>
<th>Unroofed Area</th>
</tr>
</thead>
</table>

**Structural Description**

Dry-stone wall of no more than a metre high inside of the structure but taller on the outside where there is an important slope. The enclosed area has a maximum width of c. 5-6 metres and a maximum length of c. 13 metres. Some terracing took part in the entrance area to create better access to the site. Entrance is located in the NE of the structure.

**Other Information**
A: SITE DETAILS

Structure Type: Rock Shelter
Name: Maia Blanca
Code: Rs.5

B: LOCATION

District: Famorca
Location Details:
Serrella mountain. At the bottom of the northern face of the Maia Blanca rock outcrop. Faces NE. Height c. 1000 metres a.s.l.

Environment:
There are no remains of terraces here. The area is characterised by burnt maquis vegetation, thorn bushes and an absence of trees; there is a predominance of talus.

Surrounding Features:
Coveta del Gat and Penya Maia rock shelters.

C: STRUCTURAL DETAILS

Gener. Dimensions (m²): 35
Roofed Area: —
Unroofed Area: —

Structural Description:
A dry-stone wall delimits a terraced area where flocks used to shelter in the hot hours of the summer days. As there is no a real enclosure, when necessary shepherds made it with some branches. There is traces of a possible shepherds bed.

Other Information:
A: SITE DETAILS

Structure Type: Rock Shelter

Name: Coveta del Magre

B: LOCATION

District: Famorca

Location Details:
This site was built inside the Coveta de Magre ravine, one of the ravines that runs down the Serrella slopes. The rock shelter lies practically at the foot of the ravine. Faces E. Height c. 700 metres a.s.l.

Environment:
Abandoned terraces where some old almond tree trunks can be seen are now covered by maquis, especially abundant are the thorn bushes. The ravine does not carry water at all for most of the year, especially during the summer when the structure was mainly used. Some puddles along would however have survived in its course all year round, serving as watering points for the flocks.

Surrounding Features:
The Coveta del Ampelt rock shelter, lies further down in the same ravine but in higher position.

C: STRUCTURAL DETAILS

General Dimensions (m2): 65

Structural Description:
A dry-stone wall of some 0.70 to 1 metres height in the inside and 1.5 metres in the outside. Although lying very close to the course of the water, water avenues which are characteristic of the rainful regime have not affected much the structure. Collapsing due to water flow has damaged the SE corner of the structure, but the rest of it stands in good condition after years of abandonment. Entrance facing the N.

Other Information:
In the SE corner of the site several fragments of tiles were found, no explanation was obtained from the shepherds. It is possible they were taken there from a near corral and piled with the intention of moving them eventually. No any other find was identified.
**A: SITE DETAILS**

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Rock Shelter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Barranc Fondo</td>
</tr>
<tr>
<td>Code</td>
<td>Rs.7</td>
</tr>
</tbody>
</table>

**B: LOCATION**

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
</table>

**Location Details**

In the right inside of the Barranc Fondo ravine, sheltered below a natural limestone outcrop. The site faces east. Height c. 800 metres a.s.l.

**Environment**

Although the rock outcrops in this area are predominantly limestone, the base of the rock shelter stands on marl. This rock shelter is located c. 4-5m above the base of the ravine, where some *parats* can be identified. These terraces are now abandoned, as are the ones located further up the ravine; almond tree trunks can be identified on them. Font dels Olvits is the nearest water source.

**Surrounding Features**

There is another rock shelter on the other side of the ravine, as well as several corrals and esbardals in the Plà de la Cova area.

**C: STRUCTURAL DETAILS**

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roofed Area</td>
<td></td>
</tr>
<tr>
<td>Unroofed Area</td>
<td></td>
</tr>
</tbody>
</table>

**Structural Description**

Dry-stone wall fairly collapsed. Some big boulders lie in the penning area and are incorporated into the structure. Some stones have being laid (A) as delimiting two areas inside the structure. Entrance facing S. (?)..

**Other information**

Some bones of sheep and rabbit were found on the site floor. They were, almost certainly, brought by foxes, which are fairly common in this area and whose shelters can be seen in several nearby points.
At the bottom of the slope rock, there were several artifacts. Faces N. Good visibility over the entire site area except for the heavily used area. There are some tracks that ran into the area for about directly under the height of the slope rock.

Environmental factors:
- The area is surrounded by dense vegetation and is a water source.
- The water source is located in the area.

Cultural Features:
- Ceremonial road
- Artifacts

Other observations:
- The area is sparsely populated with artifacts.
A: SITE DETAILS

Structure Type: Rock Shelter
Name: Penya l'Edra
Code: Rs.8

B: LOCATION

District: Famorca
Location Details:
At the bottom of the l'Edra rock, low steeps of the Serrella mountain. Faces N. Good visibility over the village and most of the cultivated area. There are some tracks that run into the area but none directly to the site. Height c. 800 metres a.s.l.

Environment
Abandoned terraces with some olive and almond trees; originally some vines would also have been cultivated here. Active weathering has produced areas of scree that surround the site; some pine trees and low maquis vegetation are also present. No water source is located in the immediate area.

Surrounding Features
Maia Sevines corral and esbardals.

C: STRUCTURAL DETAILS

Gener. Dimensions (m2): 30
Roofed Area
Unroofed Area

Structural Description
Dry-stone wall, with stone probably quarried from surrounding screees. The part of the wall that faces the N-NE has a considerable width, nearly 2 metres at some points. Entrance is located facing the E. Fairly regular shape, maximum width of c. 4 metres and maximum length of c. 7 metres.

Other information
**B: LOCATION**

The Yerez settlement is located on the lower slopes of the ancient mountains, west of the Varambon village. The terrain is characterized by a natural sheltering environment, characterized by oak woodlands and olive groves at the lower altitudes.

**C: STRUCTURAL DETAILS**

The site features two distinct areas, A and B, which are connected by a narrow pathway. Area A is characterized by a series of concentric walls, while Area B appears to be a more open space with a few scattered structures. The diagram indicates the presence of a north-south orientation, suggesting a possible alignment with the local landscape.
A: SITE DETAILS
Structure Type: Rock Shelter
Name: Terra Nova I
Code: Rs.9

B: LOCATION
District: Famorca
Location Details:
The Terra Nova area is located in the low slopes of the Serrella mountain, west of Famorca village. The structure takes advantage of natural sheltering possibilities. Faces N. Height c. 800 metres a.s.l.

Environment:
Abandoned terraces surround this site. Vineyard, wheat and pulses, olives and almonds were grown there earlier this century. There are also some pine and oak trees, but maquis is the dominant vegetation. There are also some terraces with almonds and olive trees as the main crops.

Surrounding Features:
Penya de l'Edra and Terra Nova II rock shelters.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2): 79
Roofed Area
Unroofed Area

Structural Description:
Dry-stone walling generally well preserved (NE corner collapsed). Maximum width of c. 7 metres and maximum length of c. 11 metres. There is not an obvious entrance, however this could be located in the collapsed NE corner. The material used is local limestone. Entrance facing W (?)

Other information:
A: SITE DETAILS
Structure Type: Cester
Name: Terra Nova II
Code: Rs.10

B: LOCATION
District: Famorca
Location Details: Serrella mountain. The site occupies a location between the Carrascal I and Terra Nova I rock shelters. It lies at the top of the village and faces N; Height c. 800 metres a.s.l.

Environment: Some oak trees, mixed with low, open vegetation. Abandoned terraces with some almond trees. Active terracing with olive and almond trees is located further down. Nearest water point in Carrascal I rock shelter.

Surrounding Features: Carrascal I and Terra Nova I.

C: STRUCTURAL DETAILS
General Dimensions (m2): 55
Roofed Area
Unroofed Area

Structural Description: A rather low dry-stone wall (it probably was used exclusively to pen sheep), partly eroded in several points. It enclosures an area with sloping ground (NW-SE) and has a maximum width of c. 3 metres and a maximum length of c. 17 metres entrance facing E.

Other information:
### A: SITE DETAILS

**Structure Type**: Rock Shelter.

**Name**: Canal I

**Code**: Rs.11

### B: LOCATION

**District**: Famorca

**Location Details**: Serrella mountain. At the top of the Canal corridor, using the shelter of a rock partially separated from the main outcrop. Faces SW. Height c. 1200 metres a.s.l.

**Environment**: Open landscape with maquis vegetation. Some abandoned terraces that continue down the Canal corridor. There are also some scree in the surroundings. There are several water sources the Canal area.

**Surrounding Features**: Coveta Llufs rock shelter. The snow deposit and the snow hole in the Canal corridor.

### C: STRUCTURAL DETAILS

**Gener. Dimensions (m2)**: 21

**Roofed Area**

**Unroofed Area**

**Structural Description**: Partially collapsed dry-stone wall enclosing an area with a maximum width of 3 metres and a maximum length of 7 metres. The walls do not stand more than half a metre but originally they probably reached a metre of height. The entrance has a SW orientation. The ‘front’ wall goes on some 1.5 metres more than the structure itself, perhaps as a result of an attempt to built a larger structure or an additional one.

**Other Information**

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323
A: SITE DETAILS

B: LOCATION

C: STRUCTURAL DETAILS

D: SITE REPORT

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324
A: SITE DETAILS
Structure Type: Rock Shelter
Name: Coveta Lluis
Code: Rs.12

B: LOCATION
District: Famorca
Location Details:
At the foot of the left line of rock shelters distributed across the Canal area. The site, although technically within the Beniarda village district, was mostly used by shepherds from Famorca. The Canal is a corridor delimited by two lines of outcropping rock that run NW-SE from the top of the Serrella mountain to the skirts of the Guadalest valley. The site faces S. Height c. 1200 metres a.s.l.

Environment:
There are several scree areas, often the scree is interspersed with boulders, in the area surrounding the site and in the Canal area in general. Sparse vegetation and an almost total lack of trees (apart from some isolated pines). Running down the Canal there is a sequence of abandoned terraces where wheat and probably pulses were grown in the recent past. Some water sources are visible in the middle of the Canal.

Surrounding Features:
There is another rock shelter further up (NW) which is also used by Famorca shepherds, and others further down (SE), mostly used by Beniarda shepherds. There also are two structures in the Canal related to the snow trade: a snow collector and a snow hole (Cruz Orozco and Segura Marti, 1996).

C: STRUCTURAL DETAILS
Gener. Dimensions (m2): 21
Roofed Area
Unroofed Area

Structural Description:
Dry-stone wall. Collapse has occurred at some points. The maximum width of the enclosed area is of about 3 metres and the maximum length is about 14 metres. The wall is 1.5 metres of high internally and 1.7 metres high externally. There is a semi-circle of rocks which may delimit a shepherds bed. The entrance is located at the SW edge of the side.

Other Information
A: SITE DETAILS
Structure Type: Rock Shelter
Name: Les Basetes I
Code: Rs.13

B: LOCATION
District: Famorca
Location Details:
At the Basetes area, located at the Alfaro mountain border between Famorca and Castells de Castells village districts. At the foot of a large limestone rock outcrop. Faces NW. Height c. 800 metres a.s.l.

Environment:
Abandoned terraces are found on the sides and bottom of the shallow ravine. Maquis and the absence of trees conform the vegetation domain. There are traces of recent summer fires. There is a well used by the shepherds, along with all year round lasting water puddles in some of the limestone rock holes (basetes).

Surrounding Features:
Basetes II rock shelter.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2): 26
Roofed Area: 
Unroofed Area: 

Structural Description:
The structure uses an outlier from the main outcrop, as part of the enclosing system, having completed it with dry-stone walling to enclose an area with a maximum of 2 metres width and 11-12 metres length. Entrance facing the NE.
A: SITE DETAILS
Structure Type: Rock Shelter
Name: Les Basetes II
Code: Rs.14

B: LOCATION
District: Famorca
Location Details:
At the Basetes area, located at the Alfaro mountain border between Famorca and Castells de Castells villages’ districts. At the foot of a big limestone rock outcrop. Faces NE. Height c. 800 metres a.s.l.

Environment
There is some scree due to weathering. Abandoned terraces covered with maquis vegetation, no trees. There is a well and some basetes (small natural pools), used as watering points by the shepherds.

Surrounding Features
Les Basetes I rock shelters.

C: STRUCTURAL DETAILS
General Dimensions (m²): 57
Roofed Area
Unroofed Area

Structural Description
Dry-stone walling delimiting a penning area which was in turn subdivided into two areas by another dry-stone wall: penning area (A) has a maximum width of 5 metres and a maximum length of some 10 metres, with an interior wall height of 1.4 metres and an exterior wall height of 1 metre. Some collapsing has however affected this wall; penning area (B) has a maximum width of 3 metres and a maximum length of 7 metres, with an interior wall height of nearly 2 metres and an exterior wall height of 1.7 metres. NE orientation with entrance point at the NW edge of the site.

Other Information
A: SITE DETAILS
Structure Type: Esbardal
Name: Ximo el Moro
Code: Rs.15

B: LOCATION
District: Famorca
Location Details:
Serrella mountain. Located at the top of the Maia Verda, sheltering behind a small outcrop. Height c. 900 metres a.s.l.

Environment:
Marl outcrops. Maquis and abandoned terraces with no sign of trees. Extensive scree areas.

Surrounding Features:
Maia Verda corral.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2): 46
Structural Description:
A three dry-stone wall structure. The eastern wall almost totally collapsed, whereas the southern and western walls, although partially collapsed still stand some 50 centimetres in height. The enclosed area was fairly regular, 7 per 7 metres approximately. Entrance point unclear, but probably facing N.

Other Information:
A: SITE DETAILS
Structure Type  Rock Shelter
Name  Noger  Code  Rs.16

B: LOCATION
District  Famorca
Location Details
Serrella mountain. Adjacent to the path from Famorca to the El Noger area, using the shelter provided by a rocky outcrop. Faces NE Height c. 1100 metres a.s.l.

Environment
Recently burnt maquis vegetation, not trees apart from a few walnut trees in the Noger area. Limestone outcrops. Occasionally small screes. Nearest water point in Font del Noger and Font del Tort.

Surrounding Features
In the Noger area there are two other rock shelters sites and a corral.

C: STRUCTURAL DETAILS
Gener. Dimensions (m²)  41
Roofed Area  Unroofed Area

Structural Description
Well preserved dry-stone wall. The enclosed area has a maximum width of 4.5 metres and a maximum length of 11 metres. The internal wall is 1.5 metres high, and the external is 2 metres high. Entrance having E orientation.

Other Information
Some plastic bags were found in the site, and these are believed to have been brought in by hunters rather than shepherds who abandoned the use of this site some years ago. No any other items were found.
A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Rock Shelter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Racó dels Teixos</td>
</tr>
<tr>
<td>Code</td>
<td>Rs.17</td>
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</table>

B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Pamorca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location Details</td>
<td></td>
</tr>
<tr>
<td>At the Racó dels Teixos area, located on the northern face of the Serrella mountain. Faces N. Height c. 1100 metres a.s.l</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td>Rocky outcrops characterise define the surrounding landscape, with sparse vegetation, young yew trees and occasional thorn bushes.</td>
<td></td>
</tr>
<tr>
<td>Surrounding Features</td>
<td></td>
</tr>
<tr>
<td>Cova del Gat and Maia Blanca rock shelters.</td>
<td></td>
</tr>
</tbody>
</table>

C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
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<td>Unroofed Area</td>
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<table>
<thead>
<tr>
<th>Structural Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A dry-stone wall enclosing an area with a maximum width of 2.5 metres and a maximum length of 11 metres. The wall has 1.5 metres of interior height and 1 metre of exterior height. It is well preserved although collapse is threatening at several points. Entrance faces N.</td>
</tr>
</tbody>
</table>

Other information
The structure has a double entrance formed with large stones, although the lower section is not clearly visible. A few meters from the entrance there is a small area with the remains of a wall. Above, a small open landscape, although this area was not further investigated.

A number of Ç karas were found in the entrance area, some of which are preserved, keeping a 1.4 meter of height in the main area. Some of them have been removed from the entrance. The wall extends in the area forming a small terrace. The north side of the wall was preserved in the entrance area, although they have been marked by a cliff at the south side of the wall (3). However, the cliff extending from the main wall was not further investigated.
A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Rock Shelter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Coveta de l'Ampelt</td>
</tr>
<tr>
<td>Code</td>
<td>Rs.18</td>
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</table>

B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
</table>

Location Details

Located on the slope of the Coveta del Magre ravine, slightly elevated above the Coveta del Magre rock shelter. This site was built at the foot of one of the rock outcrops which define the border between Plà de la Cova area and the ravine itself. Faces E Height c. 750 metres a.s.l.

Environment

The corral lies amidst abandoned terraces which have a few occasional almond trees, but is otherwise covered with dense maquis vegetation. No local water source can be identified. Access is readily available to the Plà de la Cova area, with its more open landscape, although this area was also formerly intensively cultivated.

Surrounding Features

Coveta del Magre rock shelter at the foot of the ravine. A few metres N the structure there is an a small area delimited by a dry-stone wall. A shepherd claimed this was used to dry figs.

C: STRUCTURAL DETAILS

| Gener. Dimensions (m²) | 44 | Roofed Area | Unroofed Area |

Structural Description

A series of dry-stone walls enclose an area of some 6 metres of maximum width and 12 metres of maximum length. The enclosure wall is relatively well preserved, keeping a 1.4 metres of height in the inside and more than 3 metres in the outside. The wall extends out of the animals enclosure: an access area from the Maia de Sevines at the north edge of the pen (A) was created by terracing. The main access way has been marked by a wall at the south edge of the side (B). Area (C) may be to a shepherds sleeping area. Entrance facing S.

Other information

Recent use. Two modern axes were found in the left side entrance wall; there are also a few pieces of fabric on the floor.
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Rock Shelter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Coveta del Gat</td>
</tr>
<tr>
<td>Code</td>
<td>Rs.19</td>
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</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>Location Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>The site lies at the base of the northern face of one of the rock outcrops which mark the edge of the Serrella mountain. Faces NE. Height c. 1100 metres a.s.l.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>The corral lies within a rocky landscape dominated by scree slopes with little vegetation, no trees and occasional thorn bushes (espinal). Several lines of walls representing abandoned terraces, most of which were in use until early this century, can be seen further down this side. The nearest water source is the Olvits ravine.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surrounding Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racó de Teixos and Maia Blanca rock shelters.</td>
</tr>
</tbody>
</table>

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m2)</th>
<th>65</th>
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</thead>
<tbody>
<tr>
<td>Roofed Area</td>
<td></td>
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<tr>
<td>Unroofed Area</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structural Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A dry-stone wall collapsed in several places, but still has 1 metre of interior height in some points (1.5 metres of outside height at some points). Inside the structure, two levels are defined by a dry-stone terrace wall, also partly collapsed. At the NW corner of the second level several stones delimit what could have been the sleeping area for the shepherd. The terraced structure of this side may be an attempt to create the maximum penning space possible in an area of strong sloping ground. The rock shelter has an overall maximum width of 5-6 metres and a maximum length of some 15 metres. Entrance facing SE (?).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Information</th>
</tr>
</thead>
</table>
A: SITE DETAILS
Structure Type: Rock Shelter
Name: Passet I
Code: Rs.20

B: LOCATION
District: Pageca
Location Details:
In the passet area (northern side of the Serrella mountain), adjacent to the footpath that ascends the mountain, a few metres higher (W) than the first water house encountered when coming from the village. The site faces SE. Height c. 800 metres a.s.l.

Environment:
Limestone landscape. Abandoned terraces with almond trees. Maquis vegetation with some oaks. The nearest water source used by flocks was the main fountain of the village.

Surrounding Features:
The Passet II rock shelter is located just in front (E) (this site has not been recorded because of inacessibility); walking up the ravine (S) towards the top of the mountain, there are the Bernat cave and the Chap rock shelters.

C: STRUCTURAL DETAILS
Gener. Dimensions (m²): 45
Roofed Area
Unroofed Area

Structural Description:
Partially collapsed dry stone wall enclosing a shelter area with a maximum width of 5 metres and a maximum length of some 17 metres. No entrance way has been clearly defined, though this could be located in the eastern edge of the structure.

Other Information
**A: SITE DETAILS**

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Cester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Salema</td>
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<tr>
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<td>Rs.21</td>
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</table>

**B: LOCATION**

<table>
<thead>
<tr>
<th>District</th>
<th>Pageca</th>
</tr>
</thead>
</table>

**Location Details**

Adjacent to the Seta river, behind (N) the Salema area and opposite (S) to the Jovades area in the Benimassot village district. At the foot of one of the limestone rock shelters that face the river. Faces NE. Height c. 600 metres a.s.l.

**Environment**

There are some pines and oak trees, as well as river side vegetation and trees such as white poplar.

**Surrounding Features**

Corral de la Salema site.

**C: STRUCTURAL DETAILS**

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>32</th>
</tr>
</thead>
<tbody>
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<td></td>
</tr>
<tr>
<td>Unroofed Area</td>
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</tbody>
</table>

**Structural Description**

Well preserved dry-stone wall enclosing an area of some 3 metres maximum width and 14 metres maximum length. Both sides of the wall stand approximately 1.3 metres. The inside ground surface is fairly regular and currently covered by weeds, the outside rapidly slopes towards the river bed. The entrance was built on the west side.
A: SITE DETAILS

Structure Type

Name Collao de Cosme

Code Rs.22

B: LOCATION

District Pageca

Location Details

At the foot of one of the rock shelters in the Collao de Cosme area; this area lies adjacent to the path that leads from the village to the top of Serrella mountain, above (W) the Tio Batiste orchard. Faces E. Height c. 1100 metres a.s.l.

Environment

Intensive weathering has created several scree in the surroundings of the site, especially impressive is the one crossed by the path that leads to the Plà de la Casa area. Maquis vegetation and an absence of trees. Nearest water sources were found in the Font de Gil and the Tio Batiste orchard.

Surrounding Features

Cantal de Gil and Cantal de Felip rock shelters.

C: STRUCTURAL DETAILS

Gener. Dimensions (m²) 42

Roofed Area

Unroofed Area

Structural Description

A partially collapsed dry-stone wall encloses a rock shelter corner of some 8 metres of maximum width and 7 metres of maximum length. The pen area is in turn subdivided by another dry-stone wall, less elaborated this time, also collapsed, that creates a sub-section probably used as sleeping space for the shepherd rather than as a penning section. Entrance facing E.
A: SITE DETAILS

Structure Type: Rock Shelter
Name: Font del Cuquero  Code: Rs.23

B: LOCATION

District: Pageca
Location Details: Serrella mountain. This site is located a short distance further up (S) from the Cuquero water source and water house adjacent to the main path. It faces NE. Height c. 1000 metres a.s.l.

Environment: Mainly maquis vegetation. Limestone, presence of scree in the area. There are no trees in the immediate surroundings of this site, some water vegetation due to the proximity of small ravines that divert their waters to this area. Nearest water sources are the Cuquero water source, the Guadalest water source and the Tio Batiste orchard water source.

Surrounding Features: Bernat cave, Cantal de Felip and Chap rock shelters.

C: STRUCTURAL DETAILS

Gener. Dimensions (m²): 62  Roofed Area  Unroofed Area

Structural Description: A 1.2 metres approx. dry-stone wall encloses a penning area against a natural rock shelter. The enclosure has a maximum width of 7 metres and a maximum length of 13 metres. The entrance is located at the NW corner. Vegetation is overgrown and partially covers the enclosure wall at the east corner.

Other Information:
A: SITE DETAILS

Structure Type: Rock Shelter

Name: Barranc de la Salema
Code: Rs.24

B: LOCATION

District: Fageca

Location Details:
Situated within the Salema ravine as it opens up towards the NW, facing the Salema terraced area. Height c. 700 metres a.s.l.

Environment:
Limestone. Abandoned terraces from the previous cultivation of almond trees (also very possibly pulses and cereals). There are some oak trees and pines, as well as general maquis vegetation. Traces of a recent fire can also be recognised around the top area of the ravine. Nearest water point for the flocks was the Seta river.

Surrounding Features:
The Salema corral.

C: STRUCTURAL DETAILS

General Dimensions (m²): 26

Structural Description:
Dry-stone wall enclosing a small penning area at the bottom of one of the rock cliffs. Part of the enclosing wall is now collapsed. Its maximum standing height is 1.5 metres, and its maximum width and length are 5 and 9.5 metres respectively. The entrance faces NW.

Other Information:
There are rock paintings in the ravine (Levantine Style) as well as some carved symbols in the rock further down the ravine.
A: SITE DETAILS

Structure Type: Rock Shelter

Name: Cantal de Gil

B: LOCATION

District: Pageca

Location Details

At the bottom of a scree slope located at the rear (S) of the Plà de la Casa area (southern slope of Serrella mountain), close to the Gil water source. The site faces SW. Height c. 1150 metres a.s.l.

Environment

Sparse vegetation covered by scree interspersed with boulders (limestone). There are a few pines and small oak trees. The Gil water source was traditionally used by flocks as watering point.

Surrounding Features

Collao de Cosme rock shelter.

C: STRUCTURAL DETAILS

Gener. Dimensions (m²): 73

Roofed Area: Unroofed Area

Structural Description

Shepherds took advantage of the shelter offered by a massive rock collapsed from the natural rock cliff that surrounds the area. A dry-stone wall was built to create a penning area with a maximum width of 8 metres and a maximum length of 11 metres. Sheep and goats could be penned in the low cave area beneath the rock. The entrance has a SW orientation.

Other Information
### A: SITE DETAILS

**Structure Type**: Rock Shelter

**Name**: Coves de Campos

**Code**: Rs.26

### B: LOCATION

**District**: Pageca

**Location Details**

West side of the Font Roja ravine. Faces W. Height c. 800 metres a.s.l

**Environment**

Maquis vegetation. Extensive areas of scree with some sparse oak and pine trees.

**Surrounding Features**

The Maia Matxos corral is located nearby at a lower elevation; the Campos well is some distance E this site and provided good watering for the flocks during the summer months.

### C: STRUCTURAL DETAILS

**Gener. Dimensions (m2)**: 25

**Roofed Area**: 

**Unroofed Area**: 

**Structural Description**

A dry-stone enclosure delimits a natural limestone rock shelter. There is no internal divisions. The wall, well preserve, has a maximum of 0.40 centimetres width, and has c. 1.2 metres of internal height.

**Other Information**

---

353
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Rock Shelter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Cantal del Cornut</td>
</tr>
<tr>
<td>Code</td>
<td>Rs.27</td>
</tr>
</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Fageca</th>
</tr>
</thead>
</table>

**Location Details**

Lower slopes of the Alfaro mountain, close to the road linking the Fageca and Famorca villages. Faces S. Height c. 800 metres a.s.l.

**Environment**

It is surrounded by a dense pine woodland patch.

**Surrounding Features**

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roofed Area</td>
<td></td>
</tr>
<tr>
<td>Unroofed Area</td>
<td></td>
</tr>
</tbody>
</table>

**Structural Description**

The site takes advantage of the shelter offered by a big rock, now separated from the Alfaro coves cliffs, located several hundred metres further up the slope. The enclosure area has a maximum width of 5 metres and a maximum length of 8 metres. Entrance faces W.

**Other Information**


A: SITE DETAILS
Structure Type: Rock Shelter
Name: Penya Maia
Code: Rs.28

B: LOCATION
District: Famorca
Location Details:
Serrella mountain. At the bottom of the northern face of the Penya de la Maia rock outcrop. Faces N Height c. 1000 metres a.s.l.

Environment:
There are no remains of terraces here. The area is characterised by burnt maquis vegetation, thorn bushes and an absence of trees.

Surrounding Features:
Coveta del Gat rock shelter.

C: STRUCTURAL DETAILS
Gener. Dimensions (m2) 51
Roofed Area
Unroofed Area

Structural Description:
Generally well-preserved dry-stone wall of local limestone rock. The enclosed area is fairly regular with a width of c. 6 metres and length of c. 11 metres. Inside the pen there is another dry-stone wall which marks a small terrace near the sloping SE corner of the structure. The entrance faces E.

Other information:
### A: SITE DETAILS

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Rock Shelter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Les Coves</td>
</tr>
<tr>
<td>Code</td>
<td>Rs. 20.20</td>
</tr>
</tbody>
</table>

### B: LOCATION

<table>
<thead>
<tr>
<th>District</th>
<th>Famorca</th>
</tr>
</thead>
</table>

**Location Details**

At the bottom of the Fondo Ravine.

**Environment**

Abandoned terraces (olive and almond trees). Dense patches of pines and oak trees.

**Surrounding Features**

Corral De les Coves and all the sites along the Fondo ravine.

### C: STRUCTURAL DETAILS

<table>
<thead>
<tr>
<th>Gener. Dimensions (m²)</th>
<th>300</th>
</tr>
</thead>
</table>

**Structural Description**

The site comprises 11 different pen areas which overall enclose more than 300 square metres. All walls are dry-stone made, although there are very punctual mortar applications. Walls vary in width (between 0.40 and 1 metre) and height (0.5 and 1.90 metres). There is extensive wall collapsing but the site is overall well preserved.

**Other Information**
APPENDIX V

1) Famorca District Rock Shelters

<table>
<thead>
<tr>
<th>Name</th>
<th>Wall Width (m)</th>
<th>Maximum Interior Height of Walls (m)</th>
<th>Total Interior Wall Circumference (m. aprox.)</th>
<th>Dimensions (square metres aprox.)</th>
<th>Partitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penya Noger I</td>
<td>0.80</td>
<td>1.70</td>
<td>17</td>
<td>46</td>
<td>none</td>
</tr>
<tr>
<td>Penya Noger II</td>
<td>0.50 (?)</td>
<td>0.50</td>
<td>15-17</td>
<td>60</td>
<td>none</td>
</tr>
<tr>
<td>Carrascal I</td>
<td>0.65</td>
<td>0.95</td>
<td>14</td>
<td>50</td>
<td>none</td>
</tr>
<tr>
<td>Carrascal II</td>
<td>0.80</td>
<td>2</td>
<td>16</td>
<td>46</td>
<td>none</td>
</tr>
<tr>
<td>Maia Blanca</td>
<td>0.80</td>
<td>0.50</td>
<td>20</td>
<td>51</td>
<td>none</td>
</tr>
<tr>
<td>Coveta del Magre</td>
<td>0.40</td>
<td>0.70</td>
<td>19</td>
<td>65</td>
<td>none</td>
</tr>
<tr>
<td>Coveta Lluís</td>
<td>0.70</td>
<td>1.50</td>
<td>16</td>
<td>40</td>
<td>none</td>
</tr>
<tr>
<td>Penya l'Edra</td>
<td>1.5</td>
<td>2.4</td>
<td>11</td>
<td>30</td>
<td>none</td>
</tr>
<tr>
<td>Terra Nova I</td>
<td>0.65</td>
<td>1.20</td>
<td>16</td>
<td>49</td>
<td>none</td>
</tr>
<tr>
<td>Terra Nova II</td>
<td>0.60</td>
<td>0.50</td>
<td>19</td>
<td>55</td>
<td>none</td>
</tr>
<tr>
<td>Canal I</td>
<td>0.70</td>
<td>0.50</td>
<td>11</td>
<td>21</td>
<td>none</td>
</tr>
<tr>
<td>Barranc Fondo</td>
<td>0.70</td>
<td>1</td>
<td>12</td>
<td>55</td>
<td>2 levels</td>
</tr>
<tr>
<td>Les Basetes I</td>
<td>0.50 (?)</td>
<td>0.60</td>
<td>7</td>
<td>26</td>
<td>none</td>
</tr>
<tr>
<td>Les Basetes II</td>
<td>0.60-0.70</td>
<td>1.90</td>
<td>19</td>
<td>57</td>
<td>one</td>
</tr>
<tr>
<td>Noger</td>
<td>0.50</td>
<td>1.50</td>
<td>14</td>
<td>41</td>
<td>none</td>
</tr>
<tr>
<td>Racó dels Teixos</td>
<td>0.65</td>
<td>1.30</td>
<td>12</td>
<td>28</td>
<td>none</td>
</tr>
<tr>
<td>Coveta l'Ampelt</td>
<td>0.50</td>
<td>1.30</td>
<td>16</td>
<td>44</td>
<td>none</td>
</tr>
<tr>
<td>Coveta Gat</td>
<td>0.70</td>
<td>1</td>
<td>37</td>
<td>65</td>
<td>2 levels</td>
</tr>
</tbody>
</table>
2) Fageca District Rock Shelter

<table>
<thead>
<tr>
<th>Name</th>
<th>Wall Width (m)</th>
<th>Maximum Interior Height of Walls (m)</th>
<th>Interior Wall Circumference (approx. m.)</th>
<th>Dimensions (approx. square metres)</th>
<th>Partitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Passet II</td>
<td>0.70</td>
<td>0.60</td>
<td>19</td>
<td>45</td>
<td>none</td>
</tr>
<tr>
<td>Salema</td>
<td>0.60</td>
<td>1.30</td>
<td>16</td>
<td>32</td>
<td>none</td>
</tr>
<tr>
<td>Collao de Cosme</td>
<td>1.20</td>
<td>0.80</td>
<td>9 (7 of enclosure)</td>
<td>42</td>
<td>one</td>
</tr>
<tr>
<td>Font del Cuquero</td>
<td>0.60</td>
<td>1.30</td>
<td>16</td>
<td>62</td>
<td>none</td>
</tr>
<tr>
<td>Barranc Salema</td>
<td>0.55</td>
<td>1</td>
<td>7</td>
<td>26</td>
<td>none</td>
</tr>
<tr>
<td>Cantal de Gil</td>
<td>0.80</td>
<td>0.70</td>
<td>?</td>
<td>70-75</td>
<td>none</td>
</tr>
<tr>
<td>Coves de Campos</td>
<td>0.50</td>
<td>1</td>
<td>8.50</td>
<td>30</td>
<td>none</td>
</tr>
<tr>
<td>Cantal del Cornut</td>
<td>0.80</td>
<td>1.70</td>
<td>7</td>
<td></td>
<td>none</td>
</tr>
</tbody>
</table>
### 3) Fageca* and Famorca District Esbardals

<table>
<thead>
<tr>
<th>Name</th>
<th>Walls Width (m)</th>
<th>Maximum Interior Length of Walls (m)</th>
<th>Total Interior Wall Length (approx. m)</th>
<th>Dimensions (approx. square metres)</th>
<th>Partitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barranc Fondo I</td>
<td>0.60</td>
<td>1.70</td>
<td>29</td>
<td>62</td>
<td>none</td>
</tr>
<tr>
<td>Font dels Olbits I</td>
<td>0.70</td>
<td>?</td>
<td>27</td>
<td>34</td>
<td>one</td>
</tr>
<tr>
<td>Font dels Olbits II</td>
<td>0.65</td>
<td>1.50</td>
<td>12</td>
<td>14</td>
<td>none</td>
</tr>
<tr>
<td>Ximo el Moro</td>
<td>0.70</td>
<td>0.50</td>
<td>13 (surviving)</td>
<td>46</td>
<td>none</td>
</tr>
<tr>
<td>Barranc Fondo II</td>
<td>0.60</td>
<td>1.70</td>
<td>32</td>
<td>44</td>
<td>none</td>
</tr>
<tr>
<td>Del Passet I*</td>
<td>0.80</td>
<td>1.50</td>
<td>36</td>
<td>92</td>
<td>none</td>
</tr>
<tr>
<td>Name</td>
<td>Roofed Area Wall Width (m)</td>
<td>Unroofed Area Wall Width (m)</td>
<td>Roofed Dimensions (approx. square metres)</td>
<td>Unroofed Dimensions (approx. square metres)</td>
<td>Total Floor Dimensions (approx. square metres)</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------------------</td>
<td>------------------------------</td>
<td>-------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Del Roig</td>
<td>0.40/0.50</td>
<td>0.45</td>
<td>2 Ground floors—48 2 first floors—48</td>
<td>81</td>
<td>180</td>
</tr>
<tr>
<td>Del Mellat</td>
<td>0.45</td>
<td>0.50/0.80</td>
<td>Ground Fl.—39 First Fl.—24</td>
<td>28</td>
<td>52</td>
</tr>
<tr>
<td>Solana</td>
<td>0.40</td>
<td>0.70</td>
<td>Ground Fl.—44 First Fl.—44</td>
<td>area 1—14 area 2—32 area 3—18</td>
<td>127</td>
</tr>
<tr>
<td>De les Fontetes</td>
<td>0.50</td>
<td>0.50</td>
<td>Ground Fl.—44 First Fl.—44</td>
<td>area 1—84 area 2—24 area 3—45</td>
<td>241</td>
</tr>
<tr>
<td>Maia Sevines II</td>
<td>0.50</td>
<td>0.50</td>
<td>Ground Fl.—44 First Fl.—44</td>
<td>23</td>
<td>112</td>
</tr>
<tr>
<td>Maia Sevines III</td>
<td>1</td>
<td>1</td>
<td>52</td>
<td>125</td>
<td>178</td>
</tr>
<tr>
<td>Maia Verda</td>
<td>0.70</td>
<td>0.60/0.80</td>
<td>23</td>
<td>29</td>
<td>52</td>
</tr>
<tr>
<td>Corral del Tossal</td>
<td>0.45</td>
<td>0.50</td>
<td>10</td>
<td>28</td>
<td>38</td>
</tr>
<tr>
<td>Barranc Fondo</td>
<td>0.50/0.60/0.80</td>
<td>0.60/0.70/0.80</td>
<td>Ground Fl.—50 First Fl.—50</td>
<td>53</td>
<td>153</td>
</tr>
<tr>
<td>De Batiste</td>
<td>0.17/0.30/0.50</td>
<td>0.50/0.70</td>
<td>Ground Fl.—17 Ground Fl.—2—19 First Fl.—17</td>
<td>Unroofed 1—21 Unroofed 2—27 Unroofed 3—32</td>
<td>131</td>
</tr>
<tr>
<td>Racó Fora</td>
<td>0.50</td>
<td>0.50/0.80</td>
<td>Ground Fl.—17 Ground Fl.—2—19 First Fl.—17</td>
<td>Unroofed 1—30 Unroofed 2—22</td>
<td>75</td>
</tr>
<tr>
<td>Maia</td>
<td>0.60/0.70</td>
<td>0.65/0.90</td>
<td>23</td>
<td>Ras 1—30 Ras 2—22</td>
<td>126</td>
</tr>
<tr>
<td>Dels Forans</td>
<td>0.55</td>
<td>0.80/0.50/0.60</td>
<td>28</td>
<td>29</td>
<td>47</td>
</tr>
<tr>
<td>Font del INoger</td>
<td>0.50</td>
<td>0.50</td>
<td>18</td>
<td>29</td>
<td>47</td>
</tr>
<tr>
<td>Tossal</td>
<td>1/0.50</td>
<td>0.50</td>
<td>9</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>Maia Sevines I</td>
<td>0.60</td>
<td>0.65</td>
<td>20</td>
<td>Unroofed 1—32 Unroofed 2—18</td>
<td>70</td>
</tr>
</tbody>
</table>
5) Fageca District Corrals

<table>
<thead>
<tr>
<th>Name</th>
<th>Roofed Area Wall Width (m)</th>
<th>Unroofed Area Wall Width (m)</th>
<th>Roofed Dimensions (approx. square metres)</th>
<th>Unroofed Dimensions (approx. square metres)</th>
<th>Total Floor Dimensions (approx. square metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Fullana</td>
<td>0.50</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>31 (left)</td>
</tr>
<tr>
<td>Conde 1*</td>
<td>0.50</td>
<td>0.50</td>
<td>36</td>
<td>82</td>
<td>118</td>
</tr>
<tr>
<td>Conde 2*</td>
<td>0.45/0.50</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Conde 3*</td>
<td>0.45</td>
<td>0.50</td>
<td>19</td>
<td>26</td>
<td>45</td>
</tr>
<tr>
<td>Socarrat</td>
<td>0.50</td>
<td>0.45</td>
<td>Ground Fl. --- 38</td>
<td>First Fl. --- 15</td>
<td>24</td>
</tr>
<tr>
<td>Salema</td>
<td>0.50</td>
<td>0.40</td>
<td>?</td>
<td>Unroofed 1 --- 59</td>
<td>164</td>
</tr>
<tr>
<td>Maia Matxos</td>
<td>0.45</td>
<td>0.45</td>
<td>50</td>
<td>Unroofed 2 --- 59 (visi.)</td>
<td>164</td>
</tr>
<tr>
<td>Corral Nou</td>
<td>0.40</td>
<td>0.50</td>
<td>34</td>
<td>39</td>
<td>89</td>
</tr>
<tr>
<td>Pinar de Demetrio</td>
<td>0.80</td>
<td>0.60</td>
<td>15</td>
<td>18</td>
<td>32</td>
</tr>
<tr>
<td>Cantalar</td>
<td>0.40</td>
<td>0.40</td>
<td>105</td>
<td>34</td>
<td>139</td>
</tr>
<tr>
<td>Cagadur</td>
<td>0.30/0.50</td>
<td>0.45</td>
<td>45</td>
<td>Unroofed 1 --- 58</td>
<td>172</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unroofed 2 --- 68 (visi.)</td>
<td></td>
</tr>
</tbody>
</table>

* Part of the same structure