

## Milking the Mountains\*

### Economic Activities on the Cretan Uplands in the Classical and Hellenistic Period

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Ἔνας βοσκός, γεροβοσκός καὶ παλιοκουραδάρης,  
τὰ νιάταν του θυμήθηκε, τὰ νιάταν του θυμάται.  
Ἐπὶ ἐν' ἐκείνοι οἱ καιροὶ καὶ οἱ βουλισμένοι χρόνοι,  
ἀπὸ μὲν νιὸς καὶ εἰς τὸ βουνὸν ἤβλεπα τὸ κουράδι,  
ποῦ ἔχα μαντριά τὰ πρόβατα, μαντριά μαντριά τὰ γίδια,  
ποῦ ἔχα καὶ ἐννιά μπροστάρηδες καὶ ἐσέρναν τὸ κουράδι,  
ποῦ ἔχα μιτάτον ξακουστὸ στὴ Νίδα τὸ λιβάδι."

#### 1 INTRODUCTION

R. Matton once described Crete, very aptly, as a mountain emerging out of the sea (1957, 13). An almost continuous chain of mountains (the White Mountains, the Mountains of Sphakia, Ida, Kophinas, Juktas, the Lasithi Mountains, Orino) runs through the island, occupying 4,281 km<sup>2</sup> (c. 52%) of the surface, as opposed to the c. 300 km<sup>2</sup> covered by the few inland and coastal plains (Allbaugh 1953, 42, 471 Fig. A8; Dimitrakos 1967, 782, 793, 801, 812). The mountainous character of the island is highlighted in Strabo's introductory words on the geography of Crete (x 4,4, C 475: "the island is mountainous and treed; but it has fertile valleys as well"). The Cretans are called in antiquity and in modern times alike the offspring of Crete's highest mountain — "the children of Ida" (Euripides, *Cretenses* fr. 5 ed. Cantarella: "Ἰδαί τεκνία" or "the sons of Psiloritis." Not surprisingly, the uplands of Crete have attracted the interest of modern geographers and occupy the central position they deserve in studies on the history, archaeology, and historical geography of Crete.<sup>1</sup>

This paper is concerned with two questions: how the economic exploitation of the mountains responded to the needs of the Cretan polities in the Classical and Hellenistic period; and what changes the economic role of the uplands experienced from the 5th century BC to the 1st century AD, until Crete had been fully integrated into the Roman Empire. The discussion is based on a survey of the documentary and literary sources on the resources of the Cretan mountains. In this long period Crete comprised, at times, up to 60 independent *poleis* (or more). Generalisations are therefore dangerous, the more so

\* This paper summarizes and updates the results of earlier research presented in Chaniotis 1991, 1995, and 1996a. All dates are BC, if not otherwise stated.

<sup>1</sup> See, e.g., Nevros and Zvorykin 1938/39, esp. 242f; Pendlebury 1939, 4f; Creutzburg 1958; Faure 1965; Watrous 1982; Verginis 1980, 198-203; Fabre and Maire 1984; Hempel 1984, 21-24; Hempel 1990; Chaniotis 1991; Hempel 1991, 47-146; Hempel 1992; Gifford 1992; Hempel 1995; Chaniotis 1995; 1996a; Rackham and Moody 1996, 12-32, 189-193.

since the written sources are both scant and fragmentary and the post-Minoan archaeological material insufficiently published.

## 2 SUBSISTENCE ECONOMY IN PRE-ROMAN CRETE

The economic autarchy of a community depends on a diversified territory, suitable for a variety of complementary economic activities (Renfrew and Wagstaff 1982, 73-180, 245-290; Osborne 1987, 37-40; van Effenterre 1991, 403f; Chaniotis 1991, 98): one needs land suitable for farming in the plains, the plateaus, and the hills; areas for the cultivation of olives; vineyards and orchards; mountain pastures; forests for supplying timber; access to the sea for transportation, fishing, and the production of salt.

Despite its mountainous character, the Cretan landscape is diverse (Moody 1997, 62-66), and this explains why the fertility of Crete was proverbial, at least in certain historical periods. For the poet of the *Odyssey* (19, 172-174), Crete is “a handsome country and fertile”; for the Byzantine historian Leon Diakonos (*historiae* i 4, p. 9, 14-16 ed. Bonn), “a blessed land, with an abundance of fruits, rich pasture, and numerous sheep”; for other Byzantine authors, a land “flowing with milk and honey” (Chaniotis 1988a, 63 n. 6). The mild climate (Flaccus 1992; Rackham and Moody 1996, 33-45) and the water resources (Angelakis and Spyridakis 1996; cf. Rackham and Moody 1996, 34-36, 41-44) usually guaranteed a good yield. Recent survey work on various Cretan regions — e.g., in Mallia (Dewolf-Postel and van Effenterre 1963, 42-53), Ayiofarango (Bintliff 1977b, 116f), Knossos (Roberts 1979, 240; 1981, 5), the plain of Mesara (Watrous et al. 1993, 194-214), the plateau of Lasithi (Watrous 1982, 7f), the Mesereroi valley (Hayden 1995, 99f, 133-135), and west Crete (Moody 1987, esp. 38-130) — has offered evidence for the diversity and the complementary character of the economic activities in the various geographical zones.

If the economic conditions in Classical and Hellenistic Crete were not as ideal as the geographical factors alone would allow, this was at least in part due to the social order of the Cretan communities. A central aspect of Cretan history before the Roman conquest is the division of the island among dozens of independent *poleis*. The great number of city-states on Crete impressed the other Greeks so much that they called the island *hekatompolis*: the island with one hundred cities.<sup>2</sup> The social organization and the economy of these polities in the Classical period (5th-4th centuries) were characterized by the dependence of the citizenship on military training, the rule over a dependent population of various legal statuses — bought slaves, serfs in communal or private ownership, and free non-citizens (Willetts 1955, 33-36, 166-191, 249-356; Gschnitzer 1976, 75-80; van Effenterre 1982, 35-44; Wittenburg 1982; Perlman 1996) — and the participation of the citizens in common meals or *syssitia* (Talamo 1987; Lavrencic 1988; Schmitt Pantel 1992, 60-76; Link 1994). The adequate economic system for such a social organization is a subsistence economy based on farming and animal husbandry (e.g., Wagstaff, Augustson, and Gamble 1982; Chaniotis 1988a, 67-69; Hodkinson 1988, 59-61; Sallares 1991, 298f). Large-scale agricultural production and manufacture connected with exports seem to have played an insignificant part in the Cretan economy of the Classical period.

<sup>2</sup> For the geographical and historical factors which favored the political division of the island see Lehmann 1939; cf. Kirsten 1956, 44f, 90f.; van Effenterre 1991, 395f; Bennet 1990. For efforts to estimate the number of independent and dependent cities in the Classical and Hellenistic period, see Perlman 1996; Chaniotis 1996b, 12f note 36 (with bibliography).

The stability of such a system requires that the land can produce enough food for the support of the population; that the small, privileged group of the citizen-warriors owns enough landed property to maintain its status; and that the dependent population cultivates the land and pays its tribute. These conditions can hardly be met for long periods of time: demographic developments, a bad harvest, short-term climatic changes, the concentration of landed property in a few large estates, the destruction or the loss of cultivated land during wars, the escape of slaves, and the uprising of serfs are some of the factors which may — and did — disturb a very unstable equilibrium. When food and land shortage occurred, solutions were not sought in reforms, but in the conquest of the neighbor's territory and in migration. These are well-attested, almost endemic, phenomena in Classical and — to a much greater extent — in Hellenistic Crete (Chaniotis 1996b, 13-16, 18-28, 169-175). The fears of the Cretan communities are clearly expressed in the formulaic clauses of the Hellenistic treaties of alliance, in which the partner is called to assist, “whenever someone invades the land, or occupies parts of the territory, or destroys private estates, settlements of the serfs, frontier forts, islands, or harbors.”<sup>3</sup>

The Hellenistic period brought some important changes. The political relations of the Cretan *poleis* with foreign states became more intense from the early 3rd century onwards (Petropoulou 1985; Kreuter 1992). Thousands of Cretan mercenaries served in all major Hellenistic armies (Launey 1949/50; Petropoulou 1985) and brought home not only their payment (Le Rider 1966, 191-194), but also many of the luxury items found in settlements and graves (e.g., Markoulaki and Niniou-Kindeli 1982). In the same period, the notorious Cretan pirates (Brulé 1978) gained booty from their raids in the southeastern Aegean and the coast of Asia Minor. These raids had an important effect on Cretan economy, since the sale of the booty (slaves and valuables) and the ransoming of captives increased the monetary transactions and consequently the income of the Cretan cities from the levying of customs.<sup>4</sup> On the other hand, the strategic position of the island on the trade routes of the eastern Mediterranean cannot have escaped the attention of the major trade powers, and P. Perlman's suggestion that the wars of Rhodes against Crete are connected with Rhodian economic interests in the region is plausible (Perlman, forthcoming). We still lack substantial amounts of published material from Hellenistic settlements and graves, which would allow a reappraisal of the imports in Crete. There are, however, objects which can be easily identified as imports, even in the short excavation reports, such as the Rhodian and Koan amphora stamps found in many sites and indicating an increase in the importation of foreign goods.<sup>5</sup> Since this material remains unpublished and

<sup>3</sup> E.g., *SEG* XLI 742 = Chaniotis 1996b, 278 no. 38 ll. 8-11: αἱ τίς κ' ἐνβάλλ[λ]ηι ἐς τ[ὸν] χῶρ[αν τῶν Ἀπταραίων ἢ ἀποτάμνηται] | τὰς χῶ[ρα]ς [τ]ῶ[ν] Ἀπταραίων ἢ φθειρηι κλάρος ἢ οικετήαν] ἢ φῶρι[α ἢ νόσος ἢ λιμένας]. For similar expressions, see Chaniotis 1996b, 88f.

<sup>4</sup> For the close relationship between piracy and trade in general, see Garland 1978, 5f; cf., for Crete, Brulé 1978, 158-161; Petropoulou 1985, 39f, 49f, 61f, 68-74; Chaniotis 1988a, 70. It is possible that clauses concerning exports and imports in the Cretan treaties envisage among other things (grain, livestock) the booty of wars and raids: Chaniotis 1996b, 120-122. On the ransoming of captives, see Bielman 1994; Sahin 1994. For the importance of customs in the Hellenistic period, see Viviers' paper in this volume.

<sup>5</sup> A Hellenistic house in Eleutherna, published recently, is an interesting example. It contained imported pottery, especially from Athens and Delos (Kalpaxis et al. 1994, 135-138, 154f, 157f), but these imports appear insignificant as compared to the local pottery, and can be dated mainly to the latest phase of the Hellenistic period (2nd/1st cent.). Cf. the insignificant imports of Attic pottery (early

is only insufficiently presented in short excavation reports, it is for the moment impossible to determine its chronological and geographical distribution and its relative importance for the Hellenistic economy of Crete.

Despite the intensification of trade in Hellenistic Crete (cf. Viviers, in this volume), this does not seem to have affected the traditional social and economic order substantially. This can be best seen when we turn our attention to the Cretan exports. Cypress wood is known to have been exported from Crete in Hellenistic times (§ 3.3), but these exports were related to a few building programs and cannot be regarded as a constant economic factor. Wine production is well attested in the written sources from the 6th century onwards, but to the best of my knowledge, a high degree of specialization in viticulture, a more or less planned production of surplus, and the export of substantial amounts of wine make their appearance only after the conquest of Crete by the Romans (Chaniotis 1988a; Marangou-Lerat 1995; Marangou, in this volume). The only identifiable product of Cretan manufacture exported in large quantities is a class of the 'Hadra vases' (named after a cemetery near Alexandria).<sup>6</sup> The so-called 'Clay Ground Class', which owes its name to the use of dark paint on the clay ground, was certainly produced on Crete (Mangou 1997, 149f). Besides Egypt and Eretria (Zervoudaki 1997), it is attested in Gortyn, Itanos, Knossos, Kommos, and Phaistos; Knossos and Phaistos seem to have been the main centers of production (3rd-2nd centuries). The importance of the export of Cretan 'Hadra vases' to the island's economy should not be overestimated. Vases are known to have been brought to Egypt by mercenaries — e.g., prize vases with figured decoration (Callaghan 1980, 35) — and so it is conceivable that this ware reached Alexandria and Eretria aboard the same ships, which brought there the thousands of Cretan mercenaries who served in the Ptolemaic army and the soldiers who are known to have served in the Macedonian garrison of Eretria. Another group of Cretan pottery had the same destination: amphorae decorated with relief emblems ('Plakettenvasen'), probably produced in west Crete (Georgiadou 1994, 146; cf. Markoulaki 1997).

There is no indication that subsistence farming was replaced by production oriented toward the export of agricultural products. There is a single reference to the export of grain from Cretan cities in a fragmentary treaty between Hierapytna and the Arkadians of Crete (Chaniotis 1996b, 120, 221), but these exchanges took place within neighboring communities. This hardly contradicts the orientation of Cretan economy towards subsistence farming, since interstate agreements which facilitated the export of food supplies present an alternative to the direct storage of food (Gallant 1991, 181f). Similarly, although products related to Cretan animal husbandry (cheese, leather, textiles) are mentioned in non-Cretan literary sources and, therefore, were known outside Crete (below, n. 16 and § 3.2.4), there is no indication that the by-products of shepherding were the object of substantial exports.<sup>7</sup>

Exchanges on and with Crete were primarily trade in captured persons, slaves, and foreign luxury items, which usually found their way to the island as the booty of

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3rd century), 'Megarian bowls' (2nd/1st century), and Cypriot and Syro-Palestinian glass (3rd/2nd century) in the 'Unexplored Mansion' in Knossos (Callaghan 1992, 100f, 132f; Price 1992, 416).

6 Guerrini 1964; Callaghan 1978, 15; 1980, 30-35; 1981, 38f, 55-57; 1984; 1992, 101-106, 130-132; Callaghan and Jones 1985; cf. Cook 1984; La Rosa 1984; Zervoudaki 1997.

7 It should be noted in this context that the ethnic names used in literary sources and inscriptions in connection with products (e.g., 'Kythnian cheese') sometimes indicate the quality and not the geographical origin of the product (Brun 1997).

mercenaries or raiders or in the cargo of foreign ships. For the Cretans, trade was to a large extent a side-effect of war: bringing home luxury items, selling captives, trading with booty, and transporting these goods abroad on their ships. One of the main concerns of the Hellenistic treaties between the Cretan cities is precisely the division of booty (Brulé 1978, 106-114; Petropoulou 1985, 20f, 80f; Chaniotis 1996b, 93f). The literary and documentary sources provide us with several characteristic examples of how luxury items found their way to Crete. Oroandes of Crete was a friend and supporter of King Perseus of Macedonia (early 2nd century). When Perseus was defeated at Pydna (167 BC), Oroandes promised to bring the king and his treasures to safety, but, as soon as he brought the treasures aboard his ship, he sailed to Crete to sell his booty there (Livy xlv 6,2). A reminiscence of such events is possibly found in Chariton's novel *Chaïreas and Kallirhoe* (iii 3,9, 1st/2nd century AD): A band of grave robbers loaded a ship full of luxury items and sailed to Crete to sell them in the wealthy island. This practice is confirmed by the documentary evidence. One of the causes of a war between Lato and Olous in the late 2nd century was the ownership of a ship sunk or captured off the coast of Olous. The booty consisted of two free men, one slave, silverware, silver coins, bronzeware, and other implements (van Effenterre 1942, 35f; Chaniotis 1996b, 327f). A treaty between Gortyn and the dependent population of Kaudos (Gavdos, 3rd/2nd century) provides for the dedication to Apollon Pythios in Gortyn of a tithe from all goods which ran ashore on the islet (*I.Cret.* IV 184 A 18f; Chaniotis 1996b, 415). In all these cases we are dealing with trade, but not with trade of *local* products.

The concerns of the Cretan economy in the Hellenistic period can be best seen in the Cretan treaties, which deal primarily with agriculture and pastoral activities, with exchanges within the island, and with the economic aspects of war (Petropoulou 1985; Chaniotis 1996b, 108-122). F. Guizzi's review of the economic clauses of the isopolity treaties in this volume (pp. 235-243) makes it plausible that the state revenues profited greatly from the increased mobility in the island and from Cretan seafaring (cf. also Viviers, in this volume, pp. 221-233), yet the stronger political and to some extent economic integration of Crete into the Hellenistic world does not seem to have set aside the traditional ideal of economic autarchy. Since the limited trade was not related to *local* production, it could not contribute to the formation of a strong group of manufacturers or plantation owners and thus generate significant changes in the traditional social order.

This view is confirmed by a study of the documentary sources. The Hellenistic inscriptions continue to use the traditional terms with regard to the military education of youth (*agela, egdramein*), the participation of the citizens in 'men's houses' (*andreia*), the various forms of land ownership (*klaros, aphamia, oiketeia*), and the traditional division of the population to citizens, free non-citizens, serfs, and slaves (Petropoulou 1985, 48, 81f, 115f, 123-128; Chaniotis 1996b, 19-21, 124f, 133). Unfortunately, the gaps in our evidence do not allow us to determine with certainty whether the use of a traditional vocabulary is the result of an almost unbroken continuity or of an artificial revival of archaic institutions — as suggested by M. Bile for the epehebic initiation rituals (1992, 15f). The common meals of the citizens (*syssitia*) illustrate the problem. In the Classical period, the *syssitia* were supported by contributions of the citizens, by public revenues, and by the tribute of the serfs (below, p. 194). *Syssitia* are still attested in the Hellenistic period, but only in the context of festivals (Chaniotis 1996b, 133). Unfortunately, we lack unequivocal evidence that they were practiced on a everyday basis, at least in some cities. A Gortynian inscription (*I.Cret.* IV 184 = Chaniotis 1996b, no. 69, 3rd/ 2nd

century) refers to the payment by the Gortynian citizens of a tithe of all their products. This has been taken by M. Guarducci (1933a) as an indication that the *sysstia* were still practiced in the late 3rd century, a suggestion which may well be correct, but is not certain. Another strong indication for the persistence of this archaic institution is the fact that a very detailed description of the common meals in Lyttos is given — in the present tense — by a *Hellenistic* local historian (Dosiadas, *Fragmente der griechischen Historiker* 458 F 2). The continuity from the Archaic and Classical into the Hellenistic period is more obvious in a crucial sector of economic and social organization: land ownership. The traditional division of land into private lots (*klaroi*), private land cultivated by serfs (*aphamia*), and communal land cultivated by a dependent population (*oiketia*) is attested throughout the Hellenistic period (Chaniotis 1996b, 19f). An important change in this field may be seen in the concentration of landed property in a few large estates (Guizzi, in this volume, p. 238). The Cretan expansion wars, the massive migration to Asia Minor and Egypt, the efforts to colonize abandoned or uninhabited areas in the island, and the economic clauses of interstate agreements have been interpreted as efforts to solve the social and economic problems generated by the fact that many citizens had lost their land (Chaniotis 1996b, esp. 169-175).

Despite the changes that our sources allow us to detect in the course of five centuries, the economy of the Cretan communities, in the setting of an aristocratic society pre-occupied with military exercise, is characterized by subsistence farming. It is in this framework that I study the economic activities on the Cretan uplands.

Most settlements in the periods under discussion were located on low hills, usually not in the immediate proximity of the sea. Less than 20 independent cities or larger settlements were located on sites which lay higher than 400 m above sea level (Anavlochos, Anopolis, Aphrati, Araden, Axos, Biannos, Eleutherna, Elyros, Hyrtakina, Kantanos, Krousonas, Lyttos, Malla, Prinias, Rhaukos, Sybrita: Chaniotis 1991, 96), yet the territory of almost all the independent cities consisted of mountainous terrain, which could be exploited from the main settlement.

### 3 THE EXPLOITATION OF THE UPLANDS IN CLASSICAL AND HELLENISTIC CRETE

#### 3.1 Farming and agricultural terracing

Crete has 25 mountain plains where farming can be practiced, the most important being Lasithi, Omalos, Katharo, Askyfou, and Nida (Rackham and Moody 1996, 27f, 147-150). The research of L.V. Watrous (1982) in Lasithi has demonstrated the importance of this region for settlement, particularly from the Bronze Age to the late Archaic period and then, again, in Imperial times. In the periods under discussion here, Watrous observed a decrease in the number of settlements, which may be due to climatic conditions (Watrous 1982, 22f) or to the tendency of the cave (Chonos) into which the Lasithi river disappears to block and unblock itself, which affects the size of the cultivable area (Rackham and Moody 1996, 95). Lacking direct evidence for farming in the plateau of Lasithi in the Classical and Hellenistic periods, we can only speculate about its importance for the economy of Lyttos, the city which controlled it.

We have the same problem with the plateau of Nida on Mt. Ida, where farming is attested directly, but only for the period before c. 300 BC.<sup>8</sup> In the early 3rd century, Theophrastus (*de ventis* fr. V 13 ed. Wimmer; cf. Watrous 1982, 22; Rackham and Moody 1996, 39) reports that according to local experts, the climatic conditions allowed habitation and settlement on the mountains in earlier times. The winters were less severe, the snowfalls less heavy, rainfalls more abundant. “For there are large plains on Mt. Ida and on the other mountains, none of which is cultivated nowadays, because they do not bear.” We do not know if a short-term climatic change, as Theophrastus asserts, or other factors (e.g., changes in settlement resulting from political developments) disturbed the agricultural activities in the plateau of Nida — as may have occurred in Lasithi.

Some scant evidence for farming on the mountains can be derived again in the late Hellenistic period from a treaty concluded between Hierapytna and Lato in 111/10 (*SEG* XXVI 1049 = Chaniotis 1996b, no. 59). A description of part of the frontier, which can be located with certainty on the mountains, probably between the modern villages of Vasiliki and Meseleroi (van Effenterre and Bougrat 1969, 41–43; cf. Chaniotis 1996b, 349f), refers constantly to points of orientation which imply habitation and farming (ll. 69–73). We find a reference to the estate of a certain Exakon, cultivated by his serfs (as the word *aphamia* implies). Next to it is land which used to be waste (*cherson*), i.e., which had been taken under cultivation recently. Ruins (*ereipiones*) are described at some distance.<sup>9</sup>

The word *tainia* — literally a band or stripe — in the same delimitation is of particular interest. P. Faure (1972, 230) has observed that this word is used by modern farmers in east Crete to describe a strip of cultivated land along the rock which separates the cultivated land from the rocky terrain. The context (“from the east side of Mt. Benkasos to the cliff, all round, to the other cliff, all along the *tainia*”) suggests that this may be the ancient meaning of the word and, in this case, we could have a reference to a terrace. A stripe of land in a rocky terrain can be best understood as the result of terracing, which was practiced in ancient Greece (Isager and Skydsgaard 1992, 81f; Schas and Spencer 1994, 424–430; Foxhall 1996, 45–53, 60–64). Recent research has shown the existence of agricultural terracing in the Cretan landscape (Moody and Grove 1990; Rackham and Moody 1996, 140–145; cf. Hayden 1995, 105, 122), although the chronology of terraces presents a serious problem. The treaty of Hierapytna and Lato may offer an isolated documentary attestation of this practice in antiquity. There may be more indirect literary evidence on terracing in ancient Crete. Theophrastus describes, in a passage which has survived in Pliny’s *Natural History* (xxxii 53) and Seneca’s *Natural Enquiries* (iii 11,5), the disastrous results of war for agriculture.<sup>10</sup> When the (or the major) settlement of the

8 According to information provided to me by the villagers of Anogia, grain was still growing here until the Second World War.

9 ἀπό τὰς τῶ [Β]εγκάσω (ἐπιτολάς) ἐς τὰς πέτρας περιαπέ[τε]τις ἐς [τ]ὰν (ἄλλαν πέτραν) [αἰ ἂ] ταινία παρατρέχει καὶ τοῦτω [περιαμ]πέτις [ἐ]ς [ἄ]κραν τὰν Μίτοις καὶ | ἐς ὄρθον [ἐ]ς τ[ὴ]ν κεφαλῶν τῶ παλαιοῦ χέρσω [τὰν] ἐπέχο[υσαν] ἐπὶ τὰν Ἐξάκων[ος] | ἀφαιμ[α]ν [καὶ] τοῦτω ἐπὶ τὰς κεφαλὰς τὰν ναπιᾶν περὶ τὸς ἐρειπίων[ας]. “From the east side of Mt. Benkasos to the cliff, all round, to the other cliff, all along the ‘band’; and from there all round to the peak at Mitoi; and straight on to the summit of the previously wasteland, which is adjacent to the estate of Exakon; and from there to the summits of the wooded valley, near the ruins.” For a discussion of the terminology of the Cretan delimitations, see van Effenterre and van Effenterre 1994; Chaniotis 1996b, 153–158.

10 Pliny, *naturalis historia* xxxii 53: *et coli moverique terram callumque summae cutis solvi aquarum interest. proditur arte in Creta, expugnato oppido quod vocabatur Arcadia, cessasse fontes amnesque qui in eo situ multi erant, rursus condito post sex annos emerissee, ut quaeque coepissent partes coli;*

Arkadians of Crete — on the western foothills of the Lasithi mountains — was destroyed, their land remained uncultivated for six years. Consequently, the springs and streams, which used to abound in their region, ceased to carry water. Water returned only after the farmers were able to resume their work. This story probably alludes to the erosion which inevitably occurs when agricultural activities are interrupted and the terraces are not being attended to by the farmers.

By cultivating the mountain plains and building terraces — perhaps also applying the technique of trenching (cf. Foxhall 1996, 53-60) — the Cretans could grow grain on the mountains. In addition to that, olives can grow up to a height of c. 750 m and vines up to a height of c. 1,200 m above sea level (see Nowicki, in this volume, p. 163). The existence of vineyards on mountainous terrain is attested by a 3rd-century inscription from Kydonia (*I.Cret.* II,x 1), which mentions vineyards at a site called *Schinouris*; the name of the site (cf. *oros*, 'mountain') implies a location on the uplands.

The scant literary and epigraphic evidence indicates that the Cretan uplands *could* be used for farming in the Classical and Hellenistic periods. At the same time, it shows the problems inherent in the economic exploitation of the uplands. Short-term climatic changes and political events — especially wars — result in changes in the accessibility of the uplands; they also affect — and may be influenced by — demography and settlement. The review of this evidence not only demonstrates the enormous gaps in our documentation, but also gives us a helpful warning, which we should bear in mind when we turn to the better-documented aspects of the economy of the uplands: generalizations are impermissible; one should take into consideration short-term changes and regional variations.

### 3.2 Specialized pastoralism and 'transhumance': Ancient documentary evidence, literary allusions, and modern experience

#### 3.2.1 The nature of the evidence and the problems

From Neolithic times onwards, animal husbandry and related activities (production of milk and cheese, weaving, working of the animals' skin, etc.) have represented one of the main branches of the Cretan economy.<sup>11</sup> In 1948, 48% of the land was used for nomadic grazing (Allbaugh 1953, 54 fig. 2). Since the breeding of cattle and sheep was regarded by Diodorus (v 65,2) as a *Cretan* contribution to civilization, an invention of the Kouretes (the Cretan mountain demons), the abundance of ancient literary, archaeological, and epigraphic evidence for the breeding of all kinds of livestock — horses, oxen and cows, swine, goats, and above all sheep — is not surprising (Chaniotis 1995, 39f). Despite the great number of sources, however, the information they provide on the organization of this economic sector is extremely limited.

Here, we will concentrate on the breeding of sheep in post-Minoan Crete, not only because sheep, in general, had a predominant position among livestock in ancient Greece

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cf. Seneca, *naturales quaestiones* iii 11,5; *idem* (sc. Theophrastus) *ait circa Arcadium, quae urbs in Creta insula fuit, fontes et rivis substituisse, quia deserit coli terra diruta urbe; postea vero quam cultores receperit, aquas quoque recepisse*. For the disastrous results of war for agriculture, see Hanson 1983, 11-63; Foxhall 1993.

<sup>11</sup> The bibliography, especially for the Bronze Age, is immense. I select a few relatively recent titles. Neolithic times: Manteli 1990. Bronze Age and Linear B documents: Halstead 1990/91; Bennet 1992; Palaima 1992. Modern Crete: Mavrakakis 1985; Blitzer 1990; Hempel 1995. Post-Minoan Crete: Petropoulou 1985, 50-53; van Effenterre 1991, 400, 403f; Chaniotis 1995; Nowicki, in this volume (pp. 159-162). Cf. Rackham and Moody 1996, 159-164.



(Georgoudi 1974, 165; Cherry 1988, 9), but mainly because they can participate more easily than oxen and swine in a seasonal movement to the mountain pastures. Several characteristic sources would suffice to demonstrate the central position occupied by the breeding of sheep in post-Minoan Crete. The expression 'Cretan sheep' found in Artemidorus' treatise on the interpretation of dreams (*Oniromachia* iv 22, p. 214,5 ed. Hercher) seems to have become proverbial. In the Cretan oaths we find the imprecation "if we break our oath let our women and our sheep not bear according to nature" (Chaniotis 1996b, 76 n. 412); and in the hymn sung at the sanctuary of Zeus Diktaios by the ephebes of Cretan cities, the god was called upon to spring into the flocks and give them fertility (*J.Cret.* III,ii 1).

Unfortunately, while this kind of evidence demonstrates the preoccupation of the Cretans with animal husbandry, and especially with the raising of sheep, it does not tell us anything about the organization of this economic activity. The historian of the Cretan economy is interested in how the breeding of livestock was related to the geomorphology of the island; what changes it experienced in consequence of demographic, social, and administrative changes; how Cretan settlement patterns in various periods reflect the intensive or extensive occupation with pastoralism (choice of areas, formations of settlements in connection with transhumance, building of shelters and enclosures, etc.). Related questions concern the private or collective ownership of livestock; the size of individual herds; the existence of specialized pastoralism and/or the raising of stock in close connection with farming; the legal and social status of herdsmen (slaves, serfs, free men); the part played by the pastoral economy in the economy of the different historical periods; the use of the animals (labor, transport, meat, wool, etc.); the destination of the products (export or subsistence?); the changes this sector experienced when the aristocratically organized society of Dorian Crete was integrated into the Imperium Romanum; the seasonal movement of animals. These questions cannot always be answered,<sup>12</sup> but should, nonetheless, be stated.

When it comes to such specific issues, our sources usually desert us. Zoo-archaeological data from Iron Age settlements are, generally, lacking (Payne 1985), and the evidence presented from the few post-Minoan domestic contexts which have been studied (Kommos: Reese 1984; Knossos: Bedwin 1992; Eleutherna: Villa 1994, 194f, 201) simply shows that sheep are well represented there. Unfortunately, it is difficult to recognize pastoralism or the various uses of livestock in the zoo-archaeological record (Halstead 1981, 322-329; Cherry 1988, 17-20). More information can be gained from the inscriptions of Dorian Crete, not so much from random references to sheep and other stock — e.g., in a funerary inscription (of a shepherd?) at Axos (*J.Cret.* II,v 52, 1st century) — but from legal documents which deal with the problems created by shepherding. With a few exceptions, we have such evidence only from the 3rd and 2nd century.

The problems of method and sources are best illustrated when we turn our attention to the question of whether specialized pastoralism — which should not be confused with the raising of livestock (Whittaker 1988, 1) — was practiced in the periods under discussion here. Specialized pastoralism occurs only under certain conditions (Halstead 1987, 79-81; Whittaker 1988, 3f; Cherry 1988, 7f, 17); it presupposes the existence of large flocks (Halstead 1987, 79); and it is often connected with the seasonal movement of herds and

<sup>12</sup> For the methodological issues in general, see Cherry 1988, 6f; Hodkinson 1988; Garnsey 1988; Jameson 1988, 88f; Skydsgaard 1988; Whittaker 1988, 1-4; Isager and Skydsgaard 1992, 83-85; Forbes 1995.

the presence of specialized shepherds and breeders of livestock (Cherry 1988, 8; Hodkinson 1988, 50f, 55f; Skydsgaard 1988, 75f). These conditions were not necessarily fulfilled by all Greek cities. Recent research has made it plausible that small herds prevailed in ancient Greece (Hodkinson 1988, 62f). In addition to this, the importance of the raising of stock for ancient diet was limited, as it has been estimated that about two thirds of the daily food energy requirement were covered by the annual cereal crop (Foxhall and Forbes 1982). As for the seasonal movement of herds, it requires specific conditions, not only geographical, but also demographical. Large herds require a large amount of grazing land in contrasting climatic zones. Pasture can sometimes only be found at some distance from the settlement. Consequently, the seasonal movement of the flocks from the mountain pastures to the winter quarters of the coastal plains and vice versa is necessary. This task can only be undertaken by specialized shepherds, who must be taken from other productive activities and be devoted to the grazing of the livestock. The status of such herdsmen may be very different, e.g. serfs, slaves, or just the family's youngster (Robert 1949a; Audring 1985; Hodkinson 1988, 55; Isager and Skydsgaard 1992, 100f).

In the case of Crete, the same conditions did not prevail in all regions or in all phases of the island's history. There is no doubt that in most settlements the breeding of sheep, cattle, and pigs was practiced in close relation to farming, a phenomenon familiar from ancient subsistence economies (Hodkinson 1988, 38-51; Forbes 1995, 331f; cf. the remarks of Skydsgaard 1988). One of the regulations on inheritance in the great legal inscription of Gortyn (*I.Cret.* IV 72 col. IV 31-37 = Koerner 1993, no. 169 = *Nomima* II no. 49, c. 450 BC) is interesting in this regard, stating that "in the case (the father) should die, the city houses and whatever there is in those houses in which a serf living in the country does not reside (?), and the livestock, small and large, which do not belong to a serf, shall belong to the sons" (translated by Willetts 1967, 218; but cf. *SEG* XLV 1284). The law takes for granted that a household included, among other things (agricultural implements, clothing, et sim.) small and large livestock, which could also be owned by unfree persons (*I.Cret.* IV 75 B 7 = Koerner 1993, no. 147 = *Nomima* II no. 46, Gortyn, 5th century). Small herds of a few animals representing various species (sheep, goats, swine, cows, oxen, etc.) could easily be kept in farmsteads or even in settlements, as the archaeological evidence implies (e.g., Haggis and Nowicki 1993, 327f).

The existence of a specialized pastoralism in certain areas is plausible, in light of the geographical conditions on Crete and the modern experience. Some regions are not suitable for a manifold economic activity throughout the whole year. In some areas — e.g., in the region of Ierapetra (ancient Hierapytna) — the summer is extremely hot, with almost no rainfall in July and August (Wagstaff 1972, 276-280; Rackham 1972, 284). Other regions, especially the mountainous areas of Psiloritis (Mt. Ida), the mountains of Sphakia, and the White Mountains of west Crete, which offer excellent pasture in the summer, are inadequate for habitation and agricultural activity in the winter (Nixon, Moody, and Rackham 1988, 167-170; cf. Hayden, Moody, and Rackham 1992, 307-315 on Vrokastro in east Crete). Such geographical conditions favor the seasonal movement of livestock, especially of sheep and goats, a phenomenon well known in modern Crete. Only the technological developments of recent times, such as the construction of roads, the new possibilities for the transportation and the storage of food, and irrigation, have brought significant changes to Cretan pastoral economy. The term 'transhumance' is used for a wide variety of practices related to the seasonal movement of people and livestock (Georgoudi 1974, 155-160; Halstead 1987, 79-81; Hodkinson 1988, 51-58; Garnsey

1988, 198-203; Isager and Skydsgaard 1992, 99-101; Forbes 1995, 326, 329). It will be used, here, in its most general sense, only to designate the general phenomenon of seasonal shepherding, without implying the movement of households, seasonal habitation, or exclusive occupation with pastoralism.

In modern times, individual shepherds — not whole households — living mostly in the mountainous villages of the island, especially in Sphakia, on the White Mountains, and on Psiloritis (usually 400-800 m above sea level), move to winter quarters situated in the coastal plains (*cheimadia*) or to summer pastures of the upland plains. Pasture on the mountains, called *madáres* in west Crete, is needed from March to September — in some regions until December. Each owner of livestock receives a parcel of the communal pasture, on which one or more stone huts (*mitáta*), huts (*katoúnes*), and grottos offer shelter to him and his animals. The shepherd spends the summer and autumn months at his *mitato*, in general without his family. During the rest of the year, from September/December until the spring bathing of the sheep in the sea, the herds are kept at the warm coastal plains (*cheimadiá*) or on the small islets near the Cretan coasts (Gavdos, Gavdopoula, Thodorou, Grambousa, Agriogrambousa, Gaidouronísi, Dia, etc.). The shepherds of Sphakia in west Crete bring their herds to the coastal areas south of the Mesara plain (Lasaia, Ayiofarango) and near Rethymno; the shepherds of Mt. Ida use winter quarters in Sitia in east Crete or in Kaloí Limenes in south Crete. The main problems of transhumance in modern Crete are the limited water resources and the notorious *zooklopí*, animal theft, which sometimes takes the form of organized raids.<sup>13</sup>

As the geographical conditions have not changed since the ancient times, one logically expects that the ancient Cretans must have responded to the problems imposed upon them by their environment with similar practices, but things are not as simple as that. Traditional practices should not be used, uncritically, as analogies for antiquity (Halstead 1987, 77-79; Forbes 1995, 326-328), and an environmentally determined view of pastoralism overlooks important parameters, especially the sociopolitical conditions (cf. Cherry 1988, 14-17; Hodkinson 1988, 38, 50f; Garnsey 1988, 203f) and deforestation, which is a common requirement for — or side effect of — large-scale pastoralism in the mountains (cf. Halstead 1981, 325; Cherry 1988, 15; Hodkinson 1988, 54; Skydsgaard 1988, 76; Garnsey 1988, 205f). In addition to this, there is a major difference between the political geography of the island in the Dorian period and in modern times: from the Roman conquest onwards, Crete always constituted a political and administrative unity (cf. Bennet 1990). Political structures — political unity in particular — play a major part in the development of transhumance (Georgoudi 1974, 172; Halstead 1987, 80; Cherry 1988, 16; Hodkinson 1988, 56f; Skydsgaard 1988, 80; Garnsey 1988, 204). In the Archaic, Classical, and Hellenistic periods Crete was divided among the territories of numerous *poleis* — at times, up to sixty (or more). The political fragmentation into numerous small

<sup>13</sup> An informative description of modern Cretan 'transhumance' is given by Mavrakakis 1985, 46-81, especially on west Crete; cf. Faure 1964, 24f, 46f, 217-220; Herzfeld 1985; Nixon, Moody, Price, and Rackham 1989, 212f; Blitzer 1990; Koster 1997, 153-155, 169-175. For the vocabulary of modern Cretan 'transhumance', see Xanthudidis 1918. For routes used by modern shepherds, see Faure 1964, 24f; Bintliff 1977a; 1977b, 630; Herzfeld 1985, 38; Mavrakakis 1985, 50. For Cretan folk-songs reflecting the life of transhumant shepherds, see Apostolakis 1993, 475-489. For animal-theft, see Faure 1964, 218; Herzfeld 1985, esp. 3f, 9-11, 20-33, 38-50, 163-205. Animal-theft is also a common motif of the Cretan folksongs (e.g., Apostolakis 1993, nos 703-705, 707, 710-711, 715-716, 728). For ancient sources on the duration of transhumance, see Georgoudi 1974, 167-169.

states with their separate territories undermined the advantages offered by the geomorphology of Crete, i.e., the existence of a variety of soils and climatic conditions adequate for a variety of economic activities. The numerous communities did not participate in a unified economic system; their concern for their subsistence led inevitably to conflicts.

This fragmentation affected the Cretan economy, in general, and the extensive breeding of sheep, in particular. Extensive pastoralism presupposes that a community has adequate upland pasture as well as winter quarters near the coast or on small islets. Most cities could not fulfill this condition; in this case, they had to use the territories of neighboring cities, on the basis of treaties. The constant crossing of innumerable borderlines by the shepherds could easily lead to conflicts, and additional problems were the division of the pasture, the export of goods, animal theft, access to water sources, and damages done to arable land by sheep and goats.<sup>14</sup> Since the Cretan legal inscriptions address such problems, specialized pastoralism must have existed on Crete. The following review of the available sources will show that this evidence comes, basically, from the Hellenistic period and pertains only to certain regions of the island, thus showing the interdependence between specialized pastoralism and specific demographical and sociopolitical conditions.

### 3.2.2 The Archaic and Classical periods

For the Archaic and Classical periods we only have sparse and equivocal sources. Diogenes Laertius (i 109) reports that the legendary sage Epimenides (6th century BC?), a native of Knossos or Phaistos, was sent by his father to find a lost sheep in the rich pastureland of Mt. Ida, of which Pindar sings (*paian* iv 51), fell asleep in Zeus' cave, and woke up 57 years later with the mantic and expiatory properties which made him famous in Greece. This legend shares common elements, e.g., with the legendary meeting of the young shepherds Hesiodus and Archilochus with the Muses, and thus should not necessarily be regarded as a reflection of reality (Chaniotis 1995, 56f). Nevertheless, it demonstrates that the idea that a young shepherd from Knossos or Phaistos grazed his flock in a distant summer pasture on Mt. Ida did not seem strange.

Archaeological finds may also help us recognize specialized pastoralism in Archaic times. A. Lebessi has argued plausibly that the Archaic representations of ram-bearers on bronze statuettes and bronze sheets found in various sanctuaries, always on Cretan mountains, were the dedications of wealthy citizens, who derived their wealth from their abundant flocks (Lebessi 1989). This fits well with the assumption that the main goal of animal husbandry in ancient Greece was the generation of wealth (Forbes 1995, 331f). In addition to that, several cultic traditions which go back to the Archaic period, such as the cult of Apollo Karneios (a patron of cattle breeders), the festival of the Hyperboia, and the popularity of certain cult places on the Cretan mountains in historical times, might be an indication of intensive pastoral activities.<sup>15</sup>

<sup>14</sup> For such problems in other areas, see e.g. *Hellenica Oxyrhynchia* 21,3 vv. 480-485 ed. Chambers (Boiotia); Robert 1949b (Herakleia); cf. Georgoudi 1974; Sartre 1979, 214f. For damages to arable land and problems concerning the use of water sources in medieval Crete, see Gasparis 1995, 59f.

<sup>15</sup> Apollo Karneios: Willetts 1962, 265f; Hyperboia: Willetts 1962, 108f; Trümpy 1997, 191. For cult places in the Cretan mountains, see Chaniotis 1988b, 22 n. 4. The use of caves as places of worship on Crete in prehistorical and historical times is at least partly connected with pastoral economy: Faure 1964, esp. 46f, 130-139, 150, 217-220. It has been suggested that at least some Minoan 'peak sanctuaries' which are distributed in areas of upland pastures and where very large numbers of terracotta figurines representing sheep, cattle, and other animals are found, were closely connected to

Pastoralism probably left its traces in Cretan place-names, which probably go back to this early period. According to Stephanos of Byzantion (s.v. *Polyrrhenia*) the name of the city Polyrrhenia in west Crete means 'many sheep' (*polla rhenea*). The name of the site Ardanitis, probably in the borderland of Hierapytna and Praisos (*Staatsverträge* III no. 554 = Chaniotis 1996b, no. 5 B 40-41), is related to *ardania*, a water reservoir used for the watering of sheep and cattle (Hesychius, s.v. *ardaniai*). The relation to animal husbandry is more problematic in the case of Cretan mountains named after animals, since it is not clear if we are dealing with domesticated livestock: e.g., *Aigaion oros*, 'the mountain of the (wild?) goats' (Hesiodus, *Theogonia* 484), *Tityros*, 'the mountain of the billy-goats' (*Stadiasmus maris magni* 340f), and *Hyon oros*, 'the mountain of the pigs (or boars?)' (*Staatsverträge* II no. 148 B 6). The tradition that the Gortynians used to call themselves *Kartemnides*, 'the cowmen' (Willets 1962, 155 n. 57), indicates that pastoralism played an important part in the self-representation of a whole community, at least in early times. The plain of Mesara, controlled in part by Gortyn, must have offered rich grazing land to the local cattle-breeders (cf. Vitruvius i 4,10).

More useful is the information provided by the legal sources and, in part, by Aristoteles' treatment of the Cretan institutions. This evidence concerns two important questions: (a) The contribution of shepherding to the common meals (*syssitia*) and (b) the building up of large herds for more efficient grazing.

Aristotle reports that the produce of animal husbandry represented one of the sources for the Cretan *syssitia* (*Politica* ii 10,8, 1272 a 17-18 ed. Ross); thus, he quite specifically connects the breeding of livestock with an institution of fundamental importance for a subsistence-based society. Shepherding was the source of a variety of food items, primarily milk, fat, cheese, and other milk products, rather than meat. Cheese, milk, and fat are often mentioned in inscriptions, and random references in literary sources of the Hellenistic and Imperial periods indicate that these products were known beyond the island.<sup>16</sup> Unfortunately, the manuscript tradition of Aristotle's passage on the Cretan *syssitia* is corrupt in a crucial point regarding the sources of financing the *syssitia* and the ownership of the livestock.<sup>17</sup> If we follow a particular reading of the manuscript, Aristotle attests a communal ownership of livestock. Since this has major implications, we should study this problem more closely.

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prehistoric pastoral economy (Bintliff 1977b, 148-155; Halstead 1981, 331; Cherry 1988, 11f); cf. Haggis, in this volume (pp. 73-79). For the cult of patrons of shepherds on Crete, see also the dedications to the Kouretes οἱ πρὸ καρταιπόδων: *I.Cret.* I,xxxI 7-8 (2nd/1st century); cf. the place-name Kouretes in east Crete (*SEG* XXVI 1049 l. 78).

16 Cheese: Athenaeus xiv 658 d; *I.Cret.* II,xi 3 l. 39; IV 65 l. 13; IV 143 l. 5 (Gortyn); *Anthologia Graeca* ix 744. Milk: *I.Cret.* I,xvii 18 l. 12 (in a medical recipe, recorded in an inscription at the Asklepieion of Lebena, 1st century); cf. *Anthologia Graeca* ix 744. According to Byzantine historians, the Arabs regarded Crete as "the land where milk and honey flow in abundance" (γῆ ῥέουσα μέλι καὶ γάλα): Theophanes Continuatus 74,21-22 Bonn (*Corpus Scriptorum Historiae Byzantinae*); Kedrinos II 92,14-15 Bonn; Zonaras III 398,5 ed. Dindorf. Fat: *I.Cret.* I,xvii 18 l. 12 (στέαρ πρῶτον).

17 The mss. give (with several variations) the text ἀπὸ πάντων γὰρ τῶν γινομένων καρπῶν τε καὶ βοσκημάτων (καὶ) ἐκ τῶν δημοσίων καὶ ἐκ τῶν φόρων οὓς φέρουσιν οἱ περίοικοι, τέτακται μέρος τὸ μὲν πρὸς τοὺς θεοὺς καὶ τὰς κοινὰς λειτουργίας, τὸ δὲ τοῖς συσσιτίοις. On the various emendations proposed, see Panagopoulos 1987, 77f and below. The fragment of Dosiadas on the *syssitia* of Lyttos (*Fragmente der griechischen Historiker* 458 F 2) is not relevant to the specific question of communal ownership of livestock. For full bibliography, see Chaniotis 1995, 44f.

According to the version given by some codices and followed by several historians of Crete (Kirsten 1942, 130-132; Petropoulou 1985, 81; Link 1991, 119-121; Chaniotis 1995, 44f), the Cretan common meals were financed by three sources: "from the whole of the agricultural produce and the livestock, from the public revenues (ἀπὸ πάντων γὰρ τῶν γινομένων καρπῶν τε καὶ βοσκημάτων καὶ ἐκ τῶν δημοσίων), and from the tribute paid by the serfs." In this case, the citizens paid a contribution from their private agricultural produce and their private livestock.<sup>18</sup> According to a slightly emended version, accepted by most editors and translators of Aristotle (F. Susehml, W.L. Newman, J. Aubonnet, A. Dreizehnter, B. Jowett, W. Siegfried, C. Lord, S. Everson, and E. Schütrumpf), but only by a few historians of Crete (e.g., Talamo 1987, 9, 16-19; cf. Viviers, in this volume, p. 227) the *sysstitia* were financed "from the whole of the agricultural produce and the livestock raised on public land (καὶ βοσκημάτων ἐκ τῶν δημοσίων) and from the tribute paid by the serfs." Some of the scholars who accept this emendation (e.g., Schmitt Pantel 1992, 66) suppose that the livestock raised on public land were communally owned, although there is nothing uncommon in the grazing of private cattle and sheep on public pasture. Finally, if we follow a third emendation, as some editors and translators of Aristotle (O. Gigon, O. Immisch, A. Panagopoulos, H. Rackham, and W.D. Ross) and many historians (Willettts 1955, 20 n. 4, 26; Latte 1968, 299; Lavrencic 1988, 151) do, the *sysstitia* were financed "from the whole of the agricultural produce and the livestock in public ownership (ἀπὸ... βοσκημάτων δημοσίων), and from the tribute paid by the serfs."

The consequences this last emendation would have for the economic history of Crete are important: not only would Aristotle attest the existence of livestock belonging to the community (*demosia boskemata*), but this would also presuppose highly specialized pastoralism, since the herds belonging to the community must have been kept either by citizens who specialized in this job or by public slaves, known to have existed in Dorian Crete (Gschnitzer 1976, 75-80; van Effenterre 1982, 42-44). As the following discussion will show, there is no unequivocal evidence for communal ownership of livestock. Thus, the first reading of Aristotle's passage seems more plausible. The *sysstitia* were probably financed from the tribute paid by the unfree population and the contributions of their members, which paid part — most probably a tithe — of their income from farming and animal husbandry either directly to the 'men's houses' or to the community, which then redistributed these contributions among the *andreia*.<sup>19</sup>

Apart from the ownership of herds by the sanctuary of Diktynna in west Crete in the early Imperial period (*I. Cret.* II, xi 3, 6 BC), which is related to the widespread phenomenon of Greek sanctuaries owning livestock (cf. Isager 1992) and should not be confused with public ownership of stock, there is only one piece of evidence which has been interpreted as concerning communal ownership of cattle, sheep, and swine. An Archaic

<sup>18</sup> It should be noted that an archaic decree of the community of the Dataleis (*SEG* XXVII 631 B 11-13 = *Nomima* I no. 22, c. 500) provides that the (foreign) scribe Spensitheos had to give a fixed contribution of meat to the 'men's house' (*andreion*). However, it is not clear whether Spensitheos made his contribution annually (Jeffery and Morpurgo-Davies 1970, 125, 144) or only on the day of his admission to the *andreion* (Beattie 1975, 40f).

<sup>19</sup> The payment of a tithe by the citizens is suggested by the above-mentioned Gortynian inscription (*I. Cret.* IV 184 A 18f; Chaniotis 1996b, 415). The payment of the citizens' contributions not directly to their *andreion*, but to a 'public pool' (δημόσια), has been suggested by Jeffery and Morpurgo-Davies (1970, 151f with n. 43; cf. Isager and Skydsgaard 1992, 139).

decree of the Lyttians (*SEG XXXV 991 B* = Koerner 1993, no. 88 = *Nomima I* no. 12, c. 500 BC) pertains to the limitation of an area devoted to the “putting together and separating” of livestock (B 1-4): “The Lyttians decided that the following boundaries shall be valid for the joining and separating (into herds?) of the sheep and the cattle and the swine.”<sup>20</sup> H. and M. van Effenterre (1985, 184f) suspected that this regulation reflects an important social development known from other parts of Archaic Greece: the local aristocracy had concentrated the land in its hands. Not being able to cultivate their land, the landowners intensified the animal grazing, employed aliens as their shepherds, and devoted large parts of their land to pasture. The mass of the citizens reacted against this development in other parts of Greece by demanding the abolition of debts and the redistribution of land. On Crete, two measures were taken: (a) the immigration of foreigners who would be employed by the rich Lyttians as shepherds was prohibited. This is attested by a decree written on the other side of the same stone (*SEG XXXV 991 A* = Koerner 1993, no. 87 = *Nomima I* no. 12); and (b) the collective ownership of livestock was restored. After the livestock had been put together (*koinaonia*), the various species (sheep, cattle, pigs) which needed different pasture land were separated again (*synkrisis*). This scenario is not improbable, but it is not sufficiently supported by the evidence. To begin with, we have no reason to assume that the two decrees written on either side of the stone belong to the same historical context. Then, the Lyttian text describes an action that had to be performed *periodically* in a certain limited area, and thus cannot be related with a unique action.

Two other interpretations of the Lyttian decree are more plausible. S. Link (1991, 117f) assumed that the decree made allowance for the interests of the small owners of livestock who could not afford a herdsman for their small herds. They built up large herds together, in order to make the employment of a herdsman worthwhile. The essential aim of the decree was the limitation of the public pasture and not the formation of a collective ownership of livestock. According to the similar view of R. Koerner (1993, 331f), this document regulated the grazing of livestock owned by individual citizens on public pasture; the Lyttians were concerned that this should happen in an orderly way, without damages to the arable land and the animals. The procedure assumed by Link and Koerner is well known in rural Greece and Crete of modern times. On the island of Skyros, the individual owners of sheep put their herds under the charge of employed shepherds, who are responsible for leading them to pasture.<sup>21</sup> Gains and losses are shared by the owners. In modern Crete, there are five distinct ways of joining and grazing livestock, described by the local scholar J. Mavrakakis (1985, 82-85; cf. Chalikiopoulos 1903, 134 for Sitia). The practice is called *koiniato* (‘joint grazing’) and the partners are called *koiniatadoroi*.

- a) According to the most common type of contract — *kyrios koiniato* (‘main joint grazing’) or *symmisiako* (‘half-half grazing’) — two or more owners contribute an equal number of sheep and goats to build a common herd; they carry the cost jointly and share the profit. In some cases, one of the owners undertakes the grazing, being paid for his work either in kind or in money.
- b) In the practice called *apokopsiariko koiniato*, the livestock of one or more owners are given to a shepherd who owns no animals; the shepherd is obliged to graze the

20 ἔφαδε Λυκτίοισι τὰς κοινωνίας καὶ τὰ(ς) συνκρίσιος τῶν προβάτων καὶ τῶν καρταιπῶδων καὶ τῶν ὄων ὄρον ἤμεν τόνδε.

21 I owe the information about this practice on Skyros to the anthropologist Dr. Marina Reizaki (Heidelberg).

animals for four or five years. He bears half of the costs for grazing and has a claim on half of the produce of the animals entrusted to him, i.e., meat, milk, wool, and new-born animals.

- c) According to a type of agreement called *ksechartzisto koiniato*, the owner of animals gives them to a shepherd (*syzeftis*, 'joiner'), who is obliged to pay to the owner an amount equal to the value of these animals. The shepherd finances this payment from the produce of the animals entrusted to him; after he had paid their value off, usually within a period of two or three years, the shepherd keeps half of the animals.
- d) In the eparchy of Apokoronas in west Crete, the practice called *kefaliopyrota* or *side-rokefala* ('fire'- or 'iron-headed' sheep) is attested: a shepherd grazes animals owned by another person for a certain period of time. He receives an annual payment and at the end of the agreed period of time he has to return to the owner animals of equal number and age as the ones which had been entrusted to him.
- e) According to a practice called *maksoulosimmisiako* (from Turkish *mahsul*, 'income') in the eparchy of Rethymno, several owners build a joint herd and share the costs and the gains.

Although unequivocal evidence is still lacking for the pooling together into collective herds of the small flocks owned by individual farmers in ancient Greece (Hodkinson 1988, 56),<sup>22</sup> the inscription from Lyttos may reflect a practice analogous to those attested in modern Crete. The animals (sheep, swine, cattle) were driven together in a limited area. Perhaps the different species were collected there in different seasons. The pigs, e.g., could most profitably be taken into the woods in autumn (cf. Halstead 1981, 323), whereas the ovicaprids were led to their summer quarters late in autumn or early in winter. The swine, which could not have followed the sheep and the cattle in a movement involving considerable distance (van Effenterre and van Effenterre 1985, 183f), were kept in the appointed area, whereas the other animals were kept there only for a seasonal stay and were then separated into herds and led to other areas for pasture, possibly only to a relatively short distance from Lyttos — a practice known from other parts of Greece (Hodkinson 1988, 53; Forbes 1995, 330). At the end of the season, the animals were returned to their owners. The measures envisaged by the late Archaic decree of Lyttos certainly presuppose the existence of large herds of sheep, cattle, and swine, which could not be kept on the individual farmsteads and thus must have participated in short- or long-distance seasonal movement.

A treaty between Gortyn and Rhizenia (5th century) cannot offer conclusive evidence for the communal ownership of livestock either, but also implies the occupation of a large part of the population with shepherding. In this treaty, the Gortynians imposed upon the dependent community of the Rhizenians the duty of contributing every two years animals valued at 350 staters for a sacrifice offered to Zeus Idaios (*Staatsverträge* II no 216 ll. 1-2 = *Nomima* I no. 7; cf. Gschnitzer 1958, 39-43, 173 n. 25; van Effenterre 1993, 15). If we take the prices for sacrificial sheep — the most common sacrificial animal — in classical Athens as a basis (c. 10 drachmae: Jameson 1988), we may assume that the Rhizenians had to contribute at least 70 sheep.<sup>23</sup> However, this does not necessarily mean

<sup>22</sup> The *synnoma* recorded from Rhodes may suggest common possession of pasturage (Hodkinson 1988, 36) or cooperation in the grazing of livestock.

<sup>23</sup> Large sacrifices to Zeus were common in Crete. 100 oxen were sacrificed to Zeus Agoraios in Axos (*SEG* XXIII 566 = *LSCG* 145 l. 16, 4th century; cf. the 'great hekatombe' mentioned in *I.Cret.* II,v



that the numerous animals (sheep or oxen) contributed by the Rhizenians were communal property; it is equally reasonable to assume that the community bought these sacrificial animals from its citizens. The only certainty is that a large part of the population of Rhizenia occupied itself with pastoralism.

Since the Archaic Lyttian inscription and the treaty between Gortyn and Rhizenia cannot be connected with collective ownership of livestock, there remains no other evidence for communal ownership of animals. The Cretan legal sources attest only the private ownership of sheep and cattle. In the early Classical period, the legal inscriptions of Gortyn (*I.Cret.* IV 41 I-II = Koerner 1993, no. 127 = *Nomima* II no. 65; *I.Cret.* IV 72 col. IV 35-36, V 39 = Koerner 1993, no. 169 = *Nomima* II no. 49) concern themselves with subjects such as the damage done to animals, the pledging of animals, and the inheritance of sheep and cattle. In all these cases, the legal texts consider animals in *private ownership* only (including the livestock owned by serfs). This holds true also for a 3rd-century law of Knossos which regulates the sale of domestic animals (*I.Cret.* I,viii 5). None of the numerous Cretan legal inscriptions referring to the problems related to pastoral economy, such as the damage done by sheep and goats to agricultural production (*I.Cret.* IV 41 I-II = Koerner 1993, no. 127 = *Nomima* II no. 65, Gortyn, early 5th century), the wounding of animals (*I.Cret.* I,viii 5 B 1-3, Knossos, 3rd century), animal theft, the grazing of flocks on sacred land, and the crossing of the boundaries of neighboring city-states by herdsmen (below, § 3.2.3) makes the slightest allusion to a collective ownership of animals.

As we have seen, the evidence concerning pastoralism in the Archaic and Classical periods is rather limited. There can be no doubt that large-scale raising of livestock was practiced in Crete in such different geographical zones as Gortyn, which controlled part of the plain of Mesara, but also had access to Mt. Ida; Rhizenia, somewhere in the foothills of Mt. Ida (Prinias?); Polyrrhenia, on the foothills of the White Mountains; Lyttos, near the plain of Pediada, but also with access to the plateau of Lasithi; and at the borderland of Praisos, on Mt. Orino in east Crete. Aristotle's statement concerning the contribution of shepherding to the *syssitia* seems plausible in light of the variety of sources pertaining to the raising of stock and its symbolical and cultic connections. There is no evidence for communal ownership of livestock, but the Archaic decree of Lyttos shows the effort of a community to introduce regulations either to protect the arable land from damage done by stock-breeders or to facilitate the pooling together of private herds for more efficient use of the pasture. There are only a few and uncertain indications for seasonal shepherding in mountainous areas: on Mt. Ida, implied by the legend of Epimenides, and possibly in the Lasithi mountains, indicated by the Archaic decree of Lyttos. Although the legal texts often concern themselves with issues related to pastoral activities, they do not contain any indications about large-scale specialized pastoralism.

### 3.2.3 Hellenistic developments

The evidence for specialized pastoralism and transhumance becomes rich only in the Hellenistic period. To some extent, this may be due only to the fact that the Hellenistic age provides us with more sources than the earlier periods of Cretan history, but we should consider the possibility that the augmentation of the evidence reflects a change in economic patterns whose origins should be looked for in demographic and socioeconomic

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1 I. 12-13, 6th century), 60 rams to Zeus Machaneus in Knossos (*Staatsverträge* II no. 148 B 9-10, 5th century). On the purchase of sacrificial animals in Classical Greece, see Grassl 1985.

developments. Our most reliable sources are the Hellenistic treaties between the Cretan cities (Chaniotis 1996b); their clauses often pertain directly or indirectly to husbandry.

An early 3rd-century treaty between the neighboring cities of Hierapytna and Praisos in east Crete (*Staatsverträge* III 554 = Chaniotis 1996b, no. 5 B 33-68) includes a detailed regulation about the right of the citizens of the one city to use the pasture of the other: "The Hierapytnian shall have the right to graze (his flocks) on the land of the Praisians,<sup>24</sup> with the exception of the sacred enclosures at Ardanitos and Daros, and similarly the Praisian on the land of the Hierapytnians, on the condition that they will do no damage and return each to his own land; and if a Hierapytnian chooses to keep his flock on the land of the Praisians, he shall have a Praisian (citizen) as (his) mediator; similarly, if a Praisian chooses to keep his herd on the land of the Hierapytnians, he shall have a Hierapytnian (citizen) as (his) mediator (*synkritas*)." This regulation differentiates between (a) the occasional use of the pasturage of the neighboring city by shepherds who kept their herds on the territory of their native city, certainly in the mountainous borderland of Hierapytna and Praisos, and (b) the seasonal movement of animals from the warm coastal plains and the lowlands to the upland pastures and vice versa. The former practice, i.e., the occasional use of the upland pasture, is allowed on condition that the shepherds had to return to the territory of their native city after the grazing (Chaniotis 1996b, 188 n. 1148). This clause does not concern transhumance, but simply the movement of herds at a short distance. It has a certain similarity to the joint use of the borderland by two states attested in mainland Greece. Instead of setting boundaries for a disputed frontier region, the cities involved agreed to use these areas in common, as *koinai chorai* (Daverio Rocchi 1988, 37-40; Skydsgaard 1988, 8).

Only the latter practice involves seasonal movement of herds. The text uses the verb *aulostateîn*, a composite of *aulé*, a word used in the Greek sources specifically in connection with transhumance.<sup>25</sup> In case the shepherds used the foreign territory for a long-term seasonal stay, the question of the assignment of pasture arose, which was resolved through the appointment of a mediator (*synkritas*). His duties can be explained easily. The pastureland had always been (since the time of the Linear B texts) public land; all the citizens were allowed to use it (Gschnitzer 1981, 36; Audring 1989, 77). In modern Crete, each family of a community is assigned a certain parcel of the communal pasture, and this assignment remains valid for generations (Mavrakakis 1985, 46-48). It is clear that the penetration of foreign shepherds and their flocks in such a traditional order could result in conflicts with the native shepherds, not unknown in modern Crete. Presumably, it was the duty of the local mediator, who had good knowledge of the territory and its traditional distribution among the shepherds of his city, to arbitrate in these conflicts and to see that the foreign shepherd used the pasture assigned to him (Petropoulou 1985, 51; van Effenterre and van Effenterre 1985, 183 n. 100; Chaniotis 1996b, 189). Measures

<sup>24</sup> In Greek *epinoma*. The meaning of the term is not clear. According to the most plausible interpretation (cf. Marek 1984, 148f), the word means the exemption from charges for the use of public pasturage. I have argued elsewhere (Chaniotis 1995, 63f; 1996b, 116f, 187f, 259f) that this exemption applies only to foreigners, but see the justified objection of F. Guizzi (in this volume, p. 238). It seems that in Crete, the citizens did not pay any charges for the use of public pasture.

<sup>25</sup> For *αὐλή*, *ἔκαυλος*, *σύναυλος*, and *σταθμός* in connection with transhumance, see Skydsgaard 1988, 74f (without the verb *αὐλοστατεῖν*). Cf. also the verbs *ἐναυλοστατεῖν* (*J.Cret.* III,iv 9 l. 82, *lex sacra* of the sanctuary of Zeus Diktaios in east Crete) and *αὐλιζεῖν* (*SEG* XXIII 305 III 6-7, treaty between Myania and Hypnia, c. 190 BC).

were also taken for the protection of two sacred enclosures (*temene*) in Ardanitos and Daros (Petropoulou 1985, 51, 85). Similar measures are known from a treaty between Hierapytna and Lato (Chaniotis 1996b, 344) and from a sacred law concerning the sanctuary of Zeus Diktaios in east Crete, which forbids the use of the sacred land for grazing and seasonal keeping of livestock (*enaulostatein*).<sup>26</sup>

Both the occasional grazing on the land of the neighboring city and the long-term keeping of herds there presuppose an intensive occupation of a part of the population with the raising of livestock, clearly exceeding the husbandry on the agro-pastoral farm. Further, it is clear from the formulations used in this treaty that we are dealing with *citizens* occupying themselves for a great part of the year with the breeding of animals. At least a part of the population of Praisos and Hierapytna was therefore practicing specialized pastoralism in connection with transhumance. This conclusion can be strengthened by further treaties of Hierapytna.

An early 2nd-century treaty with Priansos concerns itself with the same issue, the use of grazing land (*I.Cret.* III,iii 4 = Chaniotis 1996b, no. 28 ll. 27-30): "If anybody grazes (his flock), he shall be exempted from charges; but if he does any damage, he shall pay the fine according to the laws of each city (i.e., the city where the damage was done)". The same regulation can be restored in another treaty between Hierapytna and the neighboring community of the Arkadians (Chaniotis 1996b, no. 14 ll. 1-3). These clauses and the similar provision in the aforementioned treaty between Hierapytna and Praisos envisage the damage done to arable land and cultivation by animals, above all by goats (cf. n. 14; Chaniotis 1996b, 188 n. 1149). Finally, a clause related to the right of pasture (*epinoma*) can be restored with some probability in the treaty between Hierapytna and Lato (Chaniotis 1996b, no. 59 ll. 13-15, 111 BC). All four treaties pertain to the mutual use of pastureland (probably at the frontier), the exemption from charges, and the punishment for damages done to the arable land by the livestock. These treaties of Hierapytna were not concluded only with the neighboring communities of Praisos and the Arkadians, but also with Priansos, a city with which Hierapytna does not seem to have had a common border. The Hierapytnians had to cross the territory of two other cities, Biannos and Malla, in order to bring their flocks to the territory of Priansos. Presumably analogous treaties with Biannos and Malla enabled the seasonal movement of Hierapytnian flocks.<sup>27</sup>

... The seasonal journeys over long distances were not only connected with dangers, but also with high costs; in principle, the alien had to pay customs for the import and export

<sup>26</sup> *I.Cret.* III,iv 9 l. 82. Cf. similar *leges sacrae* from other areas: *LSCG* 67 (Tegea, 4th c.); 79 (Delphi, 178 BC); 84 (Korope, ca. 100 BC); 104-105 (Ios, 4th century); 116 (Chios, 4th century); 136 (Ialysos, ca. 300 BC); *Syll*<sup>3</sup> 963 (Arkesine, 4th century).

<sup>27</sup> *I.Cret.* III,iii 6 = Chaniotis 1996b, no. 35 (early 3d century) may in fact be a treaty between Hierapytna (l. 7) and Biannos. From the mention of a *Biannia* (sc. *chora*), i.e., the territory of Biannos, in a treaty between Gortyn, Hierapytna, and Priansos (*I.Cret.* IV 174 = Chaniotis 1996b, no. 27 l. 32, c. 205-200), van Effenterre and van Effenterre (1994, 124f) inferred that Biannos had been conquered by Hierapytna and that the treaty refers to the territory which had been occupied by the Hierapytnians. The fragmentary passage does not allow this conclusion. We should not be surprised if the description of the territory of two states (here Hierapytna and Priansos) includes a reference to the territory of a third, neighboring independent *polis* (cf., e.g., Chaniotis 1996b, no. 59 l. 61-63). In fact we know that Biannos was an independent *polis* in this period, since it issued an *asylia* decree for Teos c. 204 (*I.Cret.* I,vi 1) and signed a treaty with King Eumenes 20 years later (*I.Cret.* IV 179 l. 6, 183 BC). There is no reason to speculate that Biannos was conquered soon after 204 and regained its independence later.

of goods, unless he was freed from them by the foreign city. Beside their sheep and goats, the transhumant shepherds carried personal belongings and were sometimes accompanied by slaves. In addition to that, various transactions could take place during the journey and during their stay in the foreign city: the sale of the meat, wool, and skins of animals, the sale of newborn animals, the purchase of items necessary for the living of the shepherds, etc. Finally, on returning to their native city, the shepherds brought back not only the herds they had taken to the summer or winter pasturage, but also the newly born animals. The importance of these issues can be clearly seen in a treaty between the Aigaieis and the Olympenoi in Asia Minor (4th/3rd century), which regulates the exemption from customs for the import and/or export of certain items (garments, food and wine, newborn sheep, etc.) by transhumant shepherds (*Staatsverträge* III no. 456; Georgoudi 1974, 176-178; Hodkinson 1988, 51f). If seasonal shepherding did take place on a large scale in Hellenistic Crete, we should not be surprised to find regulations about these issues in the treaties. Indeed, numerous treaties concern themselves with the question of export of goods from the territory of the parties to the agreement. The relevant clauses provide, in principle, that the citizens of the partner-city were exempted from customs if the export took place *by land*. For exports by sea, the aliens paid the customs provided by the laws of the city where the export took place; they also had to take an oath that they were exporting items for their own use (Petropoulou 1985, 63-68; Chaniotis 1996b, 120-122; Guizzi, in this volume, p. 240). A. Petropoulou (1985, 63-68) has interpreted these clauses as an effort of the Cretan cities to intensify the trade; the Cretan cities did not demand customs for exports by land because these exports were insignificant. However, if we take into account the lack of sources attesting an intensive trade activity in Hellenistic Crete, the fact that these clauses appear in treaties which also regulate the right of pasture, and the fact the transhumant shepherds had no alternative but to use the land routes, it is plausible to connect these regulations with transhumance (Chaniotis 1996b, 117). Because of the geographical conditions of Crete, transport by land was advantageous basically only for sheep and goats; all other goods could more easily be transported by sea. As a matter of fact, all the cities which concluded these treaties had harbors. Closely related to these clauses about the export of goods is a clause in the treaty between Hierapytna and Priansos which gives the citizens of the two cities the right to bring their possessions in safety into the territory of the partner city (*I.Cret.* III,iii 4 = Chaniotis 1996b, no. 28 ll. 27-30; cf. Guizzi, in this volume, p. 241): "If a Hierapytnian deposits (brings something in safety) into Priansos or a Priansian into Hierapytna, he is allowed to import or export it as well as its produce (*tos karpos*) by land and at sea without paying any customs; but if he sells any of the goods he had deposited, if the export takes place at sea, he has to pay the customs provided by the laws of each city." In spite of the complicated formulation, it is clear that this clause permitted the citizens of the two cities to bring their belongings in case of war or another danger to the territory of the partner-city and to reexport them without having to pay any customs (Müller 1975, 143, 147; Petropoulou 1985, 22f). This regulation clearly favored, among other groups, the shepherds who had no alternative than to use the land routes (Chaniotis 1995, 66f; Chaniotis 1996b, 120f). The shepherds wandering in the frontier areas were exposed to the dangers of wars and raids more than anybody else. The treaty considers the 'produce' of the belongings brought to safety, including the offspring of the livestock

of the transumant shepherds. If 'goods' brought to safety were sold in the partner city and were not exported or were exported by land (i.e., livestock), no customs were raised.

The Hierapyntian treaties offer direct evidence for transhumance in Hellenistic Crete and deal with a series of issues arising from the seasonal movement of shepherds: the payment of charges, the assignment of pasturage, the payment of customs for the crossing of the borders by the shepherds together with their herds and their personal belongings, and the damages done to the arable land by the moving animals. They do not address, however, two serious problems: the safety of the roads and animal theft.<sup>28</sup> Exactly these two problems are the object of a clause contained in the interstate agreements of other Cretan cities, Lato and Olous (*I.Cret.* I,xvi 5 = Chaniotis 1996b, no. 61 Kopie A ll. 34-38) and Lyttos and Olous (*I.Cret.* I,xviii 9 = Chaniotis 1996b, no. 60 B 5-8), which should be seen in light of seasonal shepherding. The clause is best preserved in the treaty between Lato and Olous: "If someone takes something from a Latian or an Oluntian, the elders who are responsible for the *eunomia*i and investigate and regulate in each of these cities, shall intervene; and they shall have the right [to reconcile the parties (?)] and to undertake everything, as it seems proper. And the *xenikai hodoi* ('roads of the aliens' or the 'roads leading to foreign territory') shall be inviolable; and if someone does wrong on these roads, he shall pay the sixfold fine, if he is defeated in a lawsuit".<sup>29</sup> The 'routes of the aliens' (*xenikai hodoi*) can be located near the border of these cities, i.e., on Mt. Kadiston between Olous and Lato and on the mountains of Lasithi between Lyttos and Olous. Apart from these two treaties, the expression *xenike hodoi* is attested for Crete in Plutarch's biography of Lykurgos (31,7); according to Plutarch, the grave of the Spartan lawgiver was on a *xenike hodoi* near Pergamon in west Crete. Outside of Crete, the term is found usually in connection with mountainous regions: Mt. Alesion near Mantinea (Polybius xi 11,5), Arkadia (*IG V 2*, 443 l. 35), Mt. Parnassos (*Syll<sup>3</sup>* 636 ll. 23-24, in connection with the grazing of the cattle belonging to the sanctuary of Delphi), and Halaisa on Sicily (*IG XIV 352*). The use of a distinctive attribute for these routes (*xenikos*) clearly shows that a sharp distinction was necessary between these *specific* routes and other roads. We have either to do with routes leading beyond the border, to the foreign territory or *xene* (Petropoulou 1985, 99f; cf. van Effenterre 1942, 46; Dubois 1989, 242), or with routes which were *regularly* used by foreigners (*xenoi*). If we take into account the social and economic conditions in Hellenistic Crete, we may suppose that the transhumant shepherds made regular use of these routes and that the Cretan treaties have primarily this group in mind. The officials responsible for the security on these routes are called *preigistoi hoi epi tais eunomia*i. They are known, with similar designations (*eunomia*, *eunomiotai*, *syneunomiotai*) from several Cretan cities: Lato, Olous,

28 There is no other direct evidence for animal theft in ancient Crete than the treaties discussed below. A very fragmentary Hellenistic decree or law of Axos mentions thefts, but it is not certain if it envisages theft of cattle (*SEG XXIII 657*). *I.Cret.* IV 41 IV 2-5 = Koerner 1993, no. 127 = *Nomima* II no. 65 (Gortyn, early 5th century) possibly deals with animal theft; but see Koerner 1993, 383. A Hellenistic treaty between Malla and Lyttos which concerns itself with the abduction of free men, slaves, and their belongings may be related to animal theft and raids against shepherds in the mountainous borderland between the two cities, which was hardly controlled at all (*I.Cret.* I,xix 1 = Chaniotis 1996b, no. 11).

29 [A] δέ τί κα ἔλθται Λατῶιαι ἢ Βολωντῖ[ωι, ἐπιόντων οἱ πρεῖγιστοῖ] | [οἱ ἐ]πι τα[ῖς] εὐνομίαις οἱ ἑκατερῇ ἐρευνόντες καὶ ῥυθμίτων[τες καὶ κύριοι ἔστων -----] | πρὸς αὐσαυτὸς καὶ τᾶλλ[α] πάντα χρήμενοι, καθὼς κα ἐπεικῆς ἦι. ἦμεν] | [δὲ] καὶ τὰς ὁδοὺς τὰς ξέ[νι]κὰς θίνας· αἱ δὲ τίς κάτινα ἀδικήσῃ ἐν τα[ύταις] ταῖς ὁδοῖς,] | ἀποτεισάτω ἐξάπ[λοα τὰ π]ρόστιμα δίκαι νικαθές.

Aptera, and Polyrrenia (Chaniotis 1995, 67f, with the references and discussion). They are usually mentioned in inscriptions referring to dedications (including a dedication to Pan, the protector of shepherds) or building works carried out in sanctuaries; this does not necessarily mean that the primary function of this board was the restoration of or supervision over sanctuaries. The decisive source for the duties of these magistrates is the aforementioned treaty between Lato and Olous, from which we can infer that the members of this board intervened in cases of abduction and theft ([αἰ] δέ τί κα ἔληται) on the 'routes of the aliens', undertook a judicial investigation of the case (ἐρευνίοντες), put things in order (ῥυθμίτων[τες]), and arbitrated between the disputing parties (χρηῖσθαι καθώς κα ἐπιεικῆς ἦ). For these reasons, A. Maiuri (1910, 42-45) and M. Guarducci (1933b, 204) compared the duties of this board with the duties of the Athenian *astynomoi* and *diatetai*: the keeping of public order and arbitration in the case of minor conflicts. H. van Effenterre (1942, 46; cf. Petropoulou 1985, 99) specified these duties further by connecting them with the maintenance of law and order in the mountainous border areas and on the 'routes of the aliens'. Since the transhumant shepherds belonged to those who crossed the border regularly, it is probable that the *eunomiotai* were concerned, among other things, with the conflicts which arose amongst the shepherds: animal theft, disputes about the ownership of runaway animals, etc. Analogous officials (*orophylakes*, *chorophylakeontes*, *peripoloi*, *eremophylakes*) are known from other areas in Greece (Georgoudi 1974, 176, 182; Daverio Rocchi 1988, 84-91; Audring 1989, 79 with n. 29; Hodkinson 1988, 36).

The aforementioned clauses are part of isopolity treaties with which two Cretan cities mutually granted citizenship to those citizens who were willing to make use of it (Gawantka 1975; Chaniotis 1996b, 101-104; Guizzi, in this volume). Theoretically, an isopolity treaty gave all the citizens of one city the right to settle in the partner city; they could acquire land in their new city and develop their economic activities on the same conditions as the citizens of the partner city. The reciprocity of the clauses is, however, misleading. In September 1992, the Federal Republic of Germany and Rumania signed a treaty in which *both states* are obliged to take back those citizens who stay illegally in the partner-state; the reciprocity of this regulation cannot blind us to the fact that only Rumanian asylum-seekers were taken into consideration.<sup>30</sup> Similarly, the reciprocity of ancient treaties does not mean that the interests of both partners were identical. A close study of the relevant clauses confirms this conclusion. We cannot exclude the possibility that these treaties were used by persons who owned estates in their native city in order to acquire more land in the partner city and thus increase their landed property (Guizzi, in this volume, p. 238). I suspect, however, that the potential beneficiaries of these rights were intended to be primarily persons who did not possess land in their native city (Chaniotis 1996b, 111-113). The treaty between Hierapytna and Praisos discussed above stipulates that by making use of the isopolity a person had to settle all his financial and legal matters in his native city and then leave it. It seems that such a person could not possess land in both his native city and his new city; similar clauses are partly preserved

30 *Süddeutsche Zeitung* of 25th September 1992 (p. 1): "Die Abschiebung abgelehnter Asylbewerber aus Rumänien wird erleichtert. Bundesinnenminister Rudolf Seiters und sein rumänischer Kollege Victor Babiuc unterzeichneten in Bukarest einen Vertrag, in dem sich *beide Staaten* verpflichten, eigene Staatsangehörige zurückzunehmen, die sich illegal im Land des Vertragspartners aufhalten. Dies betrifft faktisch nur die rumänische Seite."

and partly restored in other treaties.<sup>31</sup> These treaties make more sense if one of the partners had a surplus of citizens who did not possess land (or enough land) and was interested in settling them in a neighboring city.

A close study of the isopolity treaties of Hierapytna seems to confirm this suspicion. More than half of the Cretan isopolity treaties known so far were concluded between Hierapytna and other Cretan cities (Praisos, the Arkadians, Itanos, Praisos, Lato, a community of Hierapytnian settlers, and an anonymous city, perhaps Biannos).<sup>32</sup> Except for Lato, none of the other cities which signed isopolity treaties with Hierapytna is known to have concluded an isopolity treaty with another Cretan city. One would, therefore, suspect that the initiative for these treaties was taken by Hierapytna, interested in settling a surplus of citizen population in the partner cities. Hierapytna is located on the narrowest spot of Crete, on the isthmus of Ierapetra (12 km wide); it is the place with the lowest rainfall in Greece.<sup>33</sup> At the beginning of the Hellenistic period, the territory of Hierapytna was limited by that of numerous other cities located within a short distance: Biannos (39 km) and Malla (14 km) in the west, Lato (20 km) and Istron (14 km) in the north, Praisos (32 km) with its various dependent communities (Stalai, Setaia, Ampelos) in the east. Hierapytna probably faced a considerable population growth in Hellenistic times; its population cannot be estimated, but its relatively large dimensions can be demonstrated by a comparison of the number of mercenaries Hierapytna and Olous had to send to Rhodes according to two treaties of the late 3rd century: the Olountians sent 100 men, the Hierapytnians 200 men (*Staatsverträge* III nos 551-552; Petropoulou 1985, 16; Kreuter 1992, 65-84). We also know of numerous Hierapytnian emigrants, mostly mercenaries, in Central Greece, Cyprus, and Delos (Launey 1949/50, II, 1154; *I.Délos* 2598 l. 34). To supply its population with land, Hierapytna made use of the three solutions known to the Greeks: colonization, emigration to neighboring cities, and conquest. Probably in the early 2nd century a relatively large group of citizens was settled in the territory of another Cretan state, perhaps of the Arkadians (Chaniotis 1996b, 106, 436-438 with the earlier

31 *Staatsverträge* III no. 554 = Chaniotis 1996b, no. 5 ll. 13-16 (Hierapytna-Praisos): παραιτησάμενος [ τὰν αὐτῶ πόλιν; cf. ll. 1-2: διαθέμενος τὰ ἴδια; *I.Cret.* I,xvi 17 = Chaniotis 1996b, no. 37 ll. 10-11 (Eleutherna-Lato): δικαιοπραγήσαντα τοῖς ἰδίο[ις] παραιτησάμενον[?] τὰν ἰδίαν πόλιν; *SEG* XXVI 1049 = Chaniotis 1996b, no. 59 ll. 11-12: δικα[ιοπραγήσαντι τοῖς ἰδίο[ις]] (Hierapytna-Lato); cf. *I.Cret.* I,xvi 5 = Chaniotis 1996b, no. 61 Copy A l. 11 (Lato-Olous).

32 *Staatsverträge* III no. 554 = Chaniotis 1996b, no. 5, Hierapytna-Praisos, early 3rd century; *Staatsverträge* III no. 512 = Chaniotis 1996b, no. 14, Hierapytna-Arkadians, late 3rd century; *Staatsverträge* III no. 579 = Chaniotis 1996b, no. 20, Hierapytna-Itanos, late 3rd century; *I.Cret.* III,iii 4 = Chaniotis 1996b, no. 28, Hierapytna-Praisos, early 2nd century; *I.Cret.* III,iii 6 = Chaniotis 1996b, no. 35, Hierapytna-Biannos?, early 2nd century; *I.Cret.* III,iii 5 = Chaniotis 1996b, no. 74, Hierapytna-Hierapytnian settlers, early 2nd century?; *SEG* XXVI 1049 = Chaniotis 1996b, no. 59, Hierapytna-Lato, c. 111. The other isopolity-treaties between Cretan cities are the following: *Staatsverträge* III no. 570 = Chaniotis 1996b, no. 15, Axos-Tylisos, late 3rd century; Chaniotis 1996b, no. 41, Apollonia-Kydonia, early 2nd century; *I.Cret.* I,xviii 10 = Chaniotis 1996b, no. 42, Lyttos-anonymous Cretan city, early 2nd century; *I.Cret.* I,xvi 17 = Chaniotis 1996b, no. 37, Lato-Eleutherna, early 2nd century; *I.Cret.* I,xviii 9 = Chaniotis 1996b, no. 60, Lyttos-Olous, c. 111; *I.Cret.* I,xvi 5 = Chaniotis 1996b, no. 61, Lato-Olous, c. 109.

33 On the geological situation of this area, which does not favor a dense settlement, see Lehmann 1939, 213; on the climate: Wagstaff 1972, 276-280; Rackham 1972, 284 (Ierapetra "has a more seasonal climate than anywhere else in Mediterranean Europe and closely resembles the drier parts of Palestine"); cf. Watrous 1982, 7. The temperature reaches over 25° C from June to September; from June to August there is almost no rainfall.

bibliography). Strabo (ix 5,19, C 440) refers to a *synoikismos* between Hierapytna and the neighboring community of Larisa; around 145, a small settlement of both military and agricultural character was founded on the sacred land belonging to the sanctuary of Zeus Diktaios (*J.Cret.* III,iv 9 l. 86; Chaniotis 1995, 75 n. 178). The isopolity treaties of Hierapytna always included clauses which permitted its citizens to settle in the partner cities and to acquire land there. An unequivocal indication of Hierapytna's efforts to increase its territory can be seen in the continuous wars of the 3rd and 2nd centuries against the neighboring cities. At the end of these wars, in the late 2nd century, the Hierapytnians had achieved a threefold increase of their territory: they had conquered the whole territory of Praisos, had made substantial gains in the north after the destruction of Istron, and laid claim on Itanian land (Bennet 1990, 202 with Table 3; van Effenterre 1991a, 397-400; Baldwin Bowsky 1994; Chaniotis 1996b, 173f). In light of these testimonia, it seems plausible that the economic clauses in Hierapytna's isopolity treaties primarily met the interests of the Hierapytnians. The Hierapytnians were evidently not interested in the immigration of citizens from other Cretan cities to their city, but in the possibilities provided to Hierapytnian citizens to emigrate to neighboring areas. The interests of Hierapytna's partners have to be looked after in other areas (e.g. military support). Hierapytna's policy in the Hellenistic period (colonization, emigration, conquest) implies that the city was facing demographic and economic problems. The Hierapytnians were not in a position to maintain their subsistence within their original territory; the reasons are not known, but we can suspect population growth, the concentration of land in the possession of a few landowners and the consequent pressure of population upon limited lowland resources, or both. Some citizens became mercenaries and pirates (Brulé 34-56), others had to settle in other regions of Crete. It seems that many Hierapytnians had to turn to pastoralism. A relation between rising population and specialized pastoralism is known from other parts of the ancient world (Whittaker 1988, 3; Cherry 1988, 17; Hodkinson 1988, 57).

An increase of pastoralism in Hellenistic Crete may explain the popularity of Cretan 'pastoral' motifs in Hellenistic poetry, in the work of Theocritus, Callimachus, and Leonidas of Taras (Chaniotis 1995, 70f). The motifs attested in their epigrams always concern the life of shepherds in the wilderness of the highlands: the attacks of wild animals against the shepherds of cattle and sheep (*Anthologia Graeca* vi 262 and 263), the dedication of a bronze ram-statue by Simalos and Soton to the patron of shepherds, Hermes, on a mountain (*Anthologia Graeca* ix 744), and the abduction of the goat-shepherd Astakides by a nymph on Mt. Dikte (Callimachus, *epigrammata* 22 ed. Pfeiffer). The Kydonian Lykidas in Theocritus' *Thalysia* (vii 10-20) is easily recognizable as a typical goat-shepherd through his clothing and his specific way of life. The 'staging' of these epigrams in the highlands of Crete is certainly related to the seasonal movement to the upland pastures. The epigram about Simalos und Soton implies that these persons were the owners of the rich flocks they supervised as shepherds (ὠγινύμοι... πολύ-αίγοι). One is tempted to explain these poems as an expression of the well-known interest of Hellenistic poetry and art in pastoral life.<sup>34</sup> On the other hand, the Hellenistic poets would not have 'staged' their bucolic poems in Cretan landscapes had Crete not been

<sup>34</sup> Schneider 1967, I, 147-156; Himmelmann 1980, 83-108; Laubscher 1982, esp. 43, 46f, 108-117. Isager and Skydsgaard (1992, 101) disregard the Hellenistic bucolic poetry as a source for pastoralism (cf. Georgoudi 1974, 159); Larson (1997) goes as far as to assume that the pastoral setting in Callimachus' epigram for Astakides is that of Bithynia (cf. the city Astakos).



known for its pastoralism. The 'Cretan' epigrams of the *Greek Anthology* in general, and especially those composed by Leonidas of Taras, demonstrate good knowledge of the social reality of Hellenistic Crete, especially piracy, archery, and hunting (*Anthologia Graeca* vi 75, 121, 188, 351, 427, 654; vii 448; ix 223, 265, 268), as well as of Cretan onomastics.<sup>35</sup> We have no reason to assume that these literary sources are unrelated to the situation in contemporary Crete.

It should be noted that Cretan onomastics offer some evidence for the predominant position pastoral activities took in the self-representation of the Cretans. In Hellenistic times, many personal names related to the breeding of sheep, goats, and cattle are attested in various Cretan cities (see the relevant lemmata in Fraser and Matthews 1987). A first characteristic group of personal names derives from words related to grazing and ownership of sheep, goats, and cattle: Boukolos (the shepherd of cattle, one attestation), Eurybotas / Ourybotas (the great cattle-breeder, four attestations in Knossos, Eltynia, and Gortyn), Poimne (the flock) and Poimalion (from ποιμαίνειν, 'to graze') both attested, to the best of my knowledge, only in Crete (in Hierapytna), Eumelos (the owner of good sheep, in Knossos, Olous, and Polyrrenia), Melion (the owner of sheep, in Hierapytna). A second group of Cretan personal names is related to livestock, especially to ovicaprids: Aigedas (Keraia), Aigidas, Aigylos (Polyrrhenia), and Aigon (Itanos, from ἄζ, 'goat'), Krios (ram, in Gortyn, Lasaia, and Psycheion), Chimaros (the goat, three attestations, in Priansos and elsewhere), Moschos (calf) and Moschion (in Phaistos and Rhithymna), and Bous (ox, in Olous). In view of these epigraphic sources, we may assume that the Cretan bucolic motifs in the Hellenistic poetry are not very distant from reality.

The review of the Hellenistic sources suggests that demographic pressure and economic conditions led part of the population of at least some cities (esp. Hierapytna) to an intensive specialized occupation with the breeding of livestock. This specialization was connected with seasonal shepherding. Hierapytna was certainly not the only Cretan city whose subsistence seems to have faced a crisis in Hellenistic times. It has been suggested that the rise of Cretan piracy and mercenary service was a consequence of these problems (Brulé 1978, 161f, 182-184). Information about upheavals and civil wars (van Effenterre 1948, 168-172; Brulé 1978, 178f; Petropoulou 1985, 109-133; Chaniotis 1996b, 13-15) and the massive emigration of Cretans, especially to Egypt and Asia Minor (Launey 1949/50, I, 277f; Brulé 1978, 162-170), are certainly related to these economic and social problems. The endless wars, the territorial disputes, and the numerous treaties between the Cretan cities confirm the conclusion that many Cretan cities were not in a position to maintain their subsistence without waging war against their neighbors or attempting economic cooperation. Although definite evidence is still lacking, it seems reasonable to assume that under these conditions (population growth, lack of land for all the citizens) an extensive occupation with pastoralism presented at least some citizens with an alternative to the more traditional economic activities, such as arable cultivation and small-scale animal husbandry. It also gave some wealthy citizens the possibility to increase their wealth (cf. Forbes 1995, 331f, on generation of wealth through animal husbandry).

35 Many names of Cretans in the epigrams of the *Anthologia Graeca* find parallels in Cretan onomastics (cf. the lemmata in Fraser and Matthews 1987): Androklos (vi 75; cf. Androkles, 9 attestations), Meliteia (vi 289; cf. Melita), Niko (vi 289), Philolaidas (vi 289; cf. Philolas), Sodamos (vii 494, 3 attestations), Sosos (vi 262, 57 attestations), Soton (ix 744), Therimachos (vi 188), and Theris (vii 447; cf. Theraia, Theraios, Theris, Theron).

### 3.2.4 Wool-weaving and leather working

Beside the part the breeding of livestock played in the supplying of the population with food, pastoral economy was indirectly related to two 'industrial' activities, wool-weaving and leather working. The question arises as to how these 'industrial' activities fit into the economy of the Cretan communities.

Wool-weaving had a central position among the 'industrial' activities known from the palatial economy of pre-Dorian Crete (e.g., Burke 1997; Tzachili 1997). In post-Minoan times it is known mainly as an occupation of women. This can be inferred from legal texts referring to the items woven by women or to weaving implements, epigrams, grave monuments, and loom weights inscribed with the names of women.<sup>36</sup> Textile remains are known from Arkades, Fortetsa, and the North Cemetery of Knossos (Cocking 1996). The Cretan wool manufacture was favored by the abundant presence of dye-plants, such as crocus and phycus, and purple-shells near the Cretan coasts.<sup>37</sup> In Classical and Hellenistic Crete, wool-weaving basically covered the needs of the household and was not — at least not primarily — intended for sale or export. There is no evidence for the export of wool products to other parts of Greece before Roman times. The mention of typical Cretan garments, such as the *esthema* (Pollux, *Onomasticon* vii 77, II p. 73,27-28 ed. Bethe) and Cretan *mandye* (Pollux, *Onomasticon* vii 60, II p. 69,3-6 ed. Bethe), prove the knowledge other Greeks had of these products, but do not necessarily attest exports. The clauses of the great legal inscription of Gortyn (c. 450 BC) pertaining to divorce and inheritance confirm the assumption that the products of this activity remained in the household. The relevant clauses (*I.Cret.* IV 72 col. II 45-54, col. III 24-30, 31-37; cf. Willetts 1967, 20, 29, 60-62; Koerner 1993, 475) provided that the divorced woman and the childless widow received "half of whatever she has woven"; similarly, if a wife died childless, "half of whatever she has woven" was to be returned to her heirs. The law says nothing about an income deriving from the weaving activity of the women, although it takes into consideration the income women might have attained from their other property (land and livestock). In Gortyn, the textile production was obviously not meant for trade. Since the annual need of wool for clothing probably did not exceed two or three kg per person, i.e., an amount of wool which could be produced by four or five sheep (cf. Halstead 1981, 327-329), the wool-weaving practiced in the household does not necessarily presuppose a specialized pastoralism. Things may have been different in some parts of Crete where shepherding occupied a more prominent position in the economy. It is not surprising that allusions to weaving are more common in funerary monuments found in the uplands, i.e., in Prinias, Lyttos, and Biannos (n. 36). The products of a 3rd-century establishment for the dyeing and weaving of wool at Kolonna in Lasithi (Watrous

36 Legal texts: *I.Cret.* IV 72 col. II 50-51, III 25-26, 34-35 (Gortyn, c. 450); cf. Willetts 1967, 20, 29, 60-62; Koerner 1993, 475; *I.Cret.* IV 53 B 3-5 (Gortyn, early 5th century); cf. Bile 1988, 98 n. 102; *I.Cret.* IV 75 B 4-5 (Gortyn, 5th century); cf. Koerner 1993, 424. Epigrams and grave monuments: Lebessi 1976, 86-90 (Prinias, 7th century); Davaras 1960, 463f (Lyttos, Hellenistic); *SEG* XXVII 633 (Milatos, Roman); Kritzas 1990a, 15 no. 9 (Biannos, Hellenistic); *Antholog. Gr.* vi 289. Loom weights with names of women: *I.Cret.* I,xvi 13; I,xxiii 25 (cf. Chaniotis 1989, 76); I,xxiii 27; I,xxiii 28 (cf. Chaniotis 1989, 79); II, v 56; II,ix 2; III,i 5; Levi 1966, 586; Chaniotis 1992, 320f.

37 Crocus and phycus: Theophrastus, *historia plantarum* iv 6,5; Dioscorides, *de materia medica* iv 99 ed. Wellmann; Pliny, *naturalis historia* xiii 136; Murray-Warren 1976, 49. Purple-shells: *Staatsverträge* III no. 553 = Chaniotis 1996b, no. 64 A 6 (Stalai, 3d century); Herodotus iv 151; Pliny, *naturalis historia* xxxii 66; Solinus xi 12. Cf. Murray and Warren 1976, 49; Reese 1987.

1982, 22) perhaps did not just cover the needs of an individual household, and this probably holds true for the textiles produced in a Hellenistic house in Eleutherna, where a great number of loom weights was found (Tsigounaki 1994). 345 loom weights were found in just one house, as compared, e.g., to a total of 793 loom weights found in the entire city of Olynthos (6th-4th century) and 656 loom weights in the 'Unexplored Mansion' in Knossos (10th century BC-3rd century AD), most of which seem to belong to individual looms of households (cf. Sackett, Cocking, et al. 1992, 399, 402, 406). This confirms the impression we gained during the discussion of specialized pastoralism: in some parts of Crete, particularly in the uplands, in certain periods and under certain conditions, shepherding and related activities took the form of a specialized trade which compensated for the lack of other resources (e.g., arable land).

Leather working, the other handicraft directly related to cattle-breeding, differs in an essential way from wool-weaving. Unlike wool-weaving practiced in the individual household, leather working seems to have been a specialized handicraft of vital importance for military purposes, i.e., for the manufacture of armor. We learn about this activity from a gloss of Pollux mentioning a special kind of Cretan leather shoes, *opetia* (*Onomasticon* vii 83, II p. 75,13-18 ed. Bethe; cf. x 141, II p. 232,12-14), and from two very fragmentary Archaic inscriptions from Eleutherna, the one referring to the 'makers of garments of skin' (*sisyropoioi*) and making arrangements for their payment (*I.Cret.* II,xii 9, 6th/5th century; cf. Bile 1988, 175 n. 94; Koerner 1993, 361), the other to 'a worker of leather' (*skyteus*), whose work was related to the manufacture of armor (*SEG XLV* 1257). It is not clear whether these decrees concern themselves with foreign artisans — known from Archaic Crete (van Effenterre 1979) —, who were given certain privileges in order to exercise their handicraft in Eleutherna, or with local artisans, possibly of inferior legal status. It is nevertheless evident that both decrees concern *specialized* artisans, since a specialized terminology was used to designate them. Further, their work was of benefit for the whole community; the *sisyropoioi* were indeed employed by the city of Eleutherna; also the work of the *skyteus* was of military importance. Of course, this scanty evidence for leather working as a specialized skill in Archaic Crete does not imply the existence of manufactured products which were intended for *trade*; on the contrary, the documentary sources lead to the conclusion that this handicraft was primarily meant to cover the military needs of the Cretan communities. This sector, too, is therefore to be seen in the framework of the subsistence economy of the Dorian communities.

Thus, the review of the evidence for textile production and leather working from the late Archaic to the late Hellenistic periods corresponds to the results we reached with regard to specialized pastoralism in the same periods. These two sectors are more prominently represented in upland communities — Eleutherna, Lyttos, Biannos, and Prinias. Some archaeological evidence — the first appearance of loom weights inscribed with the names of their owners in the Hellenistic period, the abundance of loom weights in a Hellenistic house in Eleutherna, and the Hellenistic establishment for the dyeing and weaving of wool at Lasithi — may be related to a higher degree of specialization and to production connected with limited trade. However, only the publication of more material will permit reliable conclusions in this field.

### 3.3 Timber

The existence of forests in ancient Crete has been as often denied by modern scholars, especially geographers (e.g., Dewolf, Postel, and van Effenterre 1963, 32; Wagstaff

1972, 282; Nixon, Moody, and Rackham 1988, 168f; Rackham and Moody 1996, 128-131) as it has been asserted by ancient literary sources.<sup>38</sup> In the most recent discussion of the subject, O. Rackham and J. Moody (1996, 130) present a prudent appraisal: "The main types of wild vegetation in Crete today would be recognised by any Cretan from Late Minoan times onwards. Their proportions and distribution may have fluctuated down the millenia, but not overwhelmingly. Most of the evidence for the historic period could be reconciled with the recent landscape. Archaeology indicates that the classical period may have been a low phase in the fortunes of the islanders; Theophrastus, writing at the end of it implies a landscape not very different from the present. How much woodland was there in ancient Crete? Crete never became a major producer of ordinary timber, which it would have done had it been as wooded as France is today. On the other hand, if it had been less wooded than in the nineteenth century, people would have stopped writing about its trees. We conjecture that woodland on Crete has fluctuated between about three times and one-half of its present extent." Rackham and Moody are right in their appeal to caution, especially when dealing with generalized statements in the literary sources or with isolated references to trees and thickets. One need not take seriously Hesiodus' and Callimachus' claim that the imaginary mountain where baby Zeus was raised was covered by forests, nor to regard the description of the shady route taken by the discutants in the Platonic *Laws* as the report of an eye-witness. Strabo's statement that the island was wooded (x 4.4, C 475) is probably a vague generalization. However, these literary sources give the impression that, for the contemporary Greek, Crete was a place with a stronger presence of forests than the Greek average.

There are a few references to particular forests. Theophrastus, who never visited Crete, but gives reliable information on other Cretan matters, mentions woods on specific mountains (Ida, White Mountains). Hesychius (s.v. *Ide*) asserts that the name of Crete's highest mountain means 'the wooded mountain'. Two other Cretan mountains — Kedros (*kedros*, a species of juniper) and Styrakion (*styrax*) — derive their names from the names of trees, probably not because of the existence of isolated examples of these species. When the author of *Stadiasmus magnis mari* describes the Diktyнна peninsula in west Crete as high and "covered with trees" (*katadendron*), he is doing so in order to provide the sailors who sail along the Cretan coast with a reliable piece of information which would allow them to identify the site.<sup>39</sup> A fragmentary late inscription from Lyttos (5th century AD?), which probably describes a series of estates on the city's territory, refers to at least two, probably three, δρυμοί (Chaniotis 1989; *SEG* XXXIX 975); based on the usage of the word (e.g., *drymophylax* = *saltuarius*) I am inclined to take the word to mean 'an oak wood'. Less clear is the case of a site on the frontier of Lato and Hierapytna, probably in the southeast part of the Lasithi mountains, which has the name Doreia (*SEG* XXVI 1049 = Chaniotis 1996b, no. 59 l. 80: 'the wooded site?'). The rest of the

38 E.g., Hesiodus, *Theogonia* 484 (Αἰγαίῳ ἐν δρεὶ πεπυκασμένῳ ὕληντι); Plato, *leges* I 625 b; Callimachus, *hymnus in Dianam* 40 (Κρηταίων δρος κεκομημένον ὕλη); Theophrastus, *historia plantarum* iii 2,6; 3,3-4; iv 1,3; Solinus xi 11. For the documentary evidence cf. Chaniotis 1991, 101. I am very grateful to Dr. Oliver Rackham (Cambridge) for his valuable remarks, which have helped me revise some of the views expressed in Chaniotis 1991 and in an earlier draft of this chapter. There are still a few points of disagreement.

39 I cannot agree with the assumption of Rackham and Moody (1996, 129) that *κατάδενδρος* may also mean "sparsely treed". The preposition *κατά*, when used in compound words, emphasizes the second component (e.g., *κατάφυτος*, 'covered with plants'; *καταλσίς*, 'wooded', etc.); *κατάδενδρος* can only have one meaning: '(entirely) covered with trees'.

documentary evidence is not very conclusive: Two inscriptions forbid the cutting of trees on sacred territory, on the land belonging to the sanctuary of Zeus Diktaios (*I.Cret.* III,iv 9 ll. 81f) and at some unknown place near Gortyn (*I.Cret.* IV 186 A).

The only Cretan product known to have been the object of substantial exports before the Imperial period is Cretan timber, cypress and juniper in particular (van Effenterre 1948, 111f; Meiggs 1982, 200, 424; Chaniotis 1991, 98f). Cypress wood from Crete — a luxury item — was primarily used for important building programs in 5th-century Athens (Hermippus, *Poetae Comici Graeci* fr. 63,14 ed. Kassel and Austin), for the building of Asklepios' temple in Epidauros in the 4th century (*IG IV I<sup>2</sup>* 102 l. 26; 103 l. 132; Burford 1969, 37, 151, 176f), and for building activities on Delos in the 3rd century (*IG XI 2*, 219 A 37). The export of Cretan timber may have continued, sporadically, into the Imperial period, as we may infer from its mention by Vitruvius (ii 9,13; cf. Sanders 1982, 33). On the contrary, the mention of Cretan trees by various Latin authors (Cicero, *de legibus* v 15; Pliny, *naturalis historia* xvi 141f, 197; xxiv 102; Isidorus, *origines* xvii 7,33; Solinus 11,12) may be regarded as a literary *topos*.

We have seen more than once that differentiations are necessary in the case of the economic exploitation of the Cretan uplands, and this applies to this particular issue as well. A differentiation is dictated first of all by the variety of soils on Crete (Nevros and Zvorykin 1938/39, 251-305) which results in a variety of possibilities. Crete was certainly not an island entirely covered with forests, but woods must have existed, possibly more than in other places in the Aegean or in Greece, possibly sufficient for the local supply with timber for fuel, domestic architecture, and shipbuilding. In light of our documentary evidence, we cannot proceed to any kind of quantitative studies. We can neither estimate the coverage with forests nor determine the amount of timber exported from Crete. The evidence cannot sustain the claim that the export of timber was continual and played a major part in the economy of Classical and Hellenistic Crete.

### 3.4 Beekeeping and collection of herbs

According to the legends narrated by Diodorus (v 65,2; cf. Columela ix 4), shepherding and beekeeping were invented in the Cretan mountains by the Cretan mountain demons, the Kouretes. Literary sources attest beekeeping for Mt. Ida and for *mons Carma* (Pliny, *naturalis historia* viii 104; xxi 79; Plutarchus, *moralia* 967 a-b; Aelianus, *de natura animalium* xvii 35), but we do not have to rely on legends and literary testimonia. Beekeeping is well attested on Crete from Minoan times to our day (Chaniotis 1991, 101 n. 52; Rackham and Moody 1996, 85f). Cretan honey is mentioned in inscriptions from Lebena (*I.Cret.* I,xvii 17 l. 15) and Gortyn (*I.Cret.* IV 144 l. 9), and is known to many authors of the Imperial period (Apollodorus, *bibliotheca* iii 3,1; Dioscorides, *de materia medica* ii 83; Pliny, *naturalis historia* xxix 119; Aelianus, *de natura animalium* xiv 20; Athenaeus xiv 247 f-248 a; *Geoponica* xv 7,1 ed. Beckh). The same applies to the production of wax, mentioned in the 'healing miracles' of Lebena (*I.Cret.* I,xvii 18 l. 13) and known to the Roman medical author Celsus (v 18,31). Beekeeping was certainly the trade of specialists. However, we lack any information concerning the organization of this activity, and we have no reason to assume that Cretan honey and wax were exported outside the island before the Imperial period.

Another activity connected with the Cretan mountains is the collection of herbs, again attested for Minoan Crete (e.g., Möbius 1933; Georgiou 1973; Murray and Warren 1976; Warren 1985; Erard-Cerceau 1990). Theophrastus (*historia plantarum* ix 16,3) calls Crete

the richest place in plants and medicinal herbs, and this has been confirmed by botanical research (e.g., Zohary and Orshan 1966; Chavakis 1979; Rackham and Moody 1996, 71-73). Many ancient and modern Cretan place-names derive from the name of herbs (Chaniotis 1991, 105 n. 90), and the ancient authors — medical authors of the Imperial period in particular — as well as inscriptions mention more than forty herbs and medical plants which were used in medicine, magic, cooking, and perfume industry (Appendix, pp. 219f). The Cretans knew their properties and made extensive use of herbs from the Archaic to the Hellenistic period. The legendary sage of the Archaic period, Epimenides, combined the occupation of the shepherd with that of the collector of herbs (Diogenes Laertius i 109 and 112). Cretan herbs are known both to the authors of the *Hippocratic corpus* (Hippocrates vii 348,17; viii 150,19; 172,9; 180,15; 194,11; 448,4; 516,8 ed. Littré) and to Theophrastus (*historia plantarum* ix 15,8; 16,1-5), and they appear in the recipes mentioned in the 2nd- and 1st-century 'healing miracles' of Lebena (*I.Cret.* I,xvii 14 A 5; 17 l. 15-16; 18 l. 19; 19 l. 8). However, there is no direct evidence for the export of medical plants from Crete before the Roman period, when it became a very important activity, partly controlled by the emperor (Chaniotis 1991, 105f; Rouanet-Liesenfelt 1992; van Effenterre and Rouanet-Liesenfelt 1995; cf. Taborrelli 1994).

#### 4 CONCLUSIONS: THE HISTORICAL DIMENSIONS OF THE ECONOMY OF THE UPLANDS

This review of the written sources on the economic exploitation of the Cretan uplands may have revealed not only the many-sided significance of the mountains for the economy of the Classical and Hellenistic communities, but also the problems of our documentation. The material available today permits neither quantitative studies nor a precise identification of the relative importance of the various economic sectors. The following conclusions are therefore tentative; they primarily aim at reminding us of the need for publication of the less spectacular post-Minoan material hoarded in the Cretan museums and the storerooms of the various archaeological schools (e.g., loom weights, imported amphora stamps, bone implements, animal remains, etc.) and stimulating further research. An important issue — the interdependence of settlement and economic activities in the Archaic, Classical, and Hellenistic period — could not be discussed here, since we still await the final publication of a series of important surveys.

In light of the evidence available so far, it seems plausible that the Cretan mountains were integrated in a system of subsistence economy in the Classical and Hellenistic period. With the exception of timber (§ 3.3) there is no evidence for substantial export of any products of the economy of the uplands — or of Crete, for that matter — before the Imperial period. There was certainly more trade activity in Hellenistic Crete than in the 5th or 4th century, and this activity did contribute to the public revenues of the poleis (cf. the papers of Viviers and Guizzi, in this volume) and, therefore, to the common meals (*syssitia*) in those cities in which they were still practiced. If I think that this evidence does not suffice to abandon for Hellenistic Crete the model of an economy primarily oriented towards subsistence, it is basically because of a comparison between Crete and other parts of the Hellenistic world. Many categories of evidence, so well represented in the source material of the areas which were integrated into the economic networks of the Hellenistic world, are entirely absent in Crete: We lack evidence for a long-distance trade with local products, for local manufacture, for Cretan merchants, and — more important — for the display of private wealth which characterizes big and small Hellenistic poleis

(luxurious dedications, foundations, private dedications of public buildings, contributions to festivals, impressive funerary documents, honorific decrees for benefactors, etc.). This is not due to some coincidental gaps in our sources, but to the peculiarities of Cretan society and economy. Although there is evidence for increased prosperity in the first decades of the 1st century (see De Souza 1998), I cannot recognize any dramatic changes in the *nature* of Cretan economy before the Roman conquest (cf. pp. 184-186). It seems plausible that in these periods the uplands were used for arable cultivation and shepherding which aimed primarily at covering local needs; they supplied the Cretans with additional land for the cultivation of olives and vines, but not for the production of surplus which would be exported; they offered a variety of products and resources, such as the by-products of shepherding, timber, honey, herbs, stone, and possibly metals (Chaniotis 1991, 102).

In several cases we may find indications both of *regional* and of *chronological differentiation*. It seems probable that specialized pastoralism — and related with it, specialized production of textiles and leatherware — was already in existence in certain regions on the uplands in the Classical period (Rhizenia/Prinias?, Eleutherna, Lyttos). We were able to find direct or indirect evidence for the existence of large flocks (e.g. in Rhizenia and Lyttos), for citizens, who derived their wealth from their rich herds, and for seasonal transhumance (§ 3.2.2). However, we can neither claim that these conditions prevailed in *all* Cretan landscapes nor that an *unbroken continuity* existed from the Archaic to the end of the Hellenistic period. The Hellenistic treaties of Hierapytna, which attest directly to the seasonal movement of herds and, thus, to specialized pastoralism, rather imply that specialized pastoralism was not a general phenomenon, but a response to a crisis in the 3rd and 2nd centuries. It cannot be a coincidence that all the treaties concerning 'transhumance' and the problems it caused date to the 3rd and 2nd centuries and almost all of them concern Hierapytna. Of course, we may not exclude the possibility that earlier Cretan treaties were written on bronze sheets and are now lost; the concentration of evidence in east Crete may also be symptomatic for the more intensive archaeological research in this area. Nevertheless, these two objections do not change the fact that in Hellenistic times Hierapytna found it necessary to conclude a series of treaties with almost all its neighbors and to include in them clauses which facilitated the practice of a specialized pastoralism for its citizens. The documentary sources rather lead to the conclusion that transhumance became important in Hellenistic Crete under certain demographic and social conditions (population growth, lack of land for all the citizens) and presented an alternative to more traditional economic activities (arable cultivation, small-scale animal husbandry) and an opportunity for the generation of wealth.

The conquest of Crete by the Romans (67/66 BC) set an abrupt end to the conflicts of the Cretan cities and at the same time to their archaic social and economic order (Chaniotis 1988a, 79f; Bennet 1990, 201-203; Harrison 1991 and 1993, 39-121; Baldwin Bowsky 1994). Now Crete occupied a central geographical position in the pacified and unified eastern Mediterranean; the extinction of piracy facilitated the trade activity with and on Crete. At the same time the fundaments of the archaic Cretan society, the common meals, the military education, and the 'men's houses', disappeared; further, the Cretans lost two of their main resources: piracy and mercenary service. The ultimate consequence of these changes was a new orientation of several economic sectors towards trade, the most clear example being the massive export of wine (Chaniotis 1988a; Marangou-Lerat 1995; Marangou, in this volume). Further exports include those of medicinal plants (§ 3.4) and

probably stone (Chaniotis 1991, 105 n. 88). If the developments in Roman Italy can serve as an analogy (Garnsey 1988, 201f), these new conditions must have affected the economic sector most closely associated with the upland: shepherding. Unfortunately, only a few indications of increased specialized pastoralism can be found in the epigraphic sources. Several vows are addressed by shepherds or cattle-owners to the Kouretes for the safety of their livestock (*I.Cret.* I,xxv 3; *SEG XXIII 593*; Kritzas 1990b); a passage in Vitruvius (i 4,10) seems to imply intensive cattle breeding in the plain of Mesara, at the border between Knossos and Gortyn; an account found at the sanctuary of Diktynna in west Crete (6 BC) attests the employment of (specialized?) slaves as shepherds of cattle, the leasing of cattle, and the controlled production of wool (*I.Cret.* II,xi 3 ll. 9-10, 22-23, 28, 30, 38). We may also note the production of bone items (pins, fibulae, etc.) in Roman Lappa (Gavrilaki-Nicoloudaki and Karamaliki 1989/90) and Knossos (Sackett 1992b), on a scale unknown in the pre-Roman period. Further, recent archaeological survey work indicates a systematic exploitation of land, possibly connected with a shift to a market economy, and at least some of the traces of human activity in areas which were abandoned in earlier periods may be related to pastoralism.<sup>40</sup> Thus, the economic exploitation of the Cretan uplands and its development from the Archaic to the early Imperial period offer an instructive case study for continuities and changes in the relations between man and landscape.

## BIBLIOGRAPHY

- Allbaugh, L.G. (1953) *Crete: A Case Study of an Underdeveloped Area*, Princeton.
- Angelakis, A.N. and S.V. Spyridakis (1996) 'The Status of Water Resources in Minoan Times. A Preliminary Study', in A.N. Angelakis and A.S. Issar (eds), *Diachronic Climatic Impacts on Water Resources*, Berlin-Heidelberg, 161-191.
- Apostolakis, S.A. (1993) *Πιζίτικα. Τὰ δημοτικά τραγούδια τῆς Κρήτης*, Athens.
- Audring, G. (1985) 'Zur sozialen Stellung der Hirten in archaischer Zeit. Thesen', in H. Kreißig and F. Kühnert (eds), *Antike Abhängigkeitsformen in den griechischen Gebieten ohne Polisstruktur und den römischen Provinzen. Actes du colloque sur l'esclavage léna, 1981*, Berlin, 12-19.
- (1989) *Zur Struktur des Territoriums griechischer Poleis in archaischer Zeit*, Berlin.
- Baldwin Bowsky, M.W. (1994) 'Cretan Connections: The Transformation of Hierapytna', *Cretan Studies* 4, 1-44.
- Beattie, A.J. (1975) 'Notes on the Spensitheos Decree', *Kadmos* 14, 8-47.
- Bedwin, O. (1992) 'The Animal Bones', in Sackett (ed.) 1992a, 491-492.
- Bennet, J. (1990) 'Knossos in Context: Comparative Perspectives on the Linear B Administration of LM II-III Crete', *AJA* 94, 193-211.
- (1992) "'Collectors" or "Owners"?: An Examination of their Possible Functions within the Palatial Economy of LM III Crete', in Olivier (ed.) 1992, 65-101.
- Bielman, A. (1994) *Retour à la liberté. Libération et sauvetage des prisonniers en Grèce ancienne*, Paris.
- Bile, M. (1988) *Le dialect crétois ancien*, Paris.

<sup>40</sup> Harrison 1991; cf. Bintliff 1977b, 620-622 (Ayiofarango); Watrous 1982, 23f (Lasithi); Nixon, Moody, and Rackham 1988, 171; Nixon, Moody, Price, and Rackham 1989, 208f (Sphakia); Moody and Hayden 1989/90, 311; Hayden, Moody, and Rackham 1992, 332f (Vrokastro); Watrous et al. 1993, 233 (Mesara). For the connection between market demand for pastoral products and specialized pastoralism, cf. Hodkinson 1988, 56.



- (1992) 'Les termes relatifs à l'initiation dans les inscriptions crétoises (VIIe-Ier siècles av. J.-C.)', in: A. Moreau (ed.), *L'initiation. Actes du colloque international de Montpellier, 11-14 avril 1991*, Montpellier, 11-18.
- Bintliff, J.L. (1977a) 'Culture, Religion, and Economics', in D. Blackman and K. Branigan, 'An Archaeological Survey of the Lower Catchment of the Ayiofarango Valley', *BSA* 72, 80-83.
- (1977b) *Natural Environment and Human Settlement in Prehistoric Greece*, Oxford.
- Blitzer, H. (1990) 'Pastoral Life in the Mountains of Crete', *Expedition* 32, 34-41.
- Brulé, P. (1978) *La piraterie crétoise hellénistique*, Paris.
- Brun, P. (1997) 'Du fromage de Kythnos au marbre de Paros: La question des appellations contrôlées (?) dans l'antiquité grecque', *Revue des Études Anciennes* 99, 401-409.
- Burford, A. (1969) *The Greek Temple Builders at Epidauros*, Liverpool.
- Burke, B. (1997) 'The Organization of Textile Production on Bronze Age Crete', in R. Laffineur and P.P. Betancourt (eds), *TEXNH. Craftsmen, Craftswomen, and Craftsmanship in the Aegean Bronze Age. Proceedings of the 6th International Aegean Conference, Philadelphia, Temple University, 18-21 April 1996*, Liège, II, 413-422.
- Callaghan, P.C. (1978) 'KRS 1976. Excavations at a Shrine of Glaukos, Knossos', *BSA* 73, 1-30.
- (1980) 'The Trefoil Style and Second-Century Hadra Vases', *BSA* 75, 33-47.
- (1981) 'The Little Palace Well and Knossian Pottery of the Late Third and Second Century B.C.', *BSA* 76, 35-58.
- (1984) 'Knossian Artists and Ptolemaic Alexandria', in *Alessandria e il mondo ellenistico-romano. Studi in onore di A. Adriani*, III, Rome, 789-794.
- (1992) 'Archaic to Hellenistic Pottery', in Sackett (ed.) 1992a, 89-136.
- Callaghan, P.C. and R.E. Jones (1985) 'Hadra Hydriae and Central Crete: A Fabric Analysis', *BSA* 80, 4-17.
- Chalikiopoulos, L. (1903) *Sitta, die Osthalbinsel Kretas. Eine geographische Studie*, Berlin.
- Chaniotis, A. (1988a) 'Vinum Creticum excellens: Zum Weinhandel Kretas', *Münstersche Beiträge zur antiken Handelsgeschichte* 7.1, 62-89.
- (1988b) [1992] 'Habgierige Götter, habgierige Städte. Heiligtumsbesitz und Gebietsanspruch in den kretischen Staatsverträgen', *Ktema* 13, 21-39.
- (1989) 'Some More Cretan Names', *ZPE* 77, 67-81.
- (1991) [1995] 'Von Hirten, Kräutersammlern, Epheben und Pilgern. Leben auf den Bergen im antiken Kreta', *Ktema* 16, 93-109.
- (1992) 'Die Geschichte von Amnisos von Homer bis zur Eroberung Kretas durch die Türken. Die Inschriften von Amnisos', in J. Schäfer (ed.) 1992, *Amnisos nach den archäologischen, historischen und epigraphischen Zeugnissen des Altertums und der Neuzeit*, Berlin, 73-127, 287-322.
- (1995) 'Problems of 'Pastoralism' and 'Transhumance' in Classical and Hellenistic Crete', *Orbis Terrarum* 1, 39-89.
- (1996a) 'Die kretischen Berge als Wirtschaftsraum', in E. Olshausen and H. Sonnabend (eds), *Akten des 6. Internationalen Kongresses der Historischen Geographie des Altertums: Gebirgsland als Lebensraum, Stuttgart 1993*, Amsterdam, 255-266.
- (1996b) *Die Verträge zwischen kretischen Poleis in der hellenistischen Zeit*, Stuttgart.
- Chavakis, I. (1979) *Φυτά και βοτάνια της Κρήτης*, Athens.
- Cherry, J.F. (1988) 'Pastoralism and the Rôle of Animals in the Pre- and Protohistoric Economies of the Aegean', in Whittaker (ed.) 1988, 6-34.
- Cocking, J. (1996) 'Textile Remains', in J.N. Coldstream and H.W. Catling (eds), *Knossos North Cemetery. Early Greek Tombs (BSA, Suppl. 28)*, London, 613-620.
- Cook, B.F. (1984) 'Some Groups of Hadra Vases', in *Alessandria e il mondo ellenistico-romano. Studi in onore di A. Adriani*, III, Rome, 795-803.
- Creutzburg, N. (1958) *Probleme des Gebirgsbaues und der Morphogenese auf der Insel Kreta (Freiburger Universitätsreden, Heft 26)*, Freiburg.
- Davaras, C. (1960) 'Ἐπιγραφὰὶ ἐκ Κρήτης', *Kretika Chronika* 14, 457-465.
- Daverio Rocchi, G. (1988) *Frontiera e confini nella Grecia antica*, Roma.
- Demoulin, H. (1901) *Épiménide de Crète*, Liège.

- de Souza, Ph. (1998) 'Late Hellenistic Crete and the Roman Conquest', in W.G. Cavanagh and M. Curtis (eds), *Post-Minoan Crete. Proceedings of the First Colloquium on Post-Minoan Crete held by the British School at Athens and the Institute of Archaeology, University College London, 10-11 November 1995 (BSA Studies, 2)*, London, 112-116.
- Dewolf, Y., F. Postel, and H. van Effenterre (1963) 'Géographie préhistorique de la région de Mallia', in H. van Effenterre and M. van Effenterre (eds), *Fouilles exécutées à Mallia. Étude du site (1950-1957). Exploration des nécropoles (1915-1928) (Études Crétoises, XIII 2)*, Paris, 28-53.
- Dimitrakos, S.D. (ed.) (1967) *Γεωγραφία. Ἄτλας Παγκόσμιος. Ἑλλάς*, Athens.
- Dubois, L. (1989) *Inscriptions grecques dialectales de Sicile*, Rome.
- Erard-Cerceau, I. (1990) 'Végétaux, parfums et parfumeurs à l'époque mycénienne', *Studi Micenei ed Egeo-Anatolici* 28, 251-283.
- Fabre, G. and R. Maire (1984) 'Un haut karst conique tropical hérite de type exceptionnel: Les Levka Ori ou Montagnes Blanches de l'île de Crète (Grèce)', *Travaux ERA 282 du CNRS* 13, 55-63.
- Faure, P. (1964) *Fonctions des cavernes crétoises*, Paris.
- (1965) 'Noms de montagnes crétoises', *Bulletin d'Association G. Budé*, 427-446.
- (1972) 'Νέα ἀνάγνωση τῆς ἐπιγραφῆς 207 τοῦ Μουσείου Ἀγίου Νικολάου', *Amaltheia* 13, 167-180 (= *Recherches de toponymie crétoise*, Amsterdam 1989, 227-240).
- Flaccus, A. (1992) 'The Climate and Vegetation of Crete', in Myers, Myers, and Cadogan (eds) 1992, 27-29.
- Forbes, H. (1995) 'The Identification of Pastoralist Sites within the Context of Estate-Based Agriculture in Ancient Greece: Beyond the "Transhumance Versus Agro-pastoralism" Debate', *BSA* 90, 325-338.
- Foxhall, L. (1993) 'Farming and Fighting in Ancient Greece', in J. Rice and G. Shipley (eds), *War and Society in the Greek World*, London-New York, 134-145.
- (1996) 'Feeling the Earth Move: Cultivation Techniques on Steep Slopes in Classical Antiquity', in G. Shipley and J. Salmon (eds), *Human Landscapes in Classical Antiquity*, London, 44-67.
- Foxhall, L. and H.A. Forbes (1982) 'Sitometreia: The Role of Grain as a Staple Food in Classical Antiquity', *Chiron* 12, 41-90.
- Fraser, P.M. and E. Matthews (1987) *A Lexicon of Greek Personal Names*, Vol. I., Oxford.
- Gallant, T.W. (1991) *Risk and Survival in Ancient Greece*. Stanford.
- Garlan, Y. (1978) 'Signification historique de la piraterie grecque', *Dialogues d'Histoire Ancienne* 4, 1-16.
- Garnsey, P. (1988) 'Mountain Economies in Southern Europe', in Whittaker (ed.) 1988, 196-209.
- Gasparis, C. (1995) 'Ἐπαρχιακοὶ καὶ ἀγροτικοὶ δρόμοι στὸν ὄστερο μεσαίωνα (13ος-14ος αἰ.)'. Ἡ περίπτωση τῆς Μακεδονίας καὶ τῆς Κρήτης', *Thesaurismata* 25, 49-60.
- Gavrilaki-Nicoloudaki, I. and N. Karamaliki (1989/90) 'Ὅστεινα ἀντικείμενα τῶν Ὑστέρων Ρωμαϊκῶν Χρόνων ἀπὸ τὴν Ἀργυρούπολη Ρεθύμνης', *Kretike Hestia* 3, 119-154.
- Gawantka, W. (1975) *Isopolitie. Ein Beitrag zur Geschichte der zwischenstaatlichen Beziehungen in der griechischen Antike*, Munich.
- Georgiadou, A. (1994) 'Θραύσμα ἔκτυπου ἐμβλήματος με παράσταση τοῦ Ἀκταίωνα', in Kalpaxis et al. (1994), 138-151.
- Georgiou, H.S. (1973) 'Aromatics in Antiquity and in Minoan Crete: A Review and Reassessment', *Kretika Chronika* 25, 441-456.
- Georgoudi, S. (1974) 'Quelques problèmes de la transhumance dans la Grèce ancienne', *Revue des Études Grecques* 87, 155-185.
- Gifford, J.A. (1992) 'The Geomorphology of Crete', in Myers, Myers, and Cadogan (eds) 1992, 17-23.
- Grassl, H. (1985) 'Zur Geschichte des Viehhandels im klassischen Griechenland', *Münstersche Beiträge zur antiken Handelsgeschichte* 4.2, 77-88.
- Gschnitzer, F. (1976) *Studien zur griechischen Terminologie der Sklaverei. Zweiter Teil. Untersuchungen zur älteren, insbesondere homerischen Sklaventerminologie*, Wiesbaden.
- (1981) *Griechische Sozialgeschichte*, Wiesbaden.
- Guarducci, M. (1933a) 'Intorno alla decima dei Cretesi', *Rivista di Filologia e di Istruzione Classica* 11 (Nuov. Ser.), 488-491.
- (1933b) 'Eunomia', *Historia* 7, 199-205.
- Guerini, L. (1964) *Vasi di Hadra. Tentativo di sistemazione cronologica di una classe ceramica*, Rome.

- Haft, A. (1996) 'The Mercurial Significance of Raiding: Baby Hermes and Animal Theft in Contemporary Crete', *Arion* (Fall), 27-48.
- Haggis, D.C. and K. Nowicki (1993) 'Khalasmeno and Katalimata. Two Early Iron Age Settlements in Monastiraki, East Crete', *Hesperia* 62, 303-337.
- Halstead, P. (1981) 'Counting Sheep in Neolithic and Bronze Age Greece', in I.R. Hodder, G. Isaac, and N. Hammond (eds), *Pattern of the Past. Studies in Honour of David Clark*, Cambridge, 307-339.
- (1987) 'Traditional and Ancient Rural Economy in Mediterranean Europe: plus ça change?', *JHS* 107, 77-87.
- (1990/91) [1993] 'Lost Sheep? On the Linear B Evidence for Breeding Flocks at Mycenaean Knossos and Pylos', *Minos* 25/26, 343-365.
- Hanson, V.D. (1983) *Warfare and Agriculture in Classical Greece*, Pisa.
- Harrison, G.W.M. (1991) 'Changing Patterns in Land Tenure and Land Use in Roman Crete', in G. Barker (ed.), *Roman Landscapes. Archaeological Survey in the Mediterranean Region*, London, 115-121.
- (1993) *The Romans and Crete*, Amsterdam.
- Hayden, B.J. (1995) 'Rural Settlement of the Orientalizing Through Early Classical Period. The Meseroloi Valley, Eastern Crete', *Aegean Archaeology* 2, 93-144.
- Hayden, B.J., J.A. Moody, and O. Rackham (1992) 'The Vrokastro Survey Project, 1986-1989. Research Design and Preliminary Results', *Hesperia* 61, 293-353.
- Hempel, L. (1984) 'Beobachtungen und Betrachtungen zur jungquartären Reliefgestaltung der Insel Kreta', in L. Hempel (ed.), *Beiträge zur Landeskunde Griechenlands*, Paderborn, 9-40.
- (1990) 'Klima- und Landschaftsgenese der östlichen Mittelmeerräume im Jungquartär', *Colloquium Geographicum* 20, 69-82.
- (1991) *Forschungen zur physischen Geographie der Insel Kreta im Quartär. Ein Beitrag zur Geoökologie des Mittelmeerraumes*, Göttingen.
- (1992) *Natürliche Höhenstufen und Siedelplätze in griechischen Hochgebirgen*, Münster.
- (1995) 'Die Hochgebirge Kretas als Wirtschaftsraum: physiogeographische Voraussetzungen, Formen und Veränderungen der Wanderviehhaltung', *Petermanns Geographische Mitteilungen* 139, 215-238.
- Herzfeld, M. (1985) *The Poetics of Manhood: Contest and Identity in a Cretan Mountain Village*, Princeton.
- Himmelmann, N. (1980) *Über Hirten-Genre in der antiken Kunst*, Opladen.
- Hodkinson, S. (1988) 'Animal Husbandry in the Greek Polis', in Whittaker (ed.) 1988, 35-74.
- Jameson, M. (1988) 'Sacrifice and Animal Husbandry in Classical Greece', in Whittaker (ed.) 1988, 87-119.
- Jarman, M.R. (1973) 'Preliminary Report on the Animal Bones', in J.N. Coldstream (ed.), *Knossos. The Sanctuary of Demeter*, London, 177-179.
- Jeffery, L.H. and A. Morpurgo-Davies (1970) 'Ποινικαστάς and ποιδικάζειν: BM 1969.4-2.1. A New Archaic Inscription from Crete', *Kadmos* 9, 118-154.
- Isager, S. (1992) 'Sacred Animals in Classical and Hellenistic Greece', in T. Linders and B. Alroth (eds), *Economics of Cult in the Ancient Greek World. Proceedings of the Uppsala Symposium 1990* (Boreas, 21), Uppsala, 15-20.
- Isager, S. and J.E. Skydsgaard (1992) *Ancient Greek Agriculture: An Introduction*, London-New York.
- Kalpaxis, Th., A. Furtwängler, A. Schnapp, et al. (1994) 'Ελεύθερα II. 2. "Ένα ελληνιστικό σπίτι ("Σπίτι Α") στη θέση Νησί, Rethymnon.
- Kardulias, P.N. and M.T. Shutes (eds) (1997) *Aegean Strategies: Studies of Culture and Environment on the European Fringe*, Lanham.
- Kirsten, E. (1956) *Die griechische Polis als historisch-geographisches Problem des Mittelmeerraums*, Bonn.
- Koerner, R. (1993) *Inscriptliche Gesetzestexte der frühen griechischen Polis*, Köln-Weimar-Wien.
- Koster, H.A. (1997) 'Yours, Mine, and Ours: Private and Public Pasture in Greece', in Kardulias and Shutes (eds) 1997, 141-185.
- Kreuter, S. (1992) *Außenbeziehungen kretischer Gemeinden zu den hellenistischen Staaten im 3. und 2. Jh. v. Chr.*, Munich.
- Kritzas, Ch.B. (1990a) 'Κρητικές έπιγραφές', *Kretika Chronika* 30, 7-17.
- (1990b) 'Αναθηματική έπιγραφή από τό Καρνάρι 'Αρχαίων', Paper presented at the Ζ' Διεθνές Κρητολογικό Συνέδριο, Rethymnon 1990.

- La Rosa, V. (1984) 'Ceramiche del tipo Hadra da Festos', in *Alessandria e il mondo ellenistico-romano. Studi in onore di A. Adriani*, III, Rome, 804-818.
- Larson, J. (1997) 'Astacides the Goatherd (Callim., Epigr. 22 Pf.)', *Classical Philology* 92, 131-137.
- Latte, K. (1968) 'Kollektivbesitz und Staatsschatz in Griechenland', in *Kleine Schriften zu Religion, Recht, Literatur und Sprache der Griechen und Römer*, Munich, 294-312.
- Laubscher, H.P. (1982) *Fischer und Landleute. Studien zur hellenistischen Genreplastik*, Mainz.
- Launey, M. (1949/50) *Recherches sur les armées hellénistiques*, Paris [cf. *Reimpression avec addenda et mise à jour en postface par Y. Garlan, P. Gauthier, and C. Orrieux*, Paris 1987].
- Lavrencic, M. (1988) 'Andreion', *Tyche* 3, 147-161.
- Lebessi, A. (1976) *Οι στῆλες τοῦ Πρινιῶ*, Athens.
- (1989) 'Der Berliner Widderträger. Hirt oder hervorragender Bürger?', in H.-U. Cain, H. Gabelmann, and D. Salzmann (eds), *Festschrift für Nikolaus Himmelmann*, Mainz, 59-64.
- Lehmann, H. (1939) 'Die Siedlungsräume Ostkretas im Wandel der Zeiten', *Geographische Zeitschrift* 45, 212-228.
- Le Rider, G. (1966) *Monnaies crétoises du Ve au Ier siècle av. J.-C.*, Paris.
- Levi, D. (1965/66) 'Bolli d'anfore e pesi fittili da Festòs', *ASAA* 43/44, 569-588.
- Link, S. (1991) *Landverteilung und sozialer Frieden im archaischen Griechenland*, Stuttgart.
- (1994) *Das griechische Kreta*, Stuttgart.
- Maiuri, A. (1910) 'Eunomia a Creta', *Rendiconti della Reale Accademia dei Lincei* 19 (Ser. 5), 34-46.
- Mangou, E. (1997) 'Χημική ανάλυση με άτομική απορρόφηση 38 μελονόγραφων ὑδριῶν τύπου Hadra καὶ 12 μελαμβαφῶν ραβδωτῶν ἀγγείων με ἔκτυπα ἐμβλήματα (Plakettenvasen)', in 'Υπουργεῖο Πολιτισμοῦ. ΚΕ' Ἐφορεία Προϊστορικῶν καὶ Κλασικῶν Ἀρχαιοτήτων, Ἐλληνιστικὴ Κεραμικὴ ἀπὸ τὴν Κρήτη, Chania, 147-151.
- Manteli, K. (1990) 'Τὸ οἰκιστικὸ σύστημα στὴ νεολιθικὴ Κρήτη σὲ σχέση με τὴν γεωμορφολογία τοῦ νησιοῦ', in *Πεπραγμένα τοῦ Στ' Κρητολογικοῦ Συνεδρίου, Ρέθυμνο 1986*, Chania, A1, 435-447.
- Marangou-Lerat, A. (1995) *Le vin et les amphores de Crète de l'époque classique à l'époque impériale*, Paris.
- Marek, Chr. (1984) *Die Proxenie*, Frankfurt.
- Markoulaki, St. (1997) 'Ἀγγεῖα με ἀνάγλυφα ἐμβλήματα ἀπὸ τὴ δυτικὴ Κρήτη', in 'Υπουργεῖο Πολιτισμοῦ. ΚΕ' Ἐφορεία Προϊστορικῶν καὶ Κλασικῶν Ἀρχαιοτήτων, Ἐλληνιστικὴ Κεραμικὴ ἀπὸ τὴν Κρήτη, Chania, 72-106.
- Markoulaki, St. and V. Niniou-Kindeli (1982) [1990] 'Ἐλληνιστικὸς λαξευτὸς τάφος Χανίων. Ἀνασκαφὴ οἰκοπέδου Μαθιουδάκη', *ADelion* 37 A, 7-118.
- Matton, R. (1957) *La Crète au cours des siècles*, Athens.
- Mavrakakis, J. (1985) *Λαογραφικὰ Κρήτης. Τὰ Ποιμενικά*, Athens.
- Meiggs, R. (1982) *Trees and Timber in the Ancient Mediterranean World*, Oxford.
- Melena, J.L. (1976) 'Aromatic Plants on the Knossos Tablets', *Minos* 15, 226-227.
- Möbius, M. (1933) 'Pflanzenbilder der minoischen Kunst in botanischer Beobachtung', *Jahrbuch des Deutschen Archäologischen Instituts* 48, 1-31.
- Moody, J. (1987) *The Environmental and Cultural Prehistory of the Khania Region of West Crete: Neolithic Through Late Minoan III*, PhD Dissertation, University of Minnesota.
- (1997) 'The Cretan Environment: Abused or Just Misunderstood?', in Kardulias and Shutes (eds) 1997, 61-77.
- Moody, J. and A.T. Grove (1990) 'Terraces and Enclosure Walls in the Cretan Landscape', in S. Bottema, A. Entjes-Nieborg, and W. van Zeist (eds), *Man's Role in the Shaping of the Eastern Mediterranean Landscape*, Rotterdam, 183-191.
- Moody, J. and B. Hayden (1989/90) 'Vrokastro', *Kretike Hestia* 3, 309-311.
- Müller, H. (1975) 'Φυγῆς ἔνεκεν', *Chiron* 5, 129-156.
- Murray, C. and P. Warren (1976) 'Po-ni-ki-jo among the Dye-plants of Minoan Crete', *Kadmos* 15, 40-60.
- Myers, J., E.E. Myers, and G. Cadogan (ed.) (1992) *The Aerial Atlas of Ancient Crete*, London.
- Nevros, K. and I. Zvorykin (1938/39) 'Zur Kenntnis der Böden der Insel Kreta (Griechenland)', *Soil Research* 6, 242-307.

- Nixon, L., J. Moody, and O. Rackham (1988) 'Archaeological Survey in Sphakia, Crete', *Échos du monde classique* 32, 159-173.
- Nixon, L., J. Moody, S. Price, and O. Rackham (1989) 'Archaeological Survey in Sphakia, Crete', *Échos du monde classique* 33, 201-215.
- Olivier, J.-P. (ed.) (1992) *Mykenaiika. Actes du IXe Colloque international sur les textes mycéniens et égéens, Athènes, 2-6 octobre 1990 (BCH, Suppl. 25)*, Paris.
- Osborne, R. (1987) *Classical Landscape with Figures: The Ancient Greek City and its Countryside*, London.
- Palaima, Th.G. (1992) 'The Knossos Oxen Dossier: The Use of Oxen in Mycenaean Crete', in Olivier (ed.) 1992, 463-474.
- Panagopoulos, A. (1987) *Ἀριστοτέλης καὶ Κρήτη*, Athens.
- Payne, S. (1985) 'Zoo-Archaeology in Greece: A Reader's Guide', in N.C. Wilkie and W.D.E. Coulson (eds), *Contribution to Aegean Archaeology. Studies in Honor of William A. McDonald*, Minneapolis, 211-244.
- Pendlebury, J.D.S. (1939) *The Archaeology of Crete: An Introduction*, London.
- Perlman, P. (1996) 'Πόλις ὑπὸ κατοῦ. The Dependent Polis and Crete', in M.H. Hansen (ed.), *Introduction to an Inventory of Poleis. Symposium August, 23-26 1995*, Copenhagen 233-285.
- (forthcoming) 'Κρήτες αἰεὶ ληιστοί? The Marginalization of Crete in Greek Thought and the Role of Piracy in the Outbreak of the First Cretan War', in *Proceedings of a Conference on Hellenistic Rhodes, Copenhagen 1994*.
- Petropoulou, A. (1985) *Beiträge zur Wirtschafts- und Gesellschaftsgeschichte Kretas in hellenistischer Zeit*, Frankfurt.
- Price, J. (1992) 'Hellenistic and Roman Glass', in Sackett (ed.) 1992a, 415-462.
- Rackham, O. (1972) 'The Vegetation of the Myrtos Area', in P. Warren (ed.), *Myrtos: An Early Bronze Age Settlement in Crete (BSA, Suppl. 7)*, London, 283-298.
- Rackham, O. and J. Moody (1996) *The Making of the Cretan Landscape*, Manchester.
- Reese, D.S. (1984) 'Faunal Remains from the Kommos Temples', *AJA* 88, 1984, 257.
- (1987) 'Palaikastro Shells and Bronze Age Purple-dye Production in the Mediterranean Basin', *BSA* 82, 200-206.
- Renfrew, C. and M. Wagstaff (eds) (1982) *An Island Polity: The Archaeology of Exploitation in Melos*, Cambridge.
- Robert, L. (1949a) 'Építaphe d'un berger à Thasos', *Hellenica* 7, 152-161.
- (1949b) 'Les chèvres de Héracléia', *Hellenica* 7, 161-170.
- Roberts, N. (1979) 'The Location and Environment of Knossos', *BSA* 74, 230-240.
- (1981) 'The Physical Environment of the Knossos Area', in S. Hood and D. Smyth (eds.), *Archaeological Survey of the Knossos Area*, London, 5.
- Rouanet-Liesenfelt A.-M. (1992) 'Les plants médicinales de Crète à l'époque romaine', *Cretan Studies* 3, 173-190.
- Sackett, L.H. (ed.) (1992a) *Knossos: from Greek City to Roman Colony. Excavation at the Unexplored Mansion (BSA, Suppl. 21)*, Oxford.
- (1992b) 'Objects in Bone and Bone Working', in Sackett (ed.) 1992a, 379-390.
- Sackett, L.H., J. Cooking et al. (1992) 'Other Finds in Stone', in Sackett (ed.) 1992a, 391-414.
- Sahin, S. (1994) 'Piratenüberfall auf Teos', *Epigraphica Anatolica* 23, 1-36.
- Sallares, R. (1991) *The Ecology of the Ancient Greek World*, Ithaca-New York.
- Sanders, J.F. (1982) *Roman Crete: An Archaeological Survey and Gazetteer of Late Hellenistic, Roman, and Early Byzantine Crete*, Warminster.
- Sartre, M. (1979) 'Aspects économiques et aspects religieux de la frontière dans les cités grecques', *Ktéma* 4, 213-224.
- Schas, G.P. and N. Spencer (1994) 'Notes on the Topography of Eresos', *AJA* 98, 411-430.
- Schmitt Pantel, P. (1992) *La cité au banquet. Histoire des repas publiques dans les cités grecques*, Paris.
- Schneider, C. (1967) *Kulturgeschichte des Hellenismus*, Munich.
- Skydsgaard, J.E. (1988) 'Transhumance in Ancient Greece', in Whittaker (ed.) 1988, 75-86.

- Staatsverträge* II: H. Bengtson, *Die Staatsverträge des Altertums. Zweiter Band. Die Verträge der griechisch-römischen Welt von 700 bis 338 v. Chr.*, Munich 1975 (second edition).
- Staatsverträge* III: H.H. Schmitt, *Die Staatsverträge des Altertums. Zweiter Band. Die Verträge der griechisch-römischen Welt von 338 bis 200 v. Chr.*, Munich 1969.
- Taborelli, L. (1994) 'Spunti per una ricerca sulla produzione di *medicamenta-aromata* a l'attività vetraria a Creta', *Archeologia Classica* 46, 441-451.
- Talamo, C. (1987) 'Il sissizio a Creta', *Miscellanea Graeca e Romana* 12, 9-26.
- Trümper, C. (1997) *Untersuchungen zu den altgriechischen Monatsnamen und Monatsfolgen*, Heidelberg.
- Tsigounaki, Ch. (1994) 'Πήλινα ύφαντικά βάρη και σφονδύλια', in Kalpaxis et al. 1994, 158-167.
- Tzachili, I. (1997) 'Υφαντική και ύφαντρες στο προϊστορικό Αίγαιο 2000-1000 π.Χ.', Herakleion.
- van Effenterre, H. (1942) 'Querelles crétoises', *Revue des Études Anciennes* 44, 31-51.
- (1948) *La Crète et le monde grec de Platon à Polybe*, Paris.
- (1979) 'Le statut comparé des travailleurs étrangers en Chypre, Crète et autres lieux à la fin de l'archaïsme', in *Acts of the International Archaeological Symposium 'The Relations Between Cyprus and Crete, ca. 2000-500 BC'*, Nicosia, 279-293.
- (1982) 'Terminologie et formes de dépendance en Crète', in L. Hadermann-Misguich and G. Raepsaet (eds.), *Reyonnement grec. Hommages à Charles Delvoye*, Bruxelles, 35-44.
- (1991) 'Die von den Grenzen der ostkretischen Poleis eingeschlossenen Flächen als Ernährungsspielraum', in *Stuttgarter Kolloquium zur Historischen Geographie des Altertums 2 (1984) und 3 (1987)*, Bonn, 393-406.
- (1993) 'Le pacte Gortyne-Rhittèn', *Cahiers du Centre G. Glotz* 4, 13-21.
- van Effenterre, H. and M. Bougrat (1969) 'Les frontières de Lato', *Kretika Chronika* 21, 9-53.
- van Effenterre, H. and A.-M. Rouanet-Liesenfeldt (1995) 'L'empereur et la Crète: Plantes médicinales', in *Πεπραγμένα του 2' Διεθνούς Κρητολογικού Συνεδρίου*, AI, Rethymnon, 241-249.
- van Effenterre, H. and M. van Effenterre (1985) 'Nouvelles lois archaïques de Lyttos', *BCH* 109, 157-188.
- (1994) 'La terminologie des bornages frontaliers', in E. Olshausen and H. Sonnabend (eds.), *Stuttgarter Kolloquium zur Historischen Geographie des Altertums, 4, 1990*, Amsterdam, 111-125.
- Verginis, S. (1980) 'Beiträge zur physischen Geographie der Insel Kreta unter besonderer Berücksichtigung der ökologischen Verhältnisse', *Kretologia* 10/11, 195-224.
- Villa, E. (1994) 'Les vestiges osseux animaux de l'habitat hellénistique d'Eleutherna', in Kalpaxis et al. 1994, 193-201.
- Wagstaff, M. (1972) 'The Physical Geography of the Myrtos Region: A Preliminary Appraisal', in P. Warren (ed.), *Myrtos: An Early Bronze Age Settlement in Crete*, London, 273-282.
- Wagstaff, M., S. Augustson, and C. Gamble (1982) 'Alternative Subsistence Strategies', in C. Renfrew and M. Wagstaff (eds.), *An Island Polity: The Archaeology of Exploitation in Melos*, Cambridge, 172-180.
- Warren, P. (1985) 'The Fresco of the Garlands from Knossos', in P. Darceque and J.-C. Poursat (eds.), *L'iconographie minoenne (BCH, Suppl. XI)*, Paris, 190-207.
- Watrous, L.V. (1982) *Lasihi: A History of Settlement on a Highland Plain in Crete*, Princeton 1982.
- Watrous, L.V. et al. (1993) 'A Survey of the Western Mesara Plain in Crete: Preliminary Report of the 1984, 1986, and 1987 Field Seasons', *Hesperia* 62, 191-248.
- Whittaker, C.R. (ed.) (1988) *Pastoral Economies in Classical Antiquity*, Cambridge.
- Willets, R.F. (1955) *Aristocratic Society in Ancient Crete*, London.
- *Cretan Cults and Festivals*, London.
- *The Law Code of Gortyn*, Berlin.
- Wittenburg, A. (1982) 'Zum sozialen Gefüge in Kreta', *Opus* 1, 1982, 67-74.
- Xanthudidis, S. (1918) 'Ποιμενικά Κρήτης', *Λεξικογραφικόν Ἀρχαίων* 5, 267-323 (= *Μελετήματα*, Herakleion 1980, 336-397).
- Zervoudaki, I. (1997) 'Ραβδωτά ἀγγεία με ἔκτοκα ἐμβλήματα καὶ μελανόγραφες ὑδρίες Hadra ἀπὸ τῆς συλλογῆς τοῦ Ἐθνικοῦ Ἀρχαιολογικοῦ Μουσείου', in 'Υπουργεῖο Πολιτισμοῦ. ΚΕ' Ἐφορεία Προϊστορικῶν καὶ Κλασικῶν Ἀρχαιοτήτων, Ἑλληνιστικὴ Κεραμικὴ ἀπὸ τὴν Κρήτη, Chania, 107-146.
- Zohary, M. and G. Orshan (1966) *An Outline of the Geobotany of Crete (Israel Journal of Botany, 14, 1965, Suppl.)*, Jerusalem.

## Appendix

## Cretan herbs and medicinal plants mentioned in ancient written sources

The following table (= Chaniotis 1991, 108f) contains only the plants for which the ancient sources explicitly assert a Cretan origin and healing properties. For the correspondence between ancient and modern names see J. André, *Les noms de plantes dans la Rome antique*, Paris 1985.

The following abbreviations are used for ancient authors and texts: *CMG* = *Corpus Medicorum Graecorum*; Diosc., *mm* = Dioscorides, *de materia medica*; Galen. = Galenus (ed. Kühn); Hippocr. = Hippocrates; Marc., *med.* = Marcellus, *de medicamentis*; Plin., *nh* = Pliny, *naturalis historia*; Theophr., *hp* = Theophrastus, *historia plantarum*.

ancient name	correspondence	sources
ἀκόνιτον	aconitum	Theophr., <i>hp</i> ix 16,4-5
ἄκορον (ἴρις)	iris pseudoacorus	Plin., <i>nh</i> xxv 157; <i>I.Cret.</i> I,xvii 17 l. 15
ἄνισον	pimpinella anisum	Diosc., <i>mm</i> iii 56; Plin., <i>nh</i> xx 187; Gal. vi p. 268 Kühn
ἀριστολογία	aristolochia Cretica L.	Plin., <i>nh</i> xxv 95; Celsus v 18,7
ἄσπληνον	ceterach officinarum Willd.	Plin., <i>nh</i> xxvii 34; Vitruvius i 4,10
ἀψίνθιον	artemisia absinthium L.	Galen. xiv p. 10 ed. Kühn
βουνιάς	brassica napur L.	Galen. xiv p. 61 ed. Kühn
γεντιανή	gentiana lutea L.	Plinius Valerianus iii 14; Galen. xiv p. 59 ed. Kühn
γλαύκιον	chelidonium majus L. or glaucium flabum Crantz	Apollodorus, <i>bibliotheca</i> iii 3,1; Hygenus, <i>fabulae</i> 49; 136
γλήχων	mentha pulegium L.	Galen., <i>CMG</i> v.4.2 p. 124,28; Soranus, <i>CMG</i> iv p. 115,10f
γλυκόρριζα	glycyrrhiza glabra L. or echinata	Galen. xiv p. 61 ed. Kühn
δαύκος	athamanta Cretensis L.	Diosc., <i>mm</i> iii 72; Plin., <i>nh</i> xxv 110-112; Plutarchus, <i>moralia</i> fr. 113; Celsus v 23,3; Soranus, <i>CMG</i> iv p. 115,10-11; Paulus Aegineta, <i>CMG</i> ix.2 p. 299,12; 310,21; 315,8; Marc., <i>med.</i> xx 34; 128; xxvi 31; xxvii 6; xxix 12; <i>Scholia ad Nicandri theriaca</i> 44e ed. Crugnola
δίκταμονν	origanum dictamnus L.	Hippocr. vii 348,17; viii 150,19; 172,9; 180,15; 448,4; 516,8 ed. Littré; Theophr., <i>hp</i> ix 15,1-3; <i>Scholia in Euripidem, Hippolytus</i> 73 (II p. 15 ed. Schwartz); Cicero, <i>de natura deorum</i> ii 126; Vergilius, <i>Aeneis</i> xii 412-415; Diosc., <i>mm</i> iii 32; <i>de simplicibus medicinis</i> i 160; Plin., <i>nh</i> xxv 92-94; Celsus v 25,13; Plutarchus, <i>moralia</i> 974 d; 991 e-f; Paulus Aegineta, <i>CMG</i> ix.2 p. 298,9-10; Valerius Maximus i 8 ext. 18; Isidorus, <i>origines</i> xvii 9,29; <i>Corpus Glossariorum Latinorum</i> iii 550,42 ed. Götz; Pseudo-Apuleius 62,18; Tyrannius Rufinus, <i>Corpus Christianorum, Series Latina</i> xx p. 281,16-17
ἐλλέβορος	helleborus L.	Galen. xiv p. 59 Kühn
θεαγγελίς	?	Plin., <i>nh</i> xxiv 164

ancient name	correspondence	sources
θλάσπι θύμος	sinapis alba or lunaria annua L. satureia thymbra L.	Galen. xiv p. 59 ed. Kühn Vegetius, <i>mulomedicina</i> iii 13,3, p. 262,4 ed. Lommatzsch
ιξία καλαμίνθη	atractylis gummifera L. calamintha officinalis L. or calamintha incana, Boiss.	Theophr., <i>hp</i> ix 1,3 Galen., <i>CMG</i> v.4.2 p. 124,28
κισσός κύπειρος	hedera helix L. cyperus longus L. or gladiolus segetum Gawler	Hippocr. viii 194,11 ed. Littré Plin., <i>nh</i> xxi 115
κάνειον λιθόσπερμον μολόχη	conium maculatum L. lithospermum officin. L. althaea officinalis L. or malva L.	Diosc., <i>mm</i> iv 78; Plin., <i>nh</i> xxv 154 Plin., <i>nh</i> xxvii 99 <i>I.Cret.</i> I,xvii 19 l. 8; Pseudo-Apuleius xxxviii 17; cf. <i>Corpus Glossariorum Latinorum</i> iii 568,63 ( <i>molaceratica</i> = <i>moloche Cretica</i> ?); cf. <i>I.Cret.</i> II,x 1 14 (place-name Molochas) <i>I.Cret.</i> I,xvii 14 A 5; 18 l. 19
μύρτος νάρδον νυμφαία ρίζα όρίγανον παιωνία πεπλίσ πόλιον (τεύ- θριον, trixago Cretica)	myrtus communis L. asarum europæum L. nuphar luteum Sm. origanum Creticum L. paeonia officinalis L.) euphorbia pepalis L. teucrium Creticum L.	Plin., <i>nh</i> xii 45 Theophr., <i>hp</i> ix 13,1 Plin., <i>nh</i> xx 177 Pseudo-Apuleius 65,11 <i>I.Cret.</i> I,xvii 17 l. 16 Cassius Felix 40; Chiron 843 (trixago Cretica)
πράσιον ρόδινον σατύριον σέσελι (τόρδι- λον, sil)	marrubium vulgare L. ρόδινον Έλαιον ? satureia capitata tordylium officinale L.	Galen. xiv p. 10 ed. Kühn <i>I.Cret.</i> I,xvii 19 l. 8 Marc., <i>med.</i> xxxiii 47 Diosc., <i>mm</i> iii 54; Plin., <i>nh</i> ii 36
σκόρδιον στύραξ	teucrium scordium L. styrax officinalis L.	Diosc., <i>mm</i> iii 111; Galen. xiv p. 61 ed. Kühn Plin., <i>nh</i> xii 125; <i>Papyri Graecae Magicae</i> iv 2642; cf. Stephanus Byzantius, s.v. <i>Styrakion</i>
τραγάκανθα	astragalus gummifer L.	Theophr., <i>hp</i> ix 1,3; 15,8; Plin., <i>nh</i> xiii 115; xxvi 140; xxx 78; 126
τράγιον	pistacia Palaestina Boiss.	Diosc., <i>mm</i> iv 49; Plin., <i>nh</i> xiii 115; xxvii 141; Paulus Aegineta, <i>CMG</i> ix.2 p. 266,28-33
τραγορίγανον υπέρεικος ύσωπος	thymus tragoriganum hypericum crispum L. satureia Cretica L. or origanum hirtum L.	Diosc., <i>mm</i> iii 30; Soranus, <i>CMG</i> iv p. 38,13-14 Galen. xiv p. 59 ed. Kühn Paulus Aegineta, <i>CMG</i> ix.2 p. 297,2; 299,15; Marc., <i>med.</i> xvii 52; xxx 51; <i>Geoponica</i> vi 8,1 ed. Beckh
φαλάγγιον χαμαίδρος (vettonica)	anthericum ramosum L. stachys officinalis L.	Solinus xi 13, p. 73,18 ed. Mommsen Paulus Aegineta, <i>CMG</i> ix.2 p. 296,7-8; Plin. Val. iii 14 (vettonica); Galen. xiv p. 59 ed. Kühn
χαμαίπιτς ψευδοβούνιον	ajuga chia Schreb. pimpinella Cretica L. or bunium aromaticum L.	Galen. xiv p. 59 ed. Kühn Diosc., <i>mm</i> iv 124; Plin., <i>nh</i> xxiv 153