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THE

Roman Aqueducts and Bathhouses of Crete

Text

Volume 1

AMANDA KELLY

This Thesis is submitted in Fulfilment of the requirements for the degree of doctor of

Philosophy

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Amanda Kelly

amanda Xelly

Depths of the Oceans

The moon has wired the sea in waves Of wonder, now and forever, momentarily, As if in innocent wizardry, so bright days

Would in their sunlight be seen as that magnetic Mover; but we who have been free from the tides Of Diana, will keep her secret safely in sympathetic

Silence, but listen to the mermaids singing Their songs: they know the powers that fathoms Have bequeathed to them with all their alluring

Enchantment; soon again it will be night And the deep dark oceanic might of all their make-believe Will help to weave the waters well

And so to their moon they pray with gratitude; We are the wandering water-babies of far-off yesteryears And our joys and tears flow easily: it's good

To know that one who sailed upon the waters Shed his salt tears too at times so humanly And all this ebb and flow rolls through forever

The turbulent lives of his many sons and daughters.

Frank J. Kelly 2001

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SUMMARY

This thesis addresses the dynamics behind the introduction, diffusion and demise of Roman aqueducts and bathhouses in Crete. The study is essentially an archaeological and architectural exploration of these monument types with a view to understanding the implications of their spread and development on the island itself and, ultimately, to establish the island's significance within a wider Roman context. Both types (aqueducts and baths) were examined due to their notable alliance in both construction and function; however, the focus on the binary connection between aqueducts and baths is not tantamount to an exclusive match or a denial of alternative factors but more an acknowledgement of the strength of their correlation. Indeed, Cretan aqueducts served a variety of sites which were devoid of baths including glass factories, dye-works, dockyards and even possibly mines.

The primary investigation included intense fieldwork and archival studies which served to locate the monuments within their geographical, topographical and historical setting (as presented catalogues A and B). An unforeseen profusion of both monument types became apparent from even this preliminary procedure. In total, the present study has located at least 52 bathhouses and 23 aqueducts constructed between the 1st and 4th centuries AD on Crete. This constitutes a substantial proliferation of both monument types in an area with no obvious Hellenistic prototypes for such architectural formats.

The lack of a progression from the Hellenistic period prompted an investigation into the exact origin of the Cretan types. Knossos and Gortyna, the colony and capital of the joint province of Crete and Cyrenaica, incorporated very early Romanising types exhibiting direct influences from Campania. The capital was home to the only definite large-scale bath (or *thermae*) on the island demonstrating clear Italian derivations. The predominant bath type of the island falls into the small bath category and the resulting disparity in bath types (small versus large bath) possibly reflects different influences which evolved as the province stabilised. In addition to the initial restricted influence from Campania, significant common features were noted between Crete and Lycia and Crete and Cyrenaica, with Crete acting as an intermediary region between the two.

The factors contributing to the abundance of bathhouses in Crete were found to be both regionally and historically specific. The island was home to an abundance of city-states in the Hellenistic period, many of which survived into the Roman period. It is a premise of this study that a bath constitutes a definitive feature of a Roman city and, as such, the continuity of a city into the Roman period ensured the construction of a bathhouse. Moreover, the presence of a baths often presupposed the construction of aqueducts. In Crete aqueduct construction often availed of the valley contours descending to sites located within river deltas. It is argued that a shift of settlement position, or at least in site aspect, occurred in order to facilitate their smooth and rapid construction.

This study technically ends with the impending imprint of Christianity, yet it is not the end of public bathing in Crete and the distributions of late-antique baths over the island demonstrate that the activity transcended the social circumstances which heralded its introduction. Aqueducts too survived and continued to be used in Gortyna in the late-antique period. The medieval aqueducts adhered to the valley contours of their Roman prototypes attesting the precision of these trajectories.

The study of these edifices within their social contexts illuminated the level of Romanisation in Crete, highlighting different areas of influence within the Empire which helped to establish the island within a wider Roman framework. Extensive examination of the material yielded perceptibly common features, simultaneously recognising Roman archetypes and distinctive Cretan variations.

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ABBREVIATIONS

AA Archäologischer Anzeiger

ΑΑΑ 'Αρχαιολογικά 'Ανάλεκτα έξ 'Αθηνῶν

ΑΕ 'Αρχαιολογική Εφημερίς

AJA American Journal of Archaeology

AR Archaeological Reports

ADelt 'Αρχαιολογικόν Δελτίον

ASAtene Annuario della Scuola Archeologica Italiana d'Atene

BAR British Archaeological Reports

BCH Bulletin de Correspondance Hellénique

BSA Annual of the British School at Athens

CIL Corpus Inscriptionum Latinarum

Ergon Τό Έργον τής 'Αρχαιολογικής Έταιρείας

EtCret Études Crétoises

IC Guarducci, M. 1935-50 Inscriptiones Creticae I-IV.

ILS Inscriptiones Latinae Selectae

JHS Journal of Hellenic Studies

JRA Journal of Roman Archaeology

JRS Journal of Roman Studies

ΚΕ Κρητική Εστία

KhrChr Κρητικά Χρονικά

Mon Ant Monumenti Anticha

NH Natural Histories

OJA Oxford Journal of Archaeology

ΠΑΕ Πρακτικά της Άρχαιολογικής Έταιρείας

PBSR Papers of the British School at Rome

PCPS Proceedings of the Cambridge Philological Society

Rom. Mitt. Mitteilungen des Deutschen Archaeologischen Instituts.

Römische Abteilung. Rome

SEG Supplementum Epigraphicum Graecum

TAPA Transactions and Proceedings of the American

Philosophical Association

THE AQUEDUCTS AND BATHHOUSES OF ROMAN CRETE

INTRODUCTION

This work is essentially an archaeological and architectural exploration of the Roman bathhouses and aqueducts on Crete with a view to illuminating the significance of their presence on the island. The study focuses on evidence dating from the Roman conquest of the island (67 BC) until the late 4th century AD. The end of the 4th century AD is a natural point for the close of the study, as at this point a dramatic decline (although by no means an end) in the use and construction of both monument types has been observed. This coincides with the introduction of Christian architecture to the island which heralds a dramatic alteration in social arrangement.

The investigations encompass both aqueducts and bathhouses as they often complement each other and form a public and monumental partnership at many of the most Roman cities on the island. This research aims to establish the architectural framework of both monument types within the Eastern Roman Empire and assess their character within such fluid parameters.

Neither the Roman bathhouses nor aqueducts of Crete have ever been studied as a group before. Surprisingly, they have been largely ignored, despite their apparent profusion throughout the island. The Roman period of Crete has generally been neglected in preference for earlier periods and the presence of Roman remains at many famous ancient Greek centres was not always appreciated, as demonstrated by Pendlebury's complaints that

'very few of the larger cities, indeed, do not show extensive Roman remains on the surface, a fact which has often deterred the prospective excavator of some promising city with a name famous in Greek times' (1939, 367).

Moreover, Evans lamented the presence of a Roman cistern over the western court of the Minoan palace at Knossos and complained that its removal could only be achieved 'after a long process of blasting' (1902-3, 106). This common sentiment has been tempered in recent times but neglect is still discernible. Crete's virtual absence

from international Roman studies in the past reflects earlier biases evident within the scholarship pertaining to the island which demonstrates a clear preference for prehistoric studies, often to the detriment of later periods. It is a testimony to such neglect that Nielsen does not include Crete in her exhaustive account of the baths of the Roman world, since she claims that there are no sufficiently preserved remains on the island (1990, 96). The present study seeks to redress such misrepresentations and their resounding repercussions.

The study involved both primary fieldwork and bibliographical research resulting in two catalogues relating to the two distinct hydraulic structural types. An initial list of sites was established through exhaustive archival research and literary investigations. Often the site only survives in the published records as a passing reference by an ancient traveller, such as the aqueduct of ancient Hierapytna. Through intensive fieldwork many of these sites were identified within the landscape. Once located, the structures were subjected to detailed examination to explore their function and social standing within their related settlement and, ultimately, within a broader Roman context. Distribution assessments were established in order to reveal their quantity, diversity and spatial location within the landscape.

Before embarking on the more detailed analysis of these monuments some basic problems concerning Roman chronology must be addressed. There is unfortunately no commonly accepted convention on how to divide the Roman era into Early, Middle and Late (Forsell 2001, 8). This renders comparisons of published material both confusing and misleading. In acknowledgement of such fundamental problems an absolute chronological framework is favoured in the present study, such as the 2nd century AD, rather than period scales, such as Early Roman etc.

Furthermore, the term 'late antiquity' is preferred to 'Early Christian' or 'Byzantine', as it is unfettered from religious or art historical connotations. Maas defines the late-antique period as that stretching roughly from Diocletian's reforms in the late 3rd century AD to the rise of Islam in the 7th century AD (2000, li). It can be argued that in Crete this watershed occurs later and relates specifically to the late 4th century AD when a series of seismic events radically interrupted the functioning of much of the hydraulic architecture on the island.

Some basic terminology must also be defined prior to any discussion of the controversial nuances of the term 'Romanisation'. The usual questions regarding Romanisation concern whether it can be recognised, assessed and defined with any meaning. Originally scholarship viewed the growth of the Roman Empire as unilateral and physically discernible rendering the process as a palpable dynamic creating a horizon between Roman and indigenous which was archaeologically visible and therefore quantifiable (Alcock 2000, 222). Romanisation was understood as a forceful imposition of Roman ways and means into areas non-Roman, a steady centrifugal trajectory, transforming the landscape and its inhabitants under an oppressive purple mantle. Conversely, today it is popularly held that there was little active Romanising on the part of Rome and that merging cultures are indefinable by their very nature (Wilson, R.J.A. 1990a, 67; Downs 2000, 207).

In attempting to classify cultural phenomena it is poor consolation to learn that the inhabitants of the Roman Empire themselves were not agreed on their cultural identity at the time. To the Romans of the West the subjects of the East were *Graeculi*, but well into late antiquity the same subjects called themselves *Rhomaioi* while the Greek-speaking citizens of western Asia Minor specifically called themselves *Rhomaioi* not *Romani* (Magie 1939, 161-85; Hanfmann 1975, 48-56; Yegül 2000, 135).

Despite its fall from grace, the term 'Romanisation' is favoured in the present study on the basis that, despite the fluidity of merging cultures, there are certain common indicators which transcend regional variables. The complete disregard of such a classification system would be detrimental to scholarship while causing a futile upheaval, as the defunct term would inevitably be replaced by newer, equally-biased and misleading, classifications. In fact this has already happened as the term Romanisation has become so controversial and intricate in its definition that it is often avoided in favour of more nebulous processes such as acculturation, reconfiguration, negotiation (Alcock 2000, 225) and even Creolisation (Webster, J. 2001, 209-225). These substitute labels do not fully express the dynamics involved, as they do not recognise that the influence which induces these societal and cultural changes in the first place is common throughout, and this common influence is

undeniably contact (regardless of how variable the degree of reactivity) with the Roman Empire.

In an attempt to interrupt such repetitive cycles, classifications will be regarded as dynamic qualifications, sensitive and receptive to the evolving concepts which they embrace. The term Romanisation can be applied to such fluid and evolving processes once it allows for variations, contingent on location, topography, geology, pre-Roman cultural history and vacillating levels of Roman receptivity (among a whole range of interconnected specifics). These processes are manifest at different times in diverse ways, but are all commonly rooted in the growth of the Roman Empire.

Classifications must recognise such common themes within varying local conditions and it is only with great regard for these diverse factors that the term Romanisation can be applied. Therefore, even when confronted with such sensitive variables, certain activities are clearly symptomatic of the overriding cultural ensemble. This is adequately expressed by Clarke when he states that 'to engage in the bathing ritual meant to be Roman' (1998, 129). Similarly, this study revolves around the premise that aqueducts and bathhouses are strong indicators of Romanisation.

Rome exerted a great interest in the affairs of Crete prior to the Roman conquest of the island, as demonstrated by various Hellenistic arbitrations concerning a number of city-states. Initial Roman interest in Crete dates as early as 195BC, when Rome's resentment of the friendship of a number of Cretan cities with Nabis was expressed in the peace terms offered to the Spartan king. The terms included that he should yield possession of any town in Crete to the Romans and that he should not conspire with the Cretans (Polybius XIII 6; Livy XXXIV 35).

More explicit interference in Cretan affairs occurred in 189BC when Rome sent the practor Quintus Fabius Labeo to the island to settle a war between ancient Kydonia and the joint allied forces of Knossos and Gortyna. He was the first Roman official to arrive on Crete. He attempted to end the war while liberating Roman and allied prisoners held on the island but made arrangements for the release of prisoners from only one Cretan city: Gortyna. If we are to take Livy literally, Gortyna alone delivered 4,000 captives to him (XXXVII 60). This is probably a more appropriate

figure for the entire island and, consequently, an indication that the *Koinon* was operating under the seniority of Gortyna at this time.

The first Roman known to reside on Crete was in foreign service with the Ptolemaic garrison at Itanos and is mentioned in connection with the foundation of a *nymphaeum* dedicated to Ptolemy Philopater and Arsinoe in the 3rd century BC (*IC* III iv 18, 115; Demargne 1900, 238; Spyridakis 1970, 81). Another Roman, Lutatius Crispus, may also have served the Ptolemies in Itanos two centuries later in the mid-1st century BC (*IC* IV 215c, 288; Reinach 1911, 411, no. 3). His presence on Crete complies with Spyridakis' belief that the withdrawal of Ptolemaic forces from the island did not signify a total detachment in Egyptian-Cretan relationships after the death of Ptolemy Philometor in 145BC (1970, 82, 87).

There is also evidence for early contact with Roman traders who may have settled on Crete. Large numbers of Italian merchants, the *negotiatores*, began to settle in the business centres of the Aegean and coastal Asia Minor from the 2nd century BC onwards (Yegül 2000, 135). An Italian trader is identified in the area of Praisos but his presence seems not to have had as active a Romanising effect on this city as has previously been implied (*IC* III vi 22; Baldwin Bowsky 1994, 29). The Roman pottery assemblage at Praisos would indicate relatively light settlement after the city's destruction by Hierapytna *c*. 146 BC (Whitley *et al.* 1999, 256). This situation can be contrasted with that of Hierapytna where the collection of non-Imperial names establishes that Italian traders and their later descendants were a dominant source of Roman influence and patronage (Baldwin Bowsky 1994, 25).

Roman interface with local identities is a complex issue and gaps in the archaeological record ultimately result in misleading and biased accounts. Studies in epigraphy, onomastics and prosopography are useful in this regard, yet often reflect the biases of their subject material which is so often limited to one facet of society. Degrees of nominal adaptations are a common characteristic encountered in the Romanisation of areas within the Empire but it is mainly evidence pertaining to the elite which survives in the epigraphic record. The indigenous elite's acceptance and adoption of the institution of Roman patronage is a strong characteristic of

¹ Nielsen attributes the initial spread of Roman baths in the West to the influence of *negotiatores* (1999, 35).

Romanisation, presumably because such acquiescence was advantageous to the upper echelons of society. Yet if the indigenous elite welcomed, and even mediated on behalf of, a Roman presence, it does not automatically guarantee that the remainder of the population, who had relatively less to gain, responded in the same fashion (Downs 2000, 207).

Onomastic studies, although illuminating and strongly reflective of societal dynamics, do not infiltrate the entire social spectrum (Baldwin Bowsky 1994, 26). The sources are generally restricted to such male-dominated activities as participation in local civic life (in the Panhellenion, in the Roman auxilia and state) which contributes to prejudiced conclusions within such studies. Baldwin Bowsky's recent work targets such disproportionate representation (1994, 26). She notes that women, admittedly those connected with high-class families, feature commonly in prosopographical studies of Crete and that those represented in the Cretan inscriptions often display dual ethnicity judging from the Greek personal names that persist in the onomasticon (Baldwin Bowsky 2000, 66).

In contrast to such indications of Roman receptivity, albeit specifically expressed by select sections of society, other criteria, such as ceramic manufacture, settlement patterns, language, and agrarian practices, demonstrate significant conservation of indigenous traditions. Such conflicting forces of continuation and change have been translated as a schism within the social network derived from a clash of interests permeating the indigenous population (Downs 2000, 208). Such discontent is not perceptible in the material record at Knossos or in Crete in general, although it is commonly argued that discord arose between the 'upwardly mobile' indigenous elite and the remainder of the native population elsewhere in the Empire. The fact that the traditionally elite Cretan families of the Hellenistic period were reinstated as mediators in the Roman period ensured the seamless nature of the transition of overall power. The inscription from Ini (see 7.2.10) demonstrates that in Crete the traditionally elite families were promoted as the instigators and mediators of Roman order and activity on behalf of the indigenous population.

Indeed, the variety of models for Roman interface illuminates the gradations of susceptibility and the subtle nuances of Romanisation throughout the Empire. Elsewhere in the Empire, Roman presence initiates an almost unconscious societal

change pertaining to a pattern of minimal Romanisation. For example, Grahame argues for increased political stability in the pre-desert region of Tripolitania due to the impact of the Roman presence alone which 'helped damp down internal feuding between groups in the Libyan pre-desert' (1998, 97 and 105).

In terms of trade Crete was still relatively insular by the time Roman administration arrived in strength. Baldwin Bowsky observes that although Crete was allegedly provincialised in the mid-1st century BC, there are in fact few examples of Cretans bearing Roman names active outside Crete before the 1st century AD (1995a, 49).

Marangou conjectures that the Italian colonists would undoubtedly have played an important role in commerce, most notably that of wine (1999, 271). Viticulture was a well-developed form of agriculture in Hellenistic Crete but was designed to cater solely for local needs (Marangou 1999, 269-70). Such wine production generated a source of income that could be exploited by Rome and may have constituted a persuasive element in the establishment of the colony at Knossos. Predictably, the Cretan wine trade's insularity ended in the mid-1st century AD when it began to flourish under provincial control. Cretan wines became available to Pompeii and Herculaneum in Campania as is attested by the amphorae shipped there bearing the insignia of Lyttos and Aptera (Chaniotis 1988, 75; De Caro 1992-3, 307-312; Baldwin Bowsky 1995a, 50 and 57). The Cretan elite also enjoyed the wines of the greater Empire as testified by fragments of more than 50 varieties of wine amphora from all over the Roman world discovered in the Villa Dionysus at Knossos (Hayes 1983, 140-1). Consequently, Paton argues that the vinarii of Knossos would be suitable tenants for this residence furnished with such potent Dionysiac motifs (1994, 148). Associations with viticulture are not exclusive to this lavish private residence; wine amphora wasters of the 3rd and 4th centuries AD were also discovered adjacent to the villa at Makriyalos (Empereur et al. 1992, 638).

Cretan wines were generally highly rated in the hierarchy of vintages (Clement of Alexandria *Paedagogus* ii 30, 2; Aelianus *Varia Historia* xii 31). Juvenal is a notable exception, rating it poorly while lambasting the ancient docks of Crete where such unpleasantness was picked up by the ships which otherwise sailed much

further afield (XIV 270).² Despite Juvenal's acerbic view of Cretan wines, his account reveals that it was transported widely throughout the Roman world. Crete held a leading position in the wine trade for the first three centuries of the Empire with Cretan amphorae representing more than a third of Aegean and Eastern imports in Ostia in the 2nd century AD (Marangou 1999, 271, 278). Cretan amphorae also dominated the imported Roman amphora group at Marina el-Alamein, the port west of Alexandria (Tomber 1996, 48), while the presence of a Cretan wine amphora at Mons Claudianus demonstrates that stone and grain were not exclusively traded along the main Roman trade routes (Tomber 1996, 45).

The Cretan cities most closely associated with the wine trade in Crete seem to be the centres most permeable to outside influence and, subsequently, it is not surprising that the architecture of these cities incorporates Roman types. Onomastic studies suggest that Gortyna, Khania, Lyttos, Aptera and Knossos were the centres best known to the outer world and, therefore, also potentially the largest (Baldwin Bowsky 1995a, 53; Pumain 1997, 99). Naturally, Gortyna's position as the capital of the joint province of Crete and Cyrenaica would propel it into the Roman sphere. Baldwin Bowsky maintains that Gortyna's position as the leading centre of 'Romanness' on Crete derives from its role as a centre of exchange from the 1st century BC to the 1st century AD (2001a, 97).

Lyttos (like Gortyna) was both an inland centre and one of the most prosperous cities in Roman Crete. Its elevated position, simultaneously overshadowing the Pedhiadha Plain and controlling the main pass into Lasithi, demonstrates its dominance over a wide agricultural area. Its far-flung amphorae intimate that its fertile hinterland produced many of the fine wines prominent in the trade network of the wider Empire. Lyttos seemed to have prospered in agricultural terms gaining possible access to the south coast via Keratokambos where a pottery production facility was in operation in the 1st century AD producing the type of amphora found in Pompeii (Baldwin Bowsky *forthcoming*). At the inland and relatively inaccessible site of Lyttos economics (as manifested in viticulture), as

² Of course Juvenal is not an unbiased observer and his hatred of all things Greek is keenly expressed in Satire III (58-80).

opposed to coastal accessibility per se, connected the city with the broader Roman world.

Nonetheless, it can reasonably be argued that coastal sites constituted portals for interface with the greater Roman world (Baldwin Bowsky 1995b, 280). Such interaction was realised through trade communications with the south coast of Crete from Hierapytna to Phoenix which lay along one of the Empire's east-west shipping lanes (Baldwin Bowsky 1995b, 269).³ The clustering of sites close to one another along the south-central coast of Crete is especially intriguing, as is a possible relationship between the ateliers of Hierapytna and Makriyalos (Marangou-Lerat 1995). Physical evidence of an active north-south export trade in connection with Hierapytna, the most dominant of all cities on the south coast, is represented by a group of Hierapytnian amphorae found in Alexandria (Empereur et al. 1992, 639-642). Textual support for this southern route is provided by Lucian who tells of an Alexandria-Rome grain carrier, the *Isis*, which should have passed south of Crete, but had been blown into the eastern Aegean on its way from Alexandria (Lucian Navigium vi 5-10). Lucian's account claims that the ship's considerable dimensions drew crowds at Athens and certainly the sheer enormity of the vessel described by Lucian would seem to lend credence to Juvenal's claims that the merchants were so greedy at this time that there were more men afloat than on shore (XIV 276). Houston highlights the distortions of Lucian's account which uses the ship as a literary construct whereby its exaggerated proportions reflect the unrealistic dreams of the speakers (1987, 446). Nonetheless, it is logical to assume that reasonably large craft were a common sight on the oceanic horizons of Crete and familiar to most Cretan fishermen.

Four Roman shipwrecks off the Cretan coast (two off the south coast and two off the north) indicate that the entire coastline, north and south, was affected by the largest trade routes of the Roman world. The southern examples are represented by a 3rd-century AD wreck at Aghia Galini and a wreck just north of the bay of Matala, also carrying Roman amphorae of either Late Republican or Early Imperial type (Parker 1992, 62, no. 68, 270, no. 681). The two northern examples are represented by

³ It is perhaps relevant that Cretan ship owners from Loutro and Phoenix on the south coast of Crete are mentioned in inscriptions of the Roman period (Baldwin Bowsky 1995a, 326-7, no. 76-7).

the wreck at Cape Sidero carrying a cargo of Roman amphorae and the wreck off the island of Dia with a cargo of 1st-century AD amphorae from Rhodes and Nubia (Parker 1992, 111 and 162).

A rock-cut ship-shed was located on the southeast point of the Bay of Matala and initially dated to the Roman Imperial period (Blackman 1973, 21). It was argued that the construction of the ship-shed post-dated the tectonic sinking of the 2nd-century AD tombs on the northern side of the bay as the modern water level corresponded with that of the slipway (Blackman 1973, 21). No physical archaeological material evidence was offered in support of the date and the similarity of this ship-shed with the example at Trypetos on the north coast, where the feature is associated with a Hellenistic settlement, was not addressed (Tsipopoulou 1989, 11). If the ship-shed were Roman and catered for warships, specifically triremes, as Blackman claims (1973, 20), this would represent the only naval defensive/offensive feature on Crete in the Imperial period. The Roman date attributed to the ship-shed at Matala is undermined by the recent realisation that seismic fluctuations along the Cretan coast can be tightly spaced.

The extent and complexity of Cretan commerce under the Roman Empire, at least in wine, must go far beyond that envisaged by Sanders, and even Baldwin Bowsky (1995a, 50). The large number of cities where Cretan amphorae have been found range throughout the Roman Mediterranean from France to North Africa. The proliferation of sites within Italy yielding Cretan amphorae, notably Rome, Ostia and Pompeii, finally establishes the popularity and demand for Cretan wines at the Empire's core.

The Romanisation of Crete was probably only marginally due to immigration from Italy, notably with the establishment of the *Colonia Iulia Nobilis Cnosos* between 36BC and 27BC. A small demographic influx would be expected for any colonial settlement, and the Capuan territory at Knossos possibly reflects this, although it is difficult to estimate the number of Romans settled at Knossos. Demographic influxes of wide-ranging scales have been proposed for Roman colonies in general. For example, Romano contends that the Flavian colony at Corinth was mainly of titular significance with few new settlers initially and that the main demographic influx of settlers coincided with the later Vespasianic colony when they

inhabited the agricultural land (2000, 102). In contrast, Spawforth estimates 3,000 settlers for colonies in general (1996, 169; Keppie 1983, 98). This would certainly be too high a number for Knossos even though it is still too small to fill the expanse of the planned city at Carthage, leading to the hypothesis of a double city. Conversely, Rakob maintains that the incoming colonists and the local community resided in the same space and formed an integrated society (2000, 82). This social amalgamation is thought to be represented architecturally through the juxtaposition of central-Italian (represented by *opus reticulatum*) and local building techniques (such as *opus Africanum* which incorporates characteristics borrowed from the late Punic tradition). Such visions of integrated societies are also promoted by Yegül who indicates that there is no factual or logical basis for assuming that the original Italian settlers of the colony at Antioch instituted and maintained a sharply separate upper class over the native population of the Greek *polis* (2000, 134).

At Knossos any influx of Campanian settlers is relatively unobtrusive in the archaeological record. Paton astutely points out that the distinctive Campanian sepulchral stela, on which the dead person and his family are shown in high relief within a shrine or aedicula, has not been discovered at Knossos (1994, 144; for stelae see Frederiksen 1984, 287). If the colonists came from Campania it would be expected that they brought their burial customs with them. Moreover, Augustus makes no claim to have settled veterans in Crete (Keppie 2000, 88; Res Gestae 28). Rigsby emphasises that none of the sources state that anyone was moved from Capua to Knossos (1976, 324). Baldwin Bowsky presents a model for Knossos whereby the contentious territory is archaeologically invisible since Cretans continued to work their own land in order to pay an annual assessment into a Capuan treasury (1995a, 313-4). Unfortunately, her interesting argument that the Campanian landowners recorded in the area were only the proprietors of luxury villas located on the borders of Knossos cannot be proven archaeologically at present. The model is undermined by the fact that luxury villas have yet to be secured as penumbra sites around Knossos (see 6.5).

⁴ This figure is ultimately derived from Appian who informs us that 3,000 Romans, and others from the surrounding districts, were sent to Caesar's colony at Carthage (*The Punic Wars* 136).

An interesting analogy is provided by a study of the Venetian colony in late medieval Candia which indicates that while the colonists constituted only a minority, they controlled the economic and civic resources of the city (Georgopoulou 2001, 165). Georgopoulou observes that the rurally-located Venetian churches often composed of untiled barrel vaults, pointed arched windows and doorways, with limited use of architectural sculpture (as represented on Crete by the chapel at Koleni Kamara), demonstrate a minimal relationship between the Gothic and local 'Byzantine' style (2001, 182). He concludes that this disparity reflects the fact that few Venetians lived in the countryside (Georgopoulou 2001, 182). Moreover, there was little radical change in the architectural profile of Candia under the new Venetian regime: the spaces of Byzantine Chandax were preserved in Venetian Candia (Georgopoulou 2001, 165). The same dynamics could be proposed for the initial Roman phase of Knossos whereby a very gradual change was brought about by only a small influx of people.

Change inevitably occurred through familiarity, easing the island into the Empire over time. How such familiarity was achieved is pertinent to this study. Rigsby states that the founding of an Augustan settlement at Knossos was 'a Romanisation of sorts' and a means of 'bringing order to a difficult land' (1976, 330). Nielsen, following the general trend, attributes the colonies in Crete, Pamphylia and Cilicia to their associations with piracy (1990, 95). A less dramatic explanation would suffice, however, whereby the founding of the colony and the arrangement for Capuan land were complementary steps taken to secure trade links between Rome, Crete and beyond (De Caro 1992-3, 310).

Whatever the motive, a Roman colony was established at Knossos early in the reign of Augustus which remained the sole colony of the joint province of Crete and Cyrenaica until the time of Hadrian (Paton 1994, 142). Not only was Knossos colonised but it also lost land to Capua, arising from Octavian's promise of Capuan territory to his troops in Sicily in 36BC in an attempt to subdue their mutinous overtones at this climacteric time. Octavian granted an aqueduct and land at Knossos to Capua to compensate for the Capuan land he gave to his soldiers (Cassius Dio XLIX xiv 5; Strabo X vi 9). This Capuan land was distinct from that of the colony at Knossos as revealed by a boundary dispute of AD 84 concerning a citizen of the

colony who owned land adjacent to that of the Capuan territory. The inscription records the erection of boundary stones demarcating the division of the two areas. The citizen involved, Plotius Plebius, was a descendant of one of the first colonists to be settled by the Imperial procurator in Crete, P. Messius Campanus (Ducrey 1969, 846-852; Rigsby 1976, 324).

The find-spot of the inscription suggests that the Capuan plots lay deep in the valley to the south. It was discovered at Karnari near Archanes which lies within the outlying territory of Knossos (Rigsby 1976, 319). It has been suggested, given the economic importance of the fertile hinterland of Knossos in the Roman period, that Archanes was important for the Cretan wine trade (Sakellarakis & Sapouna-Sakellarakis 1997, 43). The Capuan land was administered separately, the revenue being managed by an *arcuarius Cretae* at Capua (Dessau 1962, II i, no. 6317). Capua's share of territory at Knossos proved to be extremely lucrative, amassing an income of 1,200,000 *sestertii per annum* (Velleius Paterculus II 81, 2).

The epigraphical record reveals close links between Knossos and Capua. A dedication at Herculaneum reveals that M. Nonius Balbus was honoured as a Cretan patron by the colony (*CIL* X 1433). M. Sonteius Casina, *aedile* and *duovir* of the colony, was honoured in an Augustan inscription erected at Gortyna for managing the affairs of three wards whose *agnomen*, like that of the *procurator* of AD 84, was Campanus (*IC* IV 295). The presence of Campanian pottery at Knossos in the 1st to 3rd centuries AD also supports such epigraphic findings (Hayes 1983, 97-169; *AR* 1987-8, 88-104; Sackett *et al.* 1992, 147). Whether these links arose because the original colonists who settled at Knossos were from Campania or reflect a wider pattern throughout the island is not yet established.

In the broader Roman world the colonial administrative systems, including legal and electoral systems, followed the Roman model and used the Latin language, names and formulas, regardless of which language was spoken in each area (Yegül 2000, 134). At Knossos, in accordance with widespread colonial practices, all the official inscriptions dating to the 1st century AD are in Latin, while all private inscriptions are in Greek (Sanders 1982, 15). This diglottic characteristic demonstrates that while Knossos adhered to the administrative models set for the

⁵ Another inscription found at Gortyna also supports such a link (IC IV 314).

earlier colonies of the Roman Empire, Greek survived as the spoken language of the population and the general choice for religious dedications and funerary monuments.

At Knossos the dominance of Latin in administrative spheres did not exclude reasonable levels of integration, with strong local characteristics, even at the very earliest stage of the colony (i.e. in the first two generations). Such processes manifested themselves in the onomastic record of Crete approximately two generations after the formation of the province, with the advent of newly enfranchised first-generation Romanised Cretans (Baldwin Bowsky 1995a, 50).

A study of the Roman bathhouses and aqueducts of Crete within their social contexts acts as a keyhole into the extent of the Romanisation of Crete, illuminating influences from different areas of the Empire which help to establish the island within a wider Roman framework. The present study attempts to explain the dynamics behind the introduction of Roman bathhouses and aqueducts and their subsequent dissemination into the Cretan landscape. Aqueducts and bathhouses are generally viewed as an imported design to the island introduced through contact with the Roman world. There is little evidence for a tradition of public bathhouses or long-distance water conduction on the island in the Hellenistic period. A group of hydraulic structures, such as those on Crete, cannot be examined in isolation, as their significance can only be fully appreciated when offset against a broader Roman backdrop.

Distinctive regional styles, and how these variations are governed, will be investigated. A key consideration for this study will be to determine whether such regional styles are the result of numerous local peculiarities ultimately determined by local adaptations under local conditions and whether such variations preclude assessments of a unitary phenomenon within a broader scope. Extensive examination of the material will undoubtedly yield perceptibly common features, simultaneously recognising both a Roman theme and a distinctive Cretan thematic variant.

CHAPTER ONE

METHODOLOGY

1.1 Introduction

Detailed site catalogues were compiled with a view to understanding the social implications of the diffusion and development of Roman bathhouses and aqueducts on Crete. This chapter introduces the rationale behind the formatting of the catalogues and outlines how they are subsequently incorporated into the main argument.

1.2 The Written Record

Due to the relative lack of scholarship concerning Roman features within the Cretan landscape and their fragmentary nature in the field, the information on the sites relevant to this study is quite varied. In compiling the two catalogues many inconsistencies arose from the eclectic nature of the source material. Many sites had previously been only briefly mentioned by travellers and had never been investigated by trained archaeologists, such as the aqueduct of Axos. Other sites had been subject to over a century of misunderstanding while some have not been identified within the landscape at all, despite recent surveys. *The Vrokastro Survey Project* could not identify the bathhouse at Oleros (originally reported by Sanders 1982, 138) despite deliberate efforts (Barbara Hayden, pers. comm. 2000). The present study identifies a bath-suite, associated with the structure at Pachyammos, for the first time.

The bathhouses, while they have received relatively more attention than the aqueducts, have mainly been excavated as by-products of urban development, or as the architectural framework for mosaics, rather than as a focus in themselves. Many of the sites, which have been excavated, still await publication or are simply not recorded in a coherent and detailed format. Stratigraphic analysis, including section and elevation drawings, are notably absent within the archaeological record. The elevation drawing of the brick facing of wall M 19 of the Megali Porta Baths (**plate**

63a) is a unique example and sets a fine standard within the published record pertaining to these monument types in Crete (Masturzo & Tarditi 1994-5, 244, fig. 9).

Much of the information presented in the catalogues was derived from journals such as Κρητική Εστία, Κρητικά Χρονικά, Αρχαιολογικόν Δελτίον and Archaeological Reports, and while these accounts are informative they mainly represent preliminary reports. Abstracts of various conferences were consulted, such as Creta Romana e Protobizantina (Atti del Congresso Internazionale, Settembre 2000) and The International Congress of Cretan Studies series, although personal communications constituted the most valuable source of reference.

The hiatus encountered in the literature was filled by a project of intensive fieldwork, work which further emphasised the great disparity between the reality and the published record. This is best demonstrated at the Roman site of Koleni Kamara, which has only ever been briefly mentioned in $A\rho\chi\alpha\iotaο\lambdaογικόν$ $\Deltaε\lambdaτίον$ (Tzedakis 1970, 473). The text contains no description of the monument, while its identification as a bathhouse is presented as speculative. On locating the monument in the field it was a pleasant surprise to find that much of its architectural integrity remained intact.⁷

Fieldwork revealed that many of the structures are fragmentary, badly damaged or have been completely destroyed, as occurred at Hierapytna (B 7). Modern roads have cut through many of the aqueducts, as is clearly attested along the Chersonisos trajectory (**plate 6c**). However, not all of the secondary alterations are so negative. Many of the bathhouses were converted into small chapels, as occurred at Lappa (**plate 69a-c**), Kato Asites (**plates 58a-c**) and Koleni Kamara (**plate 78a-d**), an architectural transition which contributes to the historic wealth of these structures.

1.3 The Catalogues of Roman Bathhouses and Aqueducts of Crete

Two separate catalogues are presented: one dealing with aqueducts (Catalogue A) and the other with bathhouses (Catalogue B). All the aqueducts, regardless of type, are grouped together in the former and all the bathhouses in the

⁶ I am indebted to a host of scholars, many of whom are mentioned in the acknowledgements, who gave generously of their time and knowledge.

⁷ Since visiting the site in 2000 it has been subject to excavation under the auspices of the 25th Ephorate of Prehistoric and Classical Antiquities and I look forward to its publication which promises to be revealing.

latter (i.e. all public, private and agricultural examples dating from the 1st to the 4th century AD). The entries are in order of *eparchia* (i.e. a geographical division of Crete equivalent to the British borough) and follow the order used by Sanders in his gazetteer (1982).

The structure of the catalogue entries is as follows:

- Plate
- Location
- Site Description/Context
- Aqueduct or Bathhouse Description
- Type
- Date
- Dating Methodology

Naturally, these elements vary considerably, and indeed were not likely to have been common over the entire range of sites. Consequently, the catalogues are somewhat diverse yet offer a comprehensive overview for each site. The entries for **Location** and **Site Description/Context** are included only in the aqueduct catalogue (A) in cases where sites contain both monument types to avoid repetition.

Each entry is referred to in the text by both a letter and number, A 1 referring to aqueduct number 1 (i.e. Kouphonisi) while B 1 refers to bathhouse number 1 (i.e. Makriyalos). Entries relating to monuments of uncertain nature have been given numbers accompanied by an asterisk and feature last in the sequence (e.g. A 31* represents the potential for an aqueduct at Aptera). These entries represent sites where the evidence was not strong enough to indicate the exact location of the monument in the field. A good example is observed in the excavations for the Stratigraphic Museum at Knossos where a series of architectural elements relating to a bath installation were recorded (*AR* 1978-82, 93, fig. 28). These elements (including *pilae*) were discovered in secondary contexts and, although certain to represent the remains of a dismantled bathhouse somewhere in the immediate vicinity, their original deposition was not securely ascertained (B 55*).

1.4 Distributions

It was possible to process several distribution maps from this data: the first time that any configurations relating to the bathhouses and aqueducts of Crete have been formulated (figs 1-15). It is essential to understand how the aqueducts and bathhouses were spatially related within the landscape of Roman Crete. The study of distributions of comparable and contrasting aqueduct and bathhouse types can reveal relationships between contemporary sites. For example, the proximity of cities and villas equipped with these monuments can indicate a degree of affiliation and interdependence while also highlighting the strategic positioning of wealthy villas within the landscape. Distribution studies can also expose various patterns such as the correlation between sites with large-scale hydraulic structures and their participation in widespread trade.

1.5 Conclusion

The methodologies are all somewhat interdependent and all discussion is naturally based on the primary evidence presented in the catalogues. From a study of the corpora, using the methodologies outlined above, it is hoped to contribute significantly to the understanding of the development of Roman Crete as a dynamic region of merging traditions demonstrating both continuity of custom and novel adaptation.

CHAPTER TWO

A STUDY OF TWO ARCHITECTURAL TYPES

2.1 Reasons for Examining Two Monument Types

The reasons for incorporating the evidence for *both* the bathhouses *and* aqueducts of Crete in this thesis arise naturally from the partnership of these two monument types at many Romanised centres throughout the Empire. This chapter assesses the degree of significance of this relationship and the benefits of a twofold investigation.

2.1.1 The Correlation between Aqueduct and Bathhouse Design; an overview

The proliferation of both monument types in Crete can be interpreted as a symbiotic relationship. Roman baths needed copious supplies of preferably replenishable water which could only effectively be supplied by an aqueduct (Vitruvius, de Architectura VIII vi 2). It is generally accepted that it was specifically the baths which required large supplies of water which exceeded the natural resources of particular cities. Under normal circumstances supplying the baths has often been cited as the raison d'être for any aqueduct (Hodge 1992, 3-6). General calculations indicate that up to 20% of a city's total water supply could be assigned to the Roman baths and Hodge proposes a much higher proportion for cities supplied by a single aqueduct with enormous bath-complexes to sustain (1992, 268). The correlation between the monument types is visually portrayed by the mosaic located in the doorway of the bath of the Casa delle Nozze d' Argento at Pompeii. De Haan interprets the mosaic, depicting an aqueduct, as commemorating the construction of the actual aqueduct which afforded the potential for building the bath (2001, fig. 4.12).

The construction and planning of an aqueduct, designed specifically to serve a new bathhouse, could have featured as an integral and essential part of the original project. The building of the aqueduct and its collection cisterns must have been one of the priorities in a Roman bath-building project. Its place in the overall design was probably secured at an early stage in the construction of the bath since the production

of concrete and mortared rubble requires large quantities of water. Therefore, the availability of water on site during the construction of the substructures of the bath would be particularly beneficial.

The Aqua Virgo in Rome could represent a watershed in the development of this partnership as it has been suggested, although by no means proven, that this aqueduct was designed primarily to supply the Baths of Agrippa (Manderscheid 2000, 487-8). It may constitute the first of a series of such partnerships. Similarly, the decision to build the Baths of Caracalla in Rome must have relied on the construction of its aqueduct, as the baths needed a massive reservoir (consisting of a huge two-storeyed edifice of 32 chambers) to facilitate the vast quantities of water required for its operation (DeLaine 1997, 131). Caracalla's exploitation of the Aqua Marcia incorporated a new branch extending from the main line 2km southeast of the Porta Maggiore. This branch was 6-7km long and crossed the Via Appia on a monumental arch, the so-called *Arco di Druso* (Evans 2002, 87-8). This example was followed by Diocletian, who, when he built his eponymous baths, renovated and expanded the Aqua Marcia. These baths were served by the Botte di Termini, a reservoir measuring 91m x 16m, demonstrating the extent of the project.

Wilson proposes that the construction of an aqueduct prompted that of a bath and not *vice versa*. He states, citing examples at Lepcis Magna and Carthage, that 'it is demonstrable only that large baths follow the construction of aqueducts, not that they motivated them' (A.I. 1998, 92). Wilson argues convincingly that by regarding an aqueduct as affording the potential for bathhouse construction, rather than as an integral component within bathhouse design, the significance of the aqueduct within the partnership is not undermined despite presenting a looser correlation within the sequence (A.I. 1998, 92-3).

Manderscheid argues that the construction of the Antonine Baths at Carthage was facilitated by the erection of a public aqueduct (2000, 488-9). Wilson states that although the Zaghouan aqueduct almost certainly supplied the Antonine Baths and that the possibility of designing such a large bathhouse was specifically afforded by

⁸ Certainly, Reynolds' claim that the second public water system of Aphrodisias, constructed in the Antonine period, was prompted by the presence of two major Hadrianic bathhouses in the city is left unexplained (2000, 18).

an aqueduct, it has not been established that they were both part of the same initial design (A.I. 1997, 97; 1998, 92-3).

The sequence is repeated at Lepcis Magna where the construction of the aqueduct and the erection and development of Hadrian's Baths have not been secured as components of an integrated design, despite there being a strong correlation between the two. The aqueduct's route to the city is only partially detectable while its connection to the Hadrianic Baths has not yet been affirmed (Manderscheid 2000, 489). Nontheless, it is possible that only with the construction of the aqueduct, and as a direct consequence of its potential capacity, could the city authorities consider such a large-scale bath installation furnished with a substantial *natatio* (Di Vita *et al.* 1999, 90).

The dedications for the Hunting Baths (indicating a construction date at the end of the 2nd century AD) clearly post-date the inscriptions commemorating the erection of the aqueduct in AD 119/120 (Reynolds & Ward-Perkins 1952, 108, n. 357). If their construction coincided with additions to the large public cisterns, it would suggest that these baths were not integral to the original water system (Wilson 1998, 92). Nonetheless, it is certain that the Hunting Baths availed of the public supply and this alone demonstrates both the degree of wealth and the abundance of water brought to the site, especially if the bath is a private establishment (Di Vita *et al.* 1999, 106).

Similar cause and effect can be detected in bathhouse design in mainland Greece. Lolos asserts that the succession of large bathhouse constructions at Corinth, including the largest discovered to date (on the Lechaion Road), and a radical reorganisation and enlargement of a pre-existing bath (the Baths of Eurykles), was prompted by the construction of the aqueduct in the 2nd century AD (1997, 298).

Clearly, the introduction of an aqueduct could change the nature of bath design, prompting major architectural changes in bath layout. These changes emphasise the impact of the water supply as a factor in bath design as manifested by the inclusion of large pools, *piscinae* and *natationes* (Heinz 1983, 157-74). At Pompeii the aqueduct heralded the construction of other bathhouses while radically altering the plan of pre-existing examples. The Central Baths and the Suburban Baths, which always had capacious *piscinae*, now also housed a *natatio*, in the case of the

former, and a *piscina calida* in the latter. The Forum Baths and Stabian Baths were equipped with proper *frigidaria* and subsequently received *natationes*. Eschebach associates the building of the *piscina* in the *palaestra* of the Stabian Baths and the conversion of the *laconicum* into a large cold pool with the introduction of the aqueduct supply (1979).

Conversely, this partnership between the monument types, while being advantageous, could also be ruinous. If the construction of an aqueduct could herald a development in bathhouses, bath deterioration could also be linked to the destruction of an aqueduct. Robinson claims that Severus' baths in Trastevere near the *porta Septimiana* cannot have been of much use since the aqueduct, which was to supply their water, collapsed on their completion (1984, 1069). At Lugdunum the upper city was gradually abandoned by the mid- or late 3rd century AD since the four aqueducts which supplied water to the plateau through lead piping were plundered and fell into disuse (Harries 1992, 79).

Similarly, the demise of the great *thermae* of Rome was recorded by Procopius when the Goths cut the aqueducts in AD 537; he observed that although there was sufficient potable water, the baths were not functioning during the siege (*History of the Wars* X xix 27). The blockage of the Aqua Traiana, revealed during excavations of a mill in the carpark of the American Academy at Rome, could represent a drastic measure taken by troops during late March AD 537 in an effort to impede the Gothic invaders (Wilson, A.I. 2000a, 233). The area was largely abandoned after this action. The suggestion that the smallest of all the Imperial *thermae* in the city, the baths of Trajan Decius on the Aventine, continued in use after the cutting of the aqueducts by the Goths is speculative (La Follette 1994, 22).

Admittedly, there may have been problems with water supply in Rome prior to the Gothic invasions and a recent survey of the Aqua Antoniniana identifies two periods of major disruption to the supply, perhaps in the 5th century AD during restorations by Arcadius and Honorius (DeLaine 1997, 40). The addition of the cisterns behind the south pools of the *frigidarium* in the Baths of Caracalla could be interpreted as a necessary measure to cope with a reduced supply (DeLaine 1997, 40).

In Greece, it is traditionally believed that the city of Corinth fell into decline from the second half of the 4th century AD, which seemed to concur with the invasion

of the Goths under Alaric in AD 395 (Lolos 1997, 298). However, the erection of a series of subsequent baths suggests that this decline was not as drastic as once thought (see 17.8). A *terminus ante quem* for the functioning of the public aqueduct in the 5th century AD was estimated through analysing the chronology and subsequent decline of the city's baths (Lolos 1997, 295-7). Lolos determines the duration of the operation and ultimate abandonment of the aqueduct through monitoring the functional state of the baths, as they constitute the main drain on the water supply (1997, 295-7). The symbolism of baths, depending on their state, can both announce the dawn or herald the death of an era, since an integrated network of urban services needed to be established for a bath to function.

Similarly in Crete, the Praetorium Baths (B 18) at Gortyna were considerably reduced by the reign of Heraclius and this recession has been attributed to a decreased influx of water from the springs at Zaros (Di Vita 2000b, lxix). In order to cope with the reduced supply, numerous public fountains were installed between the villages of Aghioi Deka and Mitropolis to replace the expensive piped supplies for private residences. The fountains were connected by an aqueduct constructed in the reign of Justinian which crossed the city on an arcade. Equally, the deterioration of the aqueduct at Gortyna may only *reflect* a general reduction in the size of the settlement rather than constitute the *cause* of the overall decline. The interruption of the aqueduct would have been easily achieved, as it represented a sensitive commodity in an area subject to intense seismic activity throughout its history.

2.1.2 Baths Supplied by Rainwater Cisterns

The concept that aqueducts were chiefly built in order to supply public baths has recently been brought into question (Wilson, A.I. 1998). A letter of Gregory the Great reveals that the aqueducts of Rome were working again in AD 602 while, in contrast, there are no references to the continued use of any of the great public baths in the city after the Gothic Wars (*Reg. Epistularum* 12.6). It seems certain that during the Middle Ages the water-supply was used chiefly for the city's mills and church amenities such as baptistries, latrines and fountains (Coates-Stephens 1998, 171).

There is an undeniably strong correlation between baths and aqueducts, but less rigid interpretations are a welcome counterbalance to the standard interpretation which presents Roman baths as entirely dependent on aqueducts (Heinz 1983; Brödner 1997). It is true that smaller baths could function by drawing water from wells alone, as is the case at Sabratha (Wilson, A.I. 1998, 92). However, while wells, cisterns and water-wheels could supply water to some baths, these installations are generally small and notably early in date, as attested at Delos, where the baths were supplied primarily with rainwater (Crouch 1993, 302-3).

Very few of all known Roman bathhouses were supplied exclusively by rainwater and the method seems to constitute a last resort when no alternative supply could be secured (Manderscheid 2000, 486). Such measures certainly do not represent the preferred method and would have been used under duress due to the unpredictable nature of the supply. Capri provides a good example of this where the collection of rainwater was necessary due to the small number of springs on the island. The Villa Iovis has the largest cistern on the island which was thought to supply the baths (Stazio *et al.* 1983, 311-2). Manderscheid presents the fortress of Masada in Israel as another extreme example whereby the site was originally entirely dependent on rainwater but was subsequently supplied by two aqueducts at considerable cost and effort (2000, 486).

At Lepcis Magna at least one small public bath predated the construction of the aqueduct in AD 119/120 (the bath in question was constructed in the second half of the 1st century AD). The bath depended, at least partially, on rainwater catchment from the roof. The presence of a bath in the city at this early stage is not completely surprising as rainwater would have been sufficient to fill the large storage cisterns on the site (Di Vita *et al.* 1999, 89). Rainwater in this region was at a higher level in Roman times than in later centuries when the immediate hinterland became a desert.

There is a striking distinction between aqueduct-fed and rainwater cistern-fed baths in both their layout and their levels of hygiene. Manderscheid observes that studies of bathing *piscinae* can reflect the type of water supply system as they absorb a large percentage of the overall supply to the bath (2000, 489). Baths operating with restricted availability of water (i.e. those supplied by means of a water-lifting device or cisterns) were limited by the indefinite quantity of running water which prevented constant water change. Ideally, Roman baths operated with constant water flow but if the water was supplied by a cistern then 'a weak flow of water or even temporary

interruptions' must be envisaged (Manderscheid 2000, 507). Considerations concerning water consuming facilities are reflected in the architectural layout as the *piscinae* (and *labra*) had to correspond, in both quantity and dimensions, to the available water supply.

Water-lifting devices were necessary when a bathhouse was located at a higher level that its associated water supply system preventing water conduction using gravity flow (Manderscheid 2000, 491). A water-lifting device was used for the baths at Kremna in Pisidia where the springs (located 2km from the city) were over 30m below the level of the cisterns (Owens 1992, 372 and 376; Mitchell 1995, 148). The ensuing enterprising project to raise the water mechanically demonstrates the lengths to which the inhabitants of cities would go to supply their bathing establishments and is testimony to the important role of public baths in the urban life of the Roman world.

Drerup believed that the massive L-shaped cistern at Aptera (A 31*) in west Crete, with a considerable capacity of 5,500m³, was supplied exclusively by rainwater (1951, 93), a view that has been recently reiterated by Ninou-Kindeli and Christodoulakos (2000, 34). It is possible that the triple cistern complex at Aptera was fed by rainwater as these cisterns are relatively small; however, this does not preclude the existence of an aqueduct supplying the larger L-shaped cistern.

Manderscheid states that non-aqueduct supply systems would become ineffective at a specific overall usage-volume and that whenever this overall usage-volume is exceeded it must be presupposed that an aqueduct served a bath even when it cannot be identified with certainty (2000, 489). Cisterns of comparable capacities with that of the L-shaped cistern at Aptera, and indeed much smaller examples, are associated with aqueduct feeding systems. The capacity for the entire system of cisterns in the region of Kremna (Pisidia) was calculated as c. 1,622m³ and although relatively small, it was deduced that it could not have been maintained by the collection of rainwater alone (Owens 1992, 372; Mitchell 1995, 143). It can be inferred through a simple comparison that Aptera must have been equipped with an aqueduct. The capacity of the L-shaped cistern alone makes it is difficult to perceive that this quantity of water was supplied by rain. The argument for a rainwater supply for the large cistern at Aptera is further undermined by its association with the

substantial bathhouse to its north (B 38) (Ninou-Kindeli & Christodoulakos 2000, 34). The design of this bathhouse is clearly large in scale and would have necessitated a copious supply of water (**plates 72a-c**). Sanders alludes to a supply system in association with the cistern when he conjectures that a source should be searched for somewhere in the mountains southwest of the site (1982, 167).

If rainwater sufficed for small early baths, aqueducts were essential for the development of the Imperial *thermae*. As previously noted, the organisation of the water supply throughout intricate, often two-storeyed, bathing installations (incorporating *natationes*, storage cisterns and fountains) must have constituted a major consideration within the planning process and one with serious ramifications for overall bathhouse design (DeLaine 1988, 24-25).

2.2 Conclusion

In the light of the combined arrangement of Roman bathhouses and aqueducts throughout the Roman world, the analysis of *both* monument types on Crete offers a more complete picture of the social roles of such hydraulic structures on the island. The meagre and fragmentary nature of much of the evidence is also supplemented through its assessment within a broader scope. A wider overview, afforded by such a composite study, reduces irregularities in the distribution maps. Consequently, cities such as Aptera, with its two massive bathhouses and one of the largest cisterns on the island, are not omitted from this study, as would have been the case if aqueducts alone were addressed (**plates 72a-73a**). An aqueduct has not, as yet, been physically associated with the site, even though the site's considerable hydraulic structures would presuppose its existence. Indeed, aqueducts have been known to disappear without trace, as occurred at Marsala in Sicily where an inscription attests the existence of an aqueduct although not a shred of supporting evidence has been located in the field (Wilson, R.J.A. 1990b, 102).

Alternatively, if this study focussed exclusively on bathhouses, sites such as Lyttos (A 4), Axos (A 14) and Elyros (A 19) would be excluded, as there is as yet no evidence of baths at these sites, despite the fact that they are supplied by some of the most impressive aqueducts on the island. The absence of a bathhouse at the important Roman centre of Lyttos is surprising and can only be explained as an anomaly in the

archaeological record, since the impressive aqueduct could easily have conveyed water for several bathing establishments. It is notable that the site is notoriously devoid of Roman architecture and its theatre, supposedly the largest on the island, was only known from the plans of Onorius Belli until it was reportedly rediscovered in the 1980s (*Vradini* 9/9/83; *Ethnos* 9/9/83; *Kathimerini* 9/9/83). Baldwin Bowsky argues that a general epigraphic study demonstrates that Lyttos responded to Roman influence just as positively as Gortyna, Hierapytna and Knossos (1995a, 54). Consequently, its urban layout should include all the trappings of a Roman city, notably a bathhouse. At Axos the presence of an elaborate aqueduct with the apparent absence of any bathhouse is puzzling. The site is not well published but its Roman phase has been clearly established through the discovery of its substantial Roman cemetery (*Nea* 7/6/83).

It is almost a certainty that baths lie undiscovered in these cities and it is only a matter of time before they are located. In dealing with both complementary monument types, the study encompasses all of the most Roman centres on the island and minimises omissions of clearly Roman sites which might have resulted from a study of only one of the types. Such a statistical imbalance is evident in Farrington's recent study of Lycia which is almost certainly derived from the singular focus of his study i.e. the bathhouses (1995). The study of the region demonstrated a significant discrepancy between bathhouse and aqueduct counts, recording a potential of 64 bathhouses yet only 10 aqueducts (cited at Andriake, Balboura, Idebessus, Myra, Oenoanda, Patara, Phaselis, Pydna/Kydna, Rhodiapolis and Xanthos) (1995, 109 and 117). The profusion of baths indicates the likelihood that many more small-scale aqueducts lie undiscovered in the field.

As a direct result of the present study it is now confirmed that Roman bathhouses on Crete are found in profusion with a minimum total of 52 Roman baths and a minimum of 23 Roman aqueducts. It should be noted that while this work focuses on aqueducts and bathhouses this does not translate as an exclusive connection. Aqueducts were multi-functional and supplied a range of different structures within the city and its rural hinterlands. Due to the lack of fully excavated Roman cities in Crete it is difficult to explore such intra-urban distributions across the island. The focus on the binary connection between baths and aqueducts is not

tantamount to an exclusive match or a denial of alternative factors but more an acknowledgement of the strength of their correlation.

PART ONE: THE AQUEDUCTS

CHAPTER THREE

PROBLEMS IN THE STUDY OF THE AQUEDUCTS OF CRETE

3.1 Introduction

An aqueduct is essentially a monument to hydraulic engineering. It operates on the premise of constant hydraulic motion (albeit sometimes constituting continuous flow at intervals) whereby water is propelled by gravity flow. Its genius lies not in its monumentality but in its subtlety of design. The essence of its design is closely correlated with its associated geology and orography as it forms a seam within the natural contours of the topography.

In order to discuss the aqueducts of Crete accurately and scientifically some misconceptions concerning their nature must first be clarified. Rarely have monuments of such scale caused so much misunderstanding over the centuries. The situation is not ameliorated by the fact that the published archaeological record for the Roman aqueducts of Crete, although meagre, manages to incorporate incorrect and misleading information. Consequently, preconceptions pertaining to all aspects of the monuments arose. Speculation attained the apparent rank of established fact without ever having being tested in the field. Such processes are attributable to both linguistic and psychological forces whereby within the published record the conditional is eclipsed by the indicative and the factoid establishes fact, encouraged by the scholars' implicit trust in the work of others (Goring 1995, 103). This chapter aims to highlight such misconceptions in order to expose their fallacious nature and to establish a realistic functional profile for the aqueducts of Crete.

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3.2 Misconceptions Concerning the Aqueducts of Crete

The most resounding misconception concerning the aqueducts of Crete is the idea that these aqueducts linked inland and coastal cities. The association derives from the Hellenistic partnership between dominant inland cities and their dependant coastal ports. In the Roman period these port sites were still perceived as umbilically linked to their inland counterparts despite the fact that by this time they had achieved autonomy. The aqueducts erroneously became the architectural manifestation of supposed political affiliation. In reality, autonomy and spatial segregation presuppose distinct aqueducts serving each city.

The most striking example of this is the proposal by Belli that the aqueduct of Lebena supplied Gortyna with water (cited by Falkener 1852-3, 286). The suggestion is inconceivable for three reasons. Firstly, it has been established that Gortyna received an adequate supply from the springs around Zaros. Secondly, given the small dimensions of the aqueduct at Lebena and the amount of hydraulic buildings on this site (including baths and *nymphaea*), it is implausible that there would be any residual water to supply Gortyna after such Lebenian ablutions. Thirdly, and most conclusively, any visit to Lebena (incorporating a harrowing descent to the site along a series of switchbacks) establishes that the route between Lebena and Gortyna is not suited to gravitational flow towards the north and would be adverse to any lengthy trajectory.

A similar association between Souia and Elyros in western Crete led to confusion regarding their water supplies. The association of the sites prior to their Roman autonomy and segregation fuelled the idea of an integrated system leading from Elyros to the coastal site of Souia. Souia's role as port to Elyros in the Classical and Hellenistic periods (*IC* II xiii and xvii *Geographica*) and the fact that Souia is actually visible from the rise of Elyros endorsed a false impression of interdependence and close collaboration in the Roman period. The fragmentary nature of the aqueducts of both cities obscured their distinctive courses. Elyros is generally considered to be the most densely populated city in southwest Crete and the idea of residual water being conducted to Souia seems a remote possibility (Sanders 1982, 171).

The most damning misconceptions concerns the aqueducts of Lyttos and Chersonisos. These separate tracts were confused, ultimately being misconstrued not only as one and the same aqueduct but also as the longest aqueduct in Crete. The misinterpretation that the routes of these aqueducts joined a broad geographic region created the illusion that the aqueduct of Chersonisos was a continuous extension of that of Lyttos providing an architectural manifestation of the historic connection between the two cities. Their union is both improbable in theory and impossible in practice. This present study affirms that the two aqueducts are distinct entities and should be regarded separately.

3.2.1 Reports Supporting a Single Trajectory from Lassithi to Chersonisos

The aqueducts of Chersonisos and Lyttos are not mentioned by the ancient sources while their physical traces eluded many travellers over the centuries. Their remains were mostly confined to the inaccessible slopes of forested riverbeds and steep mountainous terrain. The aqueduct of Chersonisos was reduced to fragmented tracts and only its bridges were subject to brief comment but even these were viewed in isolation and remained devoid of architectural contextualisation or comparative analysis.

Ultimately the aqueducts were subject to various misinterpretations based on the fallacy that they represented one sweeping aqueduct which linked the cities of Lyttos and Chersonisos. The exact point of origin of this distortion is unknown although the misconception is detectable in the earliest descriptions of the aqueducts, which present an extensive system. Buondelmonti, who travelled throughout Crete in 1415, was the first to present the aqueducts as an integrated system. He incorporates the two aqueducts under a general discussion of the monuments of Chersonisos. His support of a unified system can be deduced from the fact that he claims that the aqueduct of Chersonisos delivered water from the high mountains at a great distance from the city and the absence of any comparisons with the aqueduct of Lyttos (cited in van Spitael 1981, 160).

Similarly, Belli, who toured the island in the 16th century AD (c. 1586), claimed that after Lyttos the aqueduct continued to Chersonisos (cited in *The Builder* 7/12/1901, 499). Belli observed that from Chersonisos to Lyttos

'extended an excellent and commodious road and that the same distance was traversed by a stupendous aqueduct, which commencing at a spring in the Lasithi mountains, four or five miles above Lyttus, conducted the water first to that city and afterwards to Chersonisos' (cited in Falkener 1854, 16).

Belli's confident statement, albeit characteristically hyperbolic, replaced the prudently vague account of Buondelmonti in just 171 years. This impression of connectivity was compounded by the fact that the main thoroughfare of the region accompanied the aqueduct of Chersonisos and, consequently, the aqueduct itself became synonymous with the main communication route. An ancient road ascended from the harbour at Chersonisos alongside the aqueduct and on its departure from the aqueduct it continued towards Lyttos. Thus the road seemed to link Chersonisos and Lyttos uniting these cities into one broad geographical region. 9

Belli continues to describe the Chersonisos aqueduct in more detail claiming that

'The aqueduct, which is about 14 feet [4.26m] in thickness, of solid masonry, and between 15 [4.57m] and 16 feet [4.87m] in height, winds round so many hills, and crosses so many valleys, that its length must be upwards of thirty miles [48.28km], nearly the whole of which is perfect, and seems likely to remain so as long as the world shall last. But what causes most astonishment is the prodigious height of the arches which cross the ravines, some of which are a hundred feet [30.48m] in height. This is the most remarkable aqueduct in Candia, though there are several others of less grandeur and extent' (cited in Falkener 1854, 16).

Belli, although over-enthusiastic in his descriptions and misled in his estimate, accurately conveys the undeniable grandeur of the aqueduct of Chersonisos. The report, despite its notable inaccuracies, is also an invaluable testimony to the subsequent intense destruction of both aqueducts. Belli's recorded length of the

⁹ Mariani encountered the remains of the Xerokamares 2 bridge when he travelled this road from Lyttos towards Chersonisos (1895, VI, 238). Taramelli also traversed the length of this road, then known as the King's road after the Kastelli of Chersonisos (1899, 372).

aqueduct of over 30 miles (48.28km) is based on his belief that the aqueduct continued the whole way from Lasithi to Chersonisos. In reality, the direct distance between Chersonisos and the source of its aqueduct is only 6km but the *actual* length of the aqueduct is c. 14km (Oikonomaki 1986, 52). At Lyttos the direct distance between the city and the source of the aqueduct at Kournias is 10km yet the route of the aqueduct measures 22km. ¹⁰ The lengths of these aqueducts arises from the nature of the mountainous terrain which is indented with gorges and ravines. The deep and expansive valleys of Langadas and Astirakia lie on a direct line between the springs of Kournias and the city of Lyttos which the aqueduct skilfully avoids bridging (fig. 24). Even taking into account such evasive action, the combined lengths of both aqueducts is still only 36km, as opposed to Belli's 48.28km.

The distorted image of these aqueducts as one unified system is perpetuated by local modern folklore. A story familiar to the villagers of Avdou and Gonies tells of a foreman who lost his trowel at Kera (at the start of the Lyttos aqueduct) during the construction of the aqueduct and had reached Chersonisos by the time he realised his loss. Subsequently, the missing trowel was relayed along the aqueduct from person to person until it was restored safely to him (Oikonomaki 1986, 81). The anecdote perpetuates the popular belief that the monuments were physically integrated.

The misconception persists in the modern archaeological reports. Watrous claimed in 1982 that a vast aqueduct drew its water from the sink-hole at Kastamonitsa and first supplied Lyttos and then descended towards Chersonisos (1982, 24). Sanders also claims that Chersonisos was supplied by a long aqueduct descending from the Lasithi Mountains and that the same system supplied Lyttos (1982, 19) although he does express some doubts regarding such a vast trajectory

¹⁰ In relative terms, there is not such a vast difference between the direct distance and the length of these aqueducts. The source of the aqueduct of Nîmes is only 17km away from the city yet the length of the aqueduct is 39km (Oikonomaki 1984, 67, n. 9).

(1982, 146).¹¹ More recently, Raab also supported the possibility of one continuous aqueduct (2001, 27).

The misconstruction is derived from the combined influence of early descriptions and folk belief on modern scholarship (Oikonomaki 1986, 76). Folktales survive as misconstrued fact in the published archaeological record of the present day. The history of the two cities, their geographical settings within the landscape and the structural similarities of both structures combine to create the illusion of a unified water system.

3.2.2 Authors Supporting Two Separate Aqueducts for Lyttos and Chersonisos

In spite of such discrepancies, there are some early authors who viewed the aqueducts as separate and functionally independent. Unfortunately, the few authors who supported the autonomy of the Chersonisos aqueduct restricted their references to specific locations with little attempt at tracing the trajectories in the field in order to establish their independence.

It is not certain from Spratt's accounts whether he connected the trajectories as his comments are confined to the aqueduct bridge in the Potamies Valley; however, the fact that they are depicted as detached entities in his accompanying map intimates that he considered them to be distinct (1865, I, 103) (fig. 23). Mariani definitely distinguishes between the aqueduct of Lyttos and that of Chersonisos since in his description of the Xerokamares 2 bridge he claims that the aqueduct brought water from Leondari to Chersonisos (1895, VI, 238). Spanakis also treated the aqueducts as two separate entities and was the first to suggest that the Chersonisos aqueduct tapped the springs of Aghios Pandeleimon and probably also the spring of Spyridon (N.D., I,

¹¹ Subsequently, Sanders contradicts himself by relocating the source for the Chersonisos aqueduct at Aghios Pandeleimon (1982, 146). Curiously, Sanders incorrectly identified a settling tank at the start of the bridge of Xerokamares 2 along the Chersonisos aqueduct as the remains of its *caput aquae*, which although incorrect, clearly demonstrates that Sanders thought that the aqueducts of Lyttos and Chersonisos were separate (1982, 146). Sanders' contradictions portray the confusion surrounding the two trajectories.

384; 1968, 161, n. 59; 1981, 17, n. 11). 12 Lolos is explicit about the distinction in stating that the aqueduct of Chersonisos

... 'is now definitely disassociated from the aqueduct supplying Lyttos. The source was probably tapped at Aghios Panteleimon (Piyi)' (1997, 31).

Finally, Mandalaki, who excavated the massive cisterns at Chersonisos, revises her idea of a source at Lasithi and concurs that the source lies at Aghios Pandeleimon (1996, 634; 1999, 258) following Spanakis (N.D., I, 384). In the 2000 edition of Barrington's atlas which focuses on the major Roman sites of the Empire, the aqueducts of Chersonisos and Lyttos are also depicted as separate (fig. 84).¹³ Their status is also heightened by the fact that the only other aqueducts depicted on the island are those of Knossos and Gortyna: the colony and capital. Moreover, the folklore of the village of Kastamonitsas (associated with the Lyttian aqueduct) is exclusively connected with Lyttos which may reflect local recognition of the autonomy of the city's water supply.

3.2.3 Field Evidence Separating the Aqueducts of Lyttos and Chersonisos

The credit for finally establishing the aqueducts as two distinct monuments must be awarded to Oikonomaki who compiled the first thorough studies of these aqueducts (1984; 1986). He traced the two aqueducts in the field, an act which finally proved that they were hydraulically and functionally independent. He followed the course of the Chersonisos aqueduct with precision from the bridge at Xerokamares 2 towards its source at Koutsounara on the fringe of the Khoridakia area (fig. 27). The detailed analysis he assiduously recorded regarding the route of the aqueduct from Xerokamares 2 up to the source confirmed that the system was independent from that of Lyttos. In fact, the very presence of springs in the area of Khoridaki and Epano

¹² Cameron notes that Aghios Pendeleimon is located near Piyi and that the church stands on the foundations of an earlier basilica while Hellenistic and Roman inscriptions and architectural fragments suggest an even earlier sanctuary (2003, 138). Cameron claims that the fact that Aghios Pendeleimon is the patron saint of healing, and that the water of the spring has healing properties, is indicative of the presence of a temple to Asclepius at this site (2003, 138). ¹³ John Bennet compiled the Cretan material for the atlas.

Vrisi (meaning Upper Spring) defies any need to probe the countryside for water sources further south in the direction of Lyttos (see A 5.2).

3.2.4 The Capacity of the Aqueducts of Chersonisos and Lyttos

The fact that the Lyttos aqueduct was built solely to supply the city of Lyttos with potable water and served this city exclusively for all its functional life is supported by the quantity of water transported by the aqueduct. The water of the Lyttos aqueduct was simply not sufficient to supply two cities. This conclusion is based on the limited potential of the springs of Kournias and the dimensions of the aqueduct channel (**figs 25 and 26**). The size of the channel is relative to the amount of water transported and, consequently, its size was a product of its purpose. A section of the Chersonisos channel is preserved at c. 200m from the bridge of Xerokamares 2 and demonstrates that its conducting capacity was over twice that of the channel at Lyttos (Oikonomaki 1984, 87, n. 94). Moreover, the fact that the *castellum* of the Chersonisos aqueduct is the largest cistern on the island (with a capacity of c. 7,018m³) affirms the immense potential of the aqueduct (**plates 7a-b**).

It is difficult to compare the cities in terms of scale (largely due to the lack of knowledge regarding the architecture of the Roman city of Lyttos) but the fact that Chersonisos boasted at least two bathhouses, a possible amphitheatre and a substantial harbour (features not shared by Lyttos) suggests that this city was home to the substantially larger population of the two (Falkener 1854, 16).

3.3 Difficulties Encountered during the Compilation of Catalogue A

The considerable number of inaccuracies in the literature complicated the compilation of the catalogue of Roman aqueducts on Crete. For example, the initial inclusion of the site of Inatos in the aqueduct catalogue was based on a reference of Pendlebury's who records an aqueduct at the site (1939, 374). Yet, on closer inspection it is clear that Pendlebury is citing an earlier report of Spratt's and it becomes apparent on reading the original account that the site in question is actually that of Ini (Spratt 1865, I, 304-5 and 337). Spratt's original misnomer, in effect, wrongly attributed the aqueduct of Ini to Inatos. Consequently, the site of Inatos was initially included in the fieldwork programme for this thesis. On visiting the site at

Inatos no aqueduct traces were discovered. Sanders also makes no reference to an aqueduct when describing the site (1982, 151, no. 7/31). Thus the misnomer was exposed and the site of Inatos removed from the catalogue.

Cisterns and an aqueduct were reported at the locales of Loutra and Sternes at Kastelliana in 1916 in *Archäologischer Anzeiger* (1916, 156). It seems that Pendlebury who subsequently reported an aqueduct at Sta Loutra merely reiterates the original report (1939, 374-5). Subsequently, Sanders (quoting Pendlebury, the secondary source) confused these local toponyms at Kastelliana with the totally detached site of Loutra 30km from the original locations (1982, 150, no. 7/4). Sanders further associates the toponym with the now nearby site of Megale Vryse (the Big Spring) where he cites 'cement foundations of a Roman building' (1982, 150, no. 7/3). Such a myriad of confusing cross-references creates aqueducts where none exist while simultaneously obfuscating actual monuments in the field.

Pendlebury also refers to an aqueduct at Olous but the reference remains unsubstantiated as no traces were located in the field (1939, 376). Nonetheless, the *Stadiasmus Maris Magna* (line 350), a guide to the Mediterranean coast dating from AD250-AD300, refers to water from here supplying Aghios Nikolaos (ancient Kamara).

·... ὑΦορμον έχει και ὑδωρ καλόν ... ἀπό 'Ολούντος είς Καμάραν στάδιοι ιε'

The migration of cities to lower altitudes in antiquity also generated erroneous commentaries. A substantial demographic change from Polyrhennia to the lower coastal site of Kastelli Kissamou is supported by the fact that the aqueduct flowed from the elevated site to the lower city. This has led to much confusion as the aqueduct is often interpreted as two separate entities or as an aqueduct which supplied two cities. The fact that Polyrhennia fell into decline as the coastal city of Kastelli Kissamou flourished in the 2nd and 3rd centuries AD, as attested by its lavish bath projects, indicates that the aqueduct was designed to supply the lower city primarily. Its source in the upper city does not translate to a *floruit* in this area, although it is probable that the aqueduct was tapped by the much-reduced Roman settlement. The

destination point of any aqueduct, regardless of any benefits for areas *en route*, is the definitive point for attributions of affluence. Indeed, the marble veneered façade of the aqueduct tunnel (which forms the village fountain today) is suggestive of a small *nymphaeum* at this point. It would be tempting to suggest that this display was intended to herald to the local populace something of the splendour of the city which the aqueduct served, i.e. Kastelli Kissamou.

3.4 The Confusion Surrounding the Aqueduct at Pachyammos

Confusion is also encountered with the sites of Pachyammos and Vasiliki in eastern Crete. Baldwin Bowsky cites the presence of aqueducts, significantly plural, at both locations (1994, 9, n. 12). Seager claims that a small conduit supplied the Roman settlement at Vasiliki (1906-7, 115; *Ergon* 1972, 118). Zois specifies that the aqueduct conducted water to Vasiliki specifically for olive-pressing and glass-making and that potable water was taken from the nearby spring in the modern-day village 500m away (1992, 278). Even Sanders claims that the basilica at the site was built on top of an earlier important building which was associated with an aqueduct (1982, 140, no. 2/13).¹⁴

The identification of a substantial Roman villa at Pachyammos confirms that the aqueduct was designed specifically to feed this large private complex rather than to supply the scanty Roman settlement at Vasiliki. The fact that the present study has identified a bath-suite within this private residence would indicate a more ablutionary purpose for the aqueduct (see 4.1.3). It is significant that neither Seager or Zois (who both cite the aqueduct) mention the Roman villa located in the area, and it is certain that their theories would have radically altered had they incorporated such a structure into their assessments. Moreover, there is no evidence for olive-pressing or glassmaking at Vasiliki in the Roman period which would have availed of an aqueduct supply as Zois maintains (1992, 278). Therefore, rather than interpret aqueduct citings in the region as two distinctive aqueducts, they should be treated as representative of a

¹⁴ A small Christian basilica was recorded associated with some poor 'late' tombs above the famous Minoan site at Vasiliki (Orlandos 1972, 118). Roman walls recorded at Vasiliki in 1938 prompted claims that the area was occupied continuously since antiquity (Schachermeyr 1938, 470).

unified system which conducted water to the Roman residence at Pachyammos probably from the Xa Gorge.

This model does not preclude the possibility that the same system was tapped by the small settlement recorded at Vasiliki (*AR* 1993, 79-80). It is perhaps possible that the supply was also availed of by the scanty Roman settlement recorded at Vasiliki in a public display of euergetism conducted by the elite residents of the villa. It is also possible that the basilica on the site post-dated the life of the villa and may have reused the aqueduct to supply water for the liturgy associated with the church.

Ultimately, the identification of a villa site at Pachyammos establishes that Vasiliki was not the ultimate destination for the aqueduct, as the important site which the aqueduct was designed to supply lay further north. The importance Sanders had bestowed on the site of Vasiliki on the basis that it was watered by the aqueduct can now be transferred to the private villa site for which the aqueduct was designed (1982, 140, no. 2/13). It will also be argued that the villa was purposely constructed at a critical point of location in the commercial Cretan landscape and that the constructional plan would have included its water supply (see 4.1.3, 9.3 and 9.6).

Finally, Harrison's model can be totally rejected as he believes that the aqueduct was destined for a small fishing village on the coast in the area of the modern village of Pachyammos which he suggests was little more than it is now in antiquity (Harrison, G.W.M. 1988, 130). Harrison does not provide any material evidence for the Roman foundation of the modern village.

3.5 Confusion between Medieval and Roman Aqueducts

A major source of confusion regarding the Roman aqueducts of Crete concerns references to aqueducts where their exact date is not clarified in the published record. Pendlebury includes an aqueduct at Phalasarna in his Roman catalogue (1939, 370) but when fieldwork was conducted for the present study the aqueduct in question was considered to be later in date, possibly medieval (A 32*). The late date was confirmed through the topography and geology of the region as the aqueduct was followed running out over the ancient sea cliffs, which were only

uplifted after the 4th century AD.¹⁵ It is apparent from the sea erosion of the masonry of the aqueduct that the building material was quarried from these cliffs presumably after they had risen from the water. The fact that the aqueduct was traced to the edge of the sea cliff, over which it must have descended sharply, would suggest the existence of a water tower belonging to a mill which is now destroyed. The aqueduct's bonding mortar, masonry style and dimensions are comparable to other Venetian mills on the island (**plates 46a-b**).

A similar scenario is encountered at Ano Zakro where an aqueduct is evident in a sketch published by Mariani in 1895 (**fig. 54**) (A 24*). The aqueduct is depicted winding its way along the course of a river, initially on the southern bank of the river but crossing to the north to reach an upland settlement. Mariani reports that the aqueduct taps a spring in the area of the aptly named Vryssi (Spring) or Paliomilou (of the Old Mill) next to Ano Zakro and descends through the hills parallel to the river only crossing it to reach the settlement which it feeds (1895, 294). The site, known as Sta Ellenika, which the aqueduct supplied, is described as a type of small 'citadel' (Mariani 1895, 294, fig. 81). It is apparent from the brief description and accompanying sketch of the rise that numerous walls, constructed of small irregular stones and associated with rock-cut features, covered its slopes.

The date of the aqueduct is not specified but Mariani indicates that the aqueduct is a rock-cut contour type (*una condottura scavata*) (1895, 294). Despite the fact that the date of the aqueduct remains unknown, it should not be associated with the 'citadel' site, as suggested by Mariani, as this settlement has recently been dated to LM IIIA-C (Nowicki 2000, 55). The description of the aqueduct, as offered by Mariani, is evidently much later in date as it represents a contour-line supply reliant on gravity-flow. Therefore, it seems undeniable that their association is anachronistic.

Further perplexity surrounds Roman aqueducts superseded by medieval examples, such as at Herakleion and Khania. The problem arises from the fact that the later 16th-century AD courses adhere closely to their Roman predecessors (Rackham & Moody 1996, 44). This often results in the later aqueducts reusing earlier substructure walls, as is evident at Knossos along the southwest slope of the Lower

¹⁵ I am grateful to Dr. Jennifer Moody for her acute observations on the geology and topography of the area.

Gypsadhes (Hood & Smyth 1981, no. 318). Here the substructure wall of the Roman aqueduct supports an elevated terrace along which the line of the Venetian aqueduct traverses. The terrace actually forms the foundation for both the Venetian aqueduct and its associated parallel pathway (plates 14b-c, where A represents the Venetian aqueduct and B the Roman aqueduct).

At Khania (A 18), although no remains have been located to affirm its trajectory, Pashley proposes an aqueduct trajectory from Boutsounaria to the city centre (1837, I, 17). Boutsounaria is the source of the modern aqueduct as outlined in the British Admiralty Handbook (1913, 29). That an aqueduct supplied ancient Kydonia in Roman times is not under debate as its presence is attested by the preponderance of bathhouses in the centre. Belli records its existence in association with a Doric temple and a theatre at Khania which would support the antiquity of the monument (cited by Falkener 1854, 27).

Similarly at Rethymnon no Roman aqueduct has been traced although there are references to later examples. Tournefort recorded that the water source which supplied the town came from a narrow valley a 'quarter of a league' to the south and that the Turks cut a channel to bring this water to Rethymnon but lost one half of it *en route* (1718, I, 28). Pococke also reported that a fine stream was brought to the town from a nearby spring which ran 'like a river from a handsome conduit'; however, he attributes its construction to the Venetians (1745, 261). Evidently there is some confusion as to who exactly built the later aqueduct, the Turks or the Venetians, although the reports may allude to successive phases of construction. Undoubtedly, any such succession in later times would contribute to theories of reusing the same springs and trajectories over time.¹⁶

The confusion persists into modern accounts, as at Kaminaki in Lasithi (A 27*) where initially a Roman aqueduct was located (Pendlebury & Money-Coutts 1935-6, 11-12, sites 9a-b, nos 29 and 30, fig. 2). On closer inspection, Watrous concludes that the feature is probably a large irrigation ditch constructed of cut blocks

¹⁶ Aqueducts were still built until the 20th century AD as attested at Aghios Nikoloas where an aqueduct built in 1928 brought water to the city until 1960. The aqueduct conducted the water from the springs called Kinigou or Khilias from the northeast peaks of the Dikte Mountains. Prior to this the inhabitants used private cisterns and the public well in the southern area of the city known aptly as Pigada (Davaras *et al.* 2000, 118).

and that its punched chisel marks resemble those on other Venetian period constructions in the area of Magatzedhais in Kaminaki (1982, 59).

3.6 Conclusion

Confusion concerning the aqueducts of Crete would have been easily resolved had a more pragmatic approach been adopted in past assessments. It is not the purpose of this work to explain the technical workings of aqueducts in detail, as this has been well documented by other researchers; however, many of the past misconceptions associated with the aqueducts of Crete are derived from fundamental misunderstandings regarding the basic principles of hydraulic properties and architectural dynamics. Such imprecision is attested in past aqueduct reports with many examples being misplaced or lost in the field. Such obscurity surrounding the aqueducts of Crete reveals the lack of past research focussing on these monuments. The confusion shows a general lack of understanding of the practical functioning of such monuments.

It is generally impractical for a public aqueduct to supply two major Roman cities (the aqueduct of Campania is exceptional in this respect). Evidence for political and legal connections do not translate into such physical architectural terms: such manifestations are architecturally more subtle. Contemporary monumental constructions in close proximity may have generated much advice and collaboration, in fact they may even have had common supervisory bodies suggestive of an element of collaboration (or $\sigma vve \rho \gamma a \sigma i a$) between the two construction projects. The presence of monumental public aqueducts which are undoubtedly contemporary in both construction and duration may attest a congenial atmosphere between their associated cities and serve as an expression of these good relations but such similarities in construction style are not tantamount to a unified structure. Despite such harmony and evident camaradarie, the associated cities were autonomous in their hydraulic systems and their separate aqueducts were independent and self-sufficient.

CHAPTER FOUR

FUNCTIONAL TYPOLOGIES OF CRETAN AQUEDUCTS

4.1 Introduction

'I expected to see a monument worthy of the hands which had erected it: for once, and for the only time in my life, the reality surpassed the expectation. ... One naturally asks what strength has transported these enormous stones so far from any quarry, and united the arms of so many thousands of men in a spot where not one of them dwells. ... I felt in spite of my sense of littleness, as if my soul was somehow or other elevated, and I said to myself with a sigh, "Why was I not born a Roman?" I remained there several hours in rapturous contemplation. I returned distracted and dreamy, and this dreaminess was not favourable to Madame de Larnage. She had been careful to warn me against the girls of Montpelier, but not against the Pont du Gard' (Jean-Jacques Rousseau, Confessions VI, cited in Furbank 1992, 235).

Such was the admiration of Jean-Jacques Rousseau on viewing the great aqueduct of Nîmes. His sense of veneration is not unique and is only one of a number of similar sentiments concerning the aqueducts throughout the Roman world, expressed by travellers, ancient historians and archaeologists alike. Such images of the magnificent and solid Pont du Gard, the elegant and slender arcades arriving into Segovia, or the crumbling arches approaching Carthage are usually invoked when one thinks of a Roman aqueduct. Unfortunately, the Roman aqueducts of Crete are rarely evoked in such terms if they are ever evoked at all.

Nonetheless, aqueducts in Roman Crete are impressive in their own right; their number and diverse nature allow for an interesting group study. Throughout the island they range in style, type, length and construction material. It can be deduced from the distribution map of recorded aqueducts that the construction of Roman

aqueducts was an island-wide phenomenon (figs 1 and 2). In this chapter the aqueducts of Crete are presented in order to demonstrate the diversity and extent to which they feature within the landscape. Cretan aqueducts are an eclectic group notable in both their profusion and range of purpose even within a broader Roman context. They can be categorised in the somewhat overlapping classifications of public, private, religious, agricultural and commercial, being defined by the nature of the site they feed.

4.1.1 Aqueducts Designed for Public Use in Crete

The use of the term 'public' does not only relate to aqueducts associated with cities, but also rural satellite communities and villages, as opposed to isolated villas or farmsteads. Public sites supplied by aqueducts have been recorded at the following sites: Kouphonisi, Hierapytna, Chersonisos, Lyttos, Malia, Ini, Knossos, Plora, Gortyna, Lasea, Eleutherna, Axos, Aghia Pelagia, Lappa, Elyros, Souia, Khania and Polyrhennia-Kastelli Kissamou. Lebena, Lissos and Diktynnaia also constitute public centres where large-scale aqueducts have been cited but they are religious rather than urban foci. Overlapping functions are notable within the public type, such as at Aghia Pelagia and Lebena where the aqueducts both fed the general centres and also replenished the water supplies of seafaring vessels.

In total there are 21 centres where aqueducts designed for public use have been cited. Moreover, four other sites yielded massive cisterns of such scale that they must have been fed by aqueducts with large capacities no longer visible today, i.e. Kastelliana, Aradena, Aptera and possibly Tholos. If these sites are included there is a potential total of 25 public aqueducts on Crete. Other unconfirmed, and perhaps spurious, citings include examples at Ano Zakro, Olous, Kaminaki, Aghia Photia and Phalasarna. These have either not been identified in the field or dated with sufficient certainty to merit inclusion in the numbered catalogue. Their confirmation in the future would increase the total to 30 public examples. However, while it is tempting to include these fringe examples they cannot be catalogued as securely identified.

Public aqueducts are undeniably informative regarding the settlements which they serve. Population evaluations have been tenuously derived from the capacity of a city's water supply, but such estimates can be misleading since there are many variables which create inconsistencies. Correlations between aqueduct capacity and population density are not directly calculable or comparable, as such equations do not allow for the varied nature of water-based activity from region to region. The considerable problems associated with modern estimates of aqueduct capacities are highlighted by Dodge and reasonably she questions whether such estimations are of any value (2000, 185).

Regardless of such variables, it has been estimated that the Salona aqueduct, in southern Dalmatia, would satisfy the needs of at least 40,000 people, delivering 2.5 million gallons per diem when the flow was normal (11.36 million litres) (Egger & Gerber 1917, iv, 104). This deduction was based on comparisons with Rome where it was concluded, in the same study, that 300 litres were needed per person per diem; however, estimates of the amount of water needed per person per diem in Rome vary between 67 and 1000 litres. Moreover, Wilkes specifies that this figure represents only the people dwelling in or near the city and that those in the surrounding territory would have relied on other supplies (1969, 225, 372). Furthermore, such estimations should incorporate not only aqueduct statistics but also bath numbers and general architectural spreads. Such estimates are greatly affected by the number of baths in any city, as administering water to them was the primary concern of aqueduct administration (Frontinus de Aquaeductu, 94, 107-8). It is almost impossible to estimate populations for the cities of Crete in the Roman period as the present work is merely the first step in establishing the degree of variability within the hydraulic organisation of Cretan cities.

The presence of an aqueduct alone presupposes a substantial population while the fact that public aqueducts are so profuse in Crete also has positive implications for their associated cities. Walker states that (along with sufficient funds, expertise, effective territorial control) a substantial population was a necessary precondition for a city to sustain a long aqueduct and was necessary in order to merit the investment (1987, 69). Consequently, the impressive aqueduct of Lyttos, although having only half the capacity of that of Chersonisos, is indicative of its large populace, which is further endorsed by its extensive theatre which Belli claims to be the largest in Crete (cited in *The Builder 7/12/1901*). Ducrey and van Effenterre claim that no other inland contemporary site in east central Crete (with the exception of

Lyttos and Chersonisos) was touched by the same prosperity or progress as Ini (1973, 290). This boast is probably heavily reliant on the presence of the aqueduct, a feature which is notably absent at the nearby sites of Ligortynos and Kato Asites which both yielded bathhouses.

Gortyna remains the only centre where a broad range of hydraulic architectural types has been identified including substantial baths, *nymphaea* and latrines. Based on the monumentality of the city, Di Vita claims that the population ranged between 60,000 and 80,000 people (2000a, 11). It was previously attributed an enormous population of 300,000 (Davaras N.D., 31). This estimate seems unrealistically optimistic especially considering that Egyptian Alexandria, deemed to be the second-largest city of the Empire after Rome, is thought to have had a population of 500,000 (Delia 1989, 275-292). The fact that the city represents the only centre in Crete fed by two aqueducts is testimony to its affluence. Nonetheless, Taramelli's praise of the aqueduct at Gortyna as comparable with the best Roman aqueducts of the East, such as those of Constantinople is an exaggeration (1902, 120). Constantinople was supplied by the longest aqueduct in the Roman Empire when a 242km-long aqueduct was constructed to conduct water to the city during the reign of Constantine (Çeçan 1996, 21).

4.1.2 Aqueducts Supplying Roman Religious Centres on Crete

The survival of ancient water-based religious activity on Crete is a pivotal phenomenon in transitions from Hellenistic to Roman (as attested at Kato Simi). Alcock's study of a small sample of sites in Greece revealed that of the rural cults those most strongly established within the local society survived the transition since those with such a prominent position were selected for active preservation (1993b, 162).

This pattern is applicable to Roman Crete where major cults of aquatic nature exclusively represent the survival of a preceding cult. Often the Roman cult initially seems to be wholly imported from the broader Roman world but on closer inspection

¹⁷ Lyons had four aqueducts but it was probably not much larger than Gortyna although its status was similar (i.e. provincial capital) (Hazel Dodge, pers. comm.).

¹⁸ Pococke was less impressed with the aqueduct at Gortyna referring to 'the remains of an ill-built aqueduct' (1745, 253). However, he incorrectly believed that the aqueduct was only transporting water from a spring two miles to the southwest.

it becomes apparent that the cult activity merely sustains worship already established in the Hellenistic period or long before. Roman architectural expressions at many of the ancient water-based religious sites demonstrate the deliberate harnessing of ancient water religions to enhance Roman identity. New aspects of the cults developed under Roman influence which reflected the new role of the island within the Roman Empire.

In Crete a small group of public aqueducts form a subset of the overall public aqueduct type whereby the sites they feed are not regular urban foci but centres with strong religious affiliations. Lebena (A 11) and Lissos (A 21) are affiliated with the cult of Asclepius and are sanctuaries associated with therapeutic public bathing (see 9.4). The third religious site associated with an aqueduct is that of the sanctuary of Diktynna on the Rhodopou Peninsula (A 22).

These sites are few but they are well chosen with each site representing an established water cult prior to any Roman activity. Therefore, they are important in terms of transition from the pre-Roman to the Roman period. At Lebena, the earliest worship was attributable to the Nymphs and only focussed on Asclepius in the Hellenistic and Roman periods (*IC* I xvii 7; *SEG* XXXVIII 916). At the Diktynnaion there is evidence for cultic activity since the 9th century BC, which establishes it as one of the most durable foci of water worship on Crete. Only the spring sanctuary at Kato Simi, dedicated to Hermes and Aphrodite, yielded a more prolonged cultic continuation from MM III until the 3rd century AD (Lembessi 1973, 188).

The springs were the cultic foci at the sanctuaries of Lebena and Lissos, whereas at the Diktynnaion water was collected in sunken cisterns (**plates 41b-c**). The fact that the water from the monumental cisterns near the temple (A 22) was conducted to the buildings in the bay below the temple, possibly via a piped line traversing a bridge, is indicative of ritual washing at this point in the bay.

The sanctuary at Lebena is recognised as the most important sanctuary site on the island in the Roman period and, as such, Gortyna, the capital and nearest large centre, is affiliated with the supervision of worship on the site (Melfi 2001, 54). Philostratus (*Apolloni* IV, 34) wrote that in the 1st century AD pilgrims travelled from as far as Libya to visit the site.

At Lissos the therapeutic spring which forms the focus of the sanctuary still

flows in front of the temple down into the centre of the site. Significantly, the temple itself was constructed in the Hellenistic period yet only fitted with a mosaic floor in the 1st century AD, representing a major Roman reorganisation of the site.

The merging of cultic forms results in a fluid continuum characterised by the stolid archaism of Greek life while affecting a Roman claim over the preceding activity in the area of worship. This branding of the older cult ensures that its newly merged format benefits from all the advantages of longevity and antiquity in terms of cult status while simultaneously heralding its dominant position within the island's contemporary socio-religious circles. Roman manipulation of the centres at Lebena, Lissos and the Diktynnaion is evident suggesting that Roman bathing practices were introduced into these sanctuaries in a deliberately conspicuous way in order to project a Roman presence in such established ritual contexts. A Roman stamp is strongly evident at the Diktynnaion where the temple itself was rebuilt several times, lastly under Hadrian in the 2nd century AD, as suggested both epigraphically and by a statue of Hadrian discovered in one of the associated buildings (Welter & Jantzen 1951, 106). Dedicatory inscriptions indicate that the Diktynnaion was a major source of public funding in the 2nd century AD and an association with the sanctuary was of benefit to any ambitious Roman city on the island (IC IV no. 334; see 7.2.4). Flourishing sites such as Sybritos and Eleutherna enjoyed dominant positions along potential routes of communication between Gortyna and the Diktynnaion (Baldwin Bowsky 2001b, 272). This financial benefit sealed the popularity and strength of the cult. Naturally, these benefits were bilateral and the popularity of the cult was transmitted to the emperor through the numerous dedications and statuary at the Diktynnaion (Welter & Jantzen 1951, 116).

4.1.3 Aqueducts Designed for Private Use in Crete

Past research on Roman hydraulic engineering and water supply dealt largely with the imposing aqueduct systems of the urban water supply. Lomas, following Jouffroy, classified the aqueduct as a major public work (1997, 26). Leveau also supported this model, noting that they were a feature of urban conspicuous consumption exclusively advantageous to the urban dwellers and resented by the inhabitants of the hinterlands (1991, 159). Ultimately, aqueducts were described by

Corbier as an image 'evoking the way cities siphoned off resources from their territory' (1991, 222).

This urban/elite consumption model has recently been questioned and it has been suggested that rural populations benefited from the primarily urban supply (Wilson, A.I. 1999, 315). Dependent systems also tapped the public aqueduct in order to supply either the farms or villas of intermediate areas. The farms located in the hinterland of Rome, which specialised in crop production for the city's markets, would have necessitated a secure perennial supply (Thomas & Wilson 1994, 189). Larger villas, equipped with baths and gardens, also availed of the public supplies. These private users paid for such water rights and this income helped fund maintenance costs. Such usage, at least in the legal sense, was largely confined to the upper echelons of rural society (Frontinus, de Aquaeductu, 118) as exemplified by Martial who complains about the difficulties of watering his rural villa and his need to tap the Aqua Marcia (Epigrams IX 18). The lavish villa of Nibretos on Crete may have tapped the aqueduct of Gortyna as it is located along the route of this public supply (fig. 38). Other private individuals also benefited from tapping the main systems illegally: such a common misdemeanour that many aqueducts were actually brought to a standstill by private citizens watering their gardens (Frontinus, de Aquaeductu, 75).

Private supplies were not only secured by tapping the main public aqueducts, but by constructing local, small-scale aqueduct or conduit systems. In addition to the public variety, independent private aqueducts were conceived of and constructed as independent entities for the sole use of private households. Despite the fact that little work has been done on private aqueducts, they must have been common, supplying farms and villas alike. In theory, the potential for private aqueducts is quite high, as public aqueducts provide a template which can be both scaled down and reproduced (Wilson, A.I. 1999, 329). Those who benefited most from this technological transfer were those who could afford to construct aqueducts for their private property or rural settlement. The general low-profile construction characteristic of most private aqueducts hampers their identification, although this attribute is not surprising in view of the cost of constructing an impressive aqueduct erected on an arcade (Wilson, R.J.A. 1996, 24-5).

There are at least two private sites supplied by purpose-built aqueducts in Crete: Pachyammos (A 3) and Minoa (A 17) (see 9.3.1 and 9.6). There is also some evidence for a supply at Makriyalos (B 1) and a strong conjectural case can also be proposed for the villa at Myrtos (B 5), with its substantial bath.

The example at Minoa, on the Akrotiri Peninsula, supplies a substantial building which has been securely identified as a villa by Sanders, Guilbride and Raab (Sanders 1982, 169, fig. 61; Guilbride 1999, 52; Raab 2001, 113). The aqueduct supplying the villa descends towards Minoa from the northeast, through the Kamares Gorge, on an architectural substructure which survives in sections as far as the north tip of the valley of Marathi (Theofonidis 1950-1, 9).

The second candidate for a private villa with its own bath-suite and private aqueduct is a Roman structure at Pachyammos originally excavated by Boyd in 1903 (1904-5). The villa has been identified by both Sanders (1982, 17 and 141 for reference to a 'villa') and Baldwin Bowsky (1994, 9, n. 12). 19 The original plan, drawn by Hastings in 1903, depicts a water supply system comprising an aqueduct and settling or regulation tanks leading to the eastern side of the structure (fig. 21). The 0.20m-wide channel has been recorded by both Seager (1906-7, 115) and Soles (1973, 240) near a tomb at Vasiliki and traced 500m further south crossing the main stream running to the north coast on a bridge (Ergon 1972, 118; Zois 1992, 280). It is probable that the aqueduct tapped the water from the nearby Xa Gorge as the aqueduct could not be traced in the field further south of the entrance to the gorge (personal observation). The springs near the chapel of Aghia Anna at the head of the Xa Gorge subsequently supplied the leat of a Venetian mill which still clings to the sheer southern cliff-face at the mouth of the gorge (Rackham & Moody 1996, 181). The springs at Episkopi, 4km from the Roman complex, have also been suggested as the water source for the Roman complex (Seager 1906-7, 115). Certainly, the aqueduct could theoretically have been quite extensive as the meandering line of any aqueduct can be potentially much longer than the direct distance. Aqueducts constructed by private individuals were status symbols and their scale would demonstrate the affluence of the owner: nearby springs were often overlooked so that a more elaborate system could be constructed.

¹⁹ Pendlebury classified it as a Greco-Roman building (1939, 364).

A possible aqueduct associated with the villa at Makriyalos presents a third potential candidate. Papadakis recorded terracotta pipes and open channels carrying water from cisterns to the complex and its associated gardens (1983c, 59). Similarly, at Myrtos the Roman villa is also likely to have been furnished with an aqueduct due to the impressive size of the bath-suite (B 5). Furthermore, the presence of a circular cistern, comparable to that at Minoa (plates 74a-b), could be indicative of an aqueduct supply where this tank acts as a regulatory device.

Circular cisterns internally faced with brick are associated with the two private bath-suites at Minoa and Myrtos, while a further example is associated with the Villa Dionysus at Knossos. All three examples are notably shallow in depth (c. 1m). At Myrtos the construction and shallow depth of the circular cistern associated with the bath-suite was exposed by the modern road-cut (plates 51a-b). The construction incorporates exterior radial buttresses similar to those used at the massive barrel-vaulted cistern complexes at Kastelliana and Aptera (plate 35b). The cistern has been dated to the earliest phase of the bath (i.e. Trajanic) on the basis of the distinctive thickness of its brick in relation to the thinner brick of the hypocaustal area which represents a later phase (see 14.4). Its early date indicates that the cistern was an integral component to the original design of the villa.

The water supply for the bath-suite at Minoa was allowed to settle in a large sunken circular cistern constructed of brick-faced mortared rubble (**plates 74a-b**). This cistern had an overall depth of 1.08m, measuring 0.20m from its inner lip down to a brick ledge from where it dropped a further 0.88m to its base. The cistern was drained by a terracotta pipeline facilitated by an opening of 0.5m on the western side of the cistern (Andreadaki-Vlazaki 1983, 368, pls 162a and b). The pipeline was composed of 0.19m long pipes each with a diameter of 0.06m and a wall thickness of 0.01m (Theofanidis 1950-1, 9).

The circular cisterns executed in brick-faced mortared rubble can be compared to the stone variety encountered at Kastelli Kissamou where a circular cistern occupies the northeast section of the bath in the Apostolaki Plot (**fig. 83**). The cistern is constructed in uncut stone (B 51). It measures 4.2m-4.3m in diameter and stands to a height of 1.14m above ground level; its floor was never established (Tzedakis 1979, 394, fig. 2, pl. 202a). Its measurements are closely comparable to

those of the cistern at Minoa.

The circular cistern discovered at the Villa Dionysus at Knossos was located in an elevated position to the southwest of the *domus*. This tank is thought to supply the *domus* and probably fed the lead pipes enclosed in stone-built channels below the surface of the peristyle. In this instance a stop-cock regulating the water into the cistern survived (**plate 74c**). A large pipe, apparently leading from the aqueduct, filled it from the west. The pipe was neatly plastered into a small fluted marble column-drum which had been hollowed out to function as a stop-cock (**plate 74c**) (see 6.4). A lead pipe extended from this to enter the tank just above its floor level (*AR* 1999-2000, 134).

All water-consuming facilities must have had a mechanism which allowed them to be shut off, although to my knowledge the example in the tank serving the Villa Dionysus at Knossos is the only example of a Roman stop-cock on Crete (**plate 74c**). They are found in North Africa, at Volubilis and Djemila, where stop-cocks are recorded regulating the water for private housing associated with tanks located along the main water supply system (Wilson, A.I. 2001, 93).

In the light of the discovery of such a cistern associated with a stop-cock at the Villa Dionysus it could be inferred that the comparable cisterns at Minoa, Myrtos and Apostolaki also regulated water intake for these complexes from aqueduct supply lines. At Minoa, where the cistern must have functioned as a composite part of the aqueduct water supply, it could be postulated that a stop-cock device, similar to that discovered in the Villa Dionysus, regulated the water flow. Similarly, the presence of a similar cistern at Myrtos suggests the presence of an aqueduct supply while it could equally be proposed that future excavations would expose a bath-suite within the Villa Dionysus.

Moreover, the shallowness of the cistern above the Villa Dionysus suggests that the water could be solar heated in the summer months (Paton 2000, 30). Even Seneca in his old age indulged in a warm bath with water from a tank warmed by the sun (*Epistulae* 83). This indulgence may explain the shallow depth of the circular cisterns of Crete as a group. Theofanidis' interpretation of the two incisions along the rim of the cistern at Minoa as evidence for a domed roof seems unfeasible (1950-1, 9) although the interior rim could have facilitated a temporary cover, which could be

applied when necessary.

The function of the circular cistern associated with the Villa Dionysus establishes the overall type as an integral feature of lavish private housing fed by an aqueduct system (in the case of the Villa Dionysus, tapping the main public supply). The cisterns regulated water flow into the complexes while also potentially facilitating solar heated supplies.

4.1.4 Agricultural/Irrigational and Industrial Aqueducts of Crete

In Crete there is a distinct dearth of agricultural aqueducts. No Roman mills have been clearly identified on the island but their popularity in the medieval period demonstrates the suitability of the topography and geology of Crete for such industry. The older residents at Palaikastro recall that villagers transported their grain to a mill at Ano Zakro, possibly represented by the toponym *Paliomilou* (of the Old Mill) in this area, up until as late as the early 20th century (Holly Parton, pers. comm. 2002; Mariani 1895, 294).²⁰

Irrigation aqueducts are also rare on Crete during the Roman period. In the Mesara Plain, in central Crete, an extensive irrigation system has been located between Pyloros and Rotasi (Sanders 1982, 23). Sanders reports a string of small sites at 2km to 3km intervals represented by cisterns varying in number from one to twelve, but of similar construction and size (10m-14m long x 4m-6m wide) (1982, 23). He deduces that these cisterns were designed to collect rainfall for the irrigation of crops and that they were associated with low-profile aqueduct systems no longer detectable in the field. Sanders believes that the cisterns represent estate centres despite the fact that there is no evidence for associated domestic complexes (1982, 23).

No clearly industrial aqueducts have been found on Crete but it could be argued that the substantial Roman glass factory at Tarrha would have availed of water supplied by an aqueduct despite the fact that, as yet, no remains have been found (Buechner 1960, 109-117; Weinberg 1960, 93). On the islet of Kouphonisi the Minoan and Hellenistic traditions of dye-making (involving murex fishing and

 $^{^{20}}$ The general popularity of the toponym 'Paliomilos' in the landscape could possibly allude to Roman mills.

processing) survived into the Roman period when it most likely availed of the aqueduct supply for the Roman site on the north of the island. The industry had expanded significantly in the Roman period; purple dye was exported from Crete at this time (Haggis 1996b, 201).

Metal-working was reported northeast of the modern village of Kantanos, which also represents the Hellenistic and Roman city of the same name (*IC* II VI). The remains included adits penetrating the quartzitic veins of chalcopyrites and galena and the actual furnaces for processing the ore (Davies 1935, 267). The furnaces measured 0.60m x 0.60m x 0.90m high and were associated with cisterns and pipes for washing and cooling the ore which still contained 44.32% iron indicating that the miners were primarily interested in the other metals, copper and gold (Davies 1935, 267). The site is located at the head of the valley of the Kakodikianos River and it is possible, although untested, that aqueducts facilitated the overall process.

4.1.5 Aqueducts and Cisterns Serving Ships

The phenomenon of aqueducts serving ships is quite common in the Roman world. The most famous is the Piscina Mirabilis, the large reservoir found at the end of the Serino aqueduct in the Bay of Misenum, where fresh water was used by the ships of the Roman fleet which sailed on the Tyrrhenian Sea. The reservoir and its 96km aqueduct were specifically designed to bring water from the Apennines (Tsuk 1996, 118).

On Crete examples, albeit of reduced scale, of this type of aqueduct have been recorded at Aghia Pelagia (A 15), Lebena (A 11) and possibly Malia (A 6). At modern Aghia Pelagia, identified as ancient Apollonia, Taramelli noted a large cistern on the coast to the west of the bay (fig. 46) (1899, 318). He recorded elevations of 'diamicton' construction, internally lined with a thick layer of mortar (Taramelli 1899, 318). In the water below Taramelli also observed traces of a quay mole and docks and concluded that the cistern was used for the supply of water for ships since an aqueduct descended the then wooded slopes of Strumbula in the direction of the cistern (1899, 318). It is interesting that Buondelmonti describes an aqueduct carried on arches leading from Mount Strumbula and includes a depiction representing the mountain (cited in van Spitael 1981, 149-150, pl. IV)

Taramelli also cited a similar system at the sanctuary at Lebena where he examined a rectangular building partially rock-cut into the cliff-edge on Cape Psamidomouri which he thought was designed primarily to supply ships with fresh water (fig. 41, as indicated by the arrow). The structure measures 11.50m x 4.20m lying on an east-west axis and is divided into two separate parts, the western being smaller and set at a higher level (Taramelli *unpublished manuscript*). The fact that the walls were coated with *opus signinum* and that a channel existed at the base of the dividing wall suggests that the building acted as a cistern. A portion of the main aqueduct in this area (marked as AR on fig. 41) was thought to feed the cistern. This facility would be most suitable for the heavy traffic at the dockside which is further attested by the presence of ship-sheds, quays, moles and docking provisions along the shore. Philostratus conveys the busy nature of the harbour in recording the multitude of pilgrims from Libya who flocked to this sanctuary in the 1st century AD (*Apolloni* IV, 34; *IC* I xvii 1-60).

At Malia a small-scale aqueduct located to the east of Mill Beach served a coastal structure of uncertain nature (plates 9a-b) (A 6). The complex at which the aqueduct terminates is badly eroded by the sea: only one small compartment and a semi-circular cistern for water collection are discernible (plate 9c, as indicated by the arrow). The channel dimensions are small and decrease as it approaches the coastal structure (0.25m wide x 0.30m deep). The aqueduct is alternately carved into the low-lying rock outcrops along the shore or supported on a low substructure wall. There are no visible docking facilities to suggest that the aqueduct serviced even small craft, with the exception of a dubious rock cutting directly below the terminus of the aqueduct, and its function has yet to be securely determined.

At Tholos in the Bay of Mirabello in east Crete another massive construction may represent a monumental cistern for the use of docking vessels, rather than a granary as was initially proposed by Haggis (1996a and b) (see 4.1.6) (**plates 81a-b**). It would surely be unfeasible that this small bay was host to the large grain carriers described by Lucian (*Navigium* vi 5-10), as argued by Haggis (1996b, 203-7). In fact it has been questioned whether grain carriers of such size ever existed, and it has been shown that the Isis acted as a literary topos to provide an "illusion of realism" (Houston 1987, 446). Lucian's claim that the vessels drew crowds at Athens,

prompted erroneous comparisons with the biggest of the British East Indiamen which came into use at the beginning of the 19th century (Casson 1994, 124).²¹

Nonetheless, the port at Tholos had importance within a regional framework. It was the main port to the isthmus monitored by a wealthy villa (equipped with a bath-suite and aqueduct) which may have been strategically founded. The site was also linked by an ancient road leading from Hierapytna across the isthmus (Seager 1904-5, 207).²² The Roman structures at Pachyammos and Tholos must have monitored and facilitated the busy trading port and regulated the traffic across the isthmus from Hierapytna.

The cistern at Tholos was probably fed by a nearby spring for the use of docking craft at this local port. Seager reported that his workmen used the spring which emerged along the shoreline at Tholos on a daily basis while working on the nearby island of Pseira (1910, 5; Haggis 1996b, 192). Admittedly, this seems too low to be associated with the cistern although seismic shifts may have upset the original location of the spring.

Indeed, in addition to these coastal architectural systems, there are many freshwater springs on Crete which emerge under or near the sea which must have offered fresh water to coastal traffic. There are numerous undersea springs along the south coast from Khrysoskalitissa to Khora Sphakion. Pashley refers to a spring near Sphakia (on the coast between Tarrha and Loutro) near the little chapel of Aghios Pavlos where an abundant source of fresh water emerged from the beach and flowed into the sea (1837, II, 259).²³ Buondelmonti, referring to the same spring, claims it was half the size of the Arno which, although an exaggeration, conveys the copious nature of the source. On Gavdos there are also fresh springs which emerge from the sands of the beaches (Jennifer Moody, pers. comm. 1999) and even today fresh water rising to the surface of the sea is drunk by passing fishermen (Rackham & Moody 1996, 42). In the early 20th century AD this was attested at Sphakia where Trevor-

²¹ Houston wisely cautions that 'if there was such an increase in the size of ships, it will eventually show up in the evidence from underwater archaeology, and it is upon that evidence, not upon a literary construct such as the imaginary Isis, that we should rely' (1987, 450).

²² Becker and Betancourt argued that nearby Vasiliki monitored traffic across the isthmus along this road in the Bronze Age (1997, 43).

Battye described fishermen hauling drinking water from the sea in pitchers (1913, 217). It is reasonable to assume that these were also used in ancient times.

4.1.6 Public Cisterns of Crete

Even though 21 public aqueducts have been recorded supplying sites on the island, sites with immense cisterns, while not necessarily pertaining to this selection, are likely to have been fed by aqueduct systems which are no longer visible in the landscape (**fig. 2**). Large cistern complexes often represent the last surviving element of an aqueduct system. Their presence within the landscape was not necessarily an isolated feature in the past, as they may have formed an integral unit within an otherwise complex hydraulic system which is now largely fragmented. The aqueduct reported in association with the cisterns at Kastelliana in 1916 is no longer visible in the field and only the immense vaulted cistern complex survives (AA 1916, 156) (**plates 12a-c**).

At Malia, the cistern and aqueduct have been treated as two separate entities in the past despite the fact that van Effenterre originally suggested, albeit tentatively, that the cistern fed a small aqueduct visible in the rock outcrops to the east of the beach (1976c, 6). This study has confirmed van Effenterre's original suggestion and secured their connected function.

The cisterns serving Carthage, in North Africa, became outdoor cellars (now cleared) for the hamlet of La Malga. It was originally accepted that they were supplied by the 98km-long Zaghouan aqueduct, now badly destroyed, which supplied them with c. 8.5 million gallons of water a day (38.6 million litres)(Raven 1993, 19-20). Recently, their association with the Zaghouan aqueduct has been questioned. Rakob argues that the cisterns were only subsequently fed by the Zaghouan aqueduct (2000, 80) while Wilson refutes their being connected to this aqueduct at any stage (A.I. 2001, 91). Wilson demonstrates that a separate aqueduct supplied the original longitudinal cistern complex at La Malga and that subsequently a transverse cistern

²⁴ Rakob proposes that the early cisterns relied on water from a nearby spring whose abundance is suggested by the fact that it still supplied the fortress and the harbour of La Goulette with water in the 19th century AD (2000, 80).

²³ Waddington, while staying at the convent of Strophades, refers to such a spring 50 yards from the sea dedicated to Dionysus and he also notes a spring at Polis on Ithaca which emerges from the sands near the water's edge (1854, 108).

was added which was supplied by another distinct channel leading in the direction of a local spring north of the city at Sidi Bou Said (A.I. 1998, 79).

Wilson confirms that the two structures (i.e. the La Malga cisterns and the Zaghouan aqueduct) functioned simultaneously as two separate systems once the Zaghouan aqueduct was constructed. He emphasises that there is no evidence that the Zaghouan aqueduct ever fed the large cisterns at La Malga, even though it runs alongside the cisterns as no diversion channels or feeder branches from the aqueduct to the cisterns have been discovered (Andrew Wilson pers. comm. 2003). Significantly, neither of the proposed arrangements (Rakob's or Wilson's) dispute that the cisterns were aqueduct fed, but rather question which aqueduct supplied them and when: the Zaghouan aqueduct, the putative Sidi Bou Said aqueduct or a shorter aqueduct which taps a nearby source.

Such observations bear profound implications for the large cisterns of Crete and their corresponding aqueducts, yet curiously, despite the massive proportions of many of these cisterns, few have received much serious attention. The major cisterns on the island are found at the following sites (in decreasing size): Eleutherna (taking the combined capacity of the two complexes together), Chersonisos, Aptera (the L-shaped cistern), Aptera (the triple-vaulted cisterns), Lappa (the so-called Octavian cistern), Kastelliana, Tholos, Diktynnaia and Aradena. The cistern in the marsh at Malia is also substantial but it survives only to floor level and, as such, it is impossible to gauge its true capacity. Other cisterns, such as those of the Davli Plot and the Marias Niotaki Plot at Kastelli Kissamou, while relatively large, are not monumental.

Cistern	Length	Width	Dept	th/Height	Capacity
Eleutherna	40m	25m	5-6n	1	(x 2) =
(rock-cut)					10,000m³ -
					12,000m³
Chersonisos	58m	22m	5.5m	1	7,018m³
Aptera					
L-shaped					
Cistern	60m	6.3m	9m	3,402m³	5,386.5m³
(long side)	35m	6.3m	9m	1,984.5m³	(the
(short side)					excavators
					offer
					5,500m³)
Aptera	24.7m	18.5m	>4.1	m	>1,873.5m ³
(triple vaulted)					
Lappa	26.10m	c.8m	4.2m		809.76m³
Kastelliana	16m (4m	12.6m	>4m		>806.4m³
	for				
	each of the				
	4 tanks)				
Tholos	52.50m	5m	3m		787.5m³
Diktynnaia	20.1m	11.75m	2.20m		520m³ plus
					the tanks
					capacity of
					$144m^3 =$
					664m³
Aradena	23.22m	13.5m	>1.5m		>470.20m³
Cisterns under	8m	7m	3m		168m³
Trefoil					
Basilica					
Malia	8.2m	4.6	?		

The rock-cut subterranean complexes found at Eleutherna represent the cisterns with the greatest capacity on the island each holding 5-6,000m³ (Mariani 1895, 213; Spanakis N.D., II, 159-160). These twin cisterns are essentially settlement tanks, being drained by a Hadrianic aqueduct which taps the water high in their rock-cut wall. The cisterns are lined internally with *opus signinum* incorporating bevelling along the corners of the walls: a specifically Roman feature. It has been argued that the Hadrianic channel which drains these cisterns represents a later addition to the complex and that originally the tanks had acted as storage cisterns; however, there is little reason to view the system as anything other than an integrated and unified Roman design.

The second-largest cistern complex on the island is that of the *castellum* at Chersonisos (A 5.10). This rectangular subterranean cistern complex yielded a capacity of 7,018m³. Mandalaki maintained that parallels for the massive dimensions of the cisterns at Chersonisos could only be found outside Crete, in Italy and North Africa (1999, 263). Certainly, if capacity studies are restricted to cisterns of similar construction style then Mandalaki's statement is correct, as the monumental cisterns Chersonisos is certainly the largest barrel-vaulted cistern complex on the island. However, the combined capacity of the rock-carved complex at Eleutherna (even allowing for the massive square rock-carved columns) represents a massive reservoir.

The third largest cistern on the island is the L-shaped cistern at Aptera which has a capacity of 5,500m³ (A 31*)(Ninou-Kindeli & Christodoulakos 2000, 34; plates 35a-b). The cistern is unusual in shape but regular in construction style with elevations of brick-faced mortared rubble clearly displaying the spring of the vault (plate 35a). An earth embankment abuts the short base of the L to the south, whereas the long stroke of the L is mainly freestanding, surviving up to over 9m high with buttresses supporting its northern end (plate 35b). The sides were originally interpreted as different construction phases (Sanders 1982, 167) but the construction

²⁵ When Hood and Smyth surveyed the Roman aqueduct at Knossos they noted that whenever the channel was exposed its bottom edges were bevelled (1981, 24). They also encountered this feature in the Roman cisterns associated with this supply but not in the aqueducts of the later periods. Consequently, when Catling *et al.* traced a Late Roman/Venetian portion of an aqueduct during the excavations preceding an extension to the Venezelion hospital at Knossos, the only feature which distinguished the channel as Venetian was the lack of a bevelled edge (1982, 64).

detail reflects a unified design. The overall effect of the superstructure (with elevations of brick-faced mortared rubble supporting by massive buttresses and barrel vaulting) is also encountered in the cisterns at Kastelliana (plate 11a), Tholos (plate 82a) and Chersonisos. The latter represents a sunken variation on the theme, whereas the complex at Kastelliana is freestanding but subsidence from the foothills of the Asterousia Mountains to the south has created a quasi-subterranean effect.

Savignoni reports that the triple-vaulted cistern complex at Aptera measures 24.7m x 18.5m with a height of 8.2m (1901, 294, fig. 4). On visiting the site it becomes apparent that these dimensions are clearly exaggerated especially with regard to the height, which could be halved, yielding a more representative capacity of 1873.5m3; admittedly some silting is evident within the cistern. The construction of this cistern is unique on Crete as it is divided internally by two rows of four columns constructed of large worked and dressed stone blocks (figs 57-58; plate 36b). These large stone blocks (average 0.30m x 0.40m) form two series of five lateral arches. The vaulted roof and the drainage aqueduct, which still partially survives at the northeast corner of the complex, are constructed in brick. The drainage system represents an arched channel similar to that of Lappa (discussed below). Drerup originally deduced from the diverse construction styles and material incorporated into the cistern that it was initially built in the Hellenistic period (as represented by the large ashlar work) but modified in the Roman period (as attested by the brick-faced mortared rubble in the upper walls, vaults and drainage channel) (1951, 53). However, the architectural sequence is questionable since the ashlar masonry forms an arcade and arcaded ashlar is uncommon in the Hellenistic period (Andrew Wilson, pers. comm.). Moreover, the arcades would have no function if not to support the triple barrel vault in concrete which is indicative of their contemporaneity.

A substantial cistern at Lappa yielded external measurements of 26.10m long x 10m wide x 4.2m high indicating an exaggerated capacity of 1,096.2m³ (personal observation). The cistern is now sealed making it impossible to estimate the internal dimensions which would provide for a more accurate assessment of its capacity. If a lateral wall thickness of 1m were estimated then the capacity would be 809.76m³. The cistern abuts a rock outcrop along its short axis and directly taps a spring through the rock face. The cistern overlooks the upper zone of both the modern and ancient site

and has been reused today to supply the modern village with water. It has been structurally stabilised and sealed for this function. Consequently, it is difficult to discern its original constructional style, as the original vault was not retained while much of the outer stone facing is missing (plates 33a-c). Facings of petit appareil only partially survive and much of the mortared-rubble core lies exposed (see 5.4 for terminology). The vaulted drainage channel is still well preserved and is similar to that of the triple cistern at Aptera, although constructed of radially placed chipped stone, as opposed to brick (plate 33a). It projects 2m from the front of the structure, i.e. towards the site. Internally, the cistern has bevelled corners and a series of narrow steps, presumably for cleaning, descending into it along the lateral wall. The roof originally consisted of a barrel vault and was probably constructed in stone as no brick was reported from the collapse.

The entire vaulted cistern complex at Kastelliana measures 18.40m x 12.60m externally. Each vaulted cistern measures 4m x 12.60m internally (A 29*). The outer walls are 1.4m thick and stand 4m high to the spring of the vault. On deduction, and allowing for the vault, the capacity of each cistern was at least 201.6m³ with an overall capacity of 806.4m³ which seems rather low. This cistern complex was subdivided into four vaulted compartments with a further smaller compartment located on the north side. This compartment probably served as a regulatory cistern for the drainage channel, as it forms an appendage to the main complex (**plate 11b**). This is a unique feature in Crete but a similarly placed sedimentation basin is associated with the 2nd-century AD reservoir of Sepphoris in Israel (Tsuk 1996, 120).

It can be argued that the massive construction at Tholos in the Bay of Mirabello also represents a monumental cistern, and so falls into the current category (plates 81-2) (see 4.1.5). Haggis provides measurements for the structure at Tholos of 52.50m x 5m (internal) x 3m (to the spring of the vault) yielding an overall capacity of c. 787.5m³ (1996a, 419). Boyd provides dimensions for the structure of 57m x 9.3m (presumably external measurements), with an average wall thickness of 1.1m, and a surviving height of 3.7m with ten buttresses supporting the east side (1901, 155).²⁶

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²⁶ Sanders records even thicker walls; the west being 2.4m while the east is 1.63m (1982, 141).

The structure was originally identified as a granary based on its supposed similarity to Roman installations under the Empire. Yet, the structure's deviation from the granary type can be clearly outlined while its conformity to the overall monumental cistern type is undeniable. Military granaries were long narrow rectangular solidly constructed structures often including buttresses, as admittedly is Tholos. Nonetheless, a raised floor is perhaps the most clearly definitive feature of the granary type and is lacking at Tholos (Rickman 1971, 2). The steps located in the corners of the structure were originally interpreted as facilitating access to the grain for the *saccarii* (Sanders 1982, 140-1; Rickman 1971, 8 and pl. 19), but are secondary additions to the original design (Donald Haggis, pers. comm. 2002) (plate 81c). In any event, steps are also a common feature in monumental Roman cisterns, as seen in the similarly sized monumental cistern at Lappa (plates 33a-c). Tholos' overall plan is characteristic of monumental cistern construction in Crete and further afield.

It becomes evident from an analysis of monumental cisterns on Crete that the structure at Tholos fits comfortably within a framework and chronology supporting its identification as a cistern. Moreover, it qualifies for entry into the category of monumental cisterns in the broader Roman world (for a description of the type see Wilson, A.I. 1997, 51). The barrel-vaulted roof, the *opus signinum* flooring with bevelled edges (as seen in the cistern at Malia, Eleutherna and Knossos), the buttressing (attested at Kastelliana, Chersonisos and Aptera) and the internal facing of brick are all characteristic of monumental cistern construction in Crete.

The triple cistern complex at the sanctuary of Diktynna is actually small enough to facilitate rainwater collection. A spread of *opus signinum* bedding, surviving along the external façade of the north wall just below the spring of the vault, might have facilitated rainwater collection. Its level also verifies that the cisterns were always subterranean with only the vaults visible above ground. The complex measures 20.1m x 11.75m x 2.2m deep (519.59m³); yet Sanders calculated a capacity of only 240m³ which when added to the capacity of the smaller sedimentation tanks in the floor yields an overall capacity of 384m³ (1982, 84) (**plates 41a-c**). His calculations imply that the sedimentation tanks have a capacity of 144m³. Moreover, the position of these cisterns within the reconstruction of the complex (**fig. 50**) would

suggest rainwater collection from the roof of the temple, an arrangement similar to that of the Trefoil Basilica plan (see below).

The capacity of the cistern at Aradena (yielding a minimum of 470.20m³) would suggest that it was also small enough to be fed by rainwater, but the estimate is clearly misleading as the cistern depth could be far greater once the fill is removed (**plate 34b**). The modern ground level is located 1.5m below the spring of the vault and is obviously not the original base of this cistern and, consequently, its capacity could potentially be doubled (**plate 34b**). Nonetheless, there is no evidence for an aqueduct in the vicinity.

On examining the published plan of the cisterns (now back-filled) under the atrium of the Trefoil Basilica at Knossos, it seems that the complex measured 8m (north-south) x 7m (fig. 33). Judging from the scale in the published photograph they stood 2m to the spring of the vault with the arch rising to c. 3m (plate 18c). A single 4th-century AD coin, found at the bottom of a foundation trench (presumably of the church walls), established the date for the construction of the basilica (Megaw 1984, 323-4). Megaw also interpreted it as a *terminus ante quem* for the large vaulted cisterns under the atrium of the church (1984, 323-4). It was thought to signify a point after the abandonment of the cisterns and a subsequent period of disuse. However, the size ratio between the cisterns and the basilica and their alignment and spatial position within the basilica suggests that they are a contemporary and integrated feature within the church. Their position under the atrium of the basilica would allow for collection of runoff water from the roof of the basilica.

The cistern at Malia was examined in 2003 and yielded internal dimensions of 8.2m x 4.6m (although its northeastern limit could not be gauged accurately as it was destroyed at this point). The walls, which survived on the northwest, southwest and southeast, are 0.80m thick. The layer of *opus signinum* lining the cistern is bevelled along its edges where it meets the outer walls (**plates 8a-b**, as indicated by the arrows). A drainage pipe penetrates the southwest wall midway along its length just above the floor of the cistern. It is visible on the outer (southwest) face of the wall just over a ledge (0.2m-0.26m thick) which runs along the wall. This ledge may have supported some form of channel (**plate 8c**, the ledge is indicated by the arrow). It is possible that the cistern acted as a form of *caput aquae* tapping the spring, which still

flows at the base of the southwest wall, in order to supply the aqueduct visible in the rocks to the east of the beach (A 6).

A general architectural framework emerges for the monumental cistern type on Crete. The overall group is defined by its architectural form which consists of a barrel vaulted rectangular structure lined internally with opus signinum incorporating bevelled edges. The rock-cut cisterns at Eleutherna are obviously atypical (although these do demonstrate bevelling in their opus signinum). The monumental cistern type is generally, but not exclusively, constructed with external facings of petit appareil and internal facings of brick over a mortared-rubble core. Putlog holes are commonly seen along the horizon defining the spring of their vaults. This horizon is sometimes also delineated with a brick bonding course (as at Kastelliana). Internal stairs facilitate access into some of the cisterns (as at Lappa), others have aeration holes within their vaulted roofs (as evidenced in the triple-vaulted cisterns at Aptera) while some are drained by vaulted channels at their base (as at Lappa and Aptera). The larger varieties are buttressed (as encountered at Kastelliana, Chersonisos and Tholos). These common features define the group, although the format allows for a degree of variation with unusual features responding to the specific demands of each system. Nevertheless, their overriding common features group them together as cisterns which operated in partnership with aqueducts (in terms of style, general function and loose chronology). Consequently, they are complementary to the overall study of longdistance water supply on the island of Crete.

Wilson includes Crete along with Italy, Spain, Asia Minor and North Africa as areas in the Mediterranean with large cisterns with capacities often exceeding several thousand cubic meters (A.I. 1997, 97; 1998, 89; 2001, 84). It is highly significant that the largest cisterns on the island fall into the same bracket as the great cisterns of Carthage (albeit on the smaller end of the spectrum) which have been rated as the largest in the Roman world.

The overarching commonalities which lend form to the group of monumental cisterns of distantly separate regions suggest a common function. Rakob attributes the size of the gigantic water reservoir at La Malga (56,500-73,500m³) as compensation for a water supply that was not permanently guaranteed and proposes that even rainwater was directed, via the cistern coverings, into the vaulted interior (2000, 80, n.

46). Crete had relatively little fear of water shortage in contrast to North Africa where the most capacious cisterns are found; however, efficiency of water use seems to be the underlining objective in their design. Wilson argues that large storage cisterns on aqueduct networks were designed to facilitate reserve supplies (A.I. 1998, 89; 2000b, 600). He posits that by day the aqueduct flowed into the city's baths and fountains as normal, but by night the water was directed towards the monumental cisterns where it was collected to be distributed as needed the next day (Andrew Wilson, pers. comm.). The fact that monumental cisterns are found in the relatively drier regions of the empire might also support a seasonal model for such reservoirs (Wilson, A.I. 1998, 89). In the case of African cities these reserves could be operate on a seasonal basis but when the cisterns are associated with large baths the reserves were accumulated daily (Wilson, A.I. 2000b, 600). Certainly, the largest of the cisterns in Crete were located in cities with relatively large baths, as the table below indicates.

Cistern	Capacity	Bath present	
Eleutherna	10,000m ³ -	Yes	
(rock-cut)	12,000m³		
Chersonisos	7,018m ³	Yes	
Aptera	5,500m ³	Yes	
(L-shaped)			
Aptera	>1,873.5m ³	Yes	
(triple vaulted)			
Lappa	809.76m³	Yes	
Kastelliana	>806.4m³	?	
Tholos	787.5m³	No-port?	
Diktynnaia	c. 664m³	?	
Aradena	>470.20m³	?	
Trefoil	168m³	No	
Basilica			
Cisterns			
Malia	?	?	

4.2 Conclusion

The main observation of this chapter concerns the diverse functional typologies attributable to the Roman aqueducts in Crete. The current chapter illustrates that on Crete not all aqueducts were designed primarily to serve the urban populace. The traditional model is dominated by large impressive aqueducts, whereas this study embraces a wider range of aqueduct types. Small-scale aqueducts designed, either exclusively or partly, to supply individual farmsteads and rural communities were a common feature within the hinterlands of Rome. Thomas and Wilson observe that many of the Forma Italiae surveys located small-scale aqueducts supplying rural sites in the hinterlands of Rome and demonstrate that this pattern is complemented by the epigraphic and literary accounts (1994, 149, 172-92). They mention an inscription discovered near Viterbo commemorating the construction of an aqueduct by Mummius Niger Valerius Vegetus to supply his private estate at Aquae Passerianae (Thomas & Wilson 1994, 148; CIL XI 3003 = ILS 5771). They also refer to Columella who emphasised the general necessity, for the efficient operation of any farm, of procuring a perennial spring or conducting water from a nearby hillside or valley (de Re Rustica I v 1-2; cited in Thomas & Wilson 1994, 148). Significantly, Thomas and Wilson maintain that this pattern is applicable to other rural areas of the Empire (1994, 149; see also Wilson, R.J.A. 1996, 24-5; see Wilson, A.I. 1997, 105-6).

On Crete the identification of at least two villas with private bath-suites supplied by their own aqueducts (i.e. Pachyammos and Minoa) represents this sophisticated architectural format for the first time in the landscape. Other early villa sites, such as Myrtos and Makriyalos, were also probably supplied by private aqueducts, establishing the type as an incipient feature in the Romanisation of Crete (see 16.3 for their chronology). This wholesale introduction may reflect a pro-active Romanising dynamic whereby affluent local elites are located at specific strategic points to facilitate ease in commercial trade and societal order. This model at such an early stage in the Romanisation of Crete presents both aqueducts and bathhouses as key components of Roman design which transformed the Cretan landscape.

The present work has identified a wealthy villa at Pachyammos (see 9.6) and argues that this would have controlled traffic along the main roads which intersect at this junction, ultimately regulating the traffic to and from the bay at Tholos. The secure identification of a monumental cistern at Tholos is also significant. The classification of Tholos as a cistern is afforded through its arrangement of recognisable constructional features pertaining to the overall type. Consequently, it has been argued that the cistern replenished docking ships, thus offering a crucial service at the port.

The bay itself is well located on the coast at a point which is easily accessible by both land and sea, preferable to bays at Mochlos which are relatively difficult to reach over land. It is possible that this specific purpose predetermined the placement and construction of the villa at this strategic location by elite entrepeneurs. This model is endorsed by Haggis' observation that the well-built structure commanding Tholos bay stands in marked contrast to the rural installations of the Kavousi area (1996b, 202). Moreover, this observation serves to link it architecturally with the substantial and very Roman layout and elevations of the structure at Pachyammos. Haggis' argument that the structure at Tholos had an economic function within the Hierapytna sphere of influence is in keeping with the identification of an affluent villa at nearby Pachyammos and also complies with the theory that this villa was administered by the Cretan elite (1996a, 419-424, fig. 25; 1996b, 202).²⁷

The range of aqueducts on Crete caters for public, private, religious, commercial and industrial sites. They vary from the longest recorded on the island, at Gortyna c. 25km (A 10), to the shortest, probably at Malia c. 400m (A 6). They range in purpose and design from those feeding small private households to city supplies connected to massive cistern complexes comparable with those of North Africa, southern Italy, Spain and Asia Minor (Wilson, A.I. 1998, 89; 2001, 84). The association of Crete with areas in the Mediterranean, with large cisterns with capacities often exceeding several thousand cubic meters, places the island within the greater Empire and highlights a monumental hydraulic potential previously unexplored.

²⁷ If the structure at Tholos were a granary, as Haggis argues (1996a and b), it is significant that such massive *horrea* were most often brought about by state interference and the needs of the Imperial *annona* (Haggis 1996b, 190).

CHAPTER FIVE

CONSTRUCTIONAL MATERIALS OF CRETAN AQUEDUCTS

5.1 Introduction

Taramelli informs us that the aqueducts of Crete were built in the *enplecton* style consisting of double facings of moderately-sized and roughly-worked stone over a rubble core bonded with a strong impermeable mortar with visible ceramic inclusions (1902, 119).²⁸ He proceeds to attribute this construction technique to cisterns, aqueducts and baths all over Crete on the grounds that it offered the highest degree of impermeability, recording it at Lebena, Gortyna and in the 'magnificent works connected with the aqueduct of Chersonesus' (Taramelli 1902, 119-120). Taramelli's observations, although made at the turn of the last century, still correspond with the construction style of many aqueducts on the island. In fact, his analysis represents the first grouping of Cretan aqueducts on the basis of their architectural components.

5.2 Terminology

Unfortunately, Taramelli's simple clarity is not characteristic of subsequent accounts. A lack of concern for Roman architectural elements on Crete is highlighted by Raab in her analysis of Watrous' survey of the western Mesara (Raab 2001, 29; Watrous *et al.* 1993). Raab reports that although 'cement' is used in wall construction within this catchment area, it constitutes 'a phenomenon rarely observed, or mentioned, in other surveys' (Raab 2001, 29). In addition to the startling implication that Roman architecture is not recorded in Cretan surveys, Raab's observations also

²⁸ 'Altera est quam enplecton appellant, qua etiam nostri rustici utuntur. Quorum frontes poliuntur, reliqua ita, uti sunt nata, cum materia conlocata alternis alligant coagmentis' (Vitruvius *de Architectura* II c viii 7).

⁽trans: This technique, which is called "enplecton", is also used by our local peasants. The outer façade of which is finished but the rest is functional and the elevations are secured with alternating cemented connections).

in Crete. The terms 'cement' or 'concrete' are not applicable to Roman Crete (as explained under 5.3) despite their popularity in the literature (as used by Sanders 1982, Hood & Smyth 1981 and Paton 1994, among others).

Other notable misnomers for Cretan construction include the term opus reticulatum which has been misapplied to several aqueduct substructures throughout the island. The term's misuse has serious repercussions as it is traditionally regarded as indicative of direct contact with Italy, as has been proposed for a typically Italian example of opus reticulatum adorning the façades of the bath building at Elaeussa-Sebaste in Cilicia (i.e. the Reticulate Baths) (Farrington 1995, 167, no. 84).²⁹ The use of a bonding substance akin to opus caementicium or 'Roman concrete' (i.e. a mortar including volcanic sand) in east Cilicia also complements the resulting Italian-Cilician connection (Ward-Perkins 1994, 353). It could be counterargued that the presence of opus reticulatum in these specific baths, which constitutes the only example recorded in the entire region, does not secure an Imperial connection for the overall province (as manifested through architectural styles), as its uniqueness implies that the more representative architecture of the area does not express direct relations with Rome. Moreover, the use of a mortar similar to opus caementicium (an aggregate including volcanic sands) may be purely reliant on the geology of the area and the availability of volcanic sands, rather than herald any particular connection with Rome.

Erroneous citings of *opus reticulatum* on Crete are actually represented by limestone facings in horizontal courses, as distinct from the accepted orthodox construction of *opus reticulatum* which follows successive diagonal lines (Oikonomaki 1984, 82-3, pl. 13; 1986, 73, 59, n. 21). This definitive difference confirms that the term is misapplied in these cases, and subsequently, is misleading. Such confusion is evident in Oikonomaki's description of the Lyttos aqueduct at Poros tou Toikhou 2 where the text, which describes a stone facing of *opus reticulatum*, is accompanied by an illustration which clearly demonstrates horizontal stone courses (**plates 4a-c**) (1984, 82-3, pl. 13). Consequently, the facing of the aqueduct's substructure more closely resembles a form of *petit appareil* (as defined under 5.4). In fact, no *opus reticulatum* has been discovered on Crete.

Terminological distinctions should be made with care and consistency as they identify the basic ingredients of the architectural elements which contribute to the overall structural manifestation. The terms discriminate between essential ingredients underscoring the potential of constructional form which shapes the urban landscape into distinctive moulds. Architectural features and types are defined below in order to minimise terminological errors in the present study.

5.3 Mortared Rubble

In this study the term 'mortared rubble' is preferred to 'Roman concrete' or 'cement' as it indicates a matrix similar, but not identical, to the composition of pozzolanic material attested in Italy i.e. *opus caementicium*. The addition of pozzolanic material to the bonding matrix acted as a catalyst for numerous revolutionary Roman architectural concepts (Ward-Perkins 1994, 75-6, 354-5). The properties of this aggregate are directly harnessed to architectural design potential. The strong Eastern flavour in the styles and techniques employed in vaulted brick construction in Greece and Asia Minor from the 1st century AD has been attributed to the fact that pozzolana (synonymous with Roman concrete) was generally not available in these areas (Dodge 1990, 112-3; Livadiotti 2000, 818).

The *opus caementicium* in central Italy differed from bonding matrices elsewhere because it was often stronger due to the superiority of volcanic pozzolana over other types of sand. The tensile quality of *opus caementicium* is considered to be instrumental in the survival of the ancient monuments within the modern city of Rome. *Opus caementicium* was regionally restricted yet volcanic sands, occurring naturally in specific regions, allowed for aggregates with similar characteristics elsewhere. Such matrices were achieved in eastern Cilicia (Ward-Perkins 1994, 279-282, 328 and 353), southern Syria (Dodge 1990, 112-3) and the island of Cos in the Dodecanese (Livadiotti *forthcoming*). Curiously, the term *opus caementicium* is also attested in an inscription found in Macedonia which refers to a temple constructed using 'OPUS CEMENTIC' (*CIL* III 63, 1). Unfortunately, whether the matrix

²⁹ Opus reticulatum is rare in the provinces with only about 30 instances of the technique cited outside Italy.

incorporated volcanic sand cannot be verified, as the exact temple is not specified in the text 30

At Gortyna on Crete, Masturzo and Tarditi report that the mortared-rubble core of the walls of phase I of the Megali Porta Baths comprises an aggregate composed of pebbles and stone flakes with the addition of a pozzolanic element represented by volcanic sand from Santorini (1994-5, 261). The inclusion of volcanic sand would suggest that the mortar was comparable to opus caementicium, at least in terms of heightened tensility. Despite such tantalising possibilities, it cannot be proposed that this matrix was incorporated elsewhere on the island without corroborative scientific analysis. All matrices on Crete must be generally referred to as 'mortared rubble' until such research is undertaken.

The term opus caementicium has been misapplied to the core of the aqueduct substructures of both Lyttos and Chersonisos (Oikonomaki 1984, 75, pl. 7; 1986, 62 and 72). Oikonomaki records that the mortared-rubble core consists of a mixture of large amounts of loess, sand, lime and feldspar strengthened with small irregular limestones (1984, 75, pl. 7; 1986, 62 and 72). Volcanic sand is not mentioned. Indeed, the friable nature of this aggregate is best evidenced along the Lyttos aqueduct at Poros tou Toikhou 2 (plates 4b-c). The bonding mortar changes consistency at this point becoming a softer clay-like substance, brown in colour and littered with orange pottery inclusions. Much of the facing has collapsed, or was possibly robbed, due to the soft nature of the mortar. Stone robbing is a valid suggestion as the facing seems to survive above arm's reach and only the lower portions of the wall are denuded. The stonework in the village directly below (known as O Toikhos: The Wall) is suspiciously similar to the stone facing of the aqueduct.³¹ Indeed, while I was studying the mortar, a local man stepped through a hole in the wall (at a place imaginatively known as Tripa tou Toikhou: Hole in the Wall) and reached up to

³¹ Appellations of Toikhos (Wall) are common along aqueduct tracts in Crete. The genitive of this appellation is applied to the aqueduct at Axos (A 14) while the toponym is also detected along the route

of the Chersonisos aqueduct (A 5).

³⁰ Rakob records that the cisterns at La Malga, Carthage, were constructed with an 'early type' of opus caementicium (2000, 80). The misuse of the term unintentionally suggests that volcanic sand, specifically pozzolanic material, was available in the Carthage region. Nonetheless, Rakob's statement is interesting as it clearly attributes chronological potential to the bonding aggregate, an attribute which he incorporates into his argument for an early date for the cisterns. He clearly distinguishes the 'opus caementicium' of the amphitheatre from that of the later Antonine aqueduct.

dislodge a stone with which he promptly disappeared in the direction of the village below.

5.4 Petit Appareil

Petit appareil is found throughout Crete representing the dominant construction technique on the island during the Roman period. Yegül describes petit appareil as construction in small squared blocks with horizontal coursing (1986, 10, 15, 22, 115, fig. 39).³² Yegül's definition (1986, 122, n. 13) seems to be based on that of Boëthius and Ward-Perkins who observe that monumental architecture in Roman Gaul was faced with dressed stone with the conventional name of petit appareil (1970, 346). Ward-Perkins observed that in Gaul the technique comprises a facing of small squared stones over a mortared-rubble core which was similar in composition to the cement of Late Republican Italy (1981, 223). Boëthius and Ward-Perkins also record facings in Cilicia which they claim are almost exactly equivalent to the petit appareil from Roman Gaul (1970, 387, pl. 191). Inevitable inconsistencies arise with comparisons of such regionally distant examples, specifically concerning the ingredients of the associated bonding matrices, for example, the volcanic sand which occurs naturally in east Cilicia, and consequently is used as a bonding agent in this region, would not have been available in Gaul.

Further confusion arises concerning the use of the terms *opus vittatum* and *petit appareil*. Adam proposes that *opus vittatum* is the *crème de la crème* of *petit appareil* yet discusses *petit appareil* under the generic heading *opus vittatum* rather than vice versa (1994, 135-9). La Torre's application of the term *opus vittatum* to the facing of the aqueduct at Gortyna represents a unique use of the term in descriptions of Cretan aqueducts (1988-9, 305).

Farrington cites *opus vittatum* in baths in the areas neighbouring Lycia; the Corasium Baths (1995, no. 81), the Elaeussa-Sebaste East Baths (1995, no. 83, pl. 193), the Heraclea under Latmus Bath (1995, no. 89, pl. 167) and in the Theatre Baths at Aphrodisias (1995, no. 76, pl. 170). Moreover, he claims that what evolved in

³² Adam equates *petit appareil* with isodomic or pseudo-isodomic construction on a small scale (1994, 135-9).

Lycia itself constituted a local variant of *opus vittatum* composed of a species of mortared rubble, faced with regularly laid square or rectangular stone (Farrington 1995, 88). It could be argued that many of these examples of *opus vittatum* demonstrate a construction style which can be more comfortably identified under the umbrella term *petit appareil* which incorporates a notable gradation in the level of execution. *Petit appareil* can be finely executed, as seen in the aqueduct of Metz at Jouy-aux-Arches (end of the 1st century AD), or coarsely, with irregular stones in approximate alignment, as seen in the substructures of the amphitheatre at Senlis (1st century AD) (Adam 1994, 137-8, figs 322 and 324).

In keeping with the broader application of the term, there is also a visible quantifiable gradation within the use of *petit appareil* on Crete. The facing La Torre describes at Gortyna (mentioned above) merely lies on the upper end of the *petit appareil* scale incorporating neatly cut stones set in regular courses which maintain a relative consistency in stone size (average stone 0.20m x 0.10m). Probably the finest example of *petit appareil* on the island can be seen in the substructure of the aqueduct at Lebena although the stone facing only survives along five regular courses (average stone 0.30m x 0.20m) (**plate 28a**).

The stone facing at Poros tou Toikhou along the Lyttos aqueduct can also be classed as *petit appareil* (**plates 4b-c**). The technique is associated with the most monumental tract of the Lyttos aqueduct while the stone facing along the more mountainous tract of the aqueduct becomes more irregular. At Poros tou Toikhou the stone facing is composed of roughly cut stone with an average stone size of 0.25m x 0.20m. Its construction does not represent *opus quadratum* nor is it remotely comparable with *opus reticulatum* as Oikonomaki implies (1984, 82-3, pl. 13).

Spratt's description of the Chersonisos aqueduct as constructed with a core of 'small stones, bricks, and mortar, but faced with small blocks of limestone that were roughly squared and smoothed' is also appropriate for this category (1865, I, 103). The description is best applied to the *petit appareil* evident in the piers of the bridge at Xerokamares 1 crossing the Aposelemi Valley (**plates 6a-c**).

Construction in *petit appareil* can be identified at Knossos where the technique is evident in the aqueduct branch in the area of the North House (**plate 18a**), while also featuring in the wall elevations of the house itself (**plate 18b**). At

Elyros, *petit appareil* evident in the walls directly below the cisterns (**plate 40a**) is also of good quality while that of the cisterns themselves is less clearly defined as most of the exterior facing has collapsed. At Aradena the cistern is executed with *petit appareil* although its degree of refinement is obscured by its buttercrust joints (**plate 34b**).

The stone facings of *petit appareil* in Crete clearly demonstrate that the builders availed of the local material. At Lebena the aqueduct substructure is composed of multi-coloured assemblages quarried from the bedrock of the area, including a reddish limestone, flysch and serpentinite-amphibolite. Similarly, the aqueduct of Lyttos availed exclusively of the limestone rocks of Dikte which were in copious supply. The aqueducts on Kouphonisi were constructed of aeolionite which constitutes the common building material of the Roman settlement on the islet (personal observation).

It has been suggested that *petit appareil* demonstrates chronological characteristics. Adam observes that the joints between the stones were, as a general rule, much finer during the first half of the Empire: 0.01-0.02m (1994, 138). Masturzo and Tarditi have proposed a general chronological sequence for the stonework of the Megali Porta Baths in Gortyna (as outlined under 14.6). The *petit appareil* of the aqueduct of Lebena occupies a relatively early position in the sequence outlined by Masturzo and Tarditi due to the regularity of its shaped blocks (1994-5, 260). The fact that construction styles are loosely datable has great appeal for any aqueduct study, as these monuments are notoriously difficult to date. Nevertheless, the methodology is far from exact or fully developed and *petit appareil* remains only a very general indicator of date which must be combined with supporting evidence to produce an accurate chronology.

Ideally, the most secure method of dating any feature is through direct stratigraphic analysis, yet the aqueduct of Knossos remains the only aqueduct in Crete which has been dated stratigraphically. Hadrianic to Severan dates were established for the tract traversing the excavations of the North House (Sackett *et al.* 1992, pls 3-4). The *petit appareil* associated with this tract is comparable to several aqueduct elevations throughout the island and it is tempting to apply similar dates to comparable structures throughout the island (**plate 18a**).

Nielsen rather starkly states that *opus incertum* represents another construction style sporadically incorporated into the baths of Crete, Achaea and Egypt (1990, 99). Technically, *opus incertum* can only be correctly applied to facings over Roman concrete, although even the superficial treatment of wall elevations on Crete are not comparable to the Italian ideal. The stone-faced mortared-rubble construction of the villa structure at Pachyammos (**plates 53a-b**) and the structure at nearby Tholos fall at the lower end of the *petit appareil* scale (**plate 82a**) (personal observation). The similarity of the stone construction of these two structures in eastern Crete might even represent a restricted regional style. The two examples also contrast sharply with indigenous construction in east Crete, which might distinguish them as Roman types within a general indigenous hinterland. The proximity of the examples at Pachyammos and Tholos would also support a model promoting their connectivity and perhaps a common purpose (as has been suggested under 4.2).

5.5 Brick-faced Mortared Rubble and the Aqueduct Elevations of Crete

In dealing with the brickwork of Crete the terms *opus latericium* and *opus testaceum* have been avoided, in favour of "brick-faced mortared rubble", since the the former often indicates an early use, more applicable to unbaked brick (Vitruvius *de Architectura* II viii 8; Pliny *NH* XXXV, 170; Masturzo & Tarditi 1994-5, 258, n. 44). Brick-faced mortared rubble describes the technique whereby fired brick serves as a facing to a core of *opus caementicium* or mortared rubble (an aggregate excluding pozzolana).

Paton claims that at Knossos the 'large concrete structures' were usually faced with coursed stone and that 'brick-faced concrete', although used in other Roman cities in Crete, was not fashionable at Knossos (1994, 152). This predominance of stone architecture at Knossos, as observed by Paton, could be due to its proximity to local stone sources. Several stone quarries of Roman date were recorded on Mount Ailias, east of the Kairatos Valley.

Alternatively, the amount of brick-faced mortared rubble at Knossos may have been underestimated. Two cistern complexes constructed in brick-faced

mortared rubble have been identified in the city, i.e. the vaulted cisterns under the atrium of the Trefoil Basilica (A 8.12) and a cistern with *opus spicatum* flooring (A 8.8).³³ Furthermore, the remains of the so-called Civic Basilica, which run behind the tourist bars along the main Knossos road for over 40m, include a series of parallel vaulted compartments executed in brick-faced mortared rubble (personal observation). These seem to be a legacy of the original wealth of brick construction on the site as recorded by Lear who visited the ruins in 1864 prior to any Minoan excavations. Lear reported that 'the site of Knossos possesses water and trees and plenty of aïdhonia [nightingales], but except scattered masses of brickwork, little remains' (cited in Stoneman 1998, 159).

Yet brick-faced mortared rubble was not a common construction technique for the elevations of aqueduct substructures on the island. Brick did not feature in either the Xerokamares 1 bridge over the Aposelemi River along the Chersonisos aqueduct (plates 6a-c) nor in any section of the Lyttos aqueduct apart from its castellum. The aqueduct at Ini is unique on Crete in that its elevations are exclusively faced with brick (plates 10a-c).

Conversely, brick constituted a common facing for the interiors of monumental vaulted cisterns throughout the island. At Kastelliana the rubble core of the monumental cistern is externally faced with small stone blocks (*petit appareil*) while faced internally with brick which incorporates a bonding course of *bipedales* penetrating the width of the wall at the spring of its vault (**plate 12c**, as indicated by the right arrow). The best examples of brick-faced mortared rubble in the construction of Roman cisterns and aqueducts on Crete are as follows: the cisterns under the Trefoil Basilica at Knossos (**plate 18c**), the cisterns at Kastelliana (**plates 11-12**), the bridge at Xerokamares 2 (**plates 5a-c**), the *castellum* at Chersonisos (**plates 7a-b**), the L-shaped cistern at Aptera (**plates 35a-b**), the aqueduct at Ini (**plates 10a-c**), the *caput aquae* at Zaros (**plate 23b**) and the *castellum* at Lyttos.

³³ This constitutes the only example of *opus spicatum* recorded on Crete. It has been recorded from numerous 2nd-century AD buildings on the Greek mainland, such as the Hadrianic cistern associated with the Athenian aqueduct at Psallida and the courtyard of the Lechaion Baths at Corinth, where it has a *terminus post quem* of the late 1st or early 2nd century AD (Biers 1985, 11).

5.6 Stone Bonding Courses

The most prominent construction feature of Cretan aqueducts are the stone bonding courses which penetrate the substructures of the aqueducts of Lyttos and Chersonisos at specific points. This architectural feature seems to be specifically reserved for sections of considerable height or pressure along the aqueducts. Their presence constitutes a strong argument for the contemporaneity of the structures.

5.6.1 Stone Bonding Courses in the Bridge at Xerokamares 2

The architecture of the bridge of Xerokamares 2 along the Chersonisos aqueduct incorporates two different masonry styles and materials (**plates 5a-c**). The mortared-rubble core of the bridge was faced with both roughly-cut blocks of local limestone and brick. The façade is divided into successive series of friezes by limestone bonding courses.³⁴ The collapsed section of the arch confirms that the bonding courses continue through the width of the wall and are not just superficial features.

The two construction materials used, stone and brick, were initially considered to be consecutive features. Mariani interpreted the brickwork as reflecting subsequent repairs after the central arch had collapsed (1895, 239). Butler's contemporary claim, that repairs upon the older aqueducts of Rome were executed in brick from the reign of Nero until Alexander Severus, offered support for Mariani's theory (1901, 177). Certainly, the unusual measure of using stone bonding courses, rather than brick, suggests that the structure was originally constructed entirely in stone. The fact that the original foundations consisted of stone courses of large uneven stones, set without mortar, was offered as validation that only the stonework of the elevations was integral to the original design (Mariani 1895, 239).

Why restorations would have been conducted in brick and not in stone, which is so abundant in the area and represents the original material used in the bridge, needs to be addressed. The decision to use brick was not aesthetically driven as the facings of the elevations would have originally been concealed by a coating of plaster. Plaster is preserved along other aqueducts on the island and is visible on the

 $^{^{34}}$ Raulin records the bonding courses at intervals of 2m (1869, 239) while Mariani cites 1.5m (1895, 238-9).

Lyttos aqueduct both in the Rozas Gorge and at Poros tou Toikhou (Taramelli 1899, 406; Oikonomaki 1984, pl. 8). The finished result would have presented a blank façade divided by the visible lines of stone bonding courses which project from the flat surface. The bonding courses perhaps not only reinforced the elevation but also constituted an aesthetic component of the façade, softening the monotonous and imposing character of the elevation (Oikonomaki 1986, 62).

The incorporation of brick may have constituted a pragmatic consideration as brickwork is generally more tensile than stonework and less likely to fracture and consequently would have better protected the inner core of the bridge. It is possible that brick was favoured in much the same way that sandstone was preferred by the architects of Venetian forts as it withstood the impact of cannon attack without fracturing (Jennifer Moody, pers. comm. 2000).

The constant strain to which the bridge was subjected is attested by its present state of repair. The river originally had a copious perennial flow descending from Lasithi and was prone to flash flooding in winter which must be responsible for the dramatic destruction of the bridge (Taramelli 1899, 372-3, fig. 36). The brick facing of the bridge is better preserved on its northern façade than on its southern. The up-stream façade (south facing) is considerably more damaged as it is more susceptible to the force of the river than the more sheltered down-stream façade (north facing) where the brick still survives *in situ* (personal observation). The rate of the destruction of the bridge seems to be accelerating over time. Oikonomaki observed that there was significantly less brick in the south face of the wall in 1986 than in 1981 (1986, 73, n. 66). He reports in 1986 that there were still some traces of brick on the southern face, just below the big limestone blocks of the upper bonding course (Oikonomaki 1986, 73), but since then this too has collapsed (personal observation 2003).

The fact that the brick is used only for the centre of the bridge and that its outline is irregular (essentially constituting patching) is suggestive of secondary repair work (**plate 5b**). It is highly unlikely that the brick facing constituted an original feature despite the fact that its presence protected the substructure at a vulnerable point. The bridge represents a point of vulnerability due to its estimated elevated height of 16m to secure free-flow conduction. The bridge's incorporation of a sharp

change in orientation and a sudden decline also tests its structural stability (fig. 28 and plate 5c). Consequently, the elevations needed to be reinforced with bonding courses distributed symmetrically from one side of the arch to the other.

5.6.2 Stone Bonding Courses in the Substructure of the Lyttos Siphon

The elevations at Poros tou Toikhou along the Lyttos aqueduct are constructed in *petit appareil* composed with large roughly-squared blocks of local limestone over a mortared-rubble core. The substructure wall stands to a height of 6.5m behind the chapel of Aghios Constantinos where the masonry forms three tiers divided by bands of substantial stone bonding courses (average stone 0.50m x 0.30m). The wall also steps in slightly, by 0.14m, along these horizons clearly representing different constructional stages (**plate 3b**, as indicated by the arrows). These shallow ridges may also indicate the use of free-standing scaffolding, similar to the type demonstrated by Adam, as no put-log holes are visible (1994, 84, fig. 182).

It is evident from the section, where a small road cuts the trajectory, that the stone courses are not superficial but penetrate through the core. The fact that the collapse of the stone facing stops along these horizons indicates their stabilising function (**plate 4b**). The exterior of this substructure wall was plastered but as the bonding courses are not prominent within the façade, it is unlikely that they created an extra optical sense of symmetrical lines (as would have occurred at Xerokamares 2) as Oikonomaki suggests (1984, 76).³⁵

At the church of Aghios Constantinos, exactly where the substructure is intercepted by the modern road, the wall has a thickness of 4.40m (personal observation).³⁶ This represents the maximum width recorded at any point along the Lyttos aqueduct. Consequently, if the aqueduct continued to Lyttos with free-flow, which it apparently did not (see 6.3.1), the greatest height of the wall could have occurred exactly at this location and the elevated section would have reached anywhere between 35m and 40m. This is impressively high, but not necessarily unfeasible when compared with other Roman examples. The Anio Novus had a height of 47.52m while the highest aqueduct bridge, represented by the Pont du Gard, rises

³⁶ Oikonomaki measured 4.70m for the wall thickness at this point (1984, 74).

³⁵ Surprisingly, as the aqueduct ascends the slope, on the far side of the ridge the stone coursing becomes superficial (**plate 4c**).

to a height of between 47.4-48.7m above stream level (Fabres *et al.* 1991, 67); however, few Roman bridges exceed 30.5m (O'Connor 1993, 154). Nonetheless, even with a cautious estimate, the potential height and weight of the wall at this point would have necessitated bonding courses to stabilise the overall structure.

5.7 Conclusion

Studies of construction styles are extremely informative, especially within such a contained catchment area. They are not only loosely datable but also revealing regarding areas of contact within the landscape. For example, the similarity in stone bonding courses at Xerokamares 2 (along the Chersonisos aqueduct) and at Poros tou Toikhou (along the Lyttos aqueduct) suggest their contemporaneity and express good relations between the two cities.

Similarly, the architecture of the structures at Pachyammos and Tholos is distinct from that of their hinterlands, which is less obviously Roman (as it does not incorporate *opus signinum*, brick or mortared rubble). The masonry facings of the villa at Pachyammos and the monumental cistern at Tholos represent mortared-rubble construction which serves to segregate both structures from the representative architecture of the area (**plates 53a and 82a**). Their commonality indicates that the sites share a common social formative dynamic different from that of the general settlement in the catchment area. Their mutual architectural style reinforces the argument that the villa at Pachyammos and the cistern at Tholos worked in partnership.

Construction studies also reveal Cretan trends and regional architectural solutions. The easier and swifter solution of using local stone resources, as opposed to brick, was an economic preference evidenced throughout the island. It was observed that the aqueducts of Crete generally availed of the more easily accessible local materials attested by the quantities of local limestone incorporated into the aqueducts of Lyttos and Chersonisos. Similarly, the cistern at Tholos is constructed predominantly of dolomite with occasional grey limestone, chert and flat schist stones all of which are local to the area (Haggis 1996b, 194). Moreover, the main block of the structure at Pachyammos (plates 53a-b) and the cistern at Malia (plate 8c) both

comprise facings of unworked water-rolled boulders which must have been deposited by the nearby rivers (personal observation).³⁷

On a broader scale, the *petit appareil* of Crete is closely comparable to that of Lycia and Asia Minor. Yegül notes that stone was an important constructional medium for the western and southern coastal areas of Asia Minor (1992, 258). In fact, Lycia presents a comparable area for Crete in terms of stone facings, although a considerable amount of ashlar work, rarely used on Crete in the Roman period, is evident in construction in this region.³⁸ Nonetheless, the characteristic masonry of Rhodiapolis in Lycia, as illustrated by Bean is effectively *petit appareil* (1978, pl. 86).

In contrast, brick production on Crete must have been a small-scale and limited industry, which might render it more prestigious than local stone. The use of brick along the aqueducts of Crete was restricted to specific features, commonly seen in cisterns, while its appearance in the bridge at Xerokamares 2 and in the aqueduct elevations at Ini represents an exception rather than general practice. The fact that the substructure of the aqueduct at Ini is entirely faced with brick is a unique phenomenon on Crete. Its brick dimensions suggest a Trajanic date (A 7) which is highly significant as it would represent the earliest dated aqueduct on the island (see 14.4.1). Its unique character may be linked to its potentially early date which may underscore its adherence to a Roman archetype with little recourse to local building traditions.

The Cretan aqueducts in general, while variants of an architectural type, are essentially local products directly influenced by the local topography. In assessing constructional style, Yegül (2000, 141), echoing Ward-Perkins (1994, 360), noted that Roman construction is often a heterogeneous mixture of materials and techniques. Mortared rubble (in its many local variants) is not simply a substitute for *opus caementicium*; it represents an indigenous technique used in more architectural contexts in the Roman world than its prototype. The architecture emblematic of Roman influence throughout the Empire is generally a hybrid of varying influences: indigenous and exotic, traditional and unconventional. In conclusion, Cretan

³⁷ On the islet of Kouphonisi greenstone inclusions are common within the matrix of the *opus signinum* lining the aqueduct channels (**plate 2c**). Greenstone has not been detected in *opus signinum* anywhere else on Crete and must represent a natural stone on the islet.

³⁸ The difference between *petit appareil* and ashlar construction is adequately demonstrated by elevations of the Baths of Faustina at Miletus where the lower masonry is ashlar while the upper zones are of *petit appareil* (Yegül 1992, 269, fig. 330).

aqueducts manage to conform to the Roman architectural ideal while availing of local resources, developing their own sense of style which is both specific to the island but also distinctly and recognisably Roman.

CHAPTER SIX

OVERCOMING OBSTACLES: ROMAN ENGINEERING SOLUTIONS

6.1 Introduction

This chapter addresses the methods employed to cope with the rare occasions when insurmountable obstacles were encountered along the trajectories of Cretan aqueducts of the Roman period. The assessment underscores the ingenuity behind Cretan aqueduct design and establishes the designers themselves as engineers and surveyors who were not only familiar with the monument type itself but also every undulation of the Cretan countryside. The topics addressed are tunnelling, bridging and the use of the inverted siphon.

6.2 Underground Aqueducts

Most Roman aqueducts are composite in nature. In fact it has been estimated that only 10% of all ancient aqueducts are carried on arched superstructures and mainly run underground for most of their courses. The most famous composite aqueduct, the Aqua Marcia, was subterranean for nearly all of its 91km length with only c. 10km overground (Dodge 2000, 173).

On Crete there is a conspicuous preference for overground aqueducts with only five aqueducts incorporating underground sections: Elyros, Eleutherna, Polyrhennia-Kastelli Kissamou, Chersonisos and Gortyna. The tunnels have generally been dated to the 2nd century AD, possibly to the Hadrianic period which would be contemporary with the subterranean tracts along the aqueducts of Athens and Corinth (Lolos 1997; Pappa 1999). The potential for future discoveries of underground tracts on Crete is high but no markers or *cippi* have been found to indicate their location.³⁹

³⁹ *Cippi* indicated the route of the aqueduct and gave the distance from the city, like milestones. They were generally set in pairs on either side of an aqueduct, either above a subterranean channel or even beside elevated sections (Evans 2002, 176-7).

The type of rock an aqueduct tunnel encountered defined the shape of the *specus*. Subsequently, if the *specus* was driven through solid rock, then the rock itself served as the channel, but if it penetrated earth or sand, it was reinforced with stone or brick and arched over. This correlation is evident in the Hadrianic aqueduct of Athens where its section was limited in areas of hard rock while in softer ground the sections became elaborate arched constructions (Dunkley 1935-6, 189; Pappa 1999, 155).⁴⁰ At Polyrhennia in Crete the underground tract was excavated through hard limestone without the need for constructional reverments.

The *specus* at Eleutherna is depicted with masonry revetment in Davaras' section (**fig. 44**). Davaras' drawing is particularly schematic and the tapering character of the section is not indicated. In reality the tunnel is rock-cut, as is evident from the photographs where tooling is evident in the sections (**plate 30b**); however, the back wall of the aqueduct, which effectively sealed the back of the subterranean cisterns, is composed of large ashlar blocks (**plate 30c**). This wall contains a perforation for a pipe which penetrated the large subterranean cisterns. Notches for lamps are evident in the lateral walls of the *specus* on either side of the back wall (**plate 30c**, as indicated by the arrow). Niches for lamps are regular features in aqueduct tunnels and are present in the 'Tunnel of the Six Shafts' associated with the Sepphoris reservoir (Lower Galilee) (Tsuk 1996, 122, fig. 8). The aqueduct at Eleutherna leads to the edge of the acropolis where it supplied smaller cisterns associated with the bathhouses below (B 28-30) (**plates 67-68**).

The dimensions of the *specus* bear little relation to the aqueduct's actual capacity, since aqueducts do not function at full flow and the water level within the *specus* varies from one example to another. Nonetheless, it is still informative to calculate the relative aqueduct capacities. Lolos notes that in comparison with the other aqueducts in modern Greece only the Cretan *specus* at Eleutherna and Elyros were larger in section than the Hadrianic example at Corinth (measuring 2m x 1m and 2.2m x 1.8m respectively) (1997, 300). Yet, the tunnel at Polyrhennia (A 23), although narrower, was higher than either that of Eleutherna or Elyros. Measurements taken at a point just over the village fountain at Polyrhennia reveal a section

⁴⁰ The dimensions of the Athens aqueduct tunnel suggest that the digging was executed with specialised tools, beyond the known pick, hammer and crowbar (Pappa 1999, 155).

measuring 2.17m (high) x 0.72m, confirming it as one of the largest aqueduct tunnels in modern Greece (personal observation). Ninou-Kindeli offers dimensions of 2.3m high x 1.35m wide which demonstrates that the section widens substantially along the tunnel (1992, 252).

There is a 200m-long subterranean tunnel along the Chersonisos aqueduct at Simo to Khani. It was impossible to examine its interior facing of brick as the length of the tunnel was half-filled with earth and debris. Oikonomaki records that the *specus* yielded an impressive maximum height of 3m with a width ranging from 1.80m to 2.10m (1986, 61). If these are accurate observations then they would represent the largest underground tunnel in modern Greece which would also correspond with the immense *castellum* associated with the aqueduct.

Specus size is closely correlated with access, as maintenance constituted an important factor in the design of aqueduct tunnels; the requirements for the internal height and width usually related to the ease of human movement. In Rome Procopius records how groups of Goths and Romans alike patrolled the Aqua Virgo (History of the Wars VI ix). Subsequently, he attributes an exaggerated width and depth to the aqueducts of Rome that would allow a man to ride in them on a mounted horse (Procopius History of the Wars V xix 13).

Aqueduct tunnels were equipped with regular shafts and openings. These shafts assisted the removal of sinter build-up (a calcareous encrustation which generally grew at a rate of 1mm a year) thus narrowing the dimensions of the channel and reducing the aqueduct's water capacity (Müller 1996, 185-9). A block of sinter that had been removed from the channel of the Aspendos aqueduct yielded a layer of *opus signinum* sandwiched between thick sinter layers (Kessener 2000, 111, fig. 11). The 0.05m-thick *opus signinum* layer had been applied over a 0.08m-thick sinter layer which does not appear to have been worked or damaged. Subsequently, another 0.07m-thick layer of sinter formed over this. This second layer must have been deposited before the aqueduct ceased to function. Kessener believes that the *opus signinum* was added as a repair after the first 70-80 years of the aqueduct's operation and that subsequently the aqueduct continued in use for another 130-150 years (2000, 11).

Shafts not only provided for ventilation, removal of sinter and the general cleaning of the aqueduct, but also aided the actual construction of the tunnel. They allowed for accurate planning of the tunnels from the surface and also admitted some light on the underground proceedings during tunnel construction. Instances where tunnels burrowing through mountains are inaccurately aligned are cases where no shafts were permissible. Pliny recommends a shaft opening every 240ft (73.1m) (*NH* XXXVI xxiv 124-5); however, the distances vary and the Athenian aqueduct had a shaft every 35m (Pappa 1999, 155) (**plates 84a-b**). The material excavated in the course of the construction of the underground aqueduct would have been removed via these shafts with the aid of a winch or windlass, as also attested by Pliny (*NH* XXXVI xxiv 124-5). Pappa assumed that the excavated material of the Athenian aqueduct had been scattered by rains since their original deposition, since he found no evidence for such debris along the course of the aqueduct (1999, 155). One such craterous mound still survives around a shaft in private property in the area of Marousi in Athens (**plate 84b**, as indicated by the arrow).

Maintenance and inspection shafts can vary in form along the length of an aqueduct, as different teams constructed specific sections and may have had particular preferences in shaft types. Shafts also differ in shape depending on their depth; a deep shaft is less likely to be stepped. The access shafts in Polyrhennia in Crete (A 23) are conveniently stepped where the aqueduct is not too deep inside the rocky hillside (personal observation). Conversely, the shaft located along the underground tract of the Gortyna aqueduct is 12m deep with a quadrate section measuring 1.5m x 1.5m (A 10.12). Taramelli reports that this shaft was later adapted for use as a well by the villagers who drew water from the aqueduct tunnel below, as is illustrated in Taramelli's sketch (1902, 138, fig. 23).

Faith in the infallibility of Roman engineering is expressed by claims that there is evidence of only one tunnel going seriously wrong: the aqueduct for the city of Saldae (Bougie) in North Africa dating to AD 152 (Roycroft 1987, 10; Raven 1993, 72). The reason for the debacle at Saldae was that no vertical shafts were sunk (probably owing to depth restrictions) and tunnelling was conducted simultaneously

from both ends. 41 A well-known inscription relates that the two teams of workers excavating the tunnel had veered both to the north and south and that the situation could only be rectified when Nonius Datus, a retired civil engineer of the 3rd Augusta Legion, resurveyed the entire area (CIL VIII 2728).

The example is not unique. The 'Tunnel of the Six Shafts' in Lower Galilee is possibly the best example of a tunnel with both directional and levelling errors. The four seams, where the various excavating teams met, are clearly evident due to deviations undertaken to compensate for cumulative directional errors. In one instance there was an error along the vertical plane where the height of the tunnel approaches 3m despite the fact that the height of the juncture is only about 1m (Tsuk 1996, 122, fig. 8). There are also two levelling errors along the Eifel aqueduct in Germany where the channel did not align correctly in the vertical plane (one 0.15m and the other 0.45m) at junctures where different teams met (Hodge 1992, 191-2; Wilson, R.J.A. 1996, 15).

Moreover, not all angled tunnels represent errors. Tunnels often incorporated angles as a deliberate measure to maximise the surface area where the two teams connected. The teams purposefully tunnelled at oblique angles to each other in order to reduce the risk of completely missing contact (Andrew Wilson, pers. comm. 2002). Consequently, the abrupt turn (1m to the west) midway along the Gythio aqueduct tunnel may not have been the result of a miscalculation as Themou asserts (1998, 402-3).

6.3 Inverted Siphons

The term 'inverted siphon' describes the system employed by Roman engineers which enabled water to be pushed up the far side of a valley along an aqueduct route (Hodge 1983, 174-5). 42 The typical inverted siphon forms a V- or Ushape. In essence, water which travels with free-flow up to this point, enters a collection tank or tower at the top of a valley's edge to allow it to settle. The water

⁴² The term 'siphon' is also acceptable in archaeology as its inverted format is implicit (Kessener 2002,

349).

⁴¹ It can be deduced from the topography at Simo to Khani, along the Chersonisos aqueduct, that the tunnel was only c. 5m underground at its greatest depth and its shallow depth would have prevented

leaves the tank in a robust piped system which conducts the water downhill, at which point pressure forces the water up the far side of the valley. The water finally passes through another tank or tower on the far side of the valley but continues from here with free-flow. The hydraulic gradient is defined as 'a notional line drawn between the intake and the outlet' (Lewis 1999, 163). The difference in altitude between the two tanks is known as the head loss, with the head relating to the greatest vertical distance of the pipes below the initial or header tank. The maximum pressure experienced by the pipes is directly proportional to the head.

Surprisingly, siphons are not mentioned by Frontinus, and his silence may reflect his lack of expertise on this topic or, more likely, the fact that they are infrequent along the aqueducts supplying Rome; with only one recorded on the Aqua Claudia (Hodge 1983, 193, n. 9). His silence caused scholars to underestimate the frequency of the use of the siphon in aqueducts elsewhere in the Empire.

The current work adds four possible siphons to the overall total: one on the aqueduct of Lyttos (A 4.7), one on the aqueduct of Chersonisos (A 5.8) and possibly two on the aqueduct of Gortyna (A 10.10 and 10.11). The exact nature of the inverted siphons of Cretan aqueducts is obscured by the fact that no pipes have ever been found *in situ*.

Both of the proposed inverted siphons recorded along the Gortyna aqueduct are unusual in design. The first siphon crosses the Mitropolianos River above the ruins of a medieval mill (**fig. 34**, indicated by the letter A). A settling tank at the edge of the river valley collects the water before its initial descent. 10m before this settling tank a small branch departs from the main aqueduct at an oblique angle (La Torre 1988-9, fig. 43). This small branch presumably relieved pressure by alleviating the water flow entering the settling tank before descending into the valley (Taramelli 1902, 129, figs 17 and 133, fig. 20). This branch effectively bypasses the settling tank only to reunite with the main channel at a lower cistern on the brink of a ravine (La Torre 1988-9, 316-7, figs 41-43). The narrow ravine has a width of 25m and plummets for a depth of 20m to the river. Taramelli suggests that the aqueduct descended into the ravine using a siphon rather than have spanned the gorge using a bold arch of 25m (1902, 134). Conversely, the construction of a bold arch seems more feasible than constructing a very deep siphon necessitated by an abrupt 20m drop.

Eitherway, the gorge was traversed as the aqueduct reappears on the opposite edge of the gorge approximately 20m above the river.

The second potential siphon along the aqueduct's descent is located in the Ruaki Valley which skirts the northwest of the western acropolis of Gortyna (**plate 21c**, as indicated by the arrow). The aqueduct continues on its bifurcated course along the western side of the river with each line gradually nearing one another approaching the valley (**fig. 34**, indicated by the letter B). Taramelli indicated that both lines cross the small Ruaki Valley with the use of two parallel siphon bridges accommodating both tracts in parallel pipes (1902, 135, fig. 3). The bridges are formed of two arched parallel substructures. The upper bridge incorporates an arched substructure and is still visible for a length of 7m (3m wide x 4m high) (Taramelli 1902, 135). The lower tract crossed the inlet on a 12m-long bridge consisting of two arches, each 5m long, supported on a 2m-thick central pylon. Taramelli indicates that the water was conducted here in enclosed pipes through a comparison with the siphon along the Chersonisos aqueduct when he observes that

'it is probably also here that like the aqueduct at Gortyna, near its acropolis, that there is a type of siphon which allows water enclosed in a supporting pipe (un robusto condotto) from the wall to go up again after the descent into the valley, at a slightly lower height than that at its start' (Taramelli 1899, 400).

6.3.1 Stone-piped Inverted Siphons

Hodge originally included a whole host of stone siphons in his chapter entitled 'The Predecessors of Rome' on the basis that stone-piped water supplies were

Hellenistic systems (1992).⁴³ He continues to consider them as exclusively pre-Roman on the assumption that the normal Roman material for siphons was lead and that they were also relatively shallow in comparison to Roman siphons (Hodge 2002, 33, 39). Forbes too insisted that siphons and bold tunnelling were typical for the water systems of Greek and Hellenistic cities but were rarely encountered along Roman systems (1964, 165).

It is becoming increasingly evident that stone-piped siphons were common features in the Roman Empire. Hodge maintained that the stone siphon at Patara in Lycia was Greek in date (1983, 185, n. 34), only to be refuted by Coulton who subsequently assigns it to the Roman period (cited in Işik 2000, 85). Coulton claims that it was constructed under Nero and repaired under Vespasian (cited in Işik 2000, 85) (**plates 85c-86c**). Similarly, the construction of the Aspendos aqueduct has been reassigned to either the 2nd or 3rd century AD and according to a 2nd-century AD inscription a certain Tiberius Claudius Italicus spent 2 million *denarii* constructing an aqueduct at Aspendos (Kessener & Piras 1997, 160).

On Crete a stone pipe, in the form of a perforated cube, was found in close proximity to the substructure at Poros tou Toikhou 2 along the Lyttos aqueduct (**plate 4a**) (Oikonomaki 1984, 75, pl. 6). It represents a unique find on Crete. The area in which the Cretan block or drum was discovered was covered with fallen debris from the aqueduct itself. Its presence in association with the aqueduct suggests that the method of water conduction was facilitated by a stone-piped system. It may seem surprising that only one pipe of the Lyttos system has been discovered, but in the case

⁴³ Hodge offers a host of possible locations for stone-piped siphons in the Eastern Empire. Articulated siphon systems have been recorded at Ephesus, Aspendos, Patara, Oenoanda, Methymna, Magnesia ad Sipylum, Philidelphia, Antioch on the Maeander, Blaundos, Smyrna, Prymnessos, Tralleis, Trapezepolis, Antioch in Pisidia, Apamea Kibotos, Akmonia, Laodicea, Pergamon (Hodge 2002, 33), Rusazus, Aïn-el-Kerma and Bled Zehna near Dougga (Wilson, A.I. 2000b, 599). Disarticulated stone pipeline blocks have been found at Eretria, Samos, Palmyra, Hippos (Israel), Beth Yerah, Hierosolyma (Jerusalem), Thamugadi and at Tomi and Istros on the Black Sea (Hodge 2002, 41, fig. 18). In the Western Empire they have been recorded at Aquileia, Aresso, Padua, Libarna, Ateste (Wilson, A.I. 2000b, 599), Lugdunum, Aventicum, Patavia, Arrentium and, as previously stated, at Rome along the Aqua Claudia (Hodge 2002, 41, fig. 18) and also on the Caelian hill where they are thought to belong to a branch of the Aqua Marcia (Wilson, A.I. 2000b, 500). France has been credited with the possession of eleven Roman siphons, nine of which are connected with the four aqueducts supplying Lugdunum.

of the Aspendos siphon 3,400 stone pipes were used, but only 250 have been preserved in the architecture of the Seljuk bridge, amounting to a less than 8% survival rate (Kessener & Piras 1997, 171).

The stone pipe from Crete is almost a perfect square. The side of the pipe facilitating the widest end of the perforation measures approximately 0.63m x 0.52m while that of the opposite surface, i.e. with the small end of the perforation, measures 0.57m x 0.57m (Oikonomaki 1984, 75 and pl. 6). The perforation of the pipe is cylindrical with a length of 0.50m and a diameter of 0.22m. It can be deduced from these dimensions that the amount of water transported was relatively small. The size is roughly comparable to that of the pipe drums from Oenoanda in Lycia, which measures 0.53m x 0.53m with a perforation diameter of 0.17m (Coulton 1987, pl. viii). The stone pipes of the Patara siphon, also in Lycia, are slightly bigger, measuring 0.90m x 0.90m with a perforation diameter of 0.33m (Işik 2000, 84-5) (plates 85c-86c). The pipes of the Aspendos siphon are similar in scale to those from Patara, measuring 0.90m x 0.90m, with a perforation diameter of 0.28m (Kessener & Piras 1997, 167 and 187, fig. 28). Judging water capacity from stone pipe dimensions is not a particularly adequate assessment as it does not allow for the rate of flow, although there must be some correlation between pipe size and capacity on a general level (Taylor 2000, 34-5).

The siphon along the Lyttos aqueduct must begin at the point where the aqueduct was obliged to depart from the mountainous contour in order to traverse a lower ridge to reach the city. The siphon starts at the aptly-named locality of Terazi (meaning balance or plumb level) where a badly-collapsed structure probably represents the header tank of the system (Taramelli 1899, 401; Oikonomaki 1986, 60). It seems highly unlikely, albeit statistically conceivable, that the Lyttos aqueduct continued from Terazi to the city with free-flow, since if functioning with free-flow the greatest height the substructure would have to reach would be between 35m and 40m, and although attainable, Roman bridges rarely exceeded a height of 30.5m (O'Connor 1993, 154). The discovery of the stone pipe, the presence of the toponym Terazi and the considerable descent and span presented by the ridge all suggest the use of a siphon.

It can also be argued that an inverted siphon facilitated the crossing of the Aposelemi Valley along the Chersonisos aqueduct (Xerokamares 1) (A 5.8) on the basis of the excessive height needed if the water travelled with free-flow. Spratt who believed that the water passed through the valley with free-flow calculated a necessary height of over 70m (1865, I, 103-4). Again, a siphon would certainly constitute the more practical method for crossing the Aposelemi Valley, given that few Roman bridges exceed 30.5m (O'Connor 1993, 154). Some notable exceptions exist, such as the Pont du Gard which, as previously noted, rises to a height of between 47.4m and 48.7m (Fabres *et al.* 1991, 67).

A stone-piped system, similar to that of Lyttos, can be proposed for the Aposelemi bridge on the basis of the numerous architectural comparisons between the Lyttos and Chersonisos aqueducts, despite the fact that no stone pipes associated with the bridge have been found. Their scarcity is probably a result of the dense undergrowth and the steep and treacherous descent into the valley (**plate 6c**). Six architectural pylons, clearly visible in the Aposelemi Valley, supported this venter bridge (**plate 6c**, as indicated by the arrows). The major pylons are 8m wide at their base, diminishing to 1m where the aqueduct rejoins the hillside. The tallest surviving pier still stands about 25m high (**plates 6a-b**). The venter bridge would have eased pressure on the walls of the stone pipes and facilitated an ascent to a level only slightly lower than at the start of the system.

The main advantage of the use of the siphon over the bridge is the considerable depth attained by siphons. Exceptionally few bridges achieve a height of over 45m, as previously mentioned, whereas siphon depths are on average much greater. The best-preserved siphons in France are the Soucieu and Beaunant along the Gier aqueduct. The Soucieu siphon is 1.20km long, with a 200m-long venter bridge, and reaches a maximum depth of 92.8m with a hydraulic fall of 9m, whereas the Beaunant is the deepest of all Roman siphons, descending to a depth of 123m i.e. 12 atmospheres (Hodge 1983, 221). The existence of stone-piped siphons and their popularity in Crete suggests that they were not more expensive to construct than bridges, a factor which has often been offered to explain the seeming scarcity of inverted siphons throughout the Empire.

6.4 Lead Pipes

Baldwin Bowsky claims that Romanised Cretans were noted for the manufacture of metallic objects such as water-pipes and lead seals (1995a, 58). Yet, only two inscribed lead pipes have been recorded from Crete. An example from Dramia is thought to belong to a lead-piped aqueduct. The pipe was 0.39m long with a narrow diameter of 0.095m and carries the text $\sum \omega \lambda \tilde{\eta} v \epsilon \zeta \Delta \rho \dot{v} \tau \omega v(s) \zeta$, translated as the 'pipes of Dryton' (IC II xiv 1; Petrulakis 1915a, 51, no. 3). Dramia, the site of ancient Hydramia, is traditionally considered to be the port of Lappa, being located at the mouth of the Mousella River. Sanders claims that nothing remains of the ancient settlement except an indeterminate pottery scatter although, somewhat contradictorily, he mentions a lead water-pipe recovered from 'Roman buildings' and a statue of Herakles now in the Khania Museum (1982, 168).

The second lead pipe was discovered in the area of Traokourta in Lappa itself and carries the text Λ AΠΠΑΙΩΝ: 'of the citizens of Lappa' (Theofanidis 1948-9, 10, 11, fig. 21). The pipe is 0.46m long with a narrow diameter of 0.10m. Theofanidis deduced, from the public nature of the text, that the pipe belonged to the public aqueduct of the ancient city (1948-9, 10, 11, fig. 21). Yet the diameter of the pipe precludes its function as a siphon pipe and indicates that it probably represents a distribution pipe (Andrew Wilson, pers. comm.).

As aforementioned, the disadvantage of the siphon is commonly assessed in terms of expense. Consequently, Hodge was surprised by the rarity of lead pipes in Greece in the light of the silver mines at Lavrion since lead is often an unwanted byproduct of silver processing (2002, 307). Even so, the cost of transporting the fabricated pieces to the site would have been enormous for the larger siphons where hundreds of tonnes were needed. Admittedly, this is not applicable to the majority of Roman siphons, notably the Cretan variety as these siphons generally lie at the smaller end of the scale.

Lead does not often survive in the archaeological record as it can be easily melted down and reused. Therefore, it is possible, although unproven, that lead siphons which no longer survive did supply Cretan cities. This phenomenon is clearly

⁴⁴ I am grateful to Professor Yannis Tzifopoulos who informed me of both references for the pipes. Unfortunately, neither pipe has been located in the museums in recent years.

demonstrated by one of the most ambitious siphons in all antiquity; the Madradağ Siphon at Pergamon. It was constructed in the 2nd century BC under Eumenes II and was approximately 3.2km long, with a maximum depth of 200m and a possible head loss of 41m. The aqueduct channel approaching the siphon was constructed of three parallel lines of terracotta pipes but the siphon itself employed lead pipes. The most significant aspect of this siphon for the present study is that no lead pipes were found associated with the siphon but chemical analysis of the soil along its course proved that lead was used (Hodge 2002, 42).

Oikonomaki claims that lead was used to different effect in the aqueducts of Crete where it was employed for the surface treatment of many of the channels (1984, 79; 1986, 67). Oikonomaki reports that the entire surface of the Lyttos and Chersonisos channels were smoothed using lead in order to aid water flow and to hinder water absorption from the channel although he offers no scientific analysis or proof of these findings (1984, 79; 1986, 67).

Lead piping was found associated with Roman baths and cisterns. Lead sheets, possibly for piping, were found associated with the bathhouse at Minoa but there is no published discussion regarding their function (Theofanidis 1950-1, 10). At Kouphonisi a lead pipe was connected to a line of terracotta pipes running east-west through the centre of the bathing complex (in area Z). The terracotta pipeline consisted of 17 separate pipes, each 0.50m long, with mortar sealing the narrow ends to the wider ends. The piping system terminated with a lead pipe (2.22m long and with a diameter of 0.06m) which acted as a miniature siphon. The lead siphon had been repaired with earth and hemp attesting its longevity (Papadakis 1986, 231). Another lead pipe was found associated with the circular cistern which regulated the water supply to the Villa Dionysus while a further section of lead piping was found in one of the three stone-built drainage channels under the walkways of the peristyle of this *domus* (*AR* 1998-9, 115; *AR* 1999-2000, 134). These examples and the dimensions of the inscribed lead pipes discovered at Lappa and Dramia points to sophisticated intra-urban water distribution systems rather than their use in siphons.

6.5 Terracotta Pipes

In Crete there seems to have been a long tradition of long-distance terracottapiped water supplies. At Knossos a Minoan conduit of terracotta pipes conducting water from a spring on the slopes of Mount Yuktas about 10km away has been depicted traversing the countryside crossing gullies on narrow stone bridges (Hood & Smyth 1981, 8, 15, 56, nos 282 and 288; Hodge 1992, 32).

The technique had been fine-tuned by the Hellenistic period. Bosanquet made a brief reference to a piped water-supply system at Praisos where he observed that the water of a distant spring was conducted to the foot of the First Acropolis in terracotta pipes (1901-2, 241). In 1901 the elderly inhabitants of Vavelloi (modern Nea Praisos) indicated the general line of this ancient piped conduit following 'the curves of the hillside from $M\varepsilon\sigma\alpha\beta\rho\dot{\nu}\sigma\iota\varsigma$ (Big Spring) to the foot of the First Acropolis' (Bosanquet 1901-2, 236). Unfortunately, it was largely destroyed even then. The piped supply would have terminated in the area of the city most likely to represent the agora: the saddle between the First and Second Acropoleis (Kelly 1997, 26 and 33).

The use of terracotta pipelines in intra-urban systems was ubiquitous by the Roman period on Crete. Baldwin Bowsky claims that the incised terracotta waterpipes discovered at both Rhaukos and Asites in central Crete, bearing a Roman name, can be associated with the owners of villas located on the western border of the Capuan lands on the outskirts of the Knossos region (1999, 325, n. 71-2). It is highly significant that the original reference to the pipes in the Asites region referred to a pipeline (consisting of a series of substantial terracotta pipes, ten of which carried the incised lettering OVAPONTOC) at Kato Asites, and not Asites (Platon 1957, 339). The distinction between Asites and Kato Asites is pertinant as Platon's original record attributes the findspot of the pipes to Kato Asites where, it can be argued, they were associated with a bath (B 16). The pipes have been dated to the late 2nd or early 3rd century AD which would correspond with the functional life of the bath (SEG XXIII 531). Moreover, the private nature of the structure has not been verified and there is an argument for a public interpretation which would refute its context within a private villa as posited by Baldwin Bowsky (1999, 325, no. 71-2). A public identification for

⁴⁵ Conversely, Davaras who also comments on this pipeline, refers to Asites, as opposed to Kato Asites, and presents the text as ουάγοντος (1963, 152).

the bathhouse at Kato Asites could be proposed in the light of a more extensive plan for the bathhouse suggested by walls which extend visibly from its southwest corner (personal observation). Exploration in the general area of Kato Asites suggested a broader Roman settlement, possibly representing ancient Pannonia (Alexiou 1965b, 555). Terracotta pipes from Aghios Myron in the neighbourhood of Asites also bear an identical inscription (Davaras 1963, 152; *IC* I xxvii 4; Halbherr 1898, 93, no. 33). Aghios Myron can be associated with ancient Rhaukos (Sanders 1982, 154).

Another inscribed terracotta pipeline was found in an architectural complex beside the odeum at Gortyna (Pernier 1925-6, 63). These pipes measured 0.43m in length with a maximum diameter of 0.18m and a minimum of 0.12m. The pipes carried the incised letters $\Theta a \rho$ (IC IV 535) thought to represent the name $\Theta a \rho \sigma \dot{\nu} \mu a \chi o \varsigma$ (Pernier 1925-6, 63, fig. 58) already attested in inscriptions from Knossos, Lato, Prinias and Olous (IC I viii 33; xvi 21; xxviii 18 and xxii 59). This piped system could be associated with the bath complex proposed for this area (B 56*) (Pernier 1925-6, 66, fig. 61). Admittedly, the bath association is vague and the date of the inscriptions bearing the same name cannot simply be transferred to that of the pipeline on the basis of the same nomina, and even if it could, the interpretation of the abbreviated format on the pipe is still highly speculative. Nonetheless, the discovery of yet another inscribed pipe (carrying the text $\Gamma v \tau \omega$) from the area adds to the collection of inscribed pipes from this architectural complex to the east of the odeum (IC IV 536).

The concentration of incised terracotta pipes in central Crete suggests the presence of an organised centre for their large-scale production (Davaras 1963, 152-3). Certainly, the popularity of bathing on Crete would have necessitated complex piping at all the major urban centres. It is tempting to propose the operation of a factory of terracotta water-pipes in the broader Gortyna area based on the evidence of recurring signatures on pipes, as has been similarly suggested for stamped brick due to their preponderance in the Mesara (see 14.7).

Hodge initially stated that terracotta pipes were sometimes used in pressure systems (2002, 113), only later to refute this, claiming that it was doubtful if in

 $^{^{46}}$ The best evidence of the existence of the city of Rhaukos in the Roman period is the Life of Saint Myron c. AD 250-350 who came from the city of Rhaukia, which must be an alternative form of the name (Detorakis 1970, 132).

practice terracotta pipes were ever used in siphons (Hodge 2002, 154). In fact, terracotta pipes were used in siphons in the Roman period, albeit not very often and perhaps in less prosperous areas where even to build a bridge would be too expensive. Terracotta pipes would certainly provide a less costly material for siphons although their relative paucity might reflect their lack of efficiency. In these areas single terracotta pipes were favoured if the depth of the siphon was not excessive. Vitruvius mentions the use of terracotta pipes for siphons, their joints strengthened against the static pressure through being sealed with a mixture of oil and quicklime (*de Architectura* VIII vi 8). Leakage under high pressure, experienced with alternative materials, must have hampered their popularity. Terracotta piped pressure lines can be identified by the exceptionally thick walls of the pipes relative to their diameters (Hodge 2002, 113). At Kremna (Pisidia) a terracotta siphon was recorded where the walls of the pipes were extremely thick (0.16m thick) and originally encased in mortar (Owens 1992, 373; Mitchell 1995, 144).

The inscribed terracotta pipes on Crete are not suitable for use in siphons due to their thin walls. The pipes from Kato Asites measure 0.445m-0.48m long with a wall thickness of 0.08m i.e. half that of the pressure line at Kremna (Davaras 1963, 152; Herakleion Museum no. 305). The Cretan examples represent pipes used in distribution branches rather than siphon pipes pertaining to the main aqueduct.

6.6 Bridges

Despite the fact that siphons featured on a more regular basis than had previously been suspected throughout the Empire, it is still argued that bridges were favoured for economic reasons (Hodge 2002, 147). Conversely, it seems that siphons were employed specifically when the valley depth and width proved too labour-intensive or physically unfeasible in terms of bridging, although in general, bridges were built when feasible.

The Xerokamares 2 bridge (Mikro Potamos) along the Chersonisos aqueduct (A 5.7) was originally incorrectly interpreted as a siphon bridge by Taramelli who stated that

'from the Acropolis at Lyttos I descended into a small valley in the area of Askous until I reached the great Potamies River of Aposelemi. A little below the village of Kamares in this region I found the substantial ruins of a Roman aqueduct which carried water to Chersonisos. The ruins were no less impressive than those which we met at Aposelemi between Kastellios and Langkou. At Kamares ruins of a bridge, with which the aqueduct crosses the valley, appear on both sides of the river. It still stands 12.5m high and is preserved for a length of 15m and a width of 6m. The bridge probably facilitated a type of siphon, as on the aqueduct at Gortyna near its acropolis, which enabled the water, after its descent, to reascend the valley enclosed in a strong pipe (un robusto condotto) at a slightly lower height than that at its start' (Taramelli 1899, 400).

The dimensions supplied by Taramelli reveal that he is describing the bridge at Xerokamares 2 (**fig. 27**). More recently, Oikonomaki has convincingly argued that the bridge at Xerokamares 2 conducted water with free-flow and suggests that at its original height of 16m the bridge was completed by a central arch over the river and possibly a series of smaller arches over this (1986, 74) (**plate 5c**). The architectural impression of considerable height is supported by the presence of stone bonding courses, usually restricted to substructures of great elevation, suggesting that the bridge was substantially elevated, possibly supporting an upper arched storey (see 5.6.1). This format also seems to be verified by Belli's observations of the bridge at the close of the 16th century describing

'an immense arch of an aqueduct, by which the water was carried across a deep valley, by means of a large marble channel (gorna) which is still apparent' (cited in Falkener 1852-3, 275).

It is significant that Belli refers to a channel, rather than a pipe, an expansive arch and a deep valley as these features are evident in the bridge at Xerokamares 2. No arches have been secured along the Lyttos aqueduct, although an interconnecting

doorway is evident at Poros tou Toikhou 1 which, significantly for this context, is not located in a valley (Oikonomaki 1984, 74).

At Knossos there is architectural evidence of a Roman aqueduct bridge traversing the Vlychia River (A 8.5) (fig. 31, no. 160). The Roman remains are located low in the small valley 90m to the north of the Venetian aqueduct bridge which dominates the skyline (plates 15a-b, where the location of Roman bridge is indicated by the arrow). The Roman bridge is evident projecting from the lower western side of the riverbed (plates 16a-b, where the arrow indicates the top of the Venetian bridge). The architectural format of the bridge is unclear with only one other stump of masonry identifiable on the opposite eastern bank. The nature of the terrain is steep but it is possible that the architecture represents a single arched bridge, as seen at Xerokamares 1, which was subsequently mirrored by the overshadowing Venetian example.

6.7 Conclusion

Cretan aqueducts adhere to pragmatic principles with little room for ostentation for its own sake. They are primarily functional monuments and, as such, their form is more sensitive to local geographical and geological characteristics than aesthetic taste. They are either of the stone-built or rock-cut contour-line varieties, demonstrating a predilection for meandering circuits over elaborate architectural solutions in overcoming obstacles. They boast few bridges (certainly none comparable to the famous arched examples at Tarragona or Nikopolis) levelling towers, tunnels or cascades. They flowed seamlessly within the landscape availing of its natural endowments in all aspects of their design. Their courses are so unobstructed that it seems as though their very cities were specifically located to facilitate their low-profile design. Their simplicity thinly veils a technical mastery and an intimate knowledge of the landscape usually only possessed by the local inhabitants of each region. Locals must have worked in union with professional surveyors, as first-hand knowledge of the most rural areas of the island would be necessary to plan the trajectories of the aqueducts of Crete, as fieldwork for this study also demonstrated.

Rather surprisingly and almost contradictorily, they incorporate at least four inverted siphons, sizeable tunnels, and boast collection cisterns on a scale only comparable with those of Spain, Southern Italy, Asia Minor and North Africa (Wilson, A.I. 1998, 89; 2001, 84). The presence of inverted siphons along Cretan aqueducts is significant, since Roman siphons were traditionally regarded as feats of engineering audacity in the ancient world, as expressed by Statius' admiration for the siphon supplying the villa of Manlius Vopiscus at Tibur (*Silvae* 1.3.66-7). The presence of at least four siphons on Crete, with two occurring along the same aqueduct (at Gortyna), conveys the high degree of Roman engineering technology incorporated into these Cretan monuments.

In studying distributions of the overall siphon type (i.e. including lead, terracotta, and wooden-piped systems) the patterning suggests that stone siphons are essentially a translation of a widespread technique. The extent of the use of wooden pipes in general water supplies remains uncertain due to the perishable nature of the material, as attested by their frequency in the northwestern provinces relative to elsewhere in the Empire (Wheeler & Wheeler 1932, 55, Wilson, R.J.A. 1996, 21). Nonetheless, wooden piped systems have been suggested for rural Italy (Wilson, A.I. 2000b, 602; Thomas & Wilson 1994) and in the Eastern empire, e.g. Satafis, Aïn Kebira (CIL VIII 20266). A siphon employing wooden pipes has been recorded in Caerwent (Hodge 2002, 111).

Hodge originally saw lead as a Roman development from a Greek stone prototype (2002, 37); however, it has been established that contemporary inverted siphons employed pipes of various media throughout the Empire. It is highly significant that of all the diverse materials used as pipes in siphons stone is the most durable and most recognisable as a siphon element; qualities which would explain its relative frequency among the distributions.

The traditional view of the stone-piped siphon is that of an Eastern phenomenon although this Eastern preference is somewhat undermined by numerous citings in both France and Italy (Hodge 2002, 41, fig. 18). Nonetheless, the stone-piped siphon enjoys a dense distribution in the East with notable concentrations around Cilicia and Lycia. Coulton informs us that one of the characteristics of the water-supply systems of Asia Minor is the use of stone pressure pipelines and the

popularity of this type is attested by his distribution maps of the area (Coulton 1987, 79; Kessener 2000, 131). In Lycia the type is encountered at Oenoanda and Patara (plates 85c-86c), the latter being both the main port of Lycia in the Roman period and the main stop on the east-west shipping routes, in effect, linking the Aegean to the Eastern Mediterranean Sea (Işik 2000, 84, fig. 69). The Cretan siphons employed stone pipes which are comparable to numerous Eastern examples.

The Cretan aqueducts, like all aqueducts throughout the Empire, evolved within a broader cultural template. They seem to be predominantly related to the Eastern formats and the Lyttos stone drum would be at home in Lycia and elsewhere in Asia Minor. It is tempting to interpret such connectivity as a testament to the application of widespread Roman techniques and the expertise of engineers throughout the Eastern Mediterranean. The Cretan variety represents a deviation from the archetype, being both distinctively independent yet recognisable as a type. Their contextual landscape moulded their distinctive form with modifications born in response to local conditions and regional stimuli.

CHAPTER SEVEN

INSCRIPTIONS RELATING TO THE AQUEDUCTS OF CRETE

7.1 Introduction

The present study is essentially an architectural assessment; however, a brief account of the inscriptions associated with the aqueducts of Crete was considered essential for a comprehensive analysis of the monument type. This epigraphic presentation does not attempt to be exhaustive but rather informative with regard to the aqueducts and their significance in Cretan society.

Inscriptions associated, even loosely, with the Cretan aqueducts are rare and must be used cautiously as chronological evidence since they refer to an absolute point in time and do not reflect the lengthy life of repair and maintenance associated with these monuments. Aqueduct chronology is not static or absolute since the construction of any given aqueduct can be started in one period and finished in the next, as is the case for the Athens aqueduct, initiated by Hadrian but completed by Antoninus. In Crete, such longevity is apparent in the repairs of inferior workmanship along the aqueduct of Gortyna which Taramelli attributes to 'epochs of lesser prosperity' (1902, 131). Such restoration would have been necessary for monuments exposed to the elements over long periods of time (Lolos 1997, 297). Indeed, the Gortyna aqueduct remained in operation long after others on the island had ceased to function and any repairs along its length attest its resilience within an active seismic zone.

The general corpus of Roman inscriptions on Crete has been divided into three major chronological concentrations throughout the first four centuries AD (van Effenterre 1976a, 208, n. 2). Van Effenterre observes that inscriptions are numerous in the time of Augustus and the first half of the 1st century AD, subsequently becoming relatively infrequent up until the reign of Trajan when they are again profuse. In this first phase they seem to reflect the organisation of the province,

referring to official construction, public works and the revision of territorial demarcations.

The second glut coincides with the first of the Antonines and is represented by a plethora of inscriptions which are well distributed throughout the island. Their profusion reflects a provincial prosperity experienced throughout the Empire. Inscriptions are again common during the reign of Severus but, subsequently are not found in abundance until the late 3rd or early 4th century AD (van Effenterre 1976a, 208, n. 2). Unfortunately, despite such a large general corpus of inscriptions from the Roman period, few relate to aqueducts either directly or indirectly. Inscriptions with any bearing on Cretan aqueducts are presented in this chapter.

7.2 Epigraphic Evidence associated with Aqueduct Construction on Crete

7.2.1 Polyrhennia

IC II xxiii 66

IMP CAESAR [Traia] NVS HADRIAN[us trib. Pot.] VII COS III

An inscription from Polyrhennia refers to some benefaction to the city by Hadrian. Theofanidis implies that this could refer to the construction of the aqueduct, although no substantial evidence for this deduction is offered (1942-4, 18). Nevertheless, Vermeule confidently catalogues the inscription as the monumental inscription for the aqueduct of Hadrian (1968, 444).

7.2.2 Lyttos

SEG XLV 1327

Εύτυχος

A sample of graffiti, probably representing the name of a worker, was identified on the Lyttos aqueduct and loosely dated to the $1^{\rm st}$ or $2^{\rm nd}$ centuries AD

(Chaniotis 1995, no. 1). The lettering is presented upside-down on a block of the substructure wall at Poros tou Toikhou. Unfortunately, its position in the wall, which would have added to our understanding of its execution, has not been recorded. The fact that the graffito is upside-down could either reflect a workman leaning over the top of the wall or the fact that the graffito predates the incorporation of the stone into the elevation. Graffiti in the taproom at Dar Saniat (Carthage) have also been interpreted as being executed by waterworks staff, although suggestive of slave labour in this context (Wilson, A.I. 1997, 83). A graffito is also known from a wall at Rhizenia (Prinias) on Crete reading AΓO (*IC* I xxxi 9).

7.2.3 Gortyna

IC IV 73

αἴ τίς] κα διαρύει ὔδορ ἐ –	ον κα
ς το γείτονος, προ[Γείπαντ-	έπι να
ι άπατον] εμεν αι με διαρεί.	ον έπ[
αὶ δ' ἀποΓείπαντος [διαρύοι, δ-]770U V-
αρκναν κα]ταστασεῖ κατ' ἀμέ-	αευτ[
ραν οττάκιν κα δι[αρύει vac.]ι τ α -
····νπο]ρτι στέγαι με πορ-	ς πμ[ᾶς
τέμεν αι με δέκα πο[·····	αἰ δε κ]α μ-
·····μέτε] ἐπνιονα μέτε κο-	€ €1
πριονα μέτε ρ[7 7 1

Concerns about water in the city are expressed in this fragmentary inscription containing urban regulations regarding the drainage of rainwater (SEG XXVIII 736).

7.2.4 Aghioi Deka, Gortyna

IC IV 334

```
___D]ivi Ne[rvae adne-
pos, M. Au]relius [Com-
modus A]ntoninus A[ug.]
___t]rib. pot --
--p.] p. viam a --
___usque ad Nym-
phaeum], ex pecuni[s
sacris] deae Dicty[n-
nae fieri] iussit.
```

Translation:

Great great great grandson to the Divine Nerva,
Marcus Aurelius Commodus Antoninus Augustus
with Tribunician power
----public way------ as far as the *nymphaeum*,
from the sacred treasury (or monies)
of the goddess Diktynna,
he ordered to be constructed.

A Latin inscription found in a stable in the village of Aghioi Deka refers to a road constructed by order of the emperor Commodus which led from a given point to the *nymphaeum* (Taramelli 1902, 140; Pagano 1992, 280). The text demonstrates that the *nymphaeum* was in sufficient use in the 2nd century AD to be accessed by a public road built by Imperial mandate. The inscription is one of a number of dedications indicating that the treasury of the temple of Diktynna was a major source of public funding in the 2nd century AD.

7.2.5 Gortyna

IC IV 330

Σόαρχος Κυλίνδρου, άρχιερεύς τοῦ κοινοῦ τῶν Κρηταιέων, ἐκ τῶν ἰδίων τὸ ὑδωρ εἰσήχαχεν

Translation:

Soarchus son of Cylindros, the high priest of the *koinon*, the Cretans, out of his expenses introduced water

This inscription from Gortyna refers to an aqueduct built by Soarchus, son of Cylindros, the high priest of the Cretan *koinon*. It is not certain if the aqueduct referred to in the text is the main public aqueduct of the city or some more obscure tract associated with the site. Sanders applies a 1st-century AD date to the inscription which would be too early for the surviving remains descending from Zaros to the city (1982, 9, n. 77). Guarducci wonders if it refers to a tract associated with the odeum (*IC* IV 330).

7.2.6 Gortyna

Bandy 1970, 63, no. 33

- a-b ο προς εὐσέβειαν ἐκτρέχων Γεώργιος:
- c-e και προσεπιβάλλων τη πόλει την ο [χετείαν?]
- f-g έξανιστα τον τόπον: Δ[ε]
- h-i [δί] ψη το πρῶτον ἀ[μφί?]

k-l ύδασιν

m $[\alpha] \pi p \epsilon [\pi \omega \varsigma?]$

n [ά]πο[λλυμένη?]

ο [άνε]κ[αίνισε?]

p-q [πρ]οσερριμμένον

Translation:

Georgios who runs forth to show his piety and adds irrigation to the city also causes the place to flourish. The city at first was thoroughly parched, inappropriately perishing for water. He made the place new again when it lay prostrate (translation by Bandy 1970, 63).

This dedicatory inscription is composed of sixteen fragments, incised on a marble *kymatium* dug out of the ruins of the odeum. It was dated to the 6th century AD by Guarducci (*IC* IV 465). The terracotta pipes which distributed water to the houses of Gortyna were old and damaged by earthquakes and almost impossible to repair by the 6th century AD. Consequently, three branches of a new aqueduct were built traversing the city on high arches. They were probably constructed on the initiative of the Metropolitan, identified as the individual mentioned in this inscription by the name of Georgios (Bandy 1970, 63, no. 33), since Justinian transferred the running of the cities' water-supplies to the bishops (Di Vita 2000a, 13).

7.2.7 Gortyna

Bandy 1970, 61, no. 32.

'Επὶ Σιγιλίου τον λαμπρότατον σκρινιαρίου καὶ πατρὸς
τῆς πο(λεως) ἀνενεόθ(η) ὁ νῖλος καὶ ὑ πάτος · ἰν[δ(ικτιῶνι) ι[.] ὑπο Γε
ωρχί(ου) συμπραξόν(των) 'Ιωάννου · [ἰς] τοῦτο καὶ 'Ελλαδί(ου).

Translation:

At the time of Sigilius, the most illustrious *scriniarius* and father of the city, the cistern and its floor were renovated in the (...) year of the indiction of Georgios, Ioannes and Helladios co-operating for this purpose.

A certain Georgios, thought to represent the same Georgios of inscription 7.2.6, also helped renovate the cistern in Gortyna in the late 6th or early 7th century AD (Bandy 1970, 62; *IC* IV 461).

7.2.8 Psallida, Gortyna

Bandy 1970, 77, no. 47

Κπίστη νέο
υ άγωγοῦ Ἑρεννιανῶ τῶ λαμι
προτάτω
"Έργον Ἡρακλίου
ἔως ὧδαι

Translation:

To the builder of the new aqueduct, the most illustrious Herennianus. The work of Heraclius is up to this point.

The text and provenance of this inscription are particularly informative regarding the Gortyna aqueduct. The inscription was found at Psallida between the villages of Gergeri and Aghioi Deka. Its text is thought to commemorate the construction or reconstruction of an aqueduct and it names the builder of the new aqueduct as Herennianus and the possible contractor as Heraclius (Bandy 1970, 77, no. 47).

Bandy dates the inscription to the 4th or 5th century AD (1970, 77, no. 47), while Di Vita assigns it to after the earthquake of AD 618 (2000a, 13). Consequently, he can suggest that this earthquake reduced the city to such a deteriorated state that it was the emperor himself, Heraclius I (made emperor in AD 610), who assisted in the renovations and repairs (Di Vita 2000a, 13). The construction of no less than 42 fountain-houses and the restoration of the *nymphaeum* were attributed to him (*IC* IV 512). Water was still clearly distributed to the site in the 7th century AD, although the inhabitants now had to journey to the fountains themselves to procure the water.

The findspot of the inscription has given rise to serious debate regarding the trajectory of the Gortyna aqueduct. Confusion concerning its rightful provenance in past scholarship has had drastic repercussions. Guarducci originally reported that this inscription came from Apomarma at Psallida, a small village a few kilometres south of Gergeri in the centre of the Mitropolianos Valley where, she specifies, the inscription was found near the aqueduct (*IC* I xxxi 9).

This findspot does not correspond with Taramelli's trajectory for the aqueduct which did not extend as far north along the valley as Apomarma, but veered west towards Plouti (fig. 38). Subsequently, Taramelli maintained that if the inscription actually originated from Apomarma it would be too far north along the valley to be connected to the aqueduct of Gortyna. Consequently, Sanders brashly attributed the inscription's findspot to the same location as the preceding inscription in Guarducci's catalogue, i.e. no. 8 from Plouti (1982, 155). This conveniently placed it on the line of the aqueduct promoted by Taramelli who believed that the aqueduct traversed the valleys of Panayia, Moroni and Plouti on arcades (Taramelli 1902, 126-7) (fig. 38). Clearly, there are no academic or scientific grounds for this relocation and La Torre maintains that Sanders has implicitly and rather uncritically accepted the hypothetical trajectory of Taramelli (1998-9, 319). It is significant that Taramelli, by his own admission, did not follow the whole course of the aqueduct, a task he leaves for future researchers, and his trajectory is presented only as a probability (1902, 121, fig. 11, 127).

La Torre calculates that if Taramelli's trajectory were followed then the aqueduct, on departing from the slopes of Orthipetra, would have to travel underground at a level of 170m for 2km to reach the valley of Plouti (1988-9, 319). This depth would

be necessary in order to penetrate the mountainous barriers of the intervening terrain, the lowest point of which is 420m, 170m higher than the preserved line of the aqueduct.

La Torre establishes that the aqueduct does not follow Taramelli's course but actually continues in a northerly direction along the Mitropolianos Valley for at least 1.5km further north of Plouti. It follows the eastern slopes of the mountains which separate this valley from those of Plouti and Moroni. La Torre confirmed this trajectory by plotting the previously unknown tracts of 17, 18 and 19 (1988-9, 319). La Torre's discovery of these new tracts along the Mitropolianos Valley, to the south of Apomarma, confirms Guarducci's ideas concerning the layout of the aqueduct while dismissing Sanders' preconceived hypothesis which linked the provenance of the inscription, mentioned above, with the misconceived trajectory suggested by Taramelli (1988-9, 320). La Torre confirms that the visible remains along the slopes of Aghios Ioannis and Pervolopetra all originate from the same aqueduct which descends the Mitropolianos Valley from at least as far up as Apomarma (1988-9, 320, figs 44-5). The more logical route proposed by La Torre is both better suited to the orography of the region and complies with the epigraphical evidence. This is the most logical course in terms of hydrography as it facilitates the continuous conduction of water without recourse to elevated substructures or arcades and without the construction of expensive and arduous underground tracts (La Torre 1988-9, 320). The aqueduct now departs from the caput aquae of Zaros and descends towards Nibretos (where a bath building has been identified at nearby Droson, see B 18), proceeding to Kardomiana and then to Apomarma, and finally coasts the contours of the eastern slopes of the Mitropolianos Valley for its entire length (La Torre 1988-9, 320). This trajectory not only alters the traditionally accepted route of the aqueduct but also validates the original findspot of its associated inscription. The aqueduct adheres to this more realistic route in the Barrington Atlas (fig. 84).

Nonetheless, Taramelli must have had some reason to lay out the tract of the aqueduct as he did, indicating a line from Zaros-Panayia-Moroni-Plouti without having followed the aqueduct. He would have been well aware of the topographical difficulties in following this course. La Torre suggests that Taramelli heard some news while working on the inverted siphon bridge at Mitropolianos, perhaps part of the oral tradition of the area, that an aqueduct was located in the valley further west parallel to

the Mitropolianos (1988-9, 320). The existence of an extra line in this area is supported by the identification of an aqueduct bridge crossing the river in the plain between Aghios Titos and Mitropolis. The substructure of the bridge stood 1.7m high supporting a channel measuring 0.50m wide x 0.65m deep in the 1900s (Taramelli 1902, 134-5). Its situation is suggestive of a branch entering the city from the west, from the area of Ambelouzos not from the slopes of the western acropolis (La Torre 1988-9, 321).⁴⁷

La Torre accepts the possibility of a separate branch originating at the *caput aquae* at Zaros and continuing through the Panayia Valley and the adjoining valleys of Moroni and Plouti, crossing the stream of Ambelouzos, before meeting the Geropotamos and thus entering the city (1988-9, 322). His acceptance of such a possible trajectory seems to undermine his initial rejection of Taramelli's trajectory on the grounds of the unsuitability of the terrain. La Torre actually suggests that the *caput aquae* at Zaros only served the line leading through Ambelouzos, while the main aqueduct, running along the Mitropolianos Valley, gained water from the numerous sources along the slopes of Mount Psiloritis which are particularly rich in the zones east of Gergeri (1988-9, 321).

7.2.9 Gortyna

IC IV 512

+

Κωνσταντίνε Ἡράκλειε

αύγουστε αύγουστε

του βίνκας του βίνκας

Εὐδοκία Κύριε

Αύγούστα νίκην τοῖς

του βίνκας δεςπότ(αι)ς

'Ρωμαίων.

⁴⁷ It is perhaps relevant that Pococke believed that the aqueduct was only transporting water from a spring two miles to the southwest and, consequently, was less impressed with the aqueduct at Gortyna than Taramelli referring to 'the remains of an ill-built aqueduct' (1745, 253).

At Gortyna, *nymphaeum* 25 is located to the north of the *praetorium* (**plate 26c**). The water enters the *nymphaeum* via the central niche and finally collects in three marble basins set along the front of the fountain. At some date after its initial construction the open basin was converted into a 3m-high vaulted cistern, the façade was rebuilt and basins in the form of shaved-down sarcophagi were added (**plate 26c**). Columns were erected along its southern façade bearing dedications to the Emperor Heraclius I (made emperor in AD 610) to whom the restorations of the *nymphaeum* are attributed (*IC* IV 512b; Pagano 1992, 282).

7.2.10 Ini

Ducrey & van Effenterre 1973, 283.

Οί σύμ Πρατομηνίω κόσμοι και οί οικονόμοι

έπΤ - - - ΤΟ - - - - - - ME. ON [έ]κο[σμε]ον οἴδε -

 $^{\rm T}$ Κάραν[ο]ς Σωμένω, Διν[οκλη]ς 'Αγεσίππω, Ίερώνυμος 'Απολλονίω,

 $K_{\text{`γραμματεύς}}$ Πρατομήνιος Έξακέστα · οἰκονόμοι Σωκλῆς Πρατο-

^{γρ}μήδους, Φίλινος Δινοκλέος. νας Λούειν δε τας γυναϊκας μήδους, Φίλινος Δινοκλέος. νας Λούειν δε τας γυναϊκας

άπο ώρας vac μέχρι ώρας vac τους δε άνδρα[ς]

PANTA ἀπο ώρας vac.

Translation:

The Kosmoi working with Pratomenios and the treasurers

have managed the public bath out of the city's expenses and ----

----The Kosmoi were:

Karanos son of Somenos, Dinokles son of Agesippos, Hieronymos son of Apollonios, the secretary Pratomenios son of Exakestas. The treasurers were Sokles son of Pratomedes and Philinos son of Dinokles. The women will bathe

from (such) an hour to (such) an hour. The men from (such) an hour.

This inscription was found close to the extant remains of the aqueduct and baths at Ini (Herakleion Museum no. 346). The inscription outlines a bath timetable for men and women and has been dated to the Late Antonine period, possibly to the reign of Marcus Aurelius when measures for the segregation of bathing were reinforced (Ducrey & van Effenterre 1973, 284).

The four *kosmoi* mentioned in the inscription were responsible for the supervision of the bath which is referred to as a *balaneion* in the text (Sanders 1982, 12-13). Ducrey and van Effenterre believe that this supervisory role incorporated the care of the aqueduct and propose that the original text in the *hiatus* at line 3 (where the inscription is unfortunately illegible) would have outlined this [πὸ ὑδραγώγιον πὸ ποτεχό]με[ν]ον (1973, 287, n. 113). It is possible on the basis of the broad sense of the verb ἐπιμελέσμαι, belonging to line 2, that it could be assigned to the overall supervision and expenses of the bathing installation, including the upkeep of the aqueduct.⁴⁸ Subsequently, it has been suggested that the inscription may commemorate the construction of the bathhouse complex including its aqueduct (Ducrey & van Effenterre 1973, 287).

The *kosmoi*, to whom the inscription refers, supervise the functioning and maintenance of the public baths. ⁴⁹ It is therefore relevant to explore the traditional tasks associated with the Cretan *kosmoi*. An inscription from Arkades concerning the reconstruction of the sanctuary of Artemis at Aphrati (*IC* I v 5) is instructive in this regard as its format is identical to that of the inscription from Ini. The inscription from Aphrati mentions *ergepistatai* in its list of *kosmoi* and it is likely that they had a similar function as the treasurers of the Ini inscription; by inference, it seems that the

⁴⁸ The finite verb enequely appears in Greek inscriptions of the Roman period. It occurs twice at Kourion to describe the action of a proconsul of Cyprus regarding construction which was either initiated or authorised and financed by the emperor (Baldwin Bowsky 2001b, 269).

⁴⁹ It is clear that the *kosmoi* supervised the upkeep and functioning of the baths but those who actually performed the associated menial tasks, such as cleaning the baths, is unknown. The discovery of a set of three iron-hinged manacles, which had been cut open, in a cavity in the face of the wall of the public bath at Knossos is tantalising (*AR* 1993-4, 75-6). Trajan characterised the task of cleaning the baths as tantamount to punishment, akin to cleaning the sewers, probably due to the fact that most *hypocaust* cavities are only one meter high (Fagan 1999, 188; Pliny *Letters* X xxxii 2).

expertise of the magistrates at Ini was not only financial, but very probably practical. They were accountable for the city's expenses and also responsible for the supervision of the public works. It is not known why they have a distinct title in the sanctuary inscription. The role of these two magistrates is clear, adhering closely to the function of an *aedile*, governing the management of the surveillance of baths, fountains, roads, markets, etc.; tasks which were usually attributed to the group of *kosmoi* called *eunomia* in other sites in Crete, notably Lato.

The following *kosmoi* are assigned the associated duties in the inscription: Karanos son of Somenos, Dinokles son of Agesippos, Hieronymos son of Apollonios, the secretary (Pratomenios son of Exakestas) and the treasurers (Sokles son of Pratomedes and Philinos son of Dinokles). The name of the *protokosmos* heads the list, according to the usual formula, and adhering to this format, the secretary of the *kosmoi* group is named last.

The names occurring in the inscription also appear in the epigraphical records pertaining to other major centres on the island. The name Pratomenes features in inscriptions from Chersonisos (IC I vii 15), Lato (IC I xvi 33) and Hyrtakina (IC II xv 8a). The name of Exakestas occurs at Knossos (IC I viii 40) while the name Sokles is evident at Olous (IC I xii 44). The name Somenos appears at Pyloros (IC I xxv 2) and at Arkades where it is also associated with the patronym Karanos (IC I v 36). This common patronym establishes that the two inscriptions are possibly referring to the same family according to Ducrey and van Effenterre (1973, 285, n. 1). It is therefore tempting to identify the kosmos, Dinokles, as the father of one of the stewards, Philinos Dinokleos. Furthermore, the protokosmos, Pratomenios, could possibly be the uncle of the other steward, Sokles Pratomedous, provided that Pratomenios and Pratomedes are, as the patronym suggests, two brothers, apparently from one of the elite families on Crete (Ducrey & van Effenterre 1973, 286-7). The same observations are applicable to the inscription from Aphrati where one of the ergepistatai, Kallicrates, son of Aristokles, could be the son of the Aristokles Apollonida mentioned in the list of kosmoi (IC I v 5).

Of course such homonymic evidence is not absolute and should be treated cautiously. Nonetheless, Aristotle explains that the Cretan *kosmoi* were chosen from certain clans and privileged hereditary groups (*Politics* II vii 5-6). Willetts suggests

that although this kind of closed oligarchy was to some extent modified, at least in certain cities, there is no doubt that the Cretan cities were governed under aristocratic regimes until the island passed under the control of the Roman Imperialists (1969, 156). The onomastics in the inscription at Ini proves that the integrity of the preceding system survived under Roman rule.

The inscription as a whole indicates that Crete was very much in rhythm with general Roman trends and adhered to the Roman rules of bathing. It is also discernible that at Ini the magistrates who superintended the baths were all Cretan, i.e. none of their names are Roman or Romanised. This ambiguity of cultural identity manifested by Cretans with Cretan names partaking in such a Roman activity as bathing serves to illuminate the nature of Roman intervention in Cretan affairs. One is faced with a testimony which illustrates the Roman method of permeating Cretan spheres of government (Ducrey & van Effenterre 1973, 290). The inscription from Ini illuminates the manner in which Roman culture merged with the indigenous Cretan traditions, with evidence that, at least in some cases, the traditional local elite acted as mediators and defenders of the habits of Rome. Moreover, the inscription establishes that the local governing elite continued in their traditional role as *kosmoi* during the Roman period, albeit their spheres of concern widened to embrace monuments emblematic of the Empire including baths and aqueducts.

7.3 Conclusion

This chapter establishes that Cretan inscriptions associated with aqueducts are illuminating in both general and specific terms despite their paucity. They contribute to our understanding of the control, construction and upkeep of the monuments. At Ini it seems that public constructions were not directly commissioned by Imperial mandate but were sustained by the traditional elite families who acted as mediators between the central power and the indigenous inhabitants. This interpretation accords well with devolvement theories according to which Rome encouraged the elite indigenous groups of the provinces to participate in the Empire.

⁵⁰ This evidence contradicts Strabo that few of the famous *nomina* of the Cretans still survived since they now lived according to the *diatagmata* or decrees of the Romans (Strabo X iv 22; Woolf 1994, 122-3).

This was achieved by allowing these individuals to retain their traditional positions of power while offering them opportunities for social advancement in return for loyalty (Grahame 1998, 97-8).

This model was popular in other areas of the Empire with well-established urban centres prior to the Roman conquest. In these cities the impetus for change came from within, motivated by a pro-Roman elite, rather than any Roman imposition (Lomas 1998, 69). Macmullen states that native populations effectively drew 'Romanness' to their world (2000, 134). He is specifically referring to the energetic administrative elite who acted as a dynamic interface for the infusion of Roman culture throughout non-Roman societies.

The general epigraphic corpus from Crete indicates a constructional *floruit* in many of the major cities in the 2nd century AD based on the wealth of honorary inscriptions referring to various emperors in response to public building. Consquently, it is tempting to assign the construction of many of the aqueducts on the island to the reign of Hadrian despite any clear affirmation of such a date. Nonetheless, this general chronology corresponds with the 2nd-century AD date applied to the construction of the aqueduct of Lyttos, a supposition that could also be ascribed to that of Chersonisos, based on constructional similarities between the two aqueducts. It is also likely that the erection of aqueducts in this period was not exclusive to the cities of Lyttos and Chersonisos, as many public works (including some baths) have been dated to this period using stratified contexts (Spanakis 1968, 158-68).

However, while the general epigraphic evidence indicates that cities were predominantly supplied with public buildings during the Hadrianic period, marking it as the precursor for essential material leisure and prosperity, it does not justify assigning all monumental construction to this period. The 2nd-century AD construction boom does not preclude construction in other centuries. The existence of late-antique inscriptions pertaining to Cretan aqueducts attests their endurance and their inclusion into the architecture of the Christian regime. Blanket dating is attested in Achaea where the aqueducts have been generally accepted as Hadrianic (including those of Corinth, Athens, Argos and Thebes) yet this supposition has been projected to that of Sparta with only minimal study of the monument (Cartledge & Spawforth 1989, 134-5). Moreover, the epigraphic information does not always correspond with

the more general evidence. The Pont du Gard, for example, has been dated to 19 BC on the strength of two inscriptions from Nîmes (*CIL* XII 3153-4), whereas Claudian and Flavian dates have been attributed to it using architectural comparisons and ceramic evidence (Wilson, R.J.A. 1996, 13).

Nonetheless, Baldwin Bowsky attributes the *floruit* of Roman Crete to the 2nd century AD, as attested by members of the Cretan elite and non-elite alike active in the entire Mediterranean and not only in the Greek East (1995a, 52). Certainly, the Antonine period, which represents the height of the Roman Empire, is noted for great political and economic changes, showing a special interest in the provinces, and seeking to enrol them in a single, homogeneous Roman power.

The epigraphic record indicates that by the end of the 2nd century AD the cities of Crete demonstrate a wealth and potential for large public works of Roman influence penetrating into the centre of the island's landmass and stretching from coast to coast. The aqueducts as monuments act as harbingers of a fundamental change in the social framework. Such architectural expression is an eloquent indication of the euergetism of provincial politics and demonstrates the extent of Imperial imprint throughout the island.

CHAPTER EIGHT

WIDER IMPLICATIONS

8.1 Introduction

This chapter presents an assessment of aqueduct distributions throughout Crete. The distribution map reveals a striking number of sites supplied by aqueducts on the island (**fig. 1**). Their density on Crete is remarkable in the light of the paucity of published examples from other areas of the Empire, which raises questions as to what this abundance of aqueducts in Crete is attributable and what it signifies.

Specific geographical regions outside Crete were selected for comparison. Areas have been carefully chosen to best illuminate external influences on the island as it would be impossible, and probably unrewarding, to draw upon similarities between Crete and every other area of the Empire. A comparative analysis of the closest geographical neighbours against core-periphery models was considered most beneficial. This chapter addresses circumstances determining widespread aqueduct distribution on the island and looks to the regions of North Africa, Sicily, and Lycia for comparable or contrasting patterns.

8.2 Implications of Aqueduct distributions on the Island

In total there are 23 Roman sites on Crete supplied by Roman aqueducts. The group incorporates a variety of scale and type. Roman aqueducts have been cited at Kouphonisi, Hierapytna, Pachyammos (incorporating citings at Vasiliki), Chersonisos, Lyttos, Malia, Ini, Knossos, Gortyna, Lebena, Lasea, Plora, Eleutherna, Axos, Aghia Pelagia, Lappa, Minoa, Elyros, Souia, Lissos, Kastelli Kissamou (incorporating the subterranean tracts at Polyrhennia), Khania and at the Diktynnaion.

It can be deduced from the distribution maps (**figs 1 and 2**) that most major Roman sites were supplied by an aqueduct and that other monument types, emblematic of Romanisation, were also common on these sites. For example, if Roman bath distributions on Crete are overlaid with those of Roman aqueducts, a

partnership between aqueducts and bathhouses becomes apparent at many Romanised centres (**fig. 3**). It can be inferred that the sites which demonstrate both monument types represent possibly the richest, and, in some cases, the most densely populated centres on the island in the Roman period. This corresponds with Alcock's suggestion that substantial growth in a city's population during the early Imperial period could be correlated with improvements in water supply (1993a, 159-160).

8.3 The Profusion of Roman Aqueducts on Crete

The high number of aqueducts on Crete is related to the island's favourable geology, orography and topography for aqueduct construction. These environmental factors also ensure abundant reserves of springwater emanating from the mountain chains running through the centre of the island. Taramelli's reports convey the abundance of water stored in the centre of the island

'in the huge ravines of that great collector of humidity, the Cretan giant, Mount Ida. It is known that this calcareous mass is pierced in every direction with enormous clefts and cracks, ploughing their surface all over. Through these disappear the melted snow and rains, and filter down, to reappear at a lower level in the hills and at the foot of the mountain in purest and most abundant springs of water which the ancients consecrated to the serene divinities of the streams and woods' (1902, 120).

Buondelmonti observes that the water from the springs at Stulo is deliciously cold in summer (cited in Cornelius 1755, I, 8; Pashley 1837, I, 61). This approach is echoed by Tournefort who noted when touring the island 'as for the water, there's none better in the world' (1718, I, 71). Taramelli wrote that the spring at Zaros, known in the 1900s as Limionas, issued clear and pure water, observing that the water

'leaves the calcareous grit behind during her subterranean course, and springs to light well clarified, with scarcely a trace of deposits of carbonates either in the aqueduct or in the various reservoirs or «castelli» through which lies her course' (1902, 125).

The topography of Crete would also have facilitated the construction of relatively economical low-profile aqueducts to conduct the water of the numerous mountain springs to the low-lying Roman cities. Meandering contour-line construction was favoured in Crete over the bridging of more direct courses. Their format corresponds with Wilson's observations that not all aqueduct projects were huge undertakings nor all Roman water technology spectacular (R.J.A. 1990b, 95). Aqueducts could be built with great speed, as attested by the 40.23km-long Lambaesis aqueduct which was constructed in eight months (Raven 1993, 72). The short aqueduct at Malia (A 6) on Crete, measuring c. 400m long, could certainly have been constructed rapidly.

Aqueducts are not necessarily monumental. Moreover, monumentality is immediately recognisable by height, as opposed to length, in aqueduct terms. The viewer would literally have to be informed of the length of the aqueduct, as it would rarely be immediately recognisable from a static vantagepoint. In Crete, as is commonly evidenced throughout the Roman world, there is a definite preference among Roman engineers for lengthening the trajectory rather than constructing the monumental bridges necessitated by more direct routes.

Roman cities in Crete are usually located at low altitudes associated with river estuaries and deltas. They are often, but not exclusively, coastal. When located inland, they are positioned in the mouths of inland tributary valleys along the foothills of mountain ranges. Consequently, the natural river-valleys descending gently towards these cities could be harnessed to their hydraulic network. Such valley contours enhanced the speed of aqueduct construction since the necessary height could be attained through the naturally elevated terrain which did not require the erection of elevated substructures.

The suitability of the Cretan landscape for aqueduct construction is reflected by the widespread construction of aqueducts in later times. The trajectories of the Venetian examples often adhered to the Roman courses, and are sometimes found directly over the Roman remains, as seen at Knossos along the southeastern flank of the Lower Gypsadhes (plates 14b-c, where the letter A represents the Venetian aqueduct and B the Roman). The hundreds of mills constructed in the Turkish and

Venetian periods, in conjunction with the many molendinary toponyms throughout the island, attest both the abundance of springs and the ease of harnessing such natural resources to man's needs.

8.4 Comparable Catchment Areas

In the light of the profusion of Cretan aqueducts comparable distributions were sought in different areas of the Empire. Patterns in North Africa, Sicily and Lycia were explored in the hope of revealing the formative dynamics behind aqueduct distributions. The fact that Crete formed a province with Cyrenaica prompted an investigation of this area of North Africa. Investigations also focussed on Sicily as a comparable island catchment area and Lycia whose potential for comparative assessments was revealed through Farrington's recent study of the region (1995).⁵¹

8.4.1 North Africa

Raven claims (on the cover of her book) that the Roman territory of North African was home to hundreds of Roman aqueducts, yet the book itself mentions only three: that of Lambaesis (1993, 72), Carthage (1993, 116) and Caesarea (1993, 101). Nonetheless, widespread aqueduct dispersal is implicit in Raven's claims that in northwest Africa there were more great baths than in any comparable part of the Empire and that they were as important in the social life of the city as the *forum* or *curia* (1993, 113). Wilson's intensive analysis of the hydraulic systems of North Africa includes a corpus of epigraphical evidence specifically referring to aqueducts (either their construction or restoration) from a host of sites and also mentions other examples for which there is no epigraphic evidence (A.I. 1997).⁵² The ensuing potential for aqueducts throughout North Africa lends credence to Raven's claims.

Cyrenaica was initially considered the most obvious place to look for corresponding material for Roman Crete due to its provincial partnership with the

⁵¹ Lycia and Crete were traditionally viewed as having ancient connections, since Lycia was popularly thought to have been settled by the Cretans under Sarpedon *c*. 1400 BC (Herodotus I 173).

⁵² These sites include Abbir Maius, Aïn Cherchar, Albulae, Althiburos, Ammaedara, Bisica, Caesarea, Calama, Capsa, Cirta, Cit...? (Constantine), Cuicul, Cyrene, Henchir el Left, Henchir Haouli, Ksour el-Ahmar, Lambaesis, Lemellef, Lepcis Magna, Madauros, Mascula, Oued Abiod, Ptolemais, Sabratha, Satafis (Aïn Kebira)?, Thamugadi, Thignica, Thugga, Thysdrus and Verecunda (Wilson, A.I. 1997).

island and it was reasonably anticipated that both regions would reflect common elements of Romanisation despite their relative distance. Cyrenaica's traditional link with Crete is echoed in the writings of Pausanias who claims that the temple of Asclepius at Lebena was built in imitation of that at Cyrene and that Lebena rose under such influence (II 26).

In physical terms Cyrenaica faces north and has often been described geographically as a type of island in the Mediterranean segregated from the rest of Africa by the Calanshu sand sea and the wastelands of the Jebel Zelten (Jones & Little 1971, 64). Crete, according to Strabo, was a two-day voyage from Cyrene (*Geography* X 475) and Fulford maintains that there must have been an expectation that the governor and his staff could travel between the two without serious difficulty (1989, 188-9). Di Vita *et al.* also linked the region to Greece by a sea journey for which the usual port of call was Crete (1999, 184).

Conversely, Sanders maintains that Crete was only marginally influenced by Africa despite their political affiliations and traditional connections (1982, 133). This view was further expounded by Harrison who pointed Crete and North Africa in opposite directions (Harrison, G.W.M. 1985, 365-373). Both Sanders and Harrison argue that contact between the two areas of the joint Roman province is based only on tenuous and unconvincing evidence and is, ultimately, incidental.

Recent evidence promoting the idea of closer contact between Crete and Cyrenaica challenges this model. The fact that large numbers of four different Cretan amphora types have been discovered in Berenice (once considered a local fabric) refutes Harrison's and Sanders' theories (Marangou-Lerat 1995, 158, pl. xlix). A Cretan amphora type has also been identified at Sabratha (Marangou-Lerat 1995, 158) and although the city is separated from Berenice by 750km across the Greater Syrtic Gulf, the two cities display mutually exclusive long-term patterns of ceramic imports and use. The ceramic record has led Mattingly to conclude that Cyrenaica looked northward, particularly towards Crete (1995, 158) while on Crete itself this connection is supported by the recent work of Haggis (1996b, 203) and Bennet (1990, 201). Such contact is also exhibited through other media. Michaelides has established a striking degree of similarity between the mosaics of Crete and Berenice which he distinguishes from those of the rest of western North Africa (1998, 134-8).

In terms of hydraulic design it is clear, from even a brief look, that topographic and climatic characteristics were the predominant influence on hydraulic solutions in the region of Cyrenaica. Solutions in the region of Cyrenaica. Cyrenaica yields a series of aqueducts which respond physically to the environmental and climatic specifics of the region. The irregularity of the water supply is clearly reflected in the regional architecture, as exemplified by the irregular cistern at Saf-Saf thought to supply the aqueduct of Cyrene using a water-lifting device. The cistern is specifically designed to benefit from maximum run-off water, extending 225m along a contour and so demonstrating an effective architectural response to obtaining water in a precarious climatic region (Wilson, A.I. 1997, 56). Similar measures are evident at Ptolemais, where extra reserves were collected in the rainy season and stored in the massive cisterns beneath the Piazza delle Cisterne to supplement the aqueduct supply which was inadequate for most of the year (Jones & Little 1971, 68).

In Tripolitania a concern for water supply determined the distribution of the main centres; the majority of sites being situated on, or close to, the Mediterranean coast (the oasis of Telmine constituting a notable exception) (Mattingly 1995, 59). The Peutinger Table shows that there was a general dispersal of smaller towns and cities along the coastal zone. Site positioning is punctuated by water sources (oases), while the names of the smaller sites disclose a concern for water storage. Lepcis Magna held an advantageous position incorporating freshwater springs, the city was only equipped with an aqueduct under Hadrian (Di Vita et al. 1999, 89). Oea and Sabratha were originally founded along caravan routes which were initially attracted by the oases. Even after Sabratha was equipped with an aqueduct in the 2nd century AD, water restrictions are still evident in the city with almost every private house being equipped with its own subterranean cistern for rainwater collection which demonstrates its precious nature (Mattingly 1995, 119, 127). Goodchild observed that the general settlement pattern was greatly influenced by the availability of water and that the extent of settlement in the Gulf of Sidra varied accordingly, with a great number of farmhouses located along the coastal belt for 50km each side of Sirte

⁵³ Aqueducts served all the main cities of Cyrenaica, with the exception of Tocra (i.e. Cyrene, Apollonia, Bernice, Hadrianopolis and Ptolemais). Tocra (ancient Tauchira/Arsinoë) is exceptional as it is an oasis and its abundant vegetation is still largely watered by a single big well situated within the city limits close to the late-antique fortress (Jones & Little 1971, 70).

(1976, 147). He observed that the lack of Roman settlement deep in the interior was attributable to a scarcity of water south of the forest belt of Gebel el Akhdar (Goodchild 1976, 152).

Recent work in Tripolitania presents sporadic inland Romanised sites, which coexisted amongst a pattern of low-profile Romanisation affecting the nomadic tribes (Grahame 1998, 93-111). A more intensive occupation of the pre-desert zone has been proposed but it is linked to a complex division between Roman and indigenous cultures (Grahame 1998, 94-106). A correlation between water control and more intensive settlement pattern in the pre-desert region is observed by Grahame who underscores that water control technology had to be applied to the wadis to facilitate settled agriculture (1998, 108). It has been argued that the patterns of the pre-desert region were actually Roman-influenced, as afforded through relative stability promoting floodwater controlled wadi cultivation (Grahame 1998, 104).

It is tempting to simplify that the foggara persisted in the interior while the Roman aqueduct per se fed the Romanised settlements of the coast as a result of traditional, regional and environmental dynamics. Wilson demonstrates that such stringent divisions between these architectural formats are not always possible as their distinctive identities are obscured by the longevity and duration of foggara use after its initial introduction to Fezzan (A.I. forthcoming). The resulting hybrid type is most frequently encountered to the north of the Aurès in the liminal zone between foggara distributions (which extend as far as the southern flank of the Aurès Range) and the Roman frontier. Within this geographical interface the foggara technique appears to incorporate Roman features, including the revetting of shafts, the lining of channels and the capping of shafts with stone slabs (Wilson, A.I. forthcoming). In short, these specific water supplies north of the Aurès constitute Romanised foggaras which embody a blend of foggara techniques and Roman refinements and precautions. Such hybrid types are represented by the Lamasba irrigation system which was constructed on the foggara principle in the Roman period (Wilson, A.I. forthcoming). The development of this hybrid type is not surprising, as aqueducts throughout the Empire demonstrate a combination of local traditions and Roman techniques. Hydraulic functional architecture is directly dependent on geographical, topographical and

traditional factors as demonstrated by the aqueducts influenced by foggara technology in Libya.

North Africa and Crete are radically different in climate, rainfall and topography and, consequently, different approaches to water supply should be expected. Mattingly touches on the problem when he notes that Africa was always a country of low rainfall and of few perennial springs, streams or rivers (1995, 2). Literary and archaeological evidence from Libya shows that rainwater was carefully utilised by the construction of control walls, dams, terraces and cisterns (Mattingly 1995, 2).

Wadis, unlike the once perennial rivers of Crete, remain dry for most of the year but swell to torrents in short rainy periods. At Oea, the Megenin Wadi is one of the few Gefara wadis whose floodwaters reach the coast (Mattingly 1995, 122). The modern Wadi Caam, which flows into the Mediterranean about 12km west of Lepcis Magna, is distinct in being the only perennial watercourse in the region (and naturally was tapped by the city's aqueduct under Hadrian).

In view of these conditions, it seems surprising to encounter closely comparable hydraulic architectural attitudes in a region where even the rivers functioned on different principles from those of Crete (Allan 1989, 235). Consequently, the presence of monumental cisterns in both North Africa and Crete represents an interesting phenomenum and is testimony to a common regard for efficient water usage across disparate climatic regions (see 4.1.6).

8.4.2 Sicily

In order to minimise environmental variables comparable patterns were sought in other large island cultures of the Mediterranean, such as Sicily. In Sicily the narrowness of the coastal strips along the east of the island between Acireale and Messina and the north between Messina and Termini Imerese generated a wealth of coastal settlement. Surprisingly, recorded aqueducts are few, despite their presence in association with five of the seven *coloniae* and epigraphic evidence indicating another at Marsala (Wilson, R.J.A. 1990b, 102; 2000, 18). Only the long-distance aqueducts

⁵⁴ Compare this with Taramelli's quote describing the copious supplies of water on Crete under section 8.3 (1902, 120).

feeding the four principal cities (Syracuse, Catania, Taormina and Termini Imerese) have been recorded in detail. Wilson describes the Palermo water supply as a quant (R.J.A. 2000, 18) while it seems, in the absence of evidence, that Agrigento, Messina and Lipari relied on springs and wells within their urban areas.

The Sicilian aqueducts of Syracuse, Taormina and Catania availed of the contours of the river valleys, as is generally the case in Crete. Conversely, the aqueduct of Termini Imerese was a unique aqueduct in Sicily in that it travelled along the contours of the foothills of a mountain range, as opposed to a river valley. Consequently, it was obliged to cross rivers, which intersected its route flowing to the sea, with the aid of inverted siphons. It also incorporated a substantial siphon to traverse the lower terrain leading to the coastal city (Wilson, R.J.A. 1990b, 98-9). The elaborate engineering of this aqueduct exposes problems encountered when attempting to construct aqueducts along mountain foothills rather than along valley contours. Its trajectory is comparable (albeit on a magnified scale) to that of Lyttos in Crete which also adheres to mountain contours, only departing from them to reach the city with the aid of a substantial siphon. The trajectory type, although comparable, is not representative of either region.

Confronted with the lack of recorded aqueducts in Sicily, it remains impossible to draw parallels between the two islands in terms of aqueduct type and density until further work is conducted throughout the hinterlands of Sicily. Potential for a comparable density is afforded by the presence of small-scale aqueducts feeding the villas at Contrada Saraceno near Agrigento (see Castellana & McConnell 1990), at Maniace (Wilson, R.J.A. 1990b, 202), and in Contrada Caffettedda near Noto. Moreover, the later aqueducts feeding Piazza Armerina attest the durability of the monument type on the island. Such evidence suggests that future research in Sicily might produce diverse and diffuse aqueduct distributions comparable to Crete.

8.4.3 Lycia

Analogous aqueduct distributions for Crete were sought in Lycia as it presents a comparable catchment area in terms of climate and geology. The region is well watered, with high mountain ranges and deep river valleys. The topography is orientated towards the south and the sea with sweeping contours descending from the

Bey Daŷ Mountain Range down into the coastal plain delivering dramatic valleys to the sea. The region is cut off from the neighbouring hinterlands by this high chain of mountains which determines the topography of the region. This physical separation from the surrounding landmass is manifested through the specific architecture of the region, as demonstrated by its bathhouses which are relatively small in comparison to those of the neighbouring regions (Farrington 1995, 7).

Harrison observes that in the Roman period Lycia was mainly a coastal province with relatively few inland routes (Harrison, R.M. 1977, 10). Eight of the Lycian cities fed by aqueducts are located along the coastal plain. These coastal cities are not randomly placed but lie in the estuaries of the major rivers of the region. Among the cities in the coastal plains Xanthos and Pydna benefit from the Xanthus River delta while Myra and Andriake are situated on the coast in the alluvial flood plain of the Demre River. This riverine association overrides low-lying or coastal prerequisites in site placement as inland cities also avail of the valley contours, as attested by Balboura and Oenoanda on the Xanthos River, and Idebessus and Rhodiapolis on the Alakir River.

Oenoanda constitutes an unusual Lycian city as its upland location is viewed as un-Lycian (Coulton 1983, 1). The city's position was fixed as it was strategically placed in order to control the routes into the region, dominating the natural crossing point of the valley. It lies in a transitional zone falling geographically between Lycia, Pisidia, Phrygia and Lydia, although still technically part of the Roman territory of Lycia (Coulton 1983, 1). Its fixed position meant that the aqueduct designers were obliged to avail of a stone-piped inverted siphon to conduct water to the city.

The fact that the majority of cities fed by aqueducts are low-lying, and often coastal, is primarily a result of aqueduct construction along river contours. Consequently, it could also be argued that the relatively lower aqueduct counts in Lycia when compared to Crete could also be attributable to fewer valleys descending into the coastal plains. Specific topographic requirements, similar to those on Crete, are evident in distributions of aqueduct-fed cities in Lycia. The pattern emerges more clearly in Lycia than on Crete as there are fewer rivers dividing the terrain. The bathhouse distribution and the format of the associated aqueducts are highly comparable to Crete which is similarly studded with baths of comparable scale (see

8.5 Conclusion

A gradual migration from upland to lowland position is evident in city locations in Crete during the Roman period. It can be argued that this trend reflects measures taken in order to water these cities and is correlated with aqueduct construction throughout the island. The important role topography played in aqueduct construction and, consequently on settlement patterns, is nicely illustrated by aqueduct distributions in Sicily. Wilson directly correlates topography with aqueduct distributions in Sicily, attributing the lack of aqueducts in the meagre hill-towns of the interior, and the few hill-towns of the coast, to their elevation (R.J.A. 2000, 18). He cites the difficulties of constructing aqueducts to supply elevated sites, together with the more general inconvenience of life on a mountain (when military security was no longer an issue), as the key factors which led to the gradual decline and ultimate abandonment of most Sicilian hill-towns during the later Republic and early Empire (Wilson R.J.A. 2000, 18). Unfortunately, he does not expand on this interesting observation.

Cyrenaica too demonstrates close contact with Crete both manifested through similarities in mosaic styles and sculptural fashions. It could be argued that Cyrenaica looks to Crete which contributes to its distinctive character from its surrounding regions. Nonetheless, despite any political or economic contact, it would not be expected that identical hydraulic architectural formats would develop in areas faced with such diverse geological and climatic conditions as generally these monuments are based on functional designs which are instigated by a pragmatic need. Consequently, the presence of monumental cisterns in Crete, a region which enjoys copious spring water (and, by the same token, their absence in regions with climatic and topographic conditions comparable to those of Crete) remains difficult to explain.

Lycia shares a comparable climate and topography with Crete and exhibits a predilection for low-lying riverine settlement. This region is closely similar to Crete in terms of aqueduct construction techniques and bath design, among a range of common hydraulic elements.

OVERALL CONCLUSION FOR SECTION 1

AQUEDUCT CONSTRUCTION IN CRET E AND ITS IMPACT ON SETTLEMENT PATTERNS

Aqueducts were constructed throughout Crete in the Roman period and, like many aqueducts elsewhere, their sources were in the hills. Aqueducts tend to be built through the hills, not merely because of the traditional purity of the mountain springs (although water purity was clearly a factor), but primarily to retain a sufficient altitude. Water had to be brought into the city at a sufficient height to serve all parts of the urban landscape. Consequently, a source high in the hills was often tapped even if there was an adequate but lower source closer at hand. This premise was always liable to cause problems, particularly where the city had an acropolis and it often meant a readjustment of site aspect.

Aqueduct reliance on gravity flow was a contributing factor to the attractiveness of relatively low-lying sites in the Roman period. Even when there is continuation in site location from pre-Roman times, a subtle alteration in the aspect of the site is discernible. Where previously the original settlement was situated on the hill for defensive purposes, it descended from the peak and extended over the lower lands in the Roman period. This migration could be executed very subtly and within a tight catchment area, such as at Gortyna, where the baths were built in the plains below the *acropoleis*, or over several kilometres, as in the case of Polyrhennia and Kastelli Kissamou and at Priansos with progression to Kastelliana. 55

In fact, these dynamics could be attributed to the relocation of the Roman site of Tarrha, even though no aqueduct has yet been located there, since the presence of a considerable Roman glass factory at the site presupposes the existence of an aqueduct to facilitate this industry. Tarrha has been described as an itinerant site and survey has established that the centre of settlement moved from 1km inland down to the coastal river delta in the Roman period (Moody *et al.* 1998, 89). Pashley remarks that

⁵⁵ This may explain Vermeule's rather stark entry for Priansos mentioning 'elaborate aqueducts' (1968, 444).

'Tarrha ... has been supposed, by some very distinguished scholars, to have been inland; but I think there is little or no doubt that its site is on the shore, at the very entrance of this glen at Haghia Rumeli' (1837 II, 263-4).

Marangou attributes such displacement from elevated settlement towards the plains, to the centripetal magnetism of the port and the development of agricultural and commercial skills (1999, 270). The model is popular, being favoured by both Sanders (1982, 31) and Raab (2001, 31) who attribute this down-slope shift to Crete's increasing security and participation in Mediterranean-wide commerce.

However, the model is neither exclusive nor absolute. Advantageous positioning was not exclusively correlated with the coast *per se* although it can be proposed that this prevalent shift to lower land, often towards the coast, predominantly reflected the difficulties in watering upland settlements, as attested in Sicily. Water had long constituted one of the most important factors determining the topography of the habitation localities in ancient Crete (Nowicki 2000, 25). Equally, it can be argued that suitability in terms of aqueduct construction was an important consideration in site development into the Roman period.

The coastal location of many Roman cities on Crete was not purely determined in terms of sea trade. It is not the coast itself but the contours descending to it that are the ultimate determiners of site placement, thereby contributing to site success, in the Roman period. The cross-hairs of the river and coastline pinpoint the greatest benefits to the site in terms of hydraulic engineering, commercial activity and agricultural land. This is well demonstrated at Souia where the site is set around the river estuary, availing of the south coast trade, the traffic along the valley thoroughfare, and the suitability of the valley contours in terms of aqueduct construction. The appeal of the river deltas and estuaries in facilitating aqueduct construction is a recurring landscape theme in Crete but is often overlooked, being eclipsed by coastal benefits in causation theories associated with site suitability. On Crete the importance of the river deltas is somewhat obfuscated in the density of aqueduct distributions but once recognised the link becomes striking. Nearly all the Roman cities associated with aqueducts in Crete are located along rivers or in the coastal plains associated with river deltas.

The riverine association is so strong that in cases where the mouth of the valley occurs inland (i.e. the mouth of a tributary river in an inland flood plain) the site foregoes its coastal primacy in favour of the topographic benefits of a location at the mouth of the inland valley, as attested by the positioning of Roman Knossos (fig. 84). The site is traditionally perceived as coastal, and while it benefited as such, it is notable that the central area i.e. the forum of Roman Knossos, is located 5km inland from the harbour at Herakleion.⁵⁶ It seems as though a coastal setting was relinquished in preference for a position adjacent to the ancient ruins which formed the focus of the Roman colony. It has often been suggested that the location of the Roman colony was initially more symbolic than economically viable since connection with the past, rather than direct access to the coast, determined the location of the forum. Nevertheless, the fact that the ancient site was located at the base of the inland valley was also advantageous for the construction of the Roman aqueduct which exploits the valley contours on its descent towards the site. This valley route was also favoured for the water supply of the Minoan site. The Roman aqueduct's construction effectively adheres to the contour-line construction model outlined above.

Some exceptions to the riverine contour theme exist on Crete, such as Lyttos, Lappa, Eleutherna, Plora and Elyros. Indeed, the high mountain ranges in central Crete allow for aqueducts which do not terminate in the coastal plains. Lappa, as a spring site, has no watering problems and is still famous for its springs today, where even in the heat of August the lower village is lush with verdant vegetation. MacGillivray describes the island's dramatic orography with appropriate prose.

'Its four mountain massifs with hard, blue-gray limestone at the core explode from the sea and climb suddenly to 2,200 meters in the White Mountains at the far west, then go even higher, to 2,456 meters at Psiloritis, the pinnacle

⁵⁶ Cadogan considers Knossos to have been sufficiently far from the sea in the Minoan period that people could prepare for, or escape from, enemies attacking from that direction (1992, 125). Sanders gives Herakleion and Knossos two separate entries in his gazetteer of Roman sites (1982, 152). The coastal settlement at Herakleion only developed at a subsequent stage despite the recent discovery of Roman villas in the modern habour city (*AR* 1998-9, 114). It has been proposed that in the Venetian period an extension of the traditional aqueduct route from Archanes to Knossos was constructed north of Knossos in this direction (Catling *et al.* 1982, 59-64). This supply possibly pre-dates the Venetian period, as the pottery found in the channel dating to the 5th, 6th and 7th centuries AD would indicate (Catling *et al.* 1982, 61 and 63). An 11th-century bath at Herakleion would also intimate an aqueduct supply at this stage.

of the Idaean range, into which the White Mountains blend above Rethymnon. Psiloritis, the ancient Mount Ida is the highest peak on the island and the focal point of legends both ancient and modern: it was the obvious setting for Kingsley's Theseus to pursue the Minotaur. There's a break in the middle of Crete linking the rolling hills of the northern center, where Herakleion (Candia) sits, with the Mesara plain on the southern coast. Here, Ida's foothills mingle with the beginning of the Diktaian range, which there rises to the east in a ring around the Lasithi plain, a concealed plateau 900m above the sea' (MacGillivray 2001,117).

Lyttos, although an elevated inland site, is still relatively low-lying, being overshadowed by the Lasithi range. Despite the relative inconvenience of the city's topography the city stayed on its perch in order to control the pass into the Lasithi Plain, a most lucrative area in terms of viticulture and wine production (see 18.2.3). The city survives as a rare example of an upland Roman city in Crete by taking full advantage of its mountainous surrounding to support its water system. This phenomenon is encountered in the Anagni area near Rome where the location of many Roman villas and cisterns on the crests of ridges implies some means of transporting water by conduit from a higher point further along the ridge (Thomas & Wilson 1994, 149, 180, 185).

Similarly, Eleutherna was located along an ancient inland route which flourished under Roman control. Its strategic position was maintained in order to control traffic along an inland transit corridor linking Gortyna with the temple of Diktynna. Contact with the temple of Diktynna was of major benefit to any developing Roman city as the temple treasury was a major source of public funding in the 2nd century AD (see 7.2.4).

The inland cities of Eleutherna (A 13) and Lyttos (A 4) certainly boast the most unusual aqueduct systems in Crete. Their engineers went to great trouble to secure their supply and the positions of their pre-Roman and Roman cities must have been of great importance in symbolic, economic and commercial terms. The dominant role of Lyttos in east Crete in pre-Roman times is expressed through the ceramic record in the principal shrine in the area: Kato Simi (Erickson 2002, 82-6). The

survival of these cities stands as a testimony to their durability of place and the ingenuity of Roman engineering which sustained their position. Their fixed locations were invaluable in terms of trade and production. Nonetheless, these highland sites constitute exceptions to the rule; the more common type of aqueduct descends the valley contours abundant in the natural topography of Crete. Sites demonstrating continuity of place from earlier times incorporate subtle alterations in aspect, rather than locale, favouring lower altitudes.

Naturally, the correlation between aqueduct construction and site placement has repercussions in bathhouse distribution and it follows logically that bathhouses would be placed at relatively low altitudes within the urban landscape where they could be easily accessed by an aqueduct supply. The dominant role bathing played in daily society had an undeniable impact on the attraction of the lower cities over those in the hills.

PART TWO: BATHHOUSES

INTRODUCTION

'In Africa, the small province consisting of Creta and Cyrenaica is well represented with respect to the latter region, with 7 baths, while Creta does not have sufficiently preserved examples' (Nielsen 1990, 96).

The underestimation of bathing in Roman Crete is attested by its cameo appearance in Nielsen's extensive volumes on the baths of the Roman world 'Thermae et Balnea; The Architecture and Cultural History of Roman Public Baths' (1990). The present study was instigated in response to erroneous statements regarding the distribution of Roman bathhouses on Crete in particular and Roman Cretan material in general. Misguided observations are hardly surprising in the light of the lack of published research regarding Roman bathhouses. As recently as 1988 DeLaine expressed her bewilderment at the neglect of Roman bath studies in general (1988, 11). Since then the situation for Roman Greece has not greatly improved; baths and bathing in Greece during the Imperial period remain largely unexplored subjects (Farrington 1999, 57).⁵⁷

The dearth of baths attested by archaeological exploration stands in stark contrast to the picture portrayed by the ancient sources which are steeped in anecdotes relating to bathing. Lucian, who journeyed in Ionia, Greece, Italy and Gaul, remarked that in the 2nd century AD bath construction was commonplace (*Hippias* 4). Surprisingly, recent studies have attributed only 35 baths (falling between the 2nd and 4th centuries AD) to Macedonia and Achaea combined (Farrington 1999, 61). Conversely, earlier assessments conducted by Alcock led to 24 baths being attested in

⁵⁷ Farrington's article 'The Introduction and Spread of Roman Bathing in Greece' is misleading in its use of the modern term 'Greece', as it actually refers to the provinces of Achaea and Macedonia and, therefore, does not include Crete (1999).

Athens alone (1993a, 125) while only 17 were associated with villas throughout Achaea (1993a, 68).

This study has compiled a minimum of 52 examples of Roman baths on Crete constructed between the 1st and 4th centuries AD. Such high concentrations of bathhouses on Crete should prompt reassessments of counts elsewhere. The proliferation of baths on Crete recalls the world of Lucian rather than the Roman world of modern scholarship. If the total in Crete seems high it should also be noted that it is a conservative estimate, the total was undoubtedly much higher in reality as it is a premise of this study that a bath constitutes a definitive feature of a Roman city. Consequently, it is my firm conviction that Roman cities in Crete where no bathhouses have been recorded, such as Axos and Lyttos, amongst others, will yield bathhouses with future excavations.

CHAPTER NINE

BATHING ESTABLISHMENTS IN CRETE

9.1 Introduction

The significance of the ubiquitous nature of baths on Crete is eloquently evoked by Clarke who depicts them as the cornerstone of Roman tradition.

'Five centuries of Greek tradition informed the Romans' conception of bathing, and the Romans extended and refined that tradition to create architecturally daring and magnificently decorated buildings as emblems of civilising values of Romanitas throughout the Mediterranean. The public baths of Republican and Imperial Pompeii and Rome constituted the focus of the daily ritual of exercise, washing, entertainment, open to all classes. Several aristocratic houses and villas at Pompeii and elsewhere had private baths. To engage in the bathing ritual meant to be Roman' (Clarke 1998, 129).

The presence of Roman baths has generally been perceived as the ultimate expression of the acceptance of Roman habits (Nielsen 1990, 60). DeLaine states that the Roman baths were one of the essential elements of civilised life, one which could be used as a symbol of the Romanisation of conquered barbarians (1988, 11). Her implicit allusion to Tacitus (*Agricola* 21) indicates that the statement was aimed specifically at the Britons as barbaric, although the correlation between public bathing and Romanisation is witnessed throughout the Empire. Tacitus' famous description of the process (that has since been termed as Romanisation) significantly includes frequenting the baths as one of the lures which ensnared the Britons in their blind conversion to Roman culture. Zajac concludes that 'building baths and the adoption of Roman bathing habits by conquered peoples was an important part of the Empire's mechanism of Romanisation' (1999, 101).

This chapter aims to reveal the receptiveness of the indigenous groups of Crete to this culturally-defining activity through an assessment of the varieties of bathhouses on Crete. The popularity of public bath houses attests their acceptance in both secular and sacred spheres while the private variants are particularly resonant in their implications.

9.2 Roman Public Secular Bathhouses on Crete

Of the 52 Cretan bathhouses compiled in this study, at least 37 represent public secular bathing installations. They have been cited at Sitia, Kouphonisi, Hierapytna, Oleros, Chersonisos (B 9 and 10), Ini (B 11 and 12), Ligortynos, Knossos (B 15), possibly Kato Asites, Gortyna (B 18, 19, 20), Sybritos, Vizari, Stavromenos Chamalevri, Alpha, Eleutherna (B 28 and 29), Lappa (B 32, 33, 34), Plakias, Loutro, Aptera (B 38 and 39), Khania (B 41, 42, 43, 44), Souia, Kastelli Kissamou (B 49, 50, 51, 52) and Koleni Kamara (**fig. 6**).

The distinction between public and private examples is not always obvious. Definitions of *balnea* are ambiguous and it remains unclear whether privately-owned public access baths should be assessed as public or private facilities (Dodge 2000, 189). Restrictions on urban excavations and a notable lack of investigation in the surrounding contextual landscape make it difficult, sometimes impossible, to categorise some baths appropriately. Consequently, urban buildings are widely considered public, often with little validation, regardless of the fact that private bathhouses are numerous in urban locations.

Equally, relatively rural bathhouses, which have initially been identified as private, have subsequently been contextualised within a much broader, but previously undetected, urban context. This complex issue is exemplified by the interpretations of the Roman bathhouse at Bir el Jebbana, on the western edge of Carthage. The structure was originally described as 'a sumptuous suburban residence' (Audollent 1901, 191); yet when the ruins were reinvestigated, the scale and construction of the bathhouse suggested a public installation (Rossiter 1998, 113).

Nonetheless, once securely identified, public bathhouses on Crete attest the wealth of their related centres and, consequently, it is relevant that many of these sites are also associated with aqueducts. Twelve public centres (and at least two private establishments) on the island boast both monument types and it is probable that these reflect the most dominant centres in Roman spheres (**fig. 3**).

9.3 Private Roman Baths on Crete

This study includes a minimum of ten private residences furnished with bath-suites on Crete. Rural examples are recorded at Makriyalos, Ano Zakro, Pachyammos, Myrtos, Plaka Kalis, Preveli, Minoa and possibly Nibretos while their urban counterparts are reported from Knossos and Eleutherna. Moreover, lavish households such as the Villa Dionysus at Knossos, the private dwellings in the Health Centre Plot at Kastelli Kissamou and the *domus* beside Herakleion Museum (*AR* 1995-6, 39) are certain to yield private bath-suites as their excavations expand. It is equally possible that other baths set in urban locations are private but they have been classed as public in the absence of clearer evidence.

Bath-suites have long been viewed as characteristic features of Roman villas even if indicated only by hypocaustal elements and mosaic floors (Percival 1976, 17). Alcock sets out some stringent conditions for the definition of a villa, as opposed to a rural settlement *per se*, such as the presence or absence of baths, marbles, mosaics, impressive size or good location (1989, 19). Villa and bath identifications are logically not interchangeable, although identifications of a villa or private bath are often considered complementary concepts since one is thought to intimate the presence of the other. Consequently, the discovery of bathing facilities at the Roman villa at La Befa, in Italy, provided the first architectural evidence identifying the building as a villa (Dobbins 1979, 58).

Private baths were among the marks of an affluent household in the Roman period. Seneca cites certain bathing establishments in private houses as representing new additions of sybaritic luxury corresponding to modern tastes of ignobly rich freedmen, of whom, naturally, he disapproved (*Epistulae* lxiii vi). Crete was obviously not exempt from such indulgences and Harrison was so impressed on viewing the villa at Makriyalos (B 1) that he claimed it to be virtually without parallel in size and sophistication in the Eastern provinces (Harrison, G.W.M. 1993, 272). Harrison's praise of the Makriyalos villa, although undeniably over-enthusiastic, suitably portrays the scale and nature of these residences. Indeed, private bath-suites on Crete could be quite expansive, as represented by the substantial *tepidarium* in the private bath-suite at Myrtos measuring 5m x 22m (*AR* 1973-4, 39; Sweetman 1999,

115).

The size and opulence of many private bath-suites on Crete has caused confusion regarding their classification. Private residences on the island were generally not conceived on exceptionally large or lavish scales. Perceptions of scale are both regionally defined and regionally sensitive and the recognition of an island scale is necessary for a realistic appraisal of such monuments. For example, at Knossos a small bath-suite (B 14), measuring 25m x 10m (250m²), was considered private on the basis of its relatively small scale, comparative to the public bath in the city (B 15). Comparative assessments with the nearby public bathhouse, thought to measure 30m x 30m (900m²), created a relative and contained scale within the city. Consequently, the small bath was associated with a *domus* despite only negligible evidence for such a residential quarter.

There is also confusion regarding the classification of a private bath-suite at Minoa, which is not altogether surprising considering its original identification as a barracks and arsenal (Theofanidis 1950-1, 1-13) (**fig. 47**). Recently, Raab recorded a broad pottery scatter over the surrounding coastal plain (covering a swathe of 8.75 hectares) and concluded that the ceramic spread represents the ancient city of Minoa (2001, 53-5, 81 and 113). Consequently, it is surprising that the same author supports Sanders' identification of the site as a private seaside villa (Raab 2001, 113); however, her reasoning for supporting both the presence of the ancient town and also a villa is straightforward. She believes that the position of the site

'in a long-established town suggests an owner of some verve; or, the availability of such real estate may be a hint of fallen fortunes of the town in the preceding period' (Raab 2001, 140).

The architectural evidence suggests that the town was considerably reduced by the Roman period despite the presence of a multi-period pottery spread. The architectural evidence reflects a Roman villa complex with only a slight dispersed local settlement. It is possible that the city or town of 'ancient Minoa' is reflected in the pre-Roman pottery scatter while the villa was founded when the town had declined in the Roman period.

Other potential villas have been identified in west Crete along the south of the Rhodopou Peninsula on the basis of features such as mortared rubble walls, columns or bath remains (Raab 2001, 31). The location of a bath at Koleni Kamara, and the fact that Sanders refers to it as a 'full-scale villa' suggests that it represent one of these sites, although its classification as private remains uncertain (1982, 30). Traces of masonry walls in the undergrowth around the small chapel on the site were extensive (prior to recent excavations), while the wider vicinity yielded column-drums and dense spreads of sherds (personal observation). The broader archaeological scatter is traditionally recognised as the site of ancient Mithymna which might provide a more urban context for the bath. Naturally, urban contexts do not preclude the existence of private establishments but they, at least, afford the potential for public projects.

Elsewhere in Crete, isolated bathhouses are reported at Ligortynos (B 13), Oleros (B 6), Alpha (B 27) and Platani Soudas (B 45) and although they would be suitable candidates for villa sites their nature is again ambiguous. It is possible that at least some of these sites formed satellite villas to their nearest cities (i.e. Eleutherna, Hierapytna and Aptera). Alternatively, if they represent remnants of larger Roman urban contexts, as could be argued for Ligortynos, their presence exposes the extent of the destruction of their original architectural context, while highlighting the low visibility of Roman settlement in the Cretan landscape.

Settings in perceived isolation have rendered any lonely bathhouse as private yet seeming isolation is not sufficient grounds for the classification of a site as a private villa. In Sicily a number of isolated bathhouses of Roman date have been allocated a context within a country estate and associated with a residential villa despite the fact that no irrefutable evidence has been discovered in the vicinity (Wilson R.J.A. 2000, 24). This interpretation may be correct, but until more intensive surveys are conducted the nature of these sites remains obscure and unsubstantiated. Admittedly, studies of rural villas have often revealed private bathhouses yet uncertainty discourages an absolute correlation between isolated baths and private villas (Alcock 1993a, 64).

Harrison introduces further ambiguity to the equation when he proposes that the external entrance to the bath-suite at Makriyalos catered for the public use of this facility (Harrison, G.W.M. 1993, 273-4). His proposal that the entrance would allow villagers to use the facilities without entering the private family rooms to the west is highly unlikely, although not unknown. Generally speaking, the private bath-suite was rarely, if ever, penetrated by strangers and represents an inner sanctum within the villa. Yet Wilson proposes such a dual purpose for the bath-suite of the villa of Piazza Armerina (R.J. A. 1983, 20). This villa is also accessed by two doorways, one of which he assigns to the family while the other to the *clientela* from the surrounding farms and villages who could only enter by this side-door at specific hours (Wilson, R.J.A. 1983, 20). The villas of Piazza Armerina and Makriyalos have little else in common in terms of design, date and wealth.

Private villas, or farmhouses, incorporating private bath-suites, have been noted in many more locations than previously thought throughout the Cretan landscape. Sanders interprets this initial creeping of isolated dwellings into the Roman landscape as a spread of farmhouses and assigns a system of farm estates (dating to the 2nd century AD) in the Mesara to this dynamic (1982, 30). Sweetman proposes, based on the lack of villa mosaics in her overall mosaic distributions, that the Cretan countryside was primarily used as farming land which did not support lavish housing due to the poor quality of land in the hinterland areas (1999, 447). High villa counts would contradict this: Raab cites a total of 31 sites classified as villas or possible villas in Crete, while Sanders specifically classifies the residences at Pachyammos, Plaka Kalis and Koleni Kamara as villas per se (Sanders 1982, 30; Raab 2001, 35).58 In fact, the settings of many of the wealthy villas on Crete correspond closely with the elite residential type: the villa maritima. These villas are recognised as recreational retreats or residences of wealthy citizens, as opposed to the majority of Italian and provincial villas built in the countryside which served at least partly as working agricultural estates (Raab 2001, 140, n. 27). Arthur views the villa maritima as a vacation residence, sited to take advantage of the sea view and whose eventual productive functions were in any case secondary (1991, 20).

⁵⁸ An important first step towards identifying villa sites on the island was undertaken by Guilbride who located numerous examples (1999). Raab, with some assurance, regards both Nibretos and Zaros as villas without explaining her deductions (2001, 28).

9.3.1 Private Bath-suites Supplied by Purpose-built Aqueducts

There are at least two candidates for private bath-suites supplied by purpose-built aqueducts in Crete (see 4.1.3). The first candidate is that of Minoa where the remains represent a section of a large seaside villa dated to the 2^{nd} century AD (**figs 47 and 48**). Areas Δ and H constitute stepped plunge-baths, the apsidal example being comparable, in shape but not scale, to the pool Δ at Kouphonisi (1950-1, 7) (**fig. 61**). The extravagant design of the bath-suite, incorporating at least four pools, suggests that its associated aqueduct was integral to its design.

At Minoa, a colonnade probably fronted the first set of rooms, lying to the north of a veranda, judging from the location of several bases. This basic design is reminiscent of the *porticus* villa which evolved from a narrow row of rooms opening onto a thoroughfare to which was added a parallel colonnade. Villas using the *porticus* design were ideal for coastal locations as they could open directly onto the shoreline, demonstrating a predilection for space, light, air and vistas (McKay 1975, 117, 124, n. 192). Such concerns are easily evident at Minoa where the villa rests on the water with an impressive view of Souda Bay, the island of Marathi and Aptera beyond (Guilbride 1999, 52). There is little agricultural concern for the placement of the villa at Minoa where amenities of a coastal existence took priority over access to productive land (Raab 2001, 138). Certainly, the elaborate plan of the excavated section suggests an expansive private dwelling belonging to a residential magistrate or *dominus* which could employ a large group of people.

The second candidate for a private bath-suite supplied by its own purpose-built aqueduct is the structure at Pachyammos (B 8). The building has been identified as a villa by both Sanders (1982, 17, 141) and Baldwin Bowsky (1994, 9, n. 12). Excavations in 1903 revealed a large rectangular building measuring 17m x 42.4m (fig. 21). Sanders believes that the plan of the overall structure represents the basement of a villa and interprets its neat symmetry as reflective of domestic storage facilities (1982, 140, fig. 50).

On re-examining Boyd's original plan of the complex, as drawn by Hastings, a semi-circular feature to the northeast of the complex could be identified (fig. 21). There seems little doubt that this feature represents a semi-circular plunge-bath comparable with examples from the baths at Makriyalos, Kato Asites and

Stavromenos Chamalevri (**plates 47a, 58a** and **66a**). In Hastings' plan the step into the bath is intact and the characteristic ridge along the curved wall is also evident (**fig. 21**). Perhaps most revealing is the fact that Hastings labels the feature as a cistern, which also corresponds with its proximity to the aqueduct's terminus. Curiously, Sanders omits these details when he republishes the plan, omissions which obscure the identification of this feature (**fig. 22**). On visiting the site, a barrel-vaulted compartment, faced internally with brick over a mortared-rubble core, was visible adjacent to the area of the pool. The bricks have been blackened by fire and an airduct is evident in the lateral wall (**plate 53c**, the arrows indicate the air-duct and the vault). Its form and location secure its identification as the *praefurnium* of the bath-suite.

It has previously been argued that the villa at Makriyalos (B 1) which is equipped with an expansive bath-suite, was also supplied by a terracotta pipeline (see 4.1.3) (Papadakis 1983c, 59). A similar system has been argued for the villa at Myrtos (B 5) based on its impressive and extensive bath-suite and the presence of a circular cistern regulating the water supply into the suite. Lastly, it can be tentatively proposed that future excavations of the Villa Dionysus at Knossos will yield a private bath-suite due to its comparable opulence of décor, location and size, with the other villas supplied by aqueduct. Its similar water supply arrangement (incorporating a circular cistern for regulating a supply from the main public aqueduct) also presupposes a bathing facility (as discussed under 4.1.3). The presence of both a bath-suite and an aqueduct elevate the status of these buildings from farmhouses to elite residences.

9.4 Roman Religious Bathing Facilities on Crete

'We attribute to water virtues that are antithetic to the ills of a sick person. Man projects his desire to be cured and dreams of a compassionate substance' (Bachelard 1983).

Three of the public sites on Crete associated with public bathing facilities and supplied by aqueducts constitute religious centres (see 4.1.2): Lebena (A 11 and B 21-3), Lissos (A 21 and B 47) and the Diktynnaion Sanctuary (A 22 and B 57*).

The sites at Lebena and Lissos are Asclepieia and, as such, ritual bathing would have been important as a preliminary rite, as has been attested at other Asclepieia, notably at the sanctuary at Piraeus (Dillon 1997, 158). At Lebena, the bathing edifices are certainly more evident and widespread than at Lissos, with a minimum total of three structures associated with bathing (B 21-3). While the potential for bathing structures on the site is high, the evidence is still fragmentary with only disarticulated masonry (lined with *opus signinum* and associated with piping) evident throughout the bay. It is only through the recent pioneering work of Melfi that such facilities have been revealed in any detail at all (1998-2000; 2000; 2001; *forthcoming*). Yet the prevalence of bath structures at the site has been known for centuries and Halbherr's diary entries expose the wealth of Roman material that has since been destroyed.

... 'the whole area is packed with ugly Roman walls and floor, with a network of water-channels of different size. It proves to have been a complex of healing and bathing establishments. Nothing earlier than Roman can be found, even digging at a great depth' (unpublished manuscript).

Similarly, at Lissos while baths have been reported by Spanakis (N.D., II, 249), Vasilakis (N.D., a, 78) and Platon (1992, 170), they have never been the focus of attention and have not been published. The presence of a single tub of a Greek bath type adjacent to the temple attests the longevity of the activity at this site.

While ritual bathing was strongly associated with the cult of Asclepius, it also featured at sanctuaries dedicated to Artemis (Morizot 1994, 201-216). The sanctuary of Aphaia in Aegina is exemplary where two rooms were fitted with basins and tubs reserved for the bathing needs of pilgrims (Ginouvès 1962, 385-6). The connection between Aphaia and Diktynna, as outlined by Kirsten, is significant in this context as they represent local forms assimilated to Artemis (1980, 261). At the Diktynnaion Sanctuary in western Crete worship has been attested since the 9th century BC but clear evidence for the deity Artemis Diktynna only emerges in the Classical period. There is an argument for her identification through retrospective analysis at the site.

Overgrown brick structures below the temple of Diktynna (immediately west

of the river) could be associated with bathing due to their incorporation of *opus* signinum and terracotta pipe fragments. The fact that the water from the monumental cisterns behind the temple (A 22) seems to be conducted to this spot is also indicative of ritual washing in this area of the bay. The bathing facilities have been subject to sparse comment, but their identification is alluded to by Spratt who observes that

'The remains of the city lie for the most part in the bed of the gorge below the temple, and seem to be nearly all of late Roman date, having been built of mortar and small stones, and in some places supported with brick arches: many were habitations. Some are large and circular as if they had been churches or baths' (1865, II, 199).⁵⁹

The continuity of cult from earlier periods at these three centres and their association with bathing in the Roman period establishes them as potentially good candidates for yielding evidence for pre-Roman bathing. However, the specific religious nature of the sites implies that their formative dynamics differ radically from sites associated with secular daily ablutions. Bathing in a religious context embodied a precise societal role, and as such, specific factors determine its durability. Its longevity was always more secure than that of secular facilities, as sacred water sites demonstrate a magnetic centripetal attraction ensuring their continued use, a phenomenon which is common in curative circles of hydrotherapy and is well-attested outside Crete. Bathing maintained a high profile at many thermo-mineral sites of antiquity, such as at the baths of Pozzuoli and Baiae where the activity continued into the 17th century (Yegül 1992, 94). In Naples the tradition of thermal bathing still continues, and as the city remained closely linked to Byzantium throughout the medieval period, it is not surprising that medieval baths existed here (Arthur 1999, 141-2).

On Crete the activity of bathing in sacred sanctuaries in the Roman period often constitutes the continuum of an ancient activity, rather than representing the introduction of a novel practice. Yet rather than reflect a conservatism of form in their

⁵⁹ The ambiguity relating to the potentially later structures on the site, identified as either ecclesiastical or ablutional, is interesting in the light of the Church's adoption of the bathing practice (see chapter 17).

architectural progression, the Roman horizon is garishly apparent. The use of brick-faced mortared rubble, *opus signinum*, marble veneer and aqueduct supply lines flagrantly attest a strong Roman influence at all three sites. Such Roman investment in these cults is based on their power to attract as wide a following as possible and to incur maximum impact on the local society. The selection of these three sites for Roman expansion was directly correlated to their dominance in the Hellenistic period.

9.5 Sea-Bathing on Crete

The activity of bathing in natural water sources often remains an invisible activity in the archaeological record and usually one which only the written sources can illuminate. Ausonius provides a description of 4th-century AD villas along the River Moselle and refers to swimming in the river as a preferable relief from the intense heat of the baths (*The Moselle* 338-350). Sea-bathing was generally advocated in Roman times despite the report of Pausanias who warned against it saying that the sea was home to a host of wild creatures and swarmed with sharks (II xxxiv 1-2). Horace (*Satires* II i 8) and Seneca (*Epistulae* 83) both mention swimming in the Tiber while Cicero specifically refers to a well-known place along the river where all the young men bathed (*Pro Caelio* XV 36).

Its association with ritual spheres is attested by both Apuleius (*Metamorphosis* XI 1) and Clement of Alexandria, writing in the 2nd and early 3rd centuries AD, who refer to sea-bathing as a form of purification before initiation into the Eleusinian Mysteries (cited in Meyer 1987, 18). It is specifically in the written sources relating to therapeutic remedies that sea-bathing is commonly attested. In both the secular and sacred Roman world sea-bathing was advocated as a treatment for a wide range of maladies (Pliny *NH* XXXI xxxiii). It was particularly advantageous to those suffering from paralysis, who benefited both from static immersion and swimming in thermal, sea and mineral waters. Sea-bathing was recommended by Celsus and by Soranus of Ephesus, the most famous physician of the Methodist sect, who practised in Rome during the reigns of Trajan and Hadrian (Celsus *De Medicina* III xxvii 1; Caelius Aurelianus *On Chronic Diseases* II 44-48). Such medicinal virtues of seawater were commercially viable, as confirmed by an inscription from Pompeii advertising the seawater and fresh-water baths of Marcus Crassus Frugi (*CIL* IV 138

'the baths of Marcus Crassus Frugi.

Thermae of sea water and balneum of fresh water
Januarius, freedman'

(Naples Archaeological Museum no. 3829).

These baths may have been located along the ancient shoreline of a promontory to the west of the Sarno and combined a regular bath with the facilities of sea-bathing which could cater for a wide range of maladies. The positioning of the baths at Porta Marina in Ostia has also been attributed to its inclusion of a sea-bathing facility (Meiggs 1973, 407). Indeed, it seems that sea-bathing could be more common than is currently thought.

In Crete, such an establishment can be identified at Sitia, representing the only secure architectural context for sea-bathing on the island (B 2). The complex incorporated an apsidal rock-cut pool accessed by a step along its short straight axis; a feature reminiscent of Roman plunge-baths throughout the island (**fig. 60**). Seawater entered the pool from a small tank via a small rock-cut pipe. The compartment probably functioned as a bathing area rather than a swimming pool on the basis of its small size and shallow depth of 0.5m. Some auxiliary rooms were discovered under collapsed debris to the west of the compartment. Davaras concludes that the remains represent the pool of a large coastal bathing installation complete with a sea-bathing facility (1974, 93).

A second potential sea-bathing facility is represented by a structure at Lebena marked as building OO on Taramelli's sketch plan of the area (fig. 41). The structure is located in a prominent position running east-west along the edge of the cliff which slopes steeply towards the beach. Taramelli records that it was internally lined with mortar and that its compartments were traversed by water-channels (unpublished manuscript). The structure has been subject to a host of interpretations ranging from ship-sheds to a windbreak. Recently Melfi has suggested that the structure may have functioned as a hostel, providing accommodation for the long-term pilgrims to the sanctuary, while availing of its location on the shore for healing

purposes such as sea-bathing and thalassotherapy (2001, 54-5). This interpretation is bolstered by an inscription from the area, belonging to the category of *sanationes*, referring to a miraculous healing accomplished through the use of seawater (*IC* I xvii 20).

9.6 Conclusion

The proliferation of Roman bathing installations throughout Crete is a testimony to the island's receptiveness to this essentially Roman tradition. The variety of bathing contexts on Crete shows the degree to which the activity of bathing was practised. Their sheer number indicates an island-wide acceptance of the architectural type, which pervades the sacred, secular, public and private domains.

A study of their diverse typology highlights the manner in which this Roman institution was introduced to the Cretan architectural repertoire. The early public baths are predictably found in the major centres around the island, notably featuring in its capital and colony, and reflect an embracement of Roman ideals. The earliest public candidates are (predictably located) in the main centres such as Gortyna (B 18), Knossos (B 55*) and Khania (B 42), while others are found in rich cities such as Lappa (B 33) and Kouphonisi (B 3).

Such analysis also reveals that private examples were among the earliest bathing structures (see 16.3). The Italianate style, strategic positioning and early date of four major villas on Crete suggests emulation of Roman customs by local elites, a dynamic which is seen throughout the empire, most notably at Lepcis Magna (Di Vita *et al.* 1999, 56). All four villas (i.e. Makriyalos, Myrtos, Pachyammos and Minoa) concur with Alcock's conditions for elite residence (1989, 19). All four have private bath-suites, while those at Minoa and Pachyammos (although also arguably Makriyalos and Myrtos) are also supplied with purpose-built aqueducts, a fact which firmly establishes them as large and affluent complexes.

Smith maintains that among the earliest houses built in any particular province the category of residences for members of the ruling or official classes is pertinent (1997, 278). The lavish villas at Myrtos, Makriyalos and Minoa represent the earliest examples on the island and in this regard it could be highly relevant that the plan of the villa at Makriyalos somewhat resembles the grand peristyle villas of

Campania (McKay 1975, 109, fig. 40, 111, fig. 41, 115-6). The structure at Minoa is perhaps the most Italianate of the villas in plan, being compared to a *porticus* villa or a *villa maritima* (Raab 2001, 140, n. 27). The *villa maritima* is the type best known in Italy often associated with the senatorial class (Potter 1987, 20). The resemblance to the Italianate villas shows a deliberate Roman stamp on the landscape and identifies them as early introductions within the Roman tapestry of Crete. The presence of lavish bath-suites in these early private Cretan villas seems to represent an integral element in Roman 'packaging'.

Throughout the Roman world particularly early residences did not constitute villas in the ordinary sense but symbolised a meaningful presence. Smith regards these lavish early residences as imported features owing nothing to indigenous society in terms of design and construction (1997, 278). This phenomenon is well illustrated on the Akrotiri peninsula in Crete where, west of the villa at Minoa, a single-family residence has been identified associated with its own private burial ground designed to hold multiple interments (Raab 2001, 141, figs 65-6, site LT3). As a property of some importance it is relevant that there is a lack of materials that typify deliberately Roman construction on the island (such as stone- or brick-faced mortared rubble etc.), as characterised by the nearby villa at Minoa (Raab 2001, 141). Therefore, the site (LT3) demonstrates the range within society whereby some relatively wealthy locals adhered to local traditions, while others were pro-actively Roman as indicated by the villa at Minoa.

Smith maintains that whether those who lived in these early villas were native to the province or incomers is inconsequential to their houses, which must have been attained through Imperial channels (1997, 278). It could be argued that the villa at Pachyammos and possibly the structure at Tholos were constructed and designed for a Roman (or Romanised) magistrate (see 5.7). This villa acted primarily as a check on movement and need not directly alter the agricultural pattern in the area. It could also be argued that the villas at Makriyalos and Myrtos were constructed by the Romanising elite as their potentially early date, wealth and location would suggest.

The format of the early baths found in the main public centres and in the strategically-placed villas throughout the island served as an archetype of amenities that could be reproduced for the benefit and enjoyment of the indigenous population.

As the type became accepted, the widespread format of bathing facilities no longer adhered rigidly to their prototype and emerged instead as a distinctively Cretan form. The subsequent proliferation of public bathhouses on Crete conveys the acceptance of the template while their infusion into the religious centres demonstrates the extent of their social integration and the degree of Roman influence on the island. An assessment of bathing contexts reveals a Roman stamp over public, private and religious life in Crete. The inception, duration and cessation of Roman public bathing on Crete is more intense, diverse and durable than previously thought, presenting a Roman-receptive society in Crete at this time.

CHAPTER TEN

THE ROMAN BATHHOUSES OF CRETE: THE SMALL BATH

10.1 Introduction

This chapter focuses on the bath type most commonly found on Crete: the small bath (commonly referred to as *balnea* in the published record), while chapter 11 examines the less commonly found large baths (commonly referred to as *thermae*) on the island. Distinctions between the two types are to some degree subjective. Yegül's definition seems the most reasonable, whereby *balnea* constitute small privately owned baths as distinct from the great public baths (1992, 488). He classifies *thermae* as exceptionally large Roman baths embracing a variety of secondary functions, with Imperial *thermae* demonstrating a bilateral symmetry (Yegül 1992, 494).

Nielsen favours a more pragmatic distinction where the term *balneum* reflects a bathing function while *thermae* incorporates an additional sports section (1999, 35). Nielsen's stringent division relies on the presence or absence of a *palaestra*. Classifications based on such an indefinable archaeological feature has obvious shortcomings and Nielsen herself concedes that *palaestrae* are notably absent from some *thermae* (e.g. the Marathon Baths) (1992, 112).

Problems relating to such divisions are exposed through studies of the baths of Lycia where the majority of baths are particularly small and share similar layouts. Farrington observes that *palaestrae* do not frequently occur in the baths of Lycia and that numerous baths in the region do not include this feature (1995, 7 and 9). Yegül suggests that both the Small and Large Baths (Baths A and B) at Tlos must have had *palaestrae*, based on the presence of large flat fields adjoining the buildings and the architectural fragments of a colonnade found on the site (1992, 455, n. 35). The presence of *palaestrae* in these baths would place them within the *thermae* group,

⁶⁰ Conversely, Waelkens observes that most of the baths of Asia Minor, especially in Lycia and Rough Cilcia, were dominated by the axial row type incorporated down one side of a *palaestra* (1989, 87).

according to Nielsen's definition, albeit at the lower end of the grand scale.

It seems nonsensical to divide the Lycian baths, which otherwise exhibit a collective cohesion, on the basis of the presence or absence of a *palaestra*, especially considering that the feature is often represented by ambiguous archaeological evidence. Farrington admits that evidence for *palaestrae* in some Lycian baths is unconvincing and that they even represent a later addition (1995, 7 and 9).

Ironically, any Lycian baths with *palaestrae* would accord with Nielsen's thermae sub-group entitled 'other thermae' which, she specifies, are only called thermae because they have a palaestra, otherwise, they would have been assigned to her balnea group (1990, 113). Thus Nielsen attributes ten thermae (from Achaea, Cyprus, Cyrenaica, Macedonia and Moesia Inferior) to this group on the basis that they have palaestrae (1990, 113). The group is characterised by a lack of symmetry and a modest average scale, with a layout typically consisting of a bathing block of one row of rooms flanking a palaestra (Nielsen 1990, 113). Curiously, Farrington's format for Lycian baths (where palaestrae only occasionally occur) is similar (1995, 7 and 9). In fact, Farrington observes that the Aegean islands and mainland Greece are conspicuously lacking in large baths with adjoining palaestrae such as those seen in Asia Minor (1995, 43).

10.2 The Definitive Small Bath

Yegül regards *balnea* as 'small privately-owned establishments which were open to the public, often sharing walls with other buildings' (1992, 43). Scale often contributes to classifications of *balnea* and *thermae*, despite the fact that regional units develop their own sense of scale. Divisions based on the size of Cretan bathhouses when compared with those of the wider Empire are not realistic. An assessment of the scales of Cretan baths indicates where to place the regional Cretan bath within the broader Imperial spectrum. The common Roman Cretan bath is small and falls into the category of small bath despite some notable exceptions.

Nielsen offers an average size for *balnea* as 500m², while allowing for the fact that many much smaller examples exist (1990, 114). In her study of seventeen *balnea* in North Africa, eight cover an area under 500m² while seven range between 500m² and 1000m² (1990, 92). The sliding scale for the small baths of Crete seems

relatively modest, as represented by the small public bath at Kouphonisi which measures c. 384m^2 (**fig. 61**). The latter has been classified as a public *balneum* by the excavator who suggested that it catered for both the male and female population of the island (Papadakis 1986, 228-9, fig. 1).

General definitions of *balnea* often generate false images of flimsy dilapidated structures with no clear symmetry whose associated communities only aspire to transform these paltry installations into *thermae*. Such negative overtones ascribed to the type are not applicable to the bathing establishments of Crete. This is adequately demonstrated at Ini where the bathhouse is referred to as a *balaneion* – a term thought to correspond to the Latin *balneum* (Staccioli 1955, 391-401) – in its associated inscription (Ducrey & van Effenterre 1973, 287, n. 13). Yet, the bathhouse at Ini is freestanding, well constructed and supplied by an impressive aqueduct. The discovery of a timetable monitoring the use of the bath is also indicative of its public role which is further verified by the fact that the structure is supervised and maintained by the *kosmoi* (see 7.2.10).

The fact that the bath at Ini is referred to as a *balaneion* in its associated inscription (Ducrey & van Effenterre 1973, 287, n. 13) is not necessarily indicative of a Greek archetype, as Farrington would argue (1995, 135). The confusion in dealing with precise terminologies is exemplified by Dio Cassius who refers to the baths of Agrippa and of Titus as both *thermae* and a *balaneion* respectively (*Roman History* 54, 29, 4; 66, 25, 1). Contradictions within the ancient sources naturally result in a degree of ambiguity in modern discussions. Tzedakis refers to bathhouses at Plakias (B 35) (1976, 372) and Kastelli in Khania (B 43)(1977a, 326) as *balaneia* despite the fact that the latter, at least, is clearly a Roman type, incorporating brick-faced mortared rubble, *opus signinum* and associated with marble veneer and Roman glass vessels.

The preference for small baths in Crete would concur with the overall distribution of this type within the Empire. Nielsen observes that small provincial baths (which she refers to as *balnea*) are mostly found in Achaea, Macedonia and in the East, specifically in Egypt which would concur with her grouping of Egypt with Crete (1990, 99 and 114)(see 14.2). Nielsen attributes few small baths to Asia Minor, a premise she also applies to Cyrenaica to which she ascribes a great number of large

10.3 Plans of the Small Baths of Crete

Numerous obstacles impede a study of relative scales of Cretan bathing establishments, including excavation strictures and a general dearth of published plans. Erroneous conclusions have often been drawn from analysis of incomplete published plans. This is evident from Sanders' plan of the bath at Kato Asites (fig. 64) which does not include the wall foundations which extend visibly from the northwest and southwest corners of the main rectangular compartment (personal observation). Sanders merely copies Gerola's original plan which specifically illustrates the later architectural conversion of the bath into a church (fig. 65). Consequently, Sanders' presentation of the bath plan is ineffective since the original bath layout is constrained by the later church module. The confusion is further compounded when Sanders claims, with specific reference to the bath plan, that the design is more common in Italy and Africa than in Greece and the East (1982, 155, 70, fig. 13). This information is more relevant for the Cellae Trichorae format associated with church plans rather than the triapsidal bath unit which certainly is common in the Eastern provinces (fig. 65). In fact, the symmetrical triple plunge-bath arrangement seen at Kato Asites is reminiscent of caldaria complexes of North Africa (Yegül 1992, 227-9 see the caldarium in the Summer Baths at Thuburbo Majus, Tunisia).

It is also difficult to reconstruct the bathing process of many Cretan bathhouses as few have been adequately examined in terms of room function. No activities or functions have been assigned to the different rooms of the baths in the Apostolaki Plot at Kastelli Kissamou (B 51) despite its detailed published plan (**fig. 83**). At Minoa, it is also impossible to establish a pattern of circulation due to the original misinterpretation of the complex as an arsenal (Theofanidis 1950-1, 7).

Nonetheless, it is recognisable from the few Cretan baths that have been assessed with any level of accuracy that the row type represents the popular layout and that bathing was mostly retractive in pattern. This complies with broader patterns within the Empire which demonstrates that the vast majority of small baths are of the row type (Nielsen 1990, 114). The row type allows for large variations but there are naturally common trends within the group. The type generally demonstrates a balance

between heated and cold rooms, as attested by the Large Baths at Argos, the Olympieion Baths in Athens, the Kladeos Baths in Olympia, the baths at Abu Mena in Egypt, the baths at Clambetae in Dalmatia and the South Baths at Solona (Nielsen 1990, nos 252, 255, 272, 279, 332*, 335). Row-type baths identified in Crete are presented below along with two private bath-suites which conform to the same pattern i.e. Makriyalos (B 1) and Knossos (B 14).

10.3.1 Stavromenos Chamalevri (B 26): parallel-row type (retractive)

Stavromenos Chamalevri is a row-type bath representing the parallel format proposed by Krencker (Krencker et al. 1929) (fig. 72). The proposal of a parallel-row layout is based on the assumption that the horseshoe-shaped pool forms an adjunct to a frigidarium, as has been suggested by Andreadaki-Vlazaki (1991/3b, 245). Its location near the start of the circulation sequence suggests that this frigidarium doubled as an apodyterium; a dual function that is attested in some Lycian baths (Farrington 1995, 15). A tepidarium should occur next in the sequence and its identification could be attributed to area 1 which is suitably adorned with a mosaic. The bathers then enter the caldaria (3, 3a and 4 and perhaps pool 9) and, subsequently, retrace their steps.

10.3.2 Kouphonisi (B 3): angular row type (retractive)

The bath at Kouphonisi was separated from building 2 by street Π to the south of areas M, Λ and K (**fig. 61**). M and Λ comprise the southeastern section of the baths and probably represent reception areas and *apodyteria*. The *frigidarium* has not been securely identified yet could be represented by area K.

The northern block of the baths consists of the heated areas. The bather proceeds north to the areas serviced by *praefurnium* E: hypocausts A and N, although the latter is thought to represent a secondary addition. Area B probably represents a *tepidarium* rather than an *apodyterium*, as Papadakis proposes (1986, 230). The area contains a window measuring 1m x 1m. Large windows feature in the *tepidarium* of the Forum Baths at Pompeii and are often used in the great baths for illuminating the

⁶¹ Sweetman maintains that the *tepidarium* is one of the three specified rooms within bathhouses allocated mosaic flooring (1999, 408).

caldaria (Yegül 1992, 469, 494, no. 85). Pools Δ and Γ must have been heated, due to their proximity to hypocaust A. Both pools overlook the sea, into which they have partially collapsed.

The angularity of the plan is afforded by the open area Z which has been identified as a garden by traces of organic remains found in a thin layer of earth suitable for plants, overlying further strata of earth and sand (Papadakis 1986, 231). Gardens are familiar features of bath blocks in general, as attested in an inscription from Tarraconensis where a *hortus* is mentioned in such a context (*CIL* II 3960).

10.3.3 Souia (B 46): asymmetrical block arrangements promoting annular circulation

At Souia only two rooms are depicted in Savignoni's plan, in which the area incorporating an apse represents a hypocaust (fig. 81) (1901, 444). Alternatively, Markoulaki, examining the same complex, refers to four rooms comprised of a 9mlong corridor flanked by three other rooms; unfortunately, the text is not accompanied by a plan (1981, 401). The two accounts are so different that it only becomes apparent that they relate to the same structure through a comparison of the published photographs (plates 75a-c).

Despite such discrepancies, the plan of the bath at Souia can be classified with the Baths of Titus at Simena in Lycia and that of the Olympia Baths IV (**fig. 81**).⁶² The group demonstrates asymmetrical block arrangements promoting annular circulation (Farrington 1995, 161, no. 54, pl. 15). Curiously, Nielsen attributes the layout of the Olympia Baths IV to its foundation over a *balaneion* (1999, 40, fig. 7).

10.3.4 The Large Baths at Eleutherna (B 28): Ring type

The bath at Eleutherna known as the 'Megalo Loutro' (Large Baths) has a plan reminiscent of the substantial bath north of the Octogan in Philippi which has been classified as a ring type (fig. 74) (Gounaris 1990, 8). Both baths have paved central areas, although that at Philippi is more substantial and is described as a palaestra (13m x 11m). The central court at Eleutherna only measures 11m x 6m (plate 68c). The entrance to the bath lies to the east and the presence of the central

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⁶² The apsed area in the Olympia Baths IV also represents the hypocaust (Nielsen 1999, 40, fig. 7).

courtyard promotes annular clockwise circulation leading from the hypocaustal complex to the southeast. Secondary phasing is evident within the bath and the circulation pattern may have been altered with later modifications.

10.3.5 The Private Bath-suite at Knossos (B 14): parallel-row (retractive)

The private bath at Knossos seems to represent Krencker's parallel-row type (Krencker et al. 1929) (fig. 63). The Athlete Mosaic (area 10) demarcates the entrance, located to the east. The bather proceeds to area 5 which could represent the frigidarium/apodyterium with its adjunct plunge-bath 11. Circulation passes to area 3 which is furnished with a net pattern mosaic. The presence of the mosaic distinguishes this area as the tepidarium (see Sweetman 1999, 408). Then the bathers enter caldaria 6 and 7, via room 4 and, subsequently, retrace their steps back to the entrance. It is not certain how area 12 functioned, although Wardle suggests that it represents the central courtyard of the villa (unpublished manuscript). If correct, the court may be integral to the overall plan of the villa proper, rather than function as an intrinsic element of the bath-suite.

10.3.6 The Private Bath-suite at Makriyalos (B 1): Originally parallel-row but modified to form a ring type

A partial plan of this bath-suite is included in the overall plan of the villa published in 1979 (Papadakis 1979, 408, fig. 2). Only certain rooms pertaining to the bath-suite are illustrated, i.e. areas Ψ , O, Z, Ω , Π , Θ , I, H, T and Λ (room P is also probably part of the bath-suite) (**fig. 59**). The remaining bath block to the southeast has never been represented on a published plan despite the fact that the area has been the subject of brief comment (Papadakis 1980, 524-5).

An assessment of the partial plan and its brief commentary demonstrates that the bath-suite was originally accessed through a doorway in the southern wall of courtyard N leading to room Z (the *apodyterium*). The bather then proceeds to compartment Ω where plunge-bath Π could be accessed. Together these areas form the main *frigidarium* of the suite. Area Ψ is also likely to be part of the bathing complex since the area is lined with *opus signinum* and marble veneer and is associated with a small sunken compartment to the west. It is probable that the area

functioned as a second *frigidarium* fitted with its own plunge-bath. Area O lies to the south and has a mosaic floor composed of a black-and-white geometrical design of intersecting circles (**plate 47c**) (Papadakis 1983b, 59). The function of this room is uncertain.

Next, the bather passes into the set of parallel rooms to the east; T, H, I and Θ which possibly functioned as *tepidaria* due to their location between the *frigidaria* and *caldaria*. The southeastern extent of the complex (not depicted on the plan) comprises areas $\Lambda 1$, $\Theta 1$, cistern I1, hypocaust K1 and *praefurnium* M1.

Areas P and Λ lie to the north of this sector. Unfortunately, there is no published account explaining the function of rooms P and Λ but a common purpose could be proposed as they share an interconnecting doorway. Area Λ may have been modified at a subsequent stage in order to be incorporated into the bathing block. The eastern half of the southern wall of area Λ was remodelled to incorporate an arched flue (visible in the left-hand corner of **plate 48a**). The eastern half of the south wall essentially abuts onto the north wall of area Θ . This modification would transform the circulation of the bathhouse from a parallel-row to a ring type, with the entrance from the courtyard into area P. There is some evidence that the courtyard was screened off at this point to facilitate its incorporation into this more extensive bath block plan.

Secondary remodelling is also supported by the discovery of trapezoidal bricks indicative of pitched brick vaulting in this sector (Livadiotti 2000, 814). The earliest dated example of pitched brick vaulting on the island is represented by cistern 14 in the Praetorium Baths dating to the reign of Severus. This would certainly constitute a much later date than that proposed for the foundation of the villa in the late 1st or early 2nd century AD.

10.4 Distinctive Architectural Features common to the Small Baths of Crete

Studies of pool size, layout and orientation can be revealing with regard to the nature of bath buildings. At Bir el Jebbana, on the western edge of Carthage, the most definitive feature in the reclassification of the bathhouse from private to public was the scale of the main pool (Rossiter 1998, 113). Its dimensions (10m x 4.8m) and

design were closely paralleled with contemporary pools in the region.

Due to the incomplete nature of Cretan bath plans, only individual features common to the Cretan group could be assessed with confidence. The pools of the Cretan baths represent the most distinguishable features within the complexes and, as such, can contribute to bath classifications. It may be significant that substantial *natationes* do not feature in the baths of Crete. Instead small plunge-baths, in keeping with the small bath type, are preferred and feature in both private and public installations.

10.4.1 Horseshoe-shaped Plunge-baths

The small horseshoe-shaped plunge bath is a popular feature in small Roman baths as is evident from the plan of the Small Baths at Baiae near Naples (Medri *et al.* 1999, 211, figs 2-10) and in the small baths in North Africa (Yegül 1992, 234-246). In Crete horseshoe-shaped plunge-baths are encountered in the baths of Stavromenos Chamalevri (**plate 66a**), Kato Asites (**plate 58a**), Makriyalos (**plate 47a**) and Pachyammos (**fig. 21**). As a group they demonstrate distinctive characteristics including access steps (usually two) and a slight ridge along the curved wall. Both features are evident on plans from Kato Asites (**fig. 64**), Makriyalos (**fig. 59**) and Pachyammos (**fig. 21**). The floors of such pools at Stavromenos Chamalevri and Makriyalos are paved with stone flagging so similar (in terms of type and size) as to suggest a contemporary construction date.

Plunge-baths generally form an appendage to the main bath block. At Makriyalos the pool projects from the southern wall of the villa overlooking the sea (fig. 59). At Stavromenos Chamalevri the plunge-bath is located to the north of the main corridor complex and set aside from the main block (fig. 72). This slightly protruding effect is best demonstrated at Kato Asites where the bath incorporates a symmetrical triple plunge-bath arrangement (figs 64 and 65). It is not known how these projecting plunge-baths were roofed but Yegül informs us that they were individually covered at a lower level than the vaulting of the more elevated central space (1992, 405). At Sitia the rock-cut pool could represent a variant on this theme, as it is also apsed and equipped with steps along its straight short axis (B 2) (fig. 60). The pool, although supplied by seawater, is associated with an architectural complex

perhaps forming an appendage to it, as is characteristic of the type.

10.4.2 Apsidal Plunge-baths

Apsidal plunge-baths are essentially rectangular pools with one apsed end. At Minoa, area H of the bath-suite represents a small apsidal pool (**figs 47-48**). Theofanidis describes the feature as an apsed cistern accessed via two steps to a depth of 0.50m (1950-1, 7). The structure is more precisely interpreted as a small apsidal plunge-bath. The pool is lined with white hydraulic mortar overlaid with *opus signinum* (**plates 73b-c**). A similar interpretation can be applied to area Δ of the same complex which is similar in scale and design, being fitted with a double-stepped feature at its northern end.

In the bath at Kouphonisi an apsidal pool overlooks the sea to the north. The pool, measuring 4m x 2.4m, was accessed by two steps and lined with *opus signinum* and marble veneer (B 3)(**fig. 61**). A decorative element occupied the centre of the pool (Papadakis 1986, 230).

It is tempting to interpret areas A and B in the bath at Minoa as one large pool as its form is similar to that of pool Δ at Kouphonisi. Both pools are founded at a lower elevation than the rest of their complexes overlooking the sea. It also appears, from the plan of Minoa, that the area had a central feature, perhaps comparable to that of Kouphonisi. Unfortunately, it is not possible to examine the remains at this exact point along the seafront at Minoa as the modern road covers them. Nonetheless, the excavator observed that the floor of apsed area A was lined with a mix of lime and pebbles which may be indicative of a bathing area (Theofanidis 1950-1, 7).

At Platani Soudas (B 45) an apsed cistern recorded by Platon, accessed by three steps and associated with two pipes, must also constitute a bathing pool (1954, 517). Similarly, Sanders' description of an apsidal structure with a radius of 2.5m at Oleros in east Crete probably represents a pool as it was coated with *opus signinum* (1982, 138).

10.4.3 Small Square Pools

Another variant of the bathing pool is represented by the small square plunge-bath. These pools are set within the complexes rather than adjunctive to it, as

is characteristic of the horseshoe-shaped variety. In the private bathhouse at Knossos (B 14) a square pool (plunge-bath 11) (**fig. 63**) was sealed with a stopper or plug consisting of a stone disc with the remains of iron fittings for a chain and handle (*AR* 1995-6, 41, fig. 24). It is comparable to a metal plug, reported as a unique discovery, found in the Stabian Baths at Pompeii (Manderscheid 2000, 502). It is also possible that the metal object attached to a chain found in a bath at Eleutherna represents a plug (Themelis 2002, 56, fig. 54). In fact, a small square plunge-bath is included in the layout of the Small Bath at Eleutherna (area 51).

At Minoa, the square compartment (area M) is likely to represent a pool, since its floor and internal surfaces are coated with a sealant (**fig. 47**). This interpretation is supported by the presence of a stepped 'bench' flanking the southern wall. Theofanidis was not convinced that the area was used for bathing because there was no water outlet and he concluded that it was used as a cistern (1950-1, 8). However, cold plunge-baths were often emptied through bailing while *alvei* associated with *caldaria* sometimes overflowed onto the hot floor where the water was left to evaporate (Nielsen 1990, 157).

Area Γ of the bath at Kouphonisi represents another square pool, although almost completely destroyed. The floor of the area is set 0.50m lower than that of the adjacent hypocaust and was lined with *opus signinum* (Papadakis 1986, 230) (**fig. 61**). The square sunken plunge-bath associated with *frigidarium* Ψ in the bath-suite at nearby Makriyalos also belongs to this category (**figs 59 and 75**). At Aghia Vavara near Malia a previously unrecorded bathhouse is represented by a rectangular room lined with *opus signinum* and can be associated with disarticulated *pilae* from the surrounding fields (personal observations).

10.5 Conclusion

This chapter examined the predominant bath type on Crete, the small bath, from an analysis of comparative scale and design. The small bath format encountered throughout Crete exhibits a predominantly row type arrangement (as defined by

 $^{^{63}}$ This feature was recorded in 2003 during explorations of 'Roman Malia' for the Malia Survey under the directorship of Dr. Sylvie Muller.

Farrington 1987, 52).

Nielsen categorises three main groups of early provincial bath types in the East (1999, 38). Nielsen's Group 1 covers the small baths of Greece (presumably Achaea and Macedonia), west Asia Minor and Egypt. Nielsen generally classifies Crete with Achaea and Egypt in her analysis and, therefore, it was initially expected that Crete would demonstrate attributes common to Group 1 (1990, 99)(see 14.2).

The small baths of Nielsen's Group 1 were built in the *balaneion* tradition (generally incorporating a tholos element) (1990, 99), yet no tholos elements, as would be fitting for the group, have been recorded in Cretan bathhouse architecture. In fact, only very scanty evidence for Hellenistic bathing traditions can be discerned in the archaeological record of Cretan bathhouses, and – significantly – none in the small bath category. The only baths with circular plans on Crete are that of the elusive bath at Preveli (B 36) and the enigmatic structure at Lappa (B 32) (see 11.3.2). At Preveli, Platon refers to a building with a petal-shaped ($\pi \epsilon \tau \alpha \lambda o \epsilon \iota \delta o \iota \delta c \phi \chi \eta \mu \alpha \tau o c s)$ central room surrounded with adjunctive *exedra* (1947, 638). It would be relevant if the plan of the bathhouse at Preveli reflected that of a tholos layout, which is thought to be a Greek derivative (Farrington 1989, 58), as demonstrated in the baths of the ancient agora in Thessaloniki (*Ergon* YIIIIA 1, 1997, 105, pl. 3).

Despite such dubious examples, the origin of Cretan public bathing cannot be found within Hellenistic or Classical Cretan traditions, as there is little solid evidence, as yet, for communal public bathhouses in Crete prior to the Roman period. It is possible that Hellenistic baths existed in Crete but are no longer detectable in the archaeological record, as has been proposed for Lycia (Farrington 1995, 43). In Crete, finds such as the bronze strigil deposited in a late 5th-century BC grave in the southern area of Khania could be indicative of earlier practices on the island (*ADelt* 1973-4, 924-5, no. 294, fig. 7 and pl. 692e).

If the origins of the common Cretan bathhouse are not detectable in pre-Roman Crete, where can they be found? The small baths of Crete exert similar characteristics to the small baths of North Africa which demonstrate a tendency towards the row-type plan (Yegül 1992, 234). Small plunge-baths (commonly of the horseshoe-shaped variety) represent a popular feature in baths in Crete and North Africa, as seen in the Baths of Trajan and Hadrian at Cyrene (Farrington 1995, 57, fig.

19). The feature is popular in the smaller baths of North Africa (Yegül 1992, 239-40), and a fine example is seen in a rich villa at Sbeitla (Tunisia), the walls of which are adorned with mosaics depicting fish (Manton 1988, 83, fig. 34). The pool type is a feature of the small baths of the Empire and affords maximum conservation of space and energy.

The small baths of Crete bear the closest affinity to the Lycian bath variety, although notably lack palaestrae. The basic retractive bathing pattern, common to Crete, is often encountered in Lycia, while examples of apparently annular bathing patterns with the frigidarium often doubling as an apodyterium is also common to both regions (Farrington 1995, 15). The scale of the baths of Crete is comparable with those of Lycia, which are notably smaller than those of her direct neighbours. The smallest Lycian example, represented by the baths of Titus at Simena, had an area of only 75m² (fig. 81) while at the other end of the scale are the baths at Limyra covering over 1,000m² (Farrington 1995, 7).⁶⁴ Based on the many notable common features between the regions a common dynamic can be argued for the development of the Lycian and Cretan bath types. The baths of both regions exhibit numerous consistencies in terms of overall scale, distribution density and negligible Hellenistic influence. In both regions bathing suddenly becomes ubiquitous in the Roman period immediately following its negligible profile in the Hellenistic period.⁶⁵

Farrington was faced with a similar conundrum concerning the origin of the Lycian baths, since none of the Hellenistic baths of the Greek world provided any major clues for their derivation (1995, 43). Lycia yielded little evidence for pre-Roman bathing, that of Kolophon being the only example, while only one inscription in Lycia refers to a Hellenistic bath (Holland 1944, 169; Farrington 1987, 54-5). Farrington also observes that the Imperial bath buildings of Lycia remained untouched by any influences from neighbouring areas in southwest Asia Minor (1995, 137). Their method of construction is set firmly within the Hellenistic traditions of Lycia.

Farrington interprets their sudden appearance as the wholesale introduction

⁶⁵ Lycia has a potential of 64 baths if the epigraphical and archaeological evidence is combined (Farrington 1995, 117).

⁶⁴ Yegül notes that the Large Baths at Tlos (Baths B) represent the largest of the Lycian bath type (1992, 455, n. 35) but Farrington provides an area of only 800m² (1995, 162).

of a sub-colonial architectural type (1995, 137). The type appeared as, and remained, a simplified version of a prototype which emerged in the 2nd and 1st century BC in Campania (Farrington 1995, 137). The argument for wholesale introduction is supported by the fact that the plan remains more or less static throughout the period of bath building in Lycia which survives into the 6th century AD providing perhaps for one or two local idiosyncrasies of bathing tastes. Waelkens observes that in Lycia the circular room, which features in Italian baths, was abandoned – perhaps as a response to simpler bathing customs (1989, 87). The model can be applied to the small baths of Crete in the light of negligible Hellenistic evidence for public baths on the island and the common features shared by the baths of both regions.

CHAPTER ELEVEN

THE LARGE BATHS OF CRETE

11.1 Introduction

Only two large baths (commonly referred to as *thermae*) have been securely identified on the island (both situated in the capital of Gortyna). It has already been established that Cretan bathhouses have dimensions more comfortably applied to small bath types. This chapter aims to explain the significance of the presence of the large bath type and its association with major centres on Crete.

11.2 Large Baths

Definitions of *thermae* are problematic, as the type is not necessarily monumental. Nielsen observes that some of the *thermae* of the Eastern provinces are not particularly large and incorporate simple plans in which a *palaestra* is not particularly dominant (1990, 113). In fact, Nielsen cites four relatively large Roman baths in Achaea which seem to completely lack a *palaestra* (1990, 112).

The Praetorium Baths (B 18) and the Megali Porta Baths (B 19) at Gortyna are the only large bath installations on Crete which correspond to the general large bath typology. Nielsen offers an average size of 2,820m² for large baths (including *palaestrae*) (1990, 105). The dimensions for the Cretan examples are relatively large as represented by the Megali Porta Baths which cover 3,600m² (Sanders 1982, 15 and 158). The Megali Porta Baths maintained their original layout for their entire functional life, with only minor changes and additions, but without radical restructuring (**figs 68-9**). The original Hellenistic *palaestra* is located to the north of the complex where it is represented by a slightly, but regularly-defined, raised unexcavated area (Masturzo & Tarditi 1994-5, 241, n. 29).

The Praetorium Baths occupy over 1,000m² and are often referred to as *thermae* in publications (Di Vita 2000a, 13). In contrast to the Megali Porta Baths these baths undergo radical restructuring. The first construction phase yielded

evidence for a massive central court surrounded by an ample portico on at least three sides (Di Vita 1990-1, 460; 2000b, xxxv). Excavations located two columns of the eastern portico *in situ* just south of pool 334 of *caldarium* 13 (Di Vita 1990-1, 460, fig. 59). The portico was almost totally destroyed by the construction of the bathing complex which occupied the area from the time of Trajan (La Rosa 1990, 431).

The major renovations of the complex in the second half of the 2nd and early 3rd centuries AD transform it from a linear system to a circular type (fig. 67c; Phase IV). The addition of a second caldarium (area 12), accessible from caldarium 13, and a second tepidarium (area 10) which communicates with both caldarium 12 and frigidaria 26 and 27, alters the operation of the complex. The simultaneous elimination of the palaestra deprives the complex of that characteristic of the Greek-Asian tradition while the introduction of a basilica thermarum provides evidence for the monumental articulation of the building (Rocco 2000, 83). The presence of the basilica thermarum alone distinguishes the baths as substantial baths. In order to merit the inclusion of a basilica thermarum, a bath of a certain size and sophistication must already be established since a basilica thermarum does not constitute a fundamental element of a bath and its removal should not impede the operation of the installation (Nielsen 1990, 162). A basilica thermarum frequently features as a substitute for a palaestra due to space restrictions or an unsuitable climate or even because sport was no longer favoured as a complementary activity to bathing. In the very large baths, especially in the Imperial thermae, a basilica thermarum could coexist with a palaestra (Nielsen 1990, 162).

There is the potential for the existence of substantially large baths at other centres on Crete outside Gortyna, although the evidence is not particularly convincing. At Knossos, a potentially massive bathhouse was partially exposed to the south of the Villa Dionysus (B 15). A 6m-high wall associated with a fragment of mosaic and marble veneer was traced for 30m suggesting a complex occupying an estimated area of 900m² with two or three possible storeys (plates 57b-c)(Wardle unpublished manuscript; 1998, 47, lower plate). Such deductions may seem purely speculative considering the limitations of the excavation, but the fact that the associated mosaic incorporated a wave crest motif, presumably a border motif, with a width of 0.25m-0.30m indicates a room of considerable size (plate 57b). The motif

constitutes the largest example of this border design on the island (Sweetman forthcoming). A public character for the building is also suggested by its location close to the public heart of the city. It is framed by both the civic basilica and the theatre, being located near the most elite private dwellings of the city only 30m from the principal thoroughfare. Consequently, it is not unreasonable to suggest the existence of a lavishly-decorated public bathhouse in such an opulent and public quarter of the Roman city of Knossos.

High levels of sophistication are attested at other large baths on Crete. In the area of the ancient agora of Kydonia (modern Khania) a bath dating to the 1st century AD yielded three hypocausts (B 42). This is a high number of hypocausts for any bath on the island, outside the capital of Gortyna. The complex (which is now covered over) appears to have occupied 300m² although it is difficult to gauge its area from the published plan (**fig. 80**). The presence of multiple hypocausts facilitating a subtle gradation of heated rooms represents a high level of sophistication at such an early stage of the Roman bathhouse programme on the island.

The dimensions of the two-storeyed bathhouses at Aptera are also relatively large but there is insufficient published information regarding the layout of these complexes to merit an accurate typology. Despite their relatively large size, they are likely to fall at the larger end of the small bath spectrum. At Hierapytna, despite Belli's claim that the city was equipped with both *thermae* and aqueducts (cited in Falkener 1854, 11), neither monument type has been located (**fig. 20**). The same scenario is encountered at Chersonisos where, although *thermae* are recorded and marked on maps, evidence for such substantial baths has not, as yet, been provided (Empereur *et al.* 1991, 496, fig. 15).

11.3 The Wonderful World of Belli

Two of the elaborate, if somewhat fanciful, plans of Onorius Belli are relevant to the study of monumental Cretan baths. Belli was appointed physician to the Proveditor General of Khania in 1583 and sent to Crete as a corresponding member of the College of Medicine of Venice. He may have been in charge of the hospital at Gortyna, to which he refers in his first letter (cited in *The Builder* 7/12/1901). He devoted his leisure time to the study of antiquities and toured the

island making detailed observations on a range of sites. He sent various plans of ancient theatres and temples to his uncle, Valerius Barbarano of Venice, a collection of which is preserved amongst the MSS of the Ambrosiana at Milan. His works include a series of theatre plans from Hierapytna, Lyttos, Chersonisos, Gortyna and Khania. The plans of Khania were unfortunately lost and the theatre itself was probably destroyed during the refortification of the city in the 16th century AD (cited in Falkener 1854, 27).

Belli's plans of the amphitheatre and the bathhouses at Gortyna have also been lost (Falkener 1854, 20). If still extant these plans could be compared with the corresponding remains in the field (i.e. those of the Praetorium Baths and the Megali Porta) to confirm Belli's reliability as a draughtsman. The plans relevant to this work include the depictions of two elaborate structures at Lappa and Lebena.

11.3.1 Belli's Plan of the Temple of Asclepius at Lebena

Belli's plans of structures at Lebena and Lappa cannot be automatically accepted as representative of monuments in the field since neither structure has been satisfactorily located, despite numerous suggestions. Belli's representation of the temple of Asclepius at Lebena depicts a complex composed of the main temple (measuring 3,025m²) and its forehall (measuring 2,700m²) (**fig. 43**). The combined dimensions of the plan yield a ground-plan of 5,725m² which would represent the largest building on Crete in the Roman period. Such an enormous area for any Roman structure in Crete, indeed considerably larger than the substantial Megali Porta Baths at Gortyna (measuring 3,600m²), remains highly irregular within the architectural tradition of bath construction presented in this thesis.

The orientation of the plan is uncertain and it is not known whether the forehall of the temple lies on the east or the south side. The main entrance into the anteroom is centrally placed along the long axis and corresponds with the entrance into the main temple block. Sanders describes the central area as a rotunda, c. 28m in diameter, surrounded by arcades which were divided into three rectangular rooms along each side with a small circular room occupying each corner (1982, 83). The central room on each side (except that leading to the forehall) communicates with a larger semi-circular apse protruding beyond the line of the wall. Three exedrae are

incorporated within the thickness of the apse walls. Similarly, the corners of the central rotunda are occupied by *exedrae* fronted by two columns, each *exedra* forming slightly more than a semicircle.

Sanders equates the two concentric circles in the middle of Belli's plan with the main fountain on the site (1982, 83). Alternatively, he suggests that the fountain is represented on the plan by either one of the round rooms in the corners or one of the apses in the centre of the lateral walls (Sanders 1982, 83). The fact that the excavated fountain on the site has a flat façade undermines Sanders' suggestions that it is represented by circular elements in the plan (plate 27c). Curving architectural walls have not been found in the field nor have they been denoted on Taramelli's sketch plan of the area (fig. 41) or on the recent plans compiled by Melfi (Milena Melfi pers. comm. 2001).

Despite these inconsistencies, Belli's plan of the Temple at Lebena is relevant to this thesis, as it has repeatedly been compared with a range of Imperial bathhouses culminating in the great Imperial bathhouses of Rome from Caracalla to Constantine (Falkener 1854, 19; Sanders 1982, 84). Sanders compares the plan with the Baths of Caracalla, and, on a smaller scale, Antioch Bath House C, while also comparing the design of the external apses with those of Herodes Atticus' *nymphaeum* at Olympia dating to the mid-2nd century AD (1982, 83). In essence, Sanders' assessments of the plan culminates in comparisons between details of the sketch plan with actual architectural features, but if the plan embodies ornate structures, the evidence in the field does not. The disparity between Belli's plan (fig. 43) and the plans executed at Lebena by modern scholars is self-evident (figs 41-2).

11.3.2 Belli's Plan of a Bathhouse at Lappa

Belli's plan of a temple at Lappa was initially re-identified as a bathhouse by Falkener (1854, 25, fn.). Falkener compared the *exedrae* in the corners of the large oval rooms to *sphaeristeria*; a common feature in bathhouse design. The building is essentially an elongated oval dominated by a rotunda with an internal diameter of 18m (**fig. 76**). This rotunda is surrounded by thirteen *exedrae*, each 3.3m in diameter, embedded in the width of the wall. The rotunda is accessed through a narrow entrance which is approached via an oval porch composed of six steps crowned by a façade of

six columns. Two large oval rooms, incorporating four *exedrae*, flank the rotunda while another smaller oval room is placed behind. These curved compartments are all set within a rectangular frame (measuring 45m x 36m) while the remaining space within is occupied by a series of square rooms of equal size. According to the plan, none of these rooms, square or oval, communicates with the central rotunda; instead they are accessed through two narrow entrances on either side of the porch. Two large hemicycles or semicircular apses are located on either side of the rectangular frame to complete the oval plan.

Sanders claims to have located Belli's monument in the field (1982, 83-4). His report describes two 3.5m-high brick piers, measuring 2m x 2m, and standing 6m apart, with two cisterns in a series (4m wide but of unknown length) attached to one of the piers (Sanders 1982, 83). Sanders' bathhouse identification primarily rests on the presence of the cisterns and their proximity to the springs; however, the fragmentary condition of the remains does not allow for confirmation of either this interpretation or for any association with Belli's plan.

Surprisingly, an account by Pashley lends some credence to the existence of Belli's monument in the field (1837, I, 81-83). Pashley describes and draws a sketch of an unusual building on the outskirts of the village of Lappa whose measurements are comparable to the expansive structure portrayed by Belli (1837, I, 81-83). He records the remains as an odd circular structure with an internal diameter of 60ft (18.3m) fitted with recesses, presumably off this circular area, each entered through arches, with each niche forming slightly more than a semicircle with a diameter of 11ft (3.3m) (1837, I, 81-83). Pashley's sketch denotes three complete arches and at least five piers (fig. 77). His descriptions of a circular construction, with measurements roughly corresponding to Belli's plan, forms the most convincing argument for the validity of Belli's monument. Moreover, Pashley also records a brick edifice with supporting buttresses nearby, measuring 15ft x 9ft (4.5m x 2.7m), and a large cistern, 76ft long and 20ft wide (23.1 x 6.1m), 300 paces south-southwest of the circular building. These dimensions correspond to those of the cistern examined by Tzedakis and could possibly represent this structure (A 16) (1977b, 333, pl. 206).

Regardless of the legitimacy of Belli's plan in the field, Sanders again claims that it is comparable with a whole series of bath buildings that culminated in the great

Imperial bathhouses of Rome from the time of Caracalla to Constantine (1982, 84). The design, as illustrated by Belli's plan, is certainly reminiscent of the *caldarium* of the Baths of Caracalla in that both are composed of a circular dome with heated pools set in arched niches within the thickness of the wall (see DeLaine 1997, 21). Sanders also claims that Belli's plan of the structure at Lappa can be paralleled with the so-called Temple of Minerva Medica in the Licinian Gardens in Rome, dating to AD 320 (1982, 83; see Ward-Perkins 1981, 434-5, figs 295-6). Ultimately, although such comparisons are tempting, they are based on Belli's plan which today exists only as a manuscript, despite some claims to the contrary, and cannot be presented as tantamount to physical material in the field.

11.4 Conclusion

Nielsen attributes the popularity of the *balneum*, over the *gymnasium*, in Egypt and Achaea as a result of the direct continuation from the Greek *balaneion* (1990, 114). This architectural progression was thought to reflect the social indifference regarding the combination of sport and a hot bath in these areas. Farrington bleakly concludes that, with the exception of the *gymnasium* at Samos, the Aegean islands and mainland Greece are conspicuously devoid of large baths with adjoining *palaestrae* such as those found in Asia Minor (1995, 43, 135).

Yet it can be argued that Greek baths with *palaestrae*, so common in Asia Minor, are present in the capital of Crete. The two *thermae* identified at Gortyna are both large establishments associated with adjoining *palaestrae* and are highly significant to the overall distribution. The complexes at Gortyna are elaborate and, while both include *palaestrae* in their precincts, that of the Praetorium Baths also boasts a *basilica thermarum*. Both baths share common features with particularly elaborate complexes outside Crete. The overall appearance of the apsed pool of *caldarium* 13 in the Praetorium Baths, with large south-facing windows opening in the upper section of the apsidal wall, is reminiscent of the apsed *caldarium* of the Thermal Baths of Constantine in Arles dating to the end of the 3rd century AD (Livadiotti 2000, 804-5, figs 5-6). *Caldarium* 13 in the Praetorium Baths complies with the Vitruvian arrangement whereby the *caldaria* and *tepidaria* face either west or south to avail of the heat of the sun and to provide shelter from the northern winds (*de*

Architectura V x 1). The layout of the Megali Porta also adheres to this orientation with a series of areas offset towards the northwest in such a way as to benefit from the heat of the afternoon sun (Masturzo & Tarditi 1994-5, 240).

In fact, the plan of the Praetorium Baths is reminiscent of the Forum Baths at Herculaneum and the Forum Baths at Pompeii and is clearly a derivative of the Pompeiian type (compare **figs 66** and **67** with Yegül 1992, 65, figs 65-66). Moreover, the cruciform *frigidarium* in the Megali Porta Baths is a common feature in Imperial *thermae*. The Megali Porta Baths were built on virgin soil in the Hadrianic period as part of a monumental programme extending over the plain to the south of the city.

Di Vita maintains that the fact that these large baths were constructed demonstrates that the provincial capital looked to the fashions of the capital of the Empire (2000b, xlii). Indeed, there must be some significance to the fact that the only secure candidates for monumental baths on the island are located in the capital of the joint province of Crete and Cyrenaica. Gortyna is unique on Crete also in that it is the only city supplied by more than one aqueduct. Gortyna's dominant position on the island is reflected in the Peutinger Table. 66 The map presents a schematic and slightly distorted representation of the island and its road systems and includes most of the main cities which were equipped with both bathhouses and aqueducts (fig. 17). Gortyna, with its sketched cartoon towers, has been located centrally to lend spatial prominence to her political position. La Torre suggests that this centrality reflects Gortyna's importance in the Imperial epoch, eclipsing that of Knossos, then rather impoverished after losing the central role it had previously maintained (1988-9, 280-1, fig. 2). Knossos is located not to the north of Gortyna, but to the east, along the northern coastal road. A cartographic description, the Codex Vindobonensis 324, also seems to reflect this balance, presenting Gortyna as the leading city.

One slightly problematic issue relating to monumental baths on Crete remains to be discussed. Belli's plan of the temple at Lappa has been rather uncritically embraced by Nielsen, who regards the plan as evidence for the existence of an Imperial bath on Crete. Nielsen creates an unusual classification of *thermae*, albeit unhelpfully entitled 'other *thermae*', under which she includes a sub-group

⁶⁶ The Peutinger Table is a medieval map that essentially reflects the Imperial posts of the 3rd and 4th centuries AD.

which she refers to as 'a special kind of thermae'. This sub-category comprises Belli's plan of a structure at Lappa, four baths in Achaea and a badly-damaged example in Sparta (1990, 112). The baths in Achaea belonging to this group include the Large Baths in Corinth, Bath C in Athens and baths at Nikopolis and Marathon (Nielsen 1990, nos. 261*, 256, 270 and 269*). The inclusion of the Cretan example is based on the premise that Belli's plan is representative of corresponding architectural evidence in the field. Nielsen identifies the main characteristics of this sub-group as a variety of room shapes (round, curved, polygonal, etc.), complexity of both plan and construction, and most significantly, the absence of palaestrae in all the baths with the exception of the Corinthian example (1990, 112). The baths are relatively large and monumental, the average measuring 1,400m², including the enigmatic structure at Lappa, but excluding the large baths at Sparta (Nielsen 1990, 112). Belli's plan of the structure at Lappa presents a building with an area of 2,952m² (82m x 36m) (fig. 76). It represents the only example of a Cretan bathhouse in Nielsen's entire study, yet the fact that the bath is represented by only a floating ground-plan is not addressed in the text (1990, 112). It is somewhat ironic that Nielsen makes no reference to the monumental baths at Gortvna.

Moreover, Sanders has intimated that some of the bathhouses of Crete are comparable to the sumptuous Imperial bathhouses of Rome on the basis of the plans executed by Belli in the 16th century. The fact that the gilded bronze ceiling of the *caldarium* of the Baths of Caracalla was considered one of the wonders of Late Imperial Rome makes any such comparisons with Crete inappropriate, even from the most optimistic vantage-point.

A detailed study of Belli's plans would perhaps lend more to our knowledge of 16th-century architectural schools of Venice and Belli's familiarity with the Imperial monuments of Rome, than reflect the actual ancient architectural structures of Crete. During the 16th century little was known about Greek antiquities and it was not until after the brilliant expedition of Morosini in 1685 that any effort was made to publish illustrative work concerning the monuments of ancient Greece, such as the folios of Fanelli and Coronelli. Belli and Palladio were both members of the Accademia Olimpica in Venice and there are undeniable similarities between Belli's theatre plans of Crete and the fantastic model of the 'Olympic' theatre built by

Palladio in the closing years of the 16^{th} century (Magagnato 1992, 41, 66). In Belli's plan of the structure at Lebena the corner compartments with four niches are suspiciously similar to the *apodyteria* depicted in the plan of the Baths of Decius executed by Palladio c. 1554 (La Follette 1994, 62, fig. 23).

Despite the capricious nature of much of Belli's work, his illustrations are tantalising while his descriptions of the landscapes and monuments are invaluable studies in themselves. His theatre plans confirm that each drawing represents at least a monument known to exist in the archaeological record and that these plans were based, if only very loosely, on tangible evidence in the field. It is undeniable that the theatre plans are more elaborate than the actual remains and little attempt to present an accurate scale has been applied. Nonetheless, relative scale is discernible through comparing the plan of the theatre of Lyttos (often claimed to be the largest on the island) with the smallest illustrated examples, as represented by the smaller theatres at Hierapytna, Chersonisos and Gortyna. However, this adherence to a relative scale does not presuppose reasonable reliability with regard to other plans such as those at Lappa and Knossos.

CHAPTER TWELVE

MOSAICS IN CRETAN BATHHOUSES

12.1 Introduction

In this chapter the interior décor of the Roman bathhouses on Crete will be addressed with a particular focus on mosaics. Vitruvius includes opulence of décor as one of the three premises under which all architectural works should be judged, the other two being excellence of craftsmanship and quality of design (*de Architectura* II viii 8). Mosaics and marble veneer (covered in chapter 13) are the decorative devices most strongly associated with bath contexts throughout the island.

Roman mosaics are particularly relevant to this study as they are strongly associated with bathhouse contexts in Crete. Their correlation with bathhouse architecture within this period will serve to reinforce the appraisal of this decorative type as an indicator of Roman influence. Their study is undertaken here with a view to unveiling the degree of opulence within this architectural type, in both private and public capacities, and to establish sources of influence on Crete within the broader Roman cultural *milieu*.

12.2 Distributions of Mosaics in Crete

Sweetman's consecutive mosaic distribution maps (1999, maps 2-9) exhibit strong correlations with bathhouse distributions on Crete produced by the present study (**figs 6 and 10**). Sixteen Roman bathhouses on Crete can be associated with mosaic floors. Mosaics were found *in situ* in baths at Makriyalos, Myrtos, Kato Asites, the Praetorium Baths at Gortyna, Sybritos, Vizari, Lappa (B 34), two baths at Khania (B 43 and 44) and both complexes at Knossos.⁶⁷ Evidence for destroyed mosaics was recorded from baths at Kouphonisi, Stavromenos Chamelevri, Khania (B

⁶⁷ Possible bath contexts have also been suggested for the Semi-Circular Mosaic and the Apollinaris Mosaic at Knossos. The mosaics of the *triclinium* at Chersonisos were located in strata overlying a bath with which there was no clear association (B 10).

42), Kastelli Kissamou (B 49) and from a private bath-suite at Eleutherna (B 30).

Sweetman records 30 mosaics in the Knossos Valley, representing the highest concentration of mosaics in Crete (2000, 94). Ramsden observes that the 1st century AD was a period of recovery for Greece and that the mosaics attributed to this period occur in the larger urban centres, the sanctuaries and the colonies (1971, 527). The latter context might explain their popularity at Knossos (*Colonia Iulia Nobilis Cnosos*) where the mosaics date from the 1st until the 4th century AD, although the majority belong to the 2nd century AD. These high concentrations contrast sharply with the low numbers of mosaics from Gortyna (Sanders 1982, 53), although statistics from Gortyna should increase dramatically with the excavation of the Megali Porta.

Sweetman specifies two types of private buildings in Crete which contain mosaics; the *domus* (or town-house) and the private bathhouse (1999, 406). Presumably when Sweetman refers to the *domus* she is referring specifically to domestic areas other than the integrated bath-suite, as although private bath-suites can form a separate module to the house proper, in Crete the private bath-suite constitutes an integral feature within the house.

Sweetman further specifies that only certain rooms within Cretan bathhouses were furnished with mosaics; these she identifies as the *tepidarium*, the 'hypocaustal areas' and the apodyterium (1999, 408). All three areas could relate to the heated sector of the baths, even the apodyterium which, although not necessarily heated, often was. The mosaics in the tepidarium of the bath at Myrtos (B 5) and in the apodyterium of the Praetorium Baths (B 18) accord with these designated contexts. Sweetman claims that mosaics have not, as yet, been identified in the caldaria of Cretan bathhouses (1999, 409). However, the fact that they are found in 'hypocaustal areas' indicates their presence in either caldaria or tepidaria. This association is demonstrated by the discovery of a mosaic fragment supported on a column of pilae at Sybritos (B 24) which could feasibly represent a caldarium context (Kirsten 1951, 149). Moreover, in the private bath-suite at Makriyalos the floor of area O is decorated with a mosaic of intersecting circles, yet in the present study, the area has been identified as a frigidarium. There seems to be no valid reason why its mosaic floor should conflict with this identification.

12.2.1 Destroyed Mosaics in Cretan Baths

Alcock observed that of the few rural villas with preserved Roman mosaics in Greece only four were datable, all being attributable to the 2nd century AD (1989, 21). This low yield, originally proposed by Ramsden in her unpublished thesis (1971, 525), seems pessimistic (although not unduly surprising given the poor condition of preservation of many mosaics) for an assessment of all known Roman mosaics in Greece.

Scattered *tesserae* throughout bathhouse contexts in Crete attest the destruction of many of these fine floors. In the bathhouse at Stavromenos Chamalevri (B 26) *tesserae* found in room 1 represent the destroyed floor of that area. At Kouphonisi the loose black and white *tesserae* collected from area B of the bathhouse (B 3) must have fallen from an upper storey since area B had a paved marble floor (Papadakis 1986, 230). At Khania, *tesserae* found throughout the area of the largest bath in the city (B 42) were also recorded as having fallen from a higher storey. In House 2 at Eleutherna (B 30) an entire mosaic floor collapsed from an upper storey where it had originally adorned a room of a private bath-suite (Themelis 2002, 80). The almost intact mosaic landed in room 23 (**fig. 73**). The presence of a bath-suite on the upper storey of this private house is clearly attested by the existence of a hypocaust (which is in an excellent state of preservation) on the second storey in the southern sector of the house (**plate 68b**, the arrow indicates the drop to the ground floor). ⁶⁸

In one of the baths at Kastelli Kissamou (B 49) the mosaics had been destroyed or removed in antiquity, presumably for reuse, leaving only their matrices visible. At Kato Asites the mosaic recorded in the main room of the bath (B 16) has either been destroyed or covered in recent times, as it is no longer visible (**plates 58a-c**). It was in a relatively good state of preservation in the 1960s when seen by Alexiou (1963, 407), and even more recently in the 1970s when described by Sanders (1982, 70).

Excavations of a bathhouse on the Kastelli in Khania (B 43) revealed a mosaic set at a level 0.93m higher than the floor of an apsed room identified as part of

 $^{^{68}}$ There is an unusual double-storeyed hypocaust in the Barbara Thermae in Trier (Krencker *et al.* 1929, 245, fig. 363).

a bathhouse (Tzedakis 1977a, 326). Only a small mosaic fragment, composed of large white marble *tesserae*, was found but there were indications that the mosaic continued for a considerable distance within the baulk.

12.2.2 Mosaics and Bathhouse Identity

On Crete, evident bathing symbolism can be seen in the bathhouse at Plateia Metropoleos in Khania (B 44) where a mosaic, strategically placed in front of the main entrance, depicts two sandals, the straps of which form the letter AA. They clearly herald an invitation to have a safe bath, Novau 'Arquiag, more commonly seen in Latin as bene lava or salvus laves (Tzedakis 1970, 467, pl. 409a; Sanders 1982, 54, 170; Dunbabin 1989, 18 and 43). Sandal (or soleae) motifs are found exclusively in bathhouse contexts and their iconography is synonymous with bathing institutions to such an extent that Nielsen chose their symbolism, using the example at Thamugadi (Timgad, Algeria), for the cover of her book (1990).

An alternative, or perhaps simultaneous, meaning for sandal images in bathhouses is that of an apotropaic symbol since the beauty of both baths and bathers provoked *phthonos* (Dunbabin 1989, 33 and 43). This particularly vulnerable environment would necessitate the use of images, embodying protective qualities, as a guard against the evil eye. Dunbabin also deduces that the presence of sandals conveys a wish for a safe passage as can be inferred from footprints which appear on thresholds in pairs (1989, 18 and 43)

Often a range of marine or aquatic imagery is encountered in bathhouse mosaics acting as a complement to their functional contexts (as evidenced for example in the *frigidarium* of the bath-suite at Piazza Armerina) (Wilson, R.J.A. 1983, 21). Marine imagery is also considered highly indicative of a bathing function and also features in the bath at Plateia Metropoleos in Khania (B 44) in the form of a Triton blowing a murex-shell conch (Tzedakis 1970, 467, pl. 409 b-c). The combination of such specific mosaic themes set within this substantial architectural complex presents a strong case for its interpretation as a bathhouse.

At Knossos, the Apollinaris Mosaic is also thought to reflect a bathhouse context purely on the basis of its aquatic motif, despite a lack of supplementary architectural evidence (Sweetman *forthcoming*). The association relies entirely on the

aquatic symbolism of the mosaic which depicts Poseidon holding his trident and riding on two reined *hippocampi*, surrounded by outer panels filled with a series of *hippocampi* and dolphins. The outer border is composed of a tendril motif with waterbirds entwined in its foliage. The link here is somewhat tenuous, as although the correlation between aquatic imagery and bathhouses is strong, it is not absolute. Aquatic imagery, although often indicating the presence of water, does not necessarily imply the activity of bathing.

At Chersonisos, a pyramidal fountain covered with mosaic panels inundated with images of fishermen and aquatic creatures provides a good example of this overriding association. The fountain was automatically thought to be associated with a 'balaneion', despite the fact that no supporting architectural justification was presented in print (Xanthoudides 1918, 31). This is not to deny that the fountain would be well placed within a bathhouse but until more conclusive evidence is offered the fountain must remain a rather lonely elaborate feature on the modern waterfront.

Aquatic symbolism can refer to a wider range of watery contexts and be associated with fountains and spring sanctuaries, as opposed to baths *per se*. Aquatic mosaic motifs are also found outside bathing contexts throughout Crete. At Kastelli Kissamou, tritons and sea-griffins are set around the *impluvium* of a private house (Markoulaki 1999, 199, fig. 27) (**plate 77c**). It may be significant that the context is associated with a water feature, although the context is not associated with bathing *per se*. At Khania, a mosaic depicting Poseidon and Amymone came from a house, but not necessarily its bath-suite, on the outskirts of the city (Sanders 1982, 54). At Lebena, the Hellenistic pebble mosaic depicting a *hippocampus* which decorates the treasury floor of the temple of Asclepius is clearly not indicative of bathing in that very room (**plate 27b**); however, the wider sanctuary is strongly associated with hydropathy and bathing has been assigned to other areas of the complex (B 21-23).

Despite the litany of exceptions, the correlation between aquatic and marine mosaic motifs and bathhouse architecture is strongly attested in bathhouses all over the Empire and their presence at least raises the likelihood of a bathing context. Conversely, there are other mosaics, which do not portray such overtly recognisable examples of bathing iconography, yet their content and design have, nonetheless, been

interpreted as indicative of the presence of bathhouses. Hunting scenes, while not the most obvious imagery for a bathhouse, commonly feature in these establishments, notably in the Hunting Baths at Lepcis Magna (Yegül 1992, 185, fig. 198; Di Vita *et al.* 1999, opp. 103). On Crete the Hunting Mosaic from Lappa is also a good example of this association, as although it is of uncertain provenance, being discovered 'somewhere in the town' in 1918, it was reported to be from a major bathhouse (Sanders 1982, 163). Initially, the mosaic was also attributed to a basilica context which was in accordance with its stylistic date (falling somewhere between the 4th and 6th centuries AD). Subsequently, Sanders maintained that the hunting theme actually precluded such a context leading to the mosaic's reassignment to a bathhouse context (1982, 54, n. 48 and 163). This deduction was based on a general recognition of the partnership between hunting scene motifs and bathing contexts elsewhere.

Sweetman attributes hunting motifs to bath buildings on the basis of their athletic connotations (pers. comm. 2000). She interprets the agonistic motif from the private bath-suite at Knossos as a *gymnasium* scene which would be appropriate for its architectural setting (Sweetman 2001, 250). Likewise, the athletes in the Porta Marina Baths in Ostia clearly portray the activities of this area while the Athlete Mosaic in the Baths of Caracalla contains numerous panels depicting athletes, their trainers and various objects directly relating to athletic contests (DeLaine 1997, 28-32, 238-9, fig. 17). Agonistic statuary has even contributed to the identification of a bathhouse at Oenoanda in Lycia (Farrington 1995, 135).

It could be counter-argued that the presence of hunting scene mosaics in bathhouses acts more as a reflection on the people who used, or indeed funded, these installations rather than any activity conducted within them. Hunting scenes are not exclusive to bath contexts and are a favoured motif for the dining rooms of private villas, as encountered in the *triclinium* of the Piazza Armerina villa (Carandini *et al.* 1982, 175-187). Maguire interprets the scenes of hunting dogs and falcons in the *triclinium* of the Villa of the Falconer at Argos as representative of activities which provided food for the table (2001, 239). Consequently, the hunting mosaics located in the *triclinium* of a private house in Kastelli Kissamou (bordering the Four Seasons Mosaic) and the Villa Dionysus at Knossos (Kondoleon 1995, 329-330, n. 78-9) could as easily be associated with platters of game as any athletic association with their

architectural context.

Other mosaics of seemingly random, obscure and fragmentary nature have also been considered sufficient grounds for bathhouse identifications. As previously mentioned (under 11.2), a fragment of mosaic preserved at the base of a substantial wall in the centre of Roman Knossos prompted the idea that the area represented a public bathhouse (AR 1995-6, 42). The dimensions of the wave crest border motif imply that it framed an expansive room, perhaps indicating a public context (Sweetman 1999, 84, pl. 62). Wardle also suggests that another mosaic is related to the complex (AR 1993-4, 75). The mosaic in question was discovered by Halbherr in 1883. It was composed of a central roundel with four ornamental figures in the corners which were identified as the Four Seasons (1893, 111). Its association with the public bathhouse (referred to above) is perhaps stretching the evidence, especially as it is located in an area close to the Villa Dionysus which provides a domestic architectural context for another Four Seasons mosaic motif (Hood & Smyth 1981, 42, no. 112 and 43, no. 115). Such a context for an identical motif serves to undermine an exclusive correlation between this thematic representation and bathhouse architecture.

The reliability of mosaic evidence as indicative of bathhouse contexts depends on their tangible or representative association with bathing contexts. The ladder of inference moves from mosaics portraying aquatic imagery set directly within obvious bathhouse architectural contexts to perceived bathhouse contexts created by detached mosaics which exhibit either aquatic or marine imagery. The loosest inference consists of less obvious imagery which promotes a bathing context, when no supporting architectural evidence exists, on the basis of their motif being common to bath contexts elsewhere.

Even the loosest inference is noteworthy, as although the correlation is by no means absolute, it is still strong. The inference is undermined by assumptions of bath contexts based on random mosaic evidence which does not follow any of the criteria to support the correlation. Such claims are surprisingly popular within the published record. Their widespread presence within bath contexts has resulted in their recognition as indicators of bathhouses, often being assigned significance beyond their design.

12.2.3 Mosaics: the only recorded remains of destroyed Cretan bathhouses

It is not uncommon for publications to focus on mosaic floors at the expense of associated architecture. This bias is attributable to the aesthetically appealing qualities of mosaics and their seemingly more readily-datable attributes. Consequently, the published record creates a false impression of floating mosaics detached from their architectural foundations.

In Crete, architectural frameworks must have been perceptible to some degree around the Apollinaris Mosaic at Knossos and the Hunting Mosaic from Lappa but were not recorded. Similarly, at Vizari a substantial bathhouse was cited (B 25) but little information regarding the architecture framework was presented. It seems that the architectural framework was eclipsed by the notable character of the associated mosaics. The mosaics include a triumphal scene constituting a unique theme in the Cretan repertoire (plate 65b). Kalokiri assigns the mosaic to the last half of the 3rd century AD and confers this date on the bath building itself (1959, 34, pl. $I\Gamma$ 2).⁶⁹ The triumphal scene survives in the southeast corner of the main frame (**plate** 65b). It consists of a representation of a helmet, with plume and cheek-pieces, between two greaves while the overall motif is defined by a minimalistic shield completing the ensemble (Platon 1958, 471; Kalokiri 1959, 33-34, pls IΓ' 1 and 2, $I\Delta$). The shield motif was repeated in the other three corners, as indicated by identical fragments located there. Sanders compares the black-and-white 'shield design' to similar motifs in the mosaics at Kastelli Kissamou which have also been dated to the 3rd century AD (1982, 54).

The bathhouse in the village at Lappa (B 34) incorporates a series of three mosaic panels occupying two rooms (**plate 70a**). The mosaics have apparently been dated to the 3rd century AD and located within a bathhouse, according to the modern

⁶⁹ Sanders compared the tendril motif located in the architectural niche off the main mosaic floor to those of Nea Paphos in Cyprus which have been dated to the 3rd century AD (1982, 54). The tendril motif is also almost identical to that of the bathhouse in the Plateia Metropoleos in Khania (B 44), dated to the first half of the 2nd century AD (Tzedakis 1970, 468).

⁷⁰ Sweetman located the mosaic in the basilica itself and interpreted the design as 'two large-billed birds, one either side of a coiled snake' (1999, 107-8). Both observations are incorrect.

⁷¹ The mosaics were reported as executed in pebbles (*AR* 1983-4, 67). This is certainly not the case and it is clear that the mosaics are executed with finely-cut *tesserae*.

sign at the site, although there is no published discussion of the site's chronology.⁷² The fact that the vault layout of the central mosaic is identical to that of the Four Seasons Mosaic in the Villa Dionysus would support a 2nd-century AD date (Rebecca Sweetman, pers. comm. 2000).

12.2.4 Dates based on Mosaic Style

The best-stratified floors on Crete are those of the Praetorium Complex at Gortyna where two mosaics were discovered. Mosaic floor 254 was located in the *apodyterium*, area 45, and was attributed to the initial Trajanic phase of the baths (**plate 59c**) while mosaic floor 64c was dated to the Hadrianic period (**plate 59b**). The stratification relating to the latter is clear as the mosaic overlies that of a pebble floor of Trajanic date while the mosaic itself is covered by the paved floor-slabs of the late 4th and 5th centuries AD. All the phases are intersected by a *dolio* of the 8th century AD.⁷³

It is not uncommon for excavated bathhouses to be dated in terms of mosaic style rather than on the basis of stratigraphic evidence. The fact that many bathhouses are still dated in terms of mosaic style is a sad reflection on both the lack of an established Roman ceramic chronology across the island and the relative lack of stratigraphic excavations.

Even in cases where a careful stratigraphic record has been established, dates may still depend on stylistic evidence. Despite the recent careful excavations at Knossos, which revealed a private bathhouse (B 14), the dating of the bath-suite was reliant on its mosaic style, rather than stratified contexts which were not cited in affirmation of the chronology (Wardle *unpublished manuscript*). Hence, even when stratigraphy is carefully recorded, as is certain at Knossos, the tradition of dating through decorative floor styles is still considered a more persuasive chronological determinant.

The private bath-suite excavated by Wardle yielded two mosaics (B 14). A

⁷² The main mosaic panel has been published in the tourist guidebook for the site (Petrakis 1997, 87). Moreover, a motor-biking guide to Crete refers to the mosaic, supplying a photograph of the wave crest border of the checkered panel while lamenting the lack of information on the site and strongly advising visitors to complain about this at the local cultural centre (Psimenos 1996, 247).

⁷³ Sweetman maintains that the mosaic is set in the *apodyterium* although she also observes on the same page that it is located just outside the baths (1999, 100-101, no. 37 *praetorium* mosaic C).

large net pattern mosaic rendered with blue *tesserae* set in a white background furnished one of the largest rooms in the complex (**fig. 63 and plate 56a**). Sweetman refutes Wardle's originally late 3rd or early 4th-century AD date for the bath claiming that it is attributed on unclear grounds and argues that the net pattern mosaic is similar to the mosaics found in the Praetorium Complex at Gortyna referred to above (1999, 83). Such a comparison between private and public spheres would contradict Sweetman's claim that the fact that the mosaics of the Praetorium Baths are simple and plain is indicative of their public context (1999, no. 37, 101). However, there seems to be little similarity between the net pattern mosaic of the private bathhouse at Knossos and the mosaics of the Praetorium Baths (B 18). The net pattern is a commonly found motif in the broader Roman world and can be paralleled in two private houses in Antioch: The House of the Boats of Psyches (Kondoleon 2001, 72, fig. 5, room 3) and in the *triclinium* of the House of Narcissus (Clarke 1979, fig. 1).

The second mosaic in the private bathhouse at Knossos (B 14), known as the Athlete Mosaic, adorns the room north of the plunge-bath (**fig. 63**) The mosaic depicts two figures possibly involved in a boxing match (**plate 57a**). The names of the figures are inscribed over their heads ... ΚΛΟΣ ΣΑΤΟΡΝΙΛΟΣ (*AR* 1995-6, 41, fig. 25). Wardle reveals that the records of Olympic victors for the year AD 209 include the name Satorninos (an alternative spelling) with the epithet *Cres Gortynios*, a Cretan from Gortyna (*unpublished manuscript*). Consequently, he suggests that the complex (constituting a town-house with its own private bath-suite) belonged to a patron of the Olympic competitor, if not the athlete, and applies a date for the construction and destruction of the house between AD 190 and AD 220 (*unpublished manuscript*).

In the private bathhouse at Myrtos a geometric mosaic was discovered in an expansive *tepidarium* (measuring 5m x 22m) which occupies the western section of the villa (*AR* 1973-4, 39). Sweetman dates the mosaic to the late 1st or early 2nd century AD (1999, 64, 116, pls 88-92), which would agree with the brick sequence (see 14.4). Consequently, the context represents one of the earliest Roman mosaics, Roman bath-suites and Roman villas on the island. The villa at Makriyalos also has several mosaics which contribute to its date and hence the date of its bath-suite (B 1). Sweetman's early date for the villa is based on the presence of black-and-white '*pebble*' mosaics (1999, 112); however, on visiting the site it is clear that all the

mosaics are executed with finely-cut *tesserae* (**plate 47c**). It could be posited that the mosaics and, indeed the bath-suite itself, could represent secondary additions. Sequential stages can be detectable in the variety of mosaics used in the villa at Makriyalos. Some of the mosaics could date to the foundation of the villa based on the fact that the rooms in which they are located were subsequently remodelled. The mosaic floors in areas $\Phi 3$ and $\Phi 4$ (composed of a black-and-white tesselated mosaic with a geometric design bordered by ivy leaves) could potentially be early in the sequence since they originally constituted the floor of one room. This room was subsequently divided by a partition wall which was constructed through the mosaic floor (Papadakis 1979, 407; 1983b, 59). Conversely, the floor of area O within the private bath-suite is decorated with a mosaic, depicting intersecting circles, which is composed of notably larger *tesserae* than the mosaics of the rest of the villa, such as those in areas Ξ and Φ , and this characteristic might represent a chronological distinction (**plate 47c**).

12.2.5 Bathhouse Mosaics and their Impact on Freedom of Movement

In addition to identifying the functions of individual rooms, and indeed buildings, mosaics can also intimate circulation patterns. Mosaics, as ubiquitous and identifiable features within bathing complexes, can be instrumental in establishing circulatory patterns, regulating the flows of interaction by signalling space status (Wallace-Hadrill 1988). This can be demonstrated by the tendril motif in the bathhouse of Plateia Metropoleos in Khania (B 44), composed of a long foliated scroll panel located lengthways in the doorway, which acted as a cue for unrestricted movement between these rooms through its design and position (Tzedakis 1970, 467, pl. 409c).

Mosaics can also serve to arrest and restrict movement, either boldly announcing or subtly intimating to unsuspecting guests where exactly they could wander. Vitruvius informs us that *cubicula*, *triclinia* and the baths constituted the only areas of the house where visitors were forbidden without specific invitation (*de Architectura* VI v 1). Such selectivity is possibly achieved by a mosaic doormat panel in the Three Part Mosaic in the Villa Dionysus which could have acted as a punctuation before entering the *cubiculum*. The entrance to the private bath-suite at

Knossos could be demarcated by the Athlete Mosaic to the same effect (B 14, area 10).

Similar punctuation is achieved by the sandal mosaic in the entranceway of the public baths in Plateia Metropoleos in Khania (B 44), as sandal imagery located at entrances to heated rooms could act, amongst other things, as a reminder to wear such apparel. The visitor would have to pause either to don sandals or to acknowledge the warning. Alternatively, the placement of such signs may indicate directional flows, especially when two pairs of footprints are placed on thresholds simultaneously pointing in and out, as at Thamugadi (Timgad, Algeria) or El Hinojal near Merida (Spain) (1989, 18 and 43).

More subtle divisions of functional space are presented by the mosaics of the bathhouse in the centre of the village at Lappa which incorporates at least three distinctive mosaic designs (B 34). The main room (measuring 8.05m x 4.50m) contains two mosaic compositions which are not divided by a tangible architectural barricade. Separation is achieved through their substantial confining border designs which lock movement and activity within two distinctive areas.

The main mosaic panel is composed of a vault pattern motif effectively contained within a triple border (plates 70a-c). The inner border is composed of a guilloche which is further bordered by a band of ogives while the outer boundary consists of a broad straight-tongued outlined double guilloche (Balmelle et al. 1985, 124). The effect of such a triple border serves to accentuate the division of the main mosaic panel from the second panel within the same room. The composition of the second mosaic design in the main room is starkly different, consisting of a checkered design bordered by a wave crest motif (plate 70a). The central motif represents a three-petalled flower or whirligig set in a square defined by a simple black band and an outer band of simple guilloche.

There is some slight architectural distinction between the mosaic compositions of the main room in the form of a minor encroachment in the walls surrounding the checkered mosaic. This creates a marginally smaller internal area, although still constitutes the same room as the main mosaic panel. The dimensional distinction between the two mosaic representations is faint and their demarcation is primarily achieved through their different style and content. Their emphatic borders

serve to claim their distinctive territory. The fact that the two mosaic panels are set within the same room demonstrates clearly that mosaics can function as more than decorative features by complementing and reinforcing architectural layouts and sometimes adopting three-dimensional characteristics forming illusory directional flows and areas of perceived containment. In contrast, a thick wall, pierced by two wide doorways, separates a third mosaic whereby the division of space and function is achieved through a physical architectural imposition rather than a perceptual subtlety (plate 70a).

12.3 Conclusion

Mosaics on Crete are almost exclusively Roman in date with only one definitely Hellenistic example represented by the pebble mosaic adorning the floor of the temple treasury at Lebena (Sweetman 1999, 104) (**plate 27b**). Their somewhat sudden appearance in Crete in the late 1st century AD excludes progression from pre-Roman development and marks them as distinctive Roman features. The appropriation of this decorative device heralds a radical alteration in architectural display on Crete.

Their dissemination through Crete seems harnessed to the spread of their most common architectural context: the bathhouse, which provides a contextual vehicle for their diffusion. The distribution maps of bathhouses and mosaics on Crete overlap to such an extent that any attempt to assess their areas of influence must reflect dynamics pertaining to the bathing institution on Crete.

Sweetman asserts that within the mosaic record of Crete only limited influence from Italy is evident and that this is confined to mosaics dating before the mid-2nd century AD (1999, 435, 448). This early influence reflects the active role taken in establishing the province. It is significant that the earliest mosaics in Crete (outside Knossos) are located in the earliest bathhouses on Crete, represented by the Praetorium Baths at Gortyna (B 18), the large public bathhouse at Khania (B 42), the bath at Kouphonisi (B 3) and the private baths at Makriyalos (B 1) and Myrtos (B 5).

In accordance with this primary Italianate influence evident in Cretan mosaics, Sweetman suggests that the Apollinaris Mosaic at Knossos, significantly thought to be located in a bathhouse, demonstrates early Western, if not Campanian,

influence (1999, 375). The mosaic bears an inscription attributing its execution to Apollinaris, thought to represent an Italian immigrant due to the frequency of the onomasticon in Campanian inscriptions. Its popularity in Campania led Donderer to suggest that the appellation was originally Latin and only subsequently Hellenised (1989, 55). This can be contrasted with the early 3^{rd} -century AD mosaic in the private bath on the site which bears a Greek name: KAOS SATOPNIAOS (plate 57a).

The only other mosaic on Crete thought to demonstrate a Western style is that of the bath in the village of Lappa described above (B 34), although its Western style is the subject of some debate. In support of a Western influence, Waywell claims that the vault pattern (a feature of this mosaic) is among the earliest to develop as an alternative to the single pattern and is commonly associated with the West (1979, 305, pl. 49, fig. 27). Alternatively, Sweetman offers more insular parallels observing that the vault pattern is a feature of the Seasons Mosaic in the Villa Dionysus at Knossos where it is also composed with a two-strand guilloche (pers. comm. 2000). There is another 2nd-century AD example of vault pattern at Korone which depicts a Dionysiac scene (Waywell 1979, 299) while vault pattern is commonly associated with figural themes at Thysdrus (El Djem) where it is used to frame the Four Seasons and Dionysus (Sweetman 1999, 467). These examples establish that the most distinguishable feature of the mosaic at Lappa (B 34), i.e. its vault pattern, can be paralleled both within Crete and Greece and in other Eastern contexts. Admittedly, the combination of the vault pattern with geometric, rather than figurative, design is unusual. Nonetheless, its seems that overall the use of the vault pattern in itself is a weak corollary for evidence of Western influence. It can be observed on Crete that as the province stabilised, and more laissez faire principles were adopted, stronger Eastern links developed. Once the province was established, evidence for Cretan art and architecture becomes more suggestive of stronger trade links with Achaea, North Africa and Asia Minor rather than with the West.⁷⁴

The presence of foreign workmen from Eastern schools has also been suggested for Cretan mosaic styles and Sanders argues that it was possible that foreign craftsmen laid some of the finest mosaics (1982, 56). Significant evidence for

⁷⁴ If the vault pattern of the 3rd-century AD mosaic in Lappa were the result of a Western influence then it would constitute a highly irregular dynamic at such a late stage in the life of the province.

the mobility of mosaic craftsmen comes from a 3rd-century AD mosaic found in the *triclinium* of a private house in Khania, where a partially-preserved inscription has been reconstructed to read ... '[the Antiochene] from Daphne made it' (Kondoleon 1995, 28, n. 9). The inscription appears above a mosaic of Dionysus on a panther and Kondoleon suggests that there are some correspondences with the mosaics of Antioch in terms of the subjects selected and the manner of their presentation (1995, 28, n. 9).

Sweetman contends that groups of workmen from Achaea dominated the Knossos-Herakleion-Gortyna region due to close parallels in the geometric decoration, highlighting several common themes and treatments between the mosaics of Crete, Greece and the East indicating a communication route through Greece (1999, 348 and 435). She observes that the mosaic inscriptions in Crete, while few, are all in Greek, indicating that the artisans were all Greek-speakers, while the singularity of the onomasticon makes is unlikely that they were of high class (Sweetman 1999, 374). Sweetman asserts that the Eastern style was probably diluted along its passage through mainland Greece from where she proposes it entered Crete (1999, 348 and 435).

Alternatively, Michaelides proposes a direct link between Berenice and Crete on the basis of their comparable mosaics (1998, 137). He highlights the similarities between the mosaics of the Villa Dionysus and the Berenice repertoire. On Crete many of the 2nd and 3rd-century AD mosaics are black-and-white geometric or black-and-white with a central polychrome panel; in other words exhibiting characteristics common to the mosaics of Cyrenaica.

Kondoleon sees the mosaics of the Villa Dionysus at Knossos, while comparable to Dionysiac scenes from North Africa, as an early expression of a general elitism which she deems 'unfettered by regional boundaries or traditions' (1995, 329-330). However, this portrayal of an unrestricted trend of elite domestic tastes spanning the Empire does not sit comfortably with comparisons of Crete and North Africa by the same author, as this comparison would suggest correctly that while lavish decoration did occur throughout the Empire it was diffracted into regionally-defined variants. Regional styles are detectable in mosaics from private contexts in western Crete where an active local workshop has been identified, catering for a rise in wealthy clients interested in expansive domestic decoration (Kondoleon

1995, 330).

In conclusion, it seems that the decorative material found within some early baths on Crete demonstrates an Italianate style which corresponds with the predominant influence on Crete at this stage. Subsequently, narrow channels of influence can be traced to North Africa and the East. The overall result was one in which Crete developed its own unique local styles which merged local trends with foreign influences, a blend which although demonstrating Eastern influence, renders the Cretan style difficult to assign within the traditional Eastern schools. The fact that mosaics can be strongly correlated with bathing contexts establishes the bathhouse as instrumental in the dissemination of mosaics throughout Crete. Consequently, any attempts to assess the development or spread of these styles on Crete illuminates that of their architectural context.

CHAPTER THIRTEEN

MARBLE VENEER AND SCULPTURE IN CRETAN BATHHOUSES

13.1 Introduction

Marble veneer is particularly relevant to the study of Roman baths on Crete, as it was strongly favoured for bath installation interiors (Lucian *Hippias* 5-6). Marble veneer, like mosaics, appears suddenly on Crete and clearly constitutes a Roman introduction. Like mosaics, its introduction can be associated with that of the baths which again reinforces the appraisal of this decorative type as an indicator of Roman influence. Alternatively, marble sculpture had a rich history in Hellenistic Crete and its proliferation in bathhouse contexts in the Roman period demonstrates its wholesale adoption by this new architectural context.

13.2 Marble on Crete

The presence of marble decoration throughout Crete is reflected in the modern Greek toponymic record associated with Roman sites. The toponyms incorporating 'marmara' are naturally indicative of the abundance of marble in the field. The locale in the Malia area yielding Roman remains is known locally as Marmara (A 6) as is the area in which a mosaic was found at Sybritos (B 24). A northern cape on the island of Dia is known as Akrotiri Marmara. The islet north of Kouphonisi is also called Marmara where the appellation is derived from the islet's associations with the Roman site on the main island of Kouphonisi to which the islet was probably joined in the Roman period. Fragments of mosaics, similar to those from the bathhouse and town-houses on the main site, were identified on the islet (Leonard 1972, 355).

Despite the widespread nature of marble distributions on Crete, the island has not featured widely in international marble discourse. The situation is improving thanks to recent work, notably by Paton who has recorded fragments of decorative marble on almost every Roman site on Crete, even those of moderate pretensions (Paton & Schneider 1999). The profusion of marble on the island, as established by Paton's work, is not surprising in the light of Crete's location along the sea-route shipping a variety of coloured marble to Rome (for maps of shipping routes see Maischberger 1997, 27, map no. 1 of Roman shipwrecks with marble cargoes).

Crete was itself a producer of marble.⁷⁵ The evidence at the Cretan marble quarries mainly points to column manufacture where the presence of unfinished columns indicates that secondary work, such as shaping a rough-out, took place before transportation. Paton toys with the possibility that Cretan marble could have been exported, albeit on a modest scale (Paton & Schneider 1999, 297); however, this raises the question as to why there would be a demand for such relatively low-grade marble outside Crete. It seems more likely that it was intended for use within the island.

A marble quarry, known locally as the Rods of Digenis, was located just west of Sitia (Durken & Lister 1983, 69). The quarry produced red and white variegated marble and four unfluted marble columns, ranging from white unbrecciated to a rose-veined marble, were found in the vicinity of the quarry. It was tentatively suggested that the marble columns recorded at Hierapytna and Kouphonisi came from this quarry but, as yet, the marble of these sites has not been scientifically analysed (Durken & Lister 1983, 84). In his architectural study of the theatre at Kouphonisi, Papadakis records a marble Ionic capital and base, two fragments of engaged columns and three pieces of a red-and-white marble column which joined to give a height of 3.46m (plate 1a) (1976b, 383). Leonard also comments on the presence of 'beautiful maroon' marble and a red-and-white marble column detected in the vicinity (1972, 359). Other decorative marble elements associated with the theatre at Kouphonisi include marble statuary fragments, marble architectural elements (such as the columns mentioned above), and marble veneer for lining the scenae in association with fragments of painted stucco (AR 1978-9, 40). The abundance of marble points to a building of some elegance (plate 1a).

⁷⁵ In the ancient Greek world the first marble workers were traditionally believed to be Cretan (Pliny *NH* XXXVI iv 9). The mythical figure Daedalus establishes a link between Crete and stonework surviving in the modern Greek meaning of the word relating to labyrinth or maze (Morris 1992, 13). Daedalus has been described as a sculptor by early Classical authors (Morris 1992, 219-237). By Roman times Daedalus' role as a sculptor was secure and Pausanias accepted a marble relief shown to him at Knossos as the work of Daedalus (IX xl iii).

Durken and Lister's proposal that activity at the quarry of the Rods of Digenis was Greek in date and not Roman, negates their earlier suggestion that the marble columns from the theatre at Kouphonisi originated here (1983, 84 and 96). The theatre is Roman and the overall site is predominantly Roman in date. Moreover, a Greek date for the quarry is unconvincing as the larger of the column fragments at the quarry incorporates a terminal flange or protective collar, a feature recognised at other Roman quarries, notably Karystos (Durken & Lister 1983, 83; Dodge 1991, 37).

Other more secure examples of Cretan marble quarries of Roman date have been recorded south of Vai where five quarries of pink marble were located on the side of a coastal cliff (*AR* 1995-6, 46). It has also been suggested that these quarries produced the marble associated with the Roman theatre at Kouphonisi (Papageorgaki *et al.* 1994, 152). It is also possible that a column of white veined marble and other unspecified marble pieces in Basilica A at Itanos originally came from these quarries (Kalpaxis *et al.* 1995, 727 and 736). The presence of this marble in the basilica at Itanos does not necessarily indicate that production at the quarry continued into late antiquity, as they may merely represent reused elements from earlier structures on the site itself, as is also intimated by the two granite columns re-employed in the basilica.

Marble veneer may also have been produced on the island and a dark red veneer used at Knossos is thought to have been quarried from the foothills of Mount Dikte (Sackett *et al.* 1992, 37-47). Paton also argues that a grey-and-white veneer found at Knossos and Lebena may be of local provenance (Paton & Schneider 1999, 285). Such emulation of Roman trends indicates the degree to which these fashions infiltrated the fabric of Cretan society while the use of regional stone would have afforded a specifically Cretan character to the interior décor.

13.3 Marble Veneer on Crete

Marble veneer is strongly favoured for the interiors of bath installations on Crete, although it is by no means exclusively associated with bath contexts. At Knossos, Paton records 212 pieces of marble veneer from the site of the Unexplored

Mansion (Paton & Schneider 1999, 286).⁷⁶ The veneers were found in contexts pertaining to Roman houses, dating to the 2nd and early 3rd centuries AD. According to Paton, of these 212 pieces, nearly 100 fragments of imported marble were identified: 62 from Proconnesus, 12 from Mount Penteli, 10 from Numidia, 7 from Thessaly, 5 from Phygria and 2 from Skyros (Paton & Schneider 1999, 286). Throughout the city of Knossos unstratified fragments, representative of all the marble groups above, were found along with marbles from Karystos, Teos and Verzirken in Bithynia (Paton 1991, 310; Paton & Schneider 1999, 289).

A wide variety of marble veneers were available to those who could afford it and may have been simply imitated by those who could not. The latter may be represented by the painted plaster décor of the House of the Diamond Frescoes at Knossos which imitated marble from Thessaly and Numidia (Sackett *et al.* 1992, 37-47). Both types are represented in the marble record from the Roman levels of the Unexplored Mansion and they must have represented familiar luxury commodities on the Roman market (Sackett & Jones 1979, 24). However, the presence of painted plaster imitating a local grey-and-white marble and the dark red stone from Dikte in the same house (Sackett *et al.* 1992, 37-47) suggests that this was a popular decorative fashion in its own right, regardless of the cost of the actual marbles it represents.

The walls of a bathhouse at Kastelli Kissamou (B 48) were lavishly decorated with both marble veneer and vibrantly-painted plaster, perhaps in imitation of marble veneer, as attested in the House of the Diamond Frescoes. Some marble veneer survives *in situ* (Tzedakis 1967, 498) while peg-holes within the brick-faced mortared rubble indicate its original abundance. The presence of both forms of wall decoration suggests that expense was not a factor contributing to the composite decorative style. The blend could reflect a fashion rather than a practicality although the plastered elevations would have provided relief from the marble glare of the walls, floor, statuary and monolithic veined columns (**plates 77a-b**)(Tzedakis 1970, 471; Sanders 1982, 173).

Marble was used for ostentatious display at the wealthiest sites on the island in the Roman period. The variety of coloured marble at the most important cities

⁷⁶ Numerical values applied to marble fragments do not realistically reflect the representative quantity of marble veneer and weight constitutes the most accurate means of assessing scatters of veneer (Dodge, pers. comm. 2000).

demonstrates that coloured marble display was regarded as a status indicator by the Cretan population in the Roman period. As might be expected, marble veneer is recorded in abundance at Knossos, the heart of the Roman colony, and at Gortyna where it adorns the baths of the Roman capital (Di Vita 1986-7b, 509, n. 35; Livadiotti 2000, 801). Its abundance at Kastelli Kissamou and Eleutherna serves as testimony to the high status of these cities. At Kouphonisi, pool Δ of the public bath is veneered with irregular marble slabs of various provenance, colour and thickness while marble plaques survive *in situ* in area B of the same bath (Papadakis 1986, 230) (**plate 49c**). The abundance and diversity of marble in this small city indicates its importance and wealth. Inferentially, the wealth of marble in private residences is resounding in terms of ostentatious display.

The richest sanctuary on the island in the Roman period, that of Lebena, was adorned with marble veneer. The brick-faced mortared rubble of the temple *cella* was faced with marble veneer from Skyros and a low-grade grey-and-white marble. Paton's suggestion that the latter was of local provenance slightly undermines images of grand display décor for this site (Paton & Schneider 1999, 285). Nonetheless, the considerable height of the marble columns in the temple, the impression of marble paving in the floor bedding and the sheer number of smaller marble columns associated with the auxiliary buildings on the site combine to promote the sanctuary as undoubtedly the richest on the island (plate 27a).

Marble veneer, although in itself emblematic of affluence, exhibits a certain degree of scale within the type. Paton believes that the marble from Skyros developed 'haute couture' status at Knossos where it was highly fashionable, being attested at the Villa Dionysus, the Unexplored Mansion and both the private and the public bathhouses excavated by Wardle (Paton 1991, 310). Alternatively, the fact that marble from Skyros is among the cheapest in Diocletian's edict (Paton & Schneider 1999, 294) might indicate a certain element of *bon marché* rather than *bon ton*. Marbles from Proconnesus and Skyros are certainly the most commonly cited on the island and feature at the lower end of the price scale at 40 *denarii* each (Paton & Schneider 1999, 294). At the other end of the scale porphyry from Mons Porphyrites in Egypt

⁷⁷ Of course, low or high prices might not be indicative of anything to do with how it was valued aesthetically. Marble from Scyros was relatively easily transported and, consequently, it generated relatively few overheads.

and Krokeae in the Peloponnese represent the most expensive marbles, costing 250 *denarii* each, and these are only found at Gortyna (Paton & Schneider 1991, 294).⁷⁸ Unfortunately, much of the veneer associated within the baths on Crete has not been provenanced and a detailed assessment of their relative associated prestige cannot as yet be completed.

From the surviving body of evidence it can be observed that beyond the main centres the trend for multi-coloured marble veneer display diminishes and that white marble, perhaps of local provenance, becomes the predominant type. ⁷⁹ A dramatic centrifugal fall-off in coloured marble veneers is not surprising as the larger cities would have been more susceptible (having the resources to gain greater access) to the fashions of the greater Roman Empire representing an interface which afforded the opportunity for interaction with that world (Pumain 1997, 99).

13.3.1 Marble Veneer in Cretan Bathhouses

Marble wall veneer is found in eleven bathhouses on Crete while marble floor paving is located in a further five (**fig. 9**). Marble veneer is associated with the baths of the most prominent Roman centres on the island with a notable preponderance at Gortyna, Knossos, Chersonisos, Kastelli Kissamou, Eleutherna, Lappa, and Kouphonisi. Marble floor paving is attested in bathhouses at Makriyalos (area H), Kouphonisi (pool Δ and area B), Nibretos, Gortyna (the Praetorium Baths), Kastelli Kissamou (B 49) and Eleutherna (B 30). These statistics contrast with Lycia where no marble veneer survives *in situ*, although its use is attested by peg-holes in at least six bathhouses (Farrington 1995, 113).

There is a clearly-defined predilection for marble surfaces in bathing contexts throughout the island, despite a preponderance of marble veneer in non-bathing contexts at Knossos. In fact, marble veneer became so synonymous with

⁷⁸ Green porphyry was worked at Knossos in the Minoan period when blocks from the Laconian quarries at Krokeae near Sparta were found in a lapidary's workshop (Warren 1992, 290-2; Dodge & Ward-Perkins 1992, 19).

⁷⁹ In fact, the pools within the bath complexes represent the most common area associated with marble veneer in Crete and are almost exclusively veneered with white marble. This marble is not necessarily local although other white marble such as Pentelic marble was not suitable for cutting up into veneering slabs due to the large bands of micaceous material which separates the beds of marble (Dodge 1991, 30-31).

bathhouse architecture that it in itself became accepted as an indicator of the presence of a bath, often with little architectural corroboration.

At Nibretos (B 17) a structure was identified as a bath seemingly on the basis of this decorative feature alone. The edifice was furnished with marble floors while the portable finds include fragments of two marble *lekanai* depicting scenes from the Labours of Herakles (The Apples of the Hesperides and The Capture of Cerberus), glass *lacrimaria* and a bronze *lekane* (Platon & Davaras 1961-2, 289). Sanders originally suggested that the motifs on the marble *lekanai* indicate an identification as a hero shrine (1982, 155), although it could equally be argued that the image of Herakles is ubiquitous in bath contexts (Marvin 1983, 378; Ginouvès 1994, 237-8). The structure's subsequent identification as a bath has been strengthened by its recently-established position along the route of the aqueduct of Gortyna, suggesting that it tapped this supply (see 7.2.8)(La Torre 1988-9, 320). This dependence on the public supply would be an appropriate arrangement for a private villa equipped with a bath-suite (Raab 2001, 28).

The substantial wall discovered at Knossos (see 11.2 and 12.2.2) was veneered with white marble and associated with a mosaic floor and both decorative techniques contributed to its contextualisation within a bathhouse (**plates 57b-c**) (B 15). Similarly, marble veneer coating an apsed feature on the Kastelli in Khania (B 43) supported its identification as a bath structure (Tzedakis 1977a, 326, pl. 194d). In the village of Lappa (B 34) the walls of the room containing the lavish mosaic were covered with white marble veneer which also contributed to its contextualisation within an opulent Roman bathhouse (**plates 70a-b**)(Markoulaki 1994-6, 246-250).

Marble veneer was not confined to public bathhouses and it often furnished the bath-suites of private ownership, emphasising the personal prestige of the owner. It features in at least three private bath-suites on Crete: at Knossos, Eleutherna and Makriyalos. In the private bath-suite at Knossos (B 14) the brick-faced mortared rubble of the plunge-bath was covered with a grey-and-white marble which Paton suggests is a local product (1999, 287) (plate 56c). A hypocaust located on the second-storey of a private house in Eleutherna is furnished with marble floor and wall

⁸⁰ The presence of spacer pins in eleven baths in Lycia affords further potential for the presence of marble veneer in these baths as the application of spacer pins has been associated with marble veneer (Farrington 1995, 105).

veneer, in keeping with the general sumptuousness of the residence (**plate 68b**)(B 30). At Makriyalos, white marble veneer lines area Ω (**plate 47b**) and its adjunctive horseshoe-shaped plunge-bath Π (**plate 47a**). Area Ψ and its adjunctive sunken plunge-bath are both lined with white marble veneer. The abundance of marble used in this villa, including its bath-suite, reflects the wealth and social standing of the occupant. The marble array includes the expensive marble from Chemtou in Numidia and the relatively cheaper marbles from Proconnesus and Skyros which are also represented by the loose fragments of marble veneer scattered throughout the site (**plate 48c**). The sheer abundance of marble veneer in this villa at Makriyalos may be linked to its establishment by the Romanising local elite (see 9.6). The overall visual impact of this villa in the early 2^{nd} century AD would have been overtly sumptuous (Paton & Schneider 1999, 287-8).

Marble veneer does not always survive and would be one of the more attractive portable objects to be looted from a site and, as such, its presence is often only indicated by peg-holes in the associated masonry. At Koleni Kamara peg-holes are detectable in the brick exposed to the rear of the chapel, particularly in the northwest corner (plates 78c-d). At Eleutherna the actual metal pegs (bow-nails) were found (Themelis 1994-6, 271). Plundering is attested in the *caldarium* of the Praetorium Baths at Gortyna which has been stripped almost completely of its marble veneer. The numerous supporting metal pegs (bow-nails) have been removed leaving only peg-holes in the brick-faced mortared rubble as testimony to their existence (Di Vita 1986-7b, 486-9; Livadiotti & Rocco 1986-7, 376, fig. 27; Livadiotti 2000, 809, n. 10). In the northern pool of the *caldarium* (fig. 66, area 305) one metal peg (bow-nail) is still attached to the wall while some marble veneer remains *in situ* (plate 61a).

The reuse of marble is also evident in a small room (area 24) in the centre of the Praetorium Complex at Gortyna. In late antiquity this room was elaborately decorated with reused marble paving which covered the floor and parts of the walls (Di Vita 1986-7b, 507-519; Paton & Schneider 1991, 283). Similarly, at Chersonisos (B 10) the bench of a late-antique *triclinium* consists of architectural elements, including a dedicatory inscription, removed from the Roman bath which it overlies (Starida & Mari 2000, 30). The main hall of the *triclinium* is also decorated with large irregularly-cut coloured marble veneer, while mosaics adorn the three auxiliary

rooms; it is tempting to imagine that the decorative elements were also plundered from the underlying bath.⁸¹ It is perhaps feasible that some of the marble from the two public baths at Eleutherna was reused for the décor of the basilica constructed in the 5th century AD which is furnished with extravagant *opus sectile* floors.

Marble was burned down to produce lime throughout the ancient world in late antiquity. At Gortyna the late stratification surviving in the southern corner of *caldarium* 13 of the Praetorium Baths revealed a medieval limekiln (Di Vita 1990-1, 448). This could feasibly date to as early as the end of the 7th century AD as it rests on contexts, including burials, datable to AD 670.

13.4 Marble Sculpture on Crete

Unlike marble veneer and mosaics, marble statuary had a long history in Crete prior to the Roman period. The most commonly-imported marble for statuary to Crete in the Hellenistic period was Parian marble. 82 Spratt describes an image at Kouphonisi as

'a colossal figure in white marble in a sitting position, like the one at Palaio Kastron. It now, however, lies on the side of the platform that supported it, and is split into two pieces, but was originally sculptured out of a fine block of Parian marble' (1865, I, 242).

As the text implies, the same author also recorded a fragment of a similarly seated figure 'of colossal size sculpted from fine Parian marble' on the beach below Kastri at Palaikastro (cited in Bosanquet 1901-2, 288; Papadakis 1983c, 52). Admittedly, these marbles have not been analysed and their Parian provenance may have been deduced purely on the basis of their white colour and fine grain.

Parian marble does not seem to feature among the veneers on the island and is not included among those at Roman Knossos (Paton & Schneider 1999). The marble's fine grain may have been more suited to sculpture and Ward-Perkins

⁸¹ Mosaics were removed, possibly plundered, from the bath in the Hartzoulaki Plot at Kastelli Kissamou (B 49) leaving only their matrices *in situ*.

remarks that Parian (and other white marbles) were chiefly used for garden ornaments and statuary (1951, 98).

At Lyttos an image executed in Parian marble was sculpted and signed by an Aphrodisian craftsman (Haussoullier 1885, 21, no. 16; Dodge 1981, 10; Dodge & Ward-Perkins 1992, 102). In fact, four signed pieces of sculpture, attributable to the Roman period, have been found on Crete. It is interesting that one is signed by Athenaios of Paros (*IC* IV 343), while a second is signed by the Timotheus clan, also from Paros, who sculpted and dedicated a statue to Artemis at Arkades (*IC* I v 6). Sanders believes that the Timotheus family were working in Crete but is not clear whether the former piece was imported or made on the island by a foreign sculptor (1982, 51). Nevertheless, it seems that the Hellenistic tradition of sculpture executed in Parian marble transcended the transition from Hellenistic to Roman Crete and its perseverance was perhaps linked with itinerant craftsmen from Paros working in Crete.

13.4.1 Marble Sculpture in Cretan bathhouses

The sculptural repertoire of Crete is significant for this study, as bathhouses are renowned as repositories for marble sculptural displays (Yegül 1992, 322). Predictably, relatively little statuary associated with Roman bathhouses survives. The mass removal of marble statues from Crete, predominantly in the Venetian period, but also prior to this, must have directly modified the bathhouse legacy of the island. Venice is certainly home to sculptures which could potentially have been taken from bathhouse contexts in Crete, such as the statue of a Nereid riding a dolphin whose sister-image was discovered in the Vigla area of Hierapytna (Papadakis 1997, 36-41). Hierapytna suffered from immense looting, as is evident from the report of the Venetian engineer F. Basilicata to the military commander of Crete, Pietro Giustiniano, in 1630 which recalls that

'on the eastern side near to the southern sea close to the fort of Ierapetra are many parts of marble columns, cornices of different colours and statues. Many eminent commanders have excavated in the area and taken away

⁸² Parian marble was the most highly esteemed and rarest of the sculptural marbles (Dodge 1991, 33).

finds' (cited in Papadakis 1997, 27).

Architectural elements and statuary were also reused and relocated within the island itself. In 1575 Foscarini was given permission to transport marble pieces from the ruins of Gortyna to decorate the ducal palace in Candia (cited in Georgopoulou 2001, 96). The once-profuse statuary of Gortyna is attested by Buondelmonti who, when visiting the site in 1415, counted over 2,000 statues from the general area (cited in Detorakis 1994, 91) and 1,500 marble columns from the site itself (cited in van Spitael 1976, 104-5; 1981, 175; *IC* IV, p. 3).

That an abundance of statuary was removed from the bathhouses of Crete is also apparent from the numerous empty niches incorporated into the bath elevations throughout the island, such as that in the *caldarium* of the baths at Aptera (**plate 72b**). A niche in the lavishly-decorated bathhouse at Kastelli Kissamou (B 49) contained a finely-executed sculpture of a satyr and represents a rare occasion where statuary was discovered in its original bathhouse context (*ADelt* 1970, 471, pl. 412g; Drosinou 1991, 419; *Kathimerini* 31/1/93). The plundering of statuary from bathhouses is similarly attested throughout the bathhouses of Lycia where niches and clasps indicate their former presence (Farrington 1995, 112).

Despite such intense looting, an impressive statuary collection survived at Gortyna due to their incorporation into the construction of a triapsidal hall in the Praetorium Complex (**fig. 66**, area 40). Despite the fact that none of the statues was found *in situ*, the group is thought to be associated with the Praetorium Baths. Their connection with the baths is not definite and is the subject of some debate; however, their fine quality would be appropriate for such an illustrious architectural setting (Ghedini 1985, 235). The group consists of statues of Hermes, Nemesis, Hygieia, Hypnos, Isis (or her priestess), Pudicitia-Modesty and a fragment of an unidentified male figure (Ghedini 1985, nos 1, 3, 24, 27, 26, 31, 41). A base with remnants of a group (incorporating the feet of an adult male, a child, an animal and a draped support) completes the assemblage (Ghedini 1985, 201, no. 49)

It has been suggested, due to the relatively diminutive measurements of the Hadrianic image of the nymph Nemesis (0.94m in height with a base of 0.055m), that

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⁸³ The only other signed statue on Crete is that accredited to an Eisidotos of Athens (IC IV 344).

she originally adorned the *nymphaeum* but Ghedini supports an association with a fountain within the bath itself (1985, 165-6, figs 70 and 235). Equally, the large statue of Hygieia with a diminutive Hypnos was considered suitable for a bathhouse context, since it represents a well-known trinity completed by an Asclepius figure (Ghedini 1985, 125, no. 25, fig. 48).⁸⁴ The Hygieia is also fitting for a bath context, representing the traditional attendant to Asclepius but who often adorns bathhouses alone. Ghedini's partnering of this figure with the cloaked Hermes (of Antonine date), on the basis of their comparable measurements, is not convincing as stylistic discrepancies indicate that the statue of Hygieia is slightly earlier than that of Hermes (1985, 64, 115, nos 1, 24 and 112, fig. 38).

The priestess of Isis was initially attributed to the existence of an associated cult in the area (IC IV 11). Ghedini groups the priestess of Isis and the statue of Modesty together (due to their similar marble and comparable dimensions) and suggests that the figures are not necessarily religious images and could be purely decorative and, consequently, attributable to the baths (1985, 183-4, 235-6, nos 26, 27 and 40). Statues of deities in bathhouses do not necessarily embody religious associations and could be erected purely for decoration. Judaic sources, such as the Mishnah or the Talmudic treatises (Avodah Zarah), reveal that it was not considered an act of idolatry to go to the baths of the Gentiles as long as the statues displayed there, such as Aphrodite who often stood at the entrance, were simply to adorn the place (Mishnah, Avodah Zarah 3.4; Caseau 2001, 27).

The sculptural group set on the plinth included a central naked male, a child and an animal thought to represent Apollo, Serapis and Dionysus (Ghedini 1985, 201, no. 49). The 1st-century AD date applied to the group does not preclude their original context within the Praetorium Baths, as has been claimed by Ghedini (1985, 201, no. 49). Recent stratigraphic studies have revealed an unforeseen longevity for the bath complex and, consequently, there is no need to interpret this group in terms of the reuse of statues of earlier buildings.

Reuse of sculpture has been attested in the Large Baths at Eleutherna (B 28)

⁸⁴ Two reliefs of Hermes and Asclepius were discovered in more recent excavations (Di Vita 1986-7b, 510, figs 111-2). The figures are poised on top of two fluted plaster pilasters and still bear traces of their original colour. They were attributed, on stylistic grounds, to the 4th-century AD restorations of the baths.

where two marble statues, representing Pan and Aphrodite, were found in a 3rd-century AD deposit. The statue of Pan has been attributed to the main workshop of Alexandria and has been dated to either the 1st century BC or the 1st century AD (Themelis 2002, 62). The image of Aphrodite is executed in the pose of the "Sandalbinder" and has been dated to the 1st century BC through comparisons with the examples from the shipwreck off Antikythera and the Mahdia wreck off Tunisia (Themelis 2002, 64). The final 3rd-century AD bath context for both statues obviously attests their reuse. The exquisite quality of the statues would explain why these masterpieces were maintained and finally re-erected in the public bathhouse.

Statuary is also associated with the Small Bath at Eleutherna (B 29). Initially, two Roman statues of females (the large and small Herculanensis) were found by chance in 1956 and 1967 in a field south of the bath prior to its excavation (Davaras 1967, 501; Rethymnon Museum nos 45 and 46). Subsequently, a headless and eroded male figure wearing a *pallium* was discovered in the wall of a sheep enclosure in the same area which probably also belongs to the decorative group of the baths (Themelis 1991-3, 257). More recently, six fragments of a male head, probably dating to the reign of Trajan, were discovered in the vicinity of these baths (Themelis 2002, 52). The bath's entrance was also marked by an inscribed altar which clearly denotes the high profile of this public installation.

The main bathhouses on the island associated with statuary are found at Gortyna, Eleutherna and Kastelli Kissamou, which would establish these public baths as particularly opulent in terms of ostentatious display. Marble statues have not otherwise been discovered in association with bathhouses which clearly reflects the decontextualisation of statuary in the published record. At Kouphonisi only three fingers from a marble statue were found in the hypocaustal area of the public bathhouse (Papadakis 1986, 229). At Makriyalos a statue of Pan was found in the northeast corner of area H1 in the villa and although found outside the bath-suite, the statue is reminiscent of the Roman marble statue from the bath at Kastelli Kissamou mentioned above (Papadakis 1979, fig. 217d). At Makriyalos, the head was missing but metal attachments still survived (for its attachment) while the buckish legs only survive to the knee. The figure is naked apart from a cloak, which is attached at the

neck by a brooch.

13.4.1 Imperial Marble Sculpture on Crete

The abundance of statue inscriptions dedicated to Trajan and Hadrian is particularly great in the city of Lyttos, leading Belli to claim that during this time the city flourished (cited in *The Builder* 7/12/1901, 499).

Pendlebury maintained a firm conviction that Gortyna and Knossos were decorated by Hadrian, and reported that the same could also be said of Aptera and Lyttos, although perhaps not to the same extent (1939, 367). He believed that Hadrian, although he never actually visited Crete, was a great patron of the major cities on the island. The plethora of building ordered in all the large centres of the island in the 2nd century AD, as noted at Gortyna, Knossos, Hierapytna, Eleutherna, Chersonisos, Lyttos and Khania, demonstrates the quality of the urban programme and the comprehensive scope of the architectural inventory.

Imperial sculpture on the island is particularly common and of a notably high standard under Hadrian. Vermeule describes the cuirassed statue of Hadrian found in Hierapytna, with its left foot on the back of a barbarian boy (now in the Istanbul Museum), as a masterpiece and lists it among the four best statues of Hadrian, which significantly are all from Crete (1968, 254). Vermeule states that the statue is as "Roman" as one would wish to have a work of art, in the sense that Hadrian stands in all his military glory, with a crown, full cuirass, and heroic panther-skin boots, with his foot on the back of a prostrate captive (1968, 41). The cuirassed statues of Hadrian with Victory crowning Athena or Roma-Virtus on the breastplate belong exclusively and extensively to Greece (most famously in the agora of Athens), Asia Minor, the Near East, the islands (especially Crete) and North Africa (Cyrene) (Vermeule 1968, 41).

Hadrianic portraits are known from the major centres of Crete such as Knossos (**plate 84c**; Paton 1994, 153), Gortyna (Romeo & Portale 1998, 445, no. 33), Hierapytna (Hannestad 1988, 200), Lyttos (Vermeule 1968, 443), Lappa (Vermeule

⁸⁶ The child is thought to represent either a captive Jewish boy or subdued Crete itself (Hanfmann & Vermeule 1957, 232, n. 73; Vermeule 1968, 442, fig. 138).

⁸⁵ The statues are named after the two replicas that formed part of the decoration of the *scaenae* frons in theatre at Herculaneum (Ridgway 1990, 92, pls 56a-b).

1968, 443), Kastelli Kissamou (Vermeule 1968, 442-3), and the Diktynnaion (Welter & Jantzen 1951, 116; Andreadaki-Vlazaki 1996, 65, fig. 74). Vermeule dates the Hadianic portrait from the Diktynnaion, however, to the reign of Antonius Pius and categorises it as posthumous dedication (1968, 258).

The large number of heads and statues of Hadrian found on Crete is striking (Vermeule 1968, 259). Beschi interprets their presence as a possible visit to the island by Hadrian (1974, 219-26). The presence of an Imperial image in the villa at Makriyalos explicitly expresses the status of the occupant of this Roman residence. This portrait head of Hadrian, deemed by Papadakis to be executed in 'good quality' marble, was found just below the villa (1997-8, 272; Sitia Museum no. 9003). Its presence intimates a certain mandatorial connection for the villa which also corresponds with its wealthy décor, being fitted with marble and mosaic interiors. The significance of the villa is further emphasised by the fact that it remains the only private context for an Imperial statue on the island.

13.5 Conclusion

Marble was imported to Crete during the Hellenistic period on a relatively small scale either as statuary or for that eventual purpose. The adoption and development of imported marble veneer as a decorative style portrays a high degree of integration within the broader Roman arena. Marble veneer, as a decorative feature, formed part of a broader architectural style, known as 'Marmorstil', characterised by the extravagant use of marble revetment and free-standing architectural sculpture in the 2nd century AD (Ward-Perkins 1981, 300). Paton observes that the increase in the use of marble in Crete seems integral to such a movement, where widespread use of imported marble is not attested in pre-2nd-century AD contexts (Paton & Schneider 1999, 290). This complies with Dodge's observation that it is under Hadrian that marble begins to find its way to provinces which had no marble of their own (1991, 36).

The wider marble movement has an undeniably Eastern flavour, although regional variations within the broader trend of opulence are detectable. It is a widely held conviction that the overall decorative style on Crete seems to flood into the island from the East (Sanders 1982, 56). This is perhaps reliant on the fact that the

majority of the marble and granite quarries are located throughout the Eastern Empire (Dodge 1990, 108). Such decorative influences were naturally dependent on the greater marble trade routes which were harnessed to the geology of the Empire.

Imports from mainland Greece and the islands of Karystos and Skyros feature strongly among the marble veneers on Crete. These include marble from Penteli, Thessaly, Skyros, Karystos and porphyry from the Peloponnese (Paton 1991, 310). Marble from further afield includes marble from Proconnesus on the Sea of Marmara, Chemtou in Numidia, Teos, Phrygia, Egypt and Verzirken in Bithynia (Paton & Schneider 1999, 286-9). Paton identifies an abundance of Egyptian granite from Mons Claudianus on Crete, which suggests that Crete tapped into the general stone export trade from this quarry to Rome and beyond (Paton & Schneider 1999, 297). Yet Dodge observes that the Mons Claudianus granite was almost exclusively sent to Rome or Ostia (1991, 40). Consequently, the grey granite found on Crete might be more comfortably identified as Troad granite where the quarries had a virtual monopoly of supply to Greece, Asia Minor and the Levant. It is also significant in this respect that Paton and Schneider also comment that the columns of Mons Claudianus granite discovered near a possible villa at Zaros could have been imported from Italy during the 20th century (1999, 290).

The evidence on Crete suggests that while specialist workmen were present at the quarries themselves for the preparation of the stone, a body of specialists was also located at the destination centres in order to complete the products according to local tastes (Paton 1991, 39). This is evident from comparisons between Knossos and Gortyna where almost identical ornamental detail is found executed in both local limestone and Proconnesus marble at Gortyna, and recreated in Pentelic marble at Knossos. At Gortyna the triple moulding crowning a mid-2nd-century AD architrave of Proconnesus marble is similar to that on the dismantled pieces of a Roman Corinthian portico of the same date executed in Pentelic marble at Knossos (reused in Tomb 244). Furthermore, a cornice recorded from the large theatre (formerly identified as the amphitheatre) at Gortyna has similar scrolled acanthus modillions with an egg-and-tongue ovolo border but is carved in fine local limestone (Sanders 1982, 80 and pl. 36; Paton 1991, 317). This evidence strongly suggests that stonemasons in Crete executed the finishing work on these buildings.

The movement of workmen is not a novel concept and has been suggested for almost all areas of the Empire. ⁸⁷ Fischer has argued that, in the case of the peopled scrolls found throughout Palestine, craftsmen must have also constituted an imported commodity, along with the marble from Asia Minor and that this phenomenon undermines the permanency of established workshops in Palestine (1988, 162-3). Dodge favours more permanent workshops with specialist craftsmen here due to the presence of capitals and sarcophagi imitations in local stone (1991, 39). Certainly, the argument for immigrant craftsmen does not preclude the existence of local indigenous schools which have been identified in recent studies of sarcophagus styles.

A similar situation is evident at Corinth where a local school working simultaneously with foreign, probably Athenian, sculptors has been detected (Sturgeon 1989, 114-121). It is significant that local production styles are strongly influenced by Asiatic trends despite the fact that Attic sarcophagi imports are slightly more dominant than those from Asia Minor (dating to the 2nd century AD) (Ghedini 1985, 63-248; Ghisellini 1985, 256; Dodge and Ward-Perkins 1992, 83, fig. 59).

Paton suggests that a body of stonemasons who had been trained in Asia Minor worked on Crete, a suggestion which was derived from a large corpus of evidence pointing to an Asiatic marble style perceptible within the architectural decoration traditions of the island (1991, 317). At Gortyna the presence of Ionic capitals (dated to the late 2nd century AD) and Corinthian capitals (of the Severan period) which are executed in the Asian tradition support this theory (Bendinelli 1912, 27-40, figs 3-5; Rizzo 1988, 299; Livadiotti 2000, 821, n. 68; Rocco 2000, 83, n. 110). On Crete it seems that general stylistic influence for the marble sculpture comes directly from Asia Minor and it could be argued that mainland Greece did not necessarily act as an intermediary between Asia Minor.

This overriding Eastern influence seems to be traceable in all aspects of decorative media commonly correlated with bathhouse architecture in Crete. The broader decorative movement encompasses marble veneer, mosaics, statuary and

⁸⁷ At Spalato, Ward-Perkins sees little doubt that workmen from the Eastern provinces, specifically Asia Minor or Syria, were employed (1981, 458). He detects their influence in the use of the Syrian acruated lintel, pitched brick vaulting and the preference for squared stone even into the vaulted roofs, while the arcading of the so-called Peristyle and the treatment of the Porta Aurea is thought to be typically Syrian.

portable furniture: all strongly, though not exclusively, associated with bathhouses.

CHAPTER FOURTEEN

THE CONSTRUCTIONAL MATERIALS OF CRETAN BATHHOUSES

14.1 Introduction

This chapter reviews the masonry styles prevalent in the bath buildings of Crete with a view to assessing Crete's architectural interface within the Eastern Empire. The chapter will cover architectural components under the headings of brickfaced mortared rubble and stonework.

14.2 Nielsen's Classification of Crete with Achaea and Egypt

Nielsen groups Crete with Achaea and Egypt (1990, 99), despite major inconsistencies, simply because so little was known about Roman baths on Crete at the time. The association is flawed in essence as the triadic arrangement is based on the common use of fired brick in these areas in the Early Roman period which is the product of a long-established tradition of mud-brick as a building material in these regions (Nielsen 1990, 99). The premise is inapplicable to Crete for two major reasons. Firstly, the progression from mud-brick to fired brick is neither inevitable nor easily applied to Crete. Secondly, the amount of mud-brick used on the island in the Roman period, or prior to this, is a subject still under major review, although it is highly unlikely that this raw material featured on the same scale in Crete as in Egypt. Moreover, Nielsen also specifies that the composite use of fired brick and stonework in the baths and *gymnasia* of these regions is attributable to their long tradition of the use of mud-brick (1990, 99). This claim is undermined by the lack of a clear progression from pre-Roman to Roman bath types on Crete.

Nonetheless, Nielsen is correct in assessing regional architectural diversity in terms of local traditions. Vitruvius' claim that the relative proportions attributable to building materials did not rely on anything more than a whim is unsatisfactory (*de Architectura* II viii 8). He simply attributes the choice of building material, be it brick or concrete or squared stone, to the owner's discretion. The situation is more

complex: the diverse media employed rely on a range of considerations arising from the specific environmental context of each structure.

14.3 Brick-faced mortared rubble employed in Cretan Bathhouses

All of the brick construction pertaining to the bathhouses of Crete is composed of brick facing over a mortared-rubble core. Nielsen observes that in Achaea, Crete and Egypt 'fired brick and concrete' was almost the only technique employed for *thermae* and *balnea* construction, and that consequently almost everything constructed of brick in these areas has been identified as a bath, whereas most of it might actually represent other architectural types such as rural villas (1990, 99).

On Crete it is clearly impossible to divide the bathhouses exclusively into brick or stone constructions as the two materials are almost always used in synthesis and in equal measure. Sanders originally viewed the Megali Porta Baths at Gortyna as 'a great jumble of tile-faced concrete' despite the fact that stonework is incorporated throughout this complex (1982, 158). Stone is not a secondary material as is implied by Sanders.

Admittedly, brick facing is undeniably common in bath architecture in Crete, in contrast to the Eastern provinces where fired brick was rarely used as a facing material (Dodge 1990, 116). Roman bathhouses throughout Crete incorporate a great deal of brick facing although its use was largely restricted to the heated areas (where brick *pilae* were also employed) as a practical consideration since the material could withstand frequent and considerable changes of temperature under conditions where most stone would disintegrate. In west central Crete the *praefurnium* in the bathhouse at Alpha incorporates a brick vault (Vanos 1993, 486-7, pl. 151d; 1994-6, 290-1) while in east Crete a brick vault represents the *praefurnium* in the bath-suite at Pachyammos (plate 53c). The bathhouse at Myrtos, in east Crete, is unique in that it seems to be primarily constructed of brick-faced mortared rubble (B 5), although this impression may be reliant on the fact that the modern road-cut

⁸⁸ In Asia Minor solid brick construction is relatively more common and has been recorded at Myra in Lycia (Dodge 1987, 107, pl. ix; Farrington 1995, 154, no. 27), Elaeussa-Sebaste (Farrington 1995, 167, no. 84, fig. 194) and Augusta in Cilicia (Gough 1956, 173-5)

specifically exposes the hypocaust (plate 51c).

This pragmatic correlation, where brick is commonly found in heat-sensitive structures, generally transcends regional trends between East and West. The partnership is evidenced as far away as Britain, where, before the Late Flavian period, with the exclusion of the Exeter bathhouse, the few 'military tiles' known were used exclusively for hearths (Webster, G. 1979, 285). Intensive brick-robbing from the hypocaustal areas of numerous bath buildings in Britain in the late 4th and early 5th centuries AD, in order to repair or complete further constructions, attests the popularity of brick in later periods (Webster, G. 1979, 287).

Similarly, at Gortyna, the lack of brick from the collapse of *caldarium* 13 in the Praetorium Baths can be attributed to subsequent plundering as confirmed by the presence of reused brick in the late-antique residential quarter (Livadiotti 2000, 809). Conversely, at Knossos the brick facing of the cisterns under the atrium of the Trefoil Basilica survived intact up to the spring of the vaults (**plate 18c**) yet the basilica itself was reduced to its foundations due to the intensive stone-robbing of later periods (Megaw 1984, 323-4; Herrin 2000, 189).

14.4 Brickwork: a chronological indicator for Cretan bath construction?

The fact that brick dimensions demonstrate chronological potential is pertinent to any regional study of an architectural type incorporating the widespread use of brick-faced mortared rubble, such as the baths of Crete. The analysis is based on the observation that brick heights become steadily thinner over time, while the mortar joints between the brick courses become thicker, and are thus datable (Ginouvès 1972, 217-245; Dodge 1987, 106).

Studies at Gortyna have been relatively successful in establishing a chronological scale based on the relative dimensions of the brick facing throughout the site (Livadiotti Rocco 2000, 63-4). This datable sequence of brick dimensions was secured through the stratigraphical excavations of the Praetorium Baths which consolidated how the standard sizes of brick assemblages changed from one period to the next.

Phase I of the Praetorium Complex has been dated to the 1st century AD and is characterised by the use of masonry techniques and styles that are influenced by earlier forms, including ashlar elements incorporating Hellenistic style mouldings (van Effenterre 1976a, 207). Little of the earliest building has been exposed but a stratified layer above a Hellenistic structure of unknown function yielded definite Augustan material (for the original account of this Arretine layer see Colini 1969-70, 449). The brick-faced mortared rubble associated with the first phase of the Praetorium Complex generally gives the overall impression of thick bricks laid between thin layers of mortar bedding.

Phase II of the Praetorium Complex coincides with the construction of the baths over a section of the preceding *gymnasium* in the Trajanic period. Masturzo and Tarditi record that the Trajanic period is represented by the southern wall of *apodyterium* 45 where the average height of the bricks is 0.046m-0.048m and this height is repeated for 22% of the tested sample (1994-5, 264).

This model can theoretically be applied to the elevations of other bathhouses on the island; however, comparable examples of such early Roman brick-faced mortared rubble in bath architecture on the island are rare. They are attested in the bath foundations under the chapel of Aghios Nikolaos at Lappa (B 33) (**plate 69a**) and the initial phase of the private bathhouse at Myrtos (B 5) (**plates 51a-b**) (Di Vita 2000b, xlviii; Livadiotti Rocco 2000, 63-4).

Phase III of the Praetorium Complex at Gortyna is now considered to be Hadrianic in date (Livadiotti Rocco 2000, 63). The overall impression is one of thick beds of mortar (0.02m-0.03m) where the bricks (0.032m-0.035m) form bonding courses within the mortar matrix. Comparisons with other sites on the island are more numerous for this phase reflecting the great building fervour that characterises Crete at this time. The cisterns of Kastelliana, Aghia Photia and Vourvoulitis, the circular cistern at Minoa, the *castellum* of the aqueduct of Lyttos, the theatre of Chersonisos, and the second construction phase of the baths of Myrtos all belong to this construction phase (Di Vita 2000b, xlviii; Livadiotti Rocco 2000, 64).

In general, brick heights in the Praetorium Complex demonstrate a steady decrease over the course of the 2^{nd} century AD from 0.04m to 0.032m. The height of the mortar joint is maintained between 0.02m and the 0.03m throughout the 2^{nd}

century AD, only becoming a distinguishing chronological element from the Late Imperial Age (Masturzo & Tarditi 1994-5, 265). Adherence to this model is evident in sample studies from the Megali Porta Baths in Gortyna and the Lechaion Baths in Corinth which both demonstrate that brick thicknesses considerably less than 0.04m be placed at the later end of the 2nd century AD (Biers 1985, 86; Masturzo & Tarditi 1994-5, 265-6).

The emphasis placed on this methodology is derived from the fact that in many cases this is the only channel available (bar systematic excavations) for dating the baths on Crete. At Loutro (B 37) the unexcavated bathhouse is all but eroded by the sea (**plates 71b-c**) but, despite its condition, brick thicknesses relating to Phase III of the Praetorium Complex are attainable (i.e. 0.035m brick thickness and 0.03m mortar thickness) (**plates 62a-b**). Similarly, brickwork dimensions observed in the foundations of the Venetian chapel at Koleni Kamara (B 52) can be assigned to the second half of the 2nd century AD (**plates 78c-d**).

The methodology has its own geographical parameters and does not support comparisons between provincial monuments with criteria established in Italy or Rome: the assessments are regionally specific. The technique is probably best applied when two styles are evident in one structure, as at Myrtos where a series of constructional phases are distinguishable (Di Vita 2000b, xlviii). The first construction phase is represented by the brick facing of the circular cistern (0.045m thick) which yields relatively thicker bricks (plates 51a-b), and is therefore earlier than the hypocaustal area (0.035m thick) (plates 51c-52a). The cistern represents the initial construction phase of the complex possibly dating as early as the Trajanic period (Di Vita 2000b, xlviii). Such architectural phasing would attest the longevity of the building, indicating either that the hypocaustal area represents an extension of an earlier block or that this brick constitutes a repair to the original structure (personal observations).

Even though the methodology is not applicable over larger regional zones, general sequences can be established over broad areas within Crete. Contradistinctive dimensions are detectable between the brick of the circular cisterns at both Myrtos (plate 51b) and Minoa (plates 74a-b). At Minoa the brick dimensions of the cistern (0.04m thick) indicate that the construction is slightly later than the thicker brick of

the cistern at Myrtos.

14.4.1 Brick Dimensions and Chronological Inconsistencies

This dating methodology encountered serious difficulties in its initial stages, i.e. before the Gortyna sequence was consolidated. In the 1970s van Effenterre studied the brickwork at the site of Ini using Colini's phasing for the Praetorium Complex (1976a, 205-210).⁸⁹ Van Effenterre proposed several extensive periods of urbanisation at Ini based on various brick thicknesses evident in elevations on the site. He dated the initial phase to the 1st century AD, the second to the reign of the Antonines and the third from the end of the 3rd until the 4th century AD (Van Effenterre 1976a, 208).

He equated the brick-faced mortared rubble of the baths on the site (B11) with that of Colini's 'first phase' of the Praetorium Complex and, consequently, was initially convinced that the construction of the baths dated to the Julio-Claudian period (van Effenterre 1976a, 206-7). This would have established the baths as the earliest dated baths on Crete. Moreover, van Effenterre interpreted a separate collapsed architectural block, discovered on the site in 1973, as repair to the baths on the basis of its brick dimensions which are comparable with those of the 'second phase' of the Praetorium Complex (1976a, 207-8, fig. 1). To add chaos to confusion, van Effenterre also applied the early date, derived from the brickwork at Ini, to the nearby bath of Kato Asites (B 16) (van Effenterre 1976a, 207-8). However, the brick facing of the plunge-baths at Kato Asites exhibits a standard height of 0.035m which would accord with brick of the middle and late 2nd century AD according to Masturzo and Tarditi (1994-5, 265).

There is evident confusion regarding the dating of the brickwork at Ini, but there seems to be a relatively simple solution. The quandary arises from the fact that van Effenterre presents the brick-faced mortared rubble of the aqueduct and the baths as identical. He actually confuses the brick facing of the aqueduct with that of the baths in his illustrations, his text referring to the baths yet significantly mis-illustrated

⁸⁹ Colini's excavations at Gortyna in the 1970s initially distinguished five main phases for the overall complex, with only the second, third and fourth pertaining to the study of the baths (1969-70, 439-450; 1973-4, 911). It was only when these basic divisions were fine-tuned that the baths yielded an unforeseen longevity (Di Vita 2000b, xlii, fig. 20).

with a photograph of the aqueduct (van Effenterre 1976a, 207-8, fig. 1). Furthermore, the brick-faced mortared rubble of the aqueduct (**plate 10c**) is (contra van Effenterre) very different from that of the baths (**plate 54b**). The dimensions of the brick actually demonstrate that the aqueduct of Ini is earlier than the bath in question (B 11). The aqueduct is constructed with thicker brick, i.e. 0.042m (**plate 10c**), more keenly associated with the construction phase of the Praetorium Baths (Phase II: Trajanic). The brick-faced mortared rubble of the aqueduct at Ini is also comparable to the brick conventions of the Myrtos cistern.

In contrast, the brick dimensions of the bath at Ini are actually characteristic of the mid- to late 2nd century AD (i.e. 0.035m) which would allow for contemporaneity with the baths at Kato Asites. This date would also correspond with the Late Antonine inscription outlining the bathing timetable found near the baths which would also suggest that they were operational at this date. ⁹⁰ The date would also agree with that of the collapsed masonry block which was initially interpreted as a secondary repair. Admittedly, there is absolutely no indication that the detached section should be associated with the bath building (*SEG* XXVI 1044). Nonetheless, this reassessment illustrates that the methodology can, at least, loosely distinguish between characteristic types of brickwork associated with the Roman structures scattered throughout Crete which could not otherwise be dated.

14.5 Brick Bonding Courses

The principal function of bonding courses was to ensure a level bed for the next stage of construction, be it vertical or vaulted (DeLaine 1997, 144). The incorporation of brick bonding courses is often claimed to be a characteristically Roman Asiatic technique, yet it was widespread in Greece and throughout the Balkans from an early stage in the Roman period (Dodge 1987, 108). The fact that the bonding courses penetrate the entire core of the wall is congruous with the construction techniques of Asia Minor, since in Rome and Italy the courses were superficial and therefore only stabilised the facing and not the core (Dodge 1984, 13).

⁹⁰ Admittedly, the building identified by van Effenterre as a bath (B 11) is not explicitly mentioned in the inscription (SEG XXVI 1044).

It is possible that bonding courses of *bipedales* were a tangent introduction to the incorporation of *bipedales* in hypocaustal *suspensurae* in Crete. In the Praetorium Baths at Gortyna these floors only appeared in *caldarium* 13 in the late 2nd or early 3rd century AD (phase IV) (Di Vita 1989, 447; Livadiotti & Rocco 1986-7, 374, figs 24-5). Brick bonding courses, consisting of bands of *bipedales* penetrating the core of the walls, are attested in the vaulted cisterns of Kastelliana (**plate 12c**, as indicated by the arrow)(see 5.5). Bonding courses composed of these large bricks are evident in the 'Brick Baths' at Myra in Lycia where Farrington has dated the bath to the 2nd or 3rd centuries AD based on the ratio of brick to mortar thickness (1995, 154, no. 27).

In the bathhouse at Souia a bonding course formed by a double row of bessales is evident just above the spring of one of the vaults (plate 76b, as indicated by the arrow). The vaulted roof above the brick courses consists of radially-laid split stones reminiscent of late-antique cisterns on Crete, such as at Loutres just east of the village of Mochlos (plates 80a-c). The use of uncut stone in the vaulted roofs of the cisterns at Souia represents a departure from the brick-faced mortared rubble of the walls (where it is used only as an interior facing). It could therefore represent repair to the vault where the horizon of brick demarcates the point at which an old roof collapsed. Significantly, bonding courses have been viewed as a source of weakness, rather than of strength, for the associated elevation (Ward-Perkins 1994, 352, n. 4).

14.6 Stonework associated with Cretan Bathhouses

In general it remains difficult to classify the type of stonework used in bathhouse construction of Crete. *Opus reticulatum* has not been attested in the bathhouses, or in any other architectural type, on the island. Nielsen claims that occasionally the baths are constructed using *incertum* but never *quadratum* (1990, 99). Conversely, true *opus incertum* is not found on Crete while some ashlar masonry on the island can be classed as *quadratum*.

The large ashlar blocks of the Large Bath at Eleutherna (B 28) (plate 68c) are unique to bathing installations on Crete and are reminiscent of the Hellenistic building tradition on the island, as exemplified by the temple at Lissos. The bath is positioned on top of a high Hellenistic wall, referred to as a terrace wall, and the builders reused the blocks from this wall in constructing this unusual bathhouse. The

ashlar voussoirs of the vaults are also unique to Crete and are closely comparable with those of the baths of Lycia (**plate 85a**). The large ashlar blocks (**plate 68c**) of this bath at Eleutherna constitute exceptions to the general masonry style of the site which is most accurately described by the term *petit appareil* (see 5.4). This complies with the stonework of the baths at other major centres on Crete as demonstrated by the substantial stone wall of a public bath at Knossos which comprises a mortared-rubble core faced with roughly-squared stones (**plate 57c**).

Masturzo and Tarditi conducted a study of the overall masonry of the Megali Porta Baths at Gortyna and applied a loose chronology to the stonework (1994-5). They observed that the dimensional statistics of individual stone elements do not translate into a clear linear chronological development comparable with brickwork. Instead, they proposed that a chronological progression is discernible through the general impression of the construction and its qualitative effect and that the analysis is more loosely indicative of grades of change in the appearance of the stonework. Masturzo and Tarditi presented the following classification of stonework façades (1994-5, 260):

Masturzo observes that in the Megali Porta Baths, in addition to brick-faced mortared rubble, there are facings composed of cut stone blocks and more loosely styled stone elements (Masturzo & Tarditi 1994-5, 69). The term 'blockwork', as defined by Masturzo, relates to stone facings consisting of carefully-cut blocks with regular edges (Masturzo & Tarditi 1994-5, 260). In this bracket any less regular block outline is indicative of a later date. The dimensions of the blocks of the Megali Porta Baths vary in height from 0.10m-0.18m and in width from 0.15m-0.30m. The mortar joints are regular and not particularly thick and are only occasionally wedged with stone flakes. The core of the wall comprises a strong mortar matrix with inclusions of split stone and pebbles. This classification incorporates most of the *petit appareil* in the bathhouses of the island as represented by that of Souia (B 46) and Eleutherna (B 29).

The term 'stonework', as defined by Masturzo, indicates more irregular facings of uncut stone, although the stone may have been altered or adapted dimensionally to fit a series of horizontal courses. The mortar joints are thick and wedged with stone flakes and occasional brick fragments (Masturzo & Tarditi 1994-5,

261). The elevations of the bathhouse at Aptera (B 38) consist of stone-faced mortared rubble with negligible use of brick (plates 72a-73a). The stonework comprises loosely-shaped stone with large dressed masonry blocks, reused from earlier structures, reserved for the corners (evident in plate 72b). The frequent use of filling wedges of brick fragments is suggestive of a late date. Similarly, the late-antique bath at Phaestos is almost exclusively faced with stone, interspersed with wedges of stone flakes (a single reused brick in evident; plates 79a-c).

The stone facings of the bathhouse at Kato Asites are difficult to classify as they consist of roughly-squared stone blocks in neat courses, but the courses are sporadically interspersed with brick fragments and stone flakes which would suggest a relatively late date. This is significant as the brick-faced mortared rubble of the plunge-baths exhibits a standard height of 0.035m characteristic of the late 2nd century AD (van Effenterre 1976a, 207-8; Masturzo & Tarditi 1994-5, 265). It could be suggested that the elevations were modified (and possibly reinforced with wedging fillers) when the baths were converted into the church of Aghia Katerina which has been dated to the 5th century AD (plates 58a-c).

Masturzo and Tarditi observe that a partnership emerges between the stonework and the brick-faced mortared rubble of the Megali Porta Baths. The elevations with facings of more regular stone blocks are associated with brick attributable to the 2nd century AD. The facings of more irregular stonework can be related to the later minor transformations of the plan (1994-5, 260). The stonework in the Megali Porta Baths follows a linear sequence from regular to irregular.

Unfortunately, although this correlation holds in this single instance, it cannot be applied on an island-wide scale. At Kouphonisi the irregular stonework of the general bathing installation lies in stark contrast with the regularity of the brick facing of pool Δ (**plates 49b-c**). The clarity of the sequence in the Megali Porta Baths is reliant on the fact that these baths demonstrate an exceptional consistency. The original plan was basically maintained for the entire functional life of the baths (Masturzo & Tarditi 1994-5, 241, n. 29). Moreover, the bath also constitutes one of the two monumental baths on the island whose appropriate monumentality would lend itself to such assessments, exhibiting more recognisable and calculable characteristics. This contrasts with the majority of bathing edifices on the island where the pattern is

less obvious and the methodology cannot be as confidently applied. Consequently, the methodology is undoubtedly helpful in securing chronological sequences but only creates the most general of overviews. Such results need to be fortified and refined through more securely-established methodologies.

14.7 Conclusion

Crete, like other areas in the East, was not a mere recipient of design, but the creator of a new repertoire. Local resources shape the appearance of any architectural style but are often overlooked in the search for broader sweeping influence on architecture in the Roman period. Most of the stonework for the bathhouse elevations on Crete is representative of the geology of the immediate region (see 5.7). Moreover, in areas which demonstrate a continuum of place, stone blocks from pre-Roman foundations were incorporated into the elevations of the Roman baths (as demonstrated by the baths at Aptera and Gortyna) while the plundering and looting of stone in the Roman period was as advantageous as quarrying and importing.

Conversely, the use of brick on the island would afford a greater degree of standardisation than any other construction material. It is tempting to propose the operation of a factory of stamped brick in the late 1st century AD somewhere in the Mesara due to their preponderance in the region (Sanders 1982, 34; Watrous *et al.* 1993, 233). Dodge observes that brickwork was favoured in the Trajanic period in Crete, as demonstrated by the odeum of Gortyna, and under Hadrian, as attested by the large theatre (1987, 107).⁹¹

The name *Lykou Felix* is stamped on bricks dating to the 1st century AD at Zaros, Lebena and Gortyna (*IC* I xxxi 10; *IC* I xvii 58-9; *IC* IV 526). The same name is also recorded on amphorae from Lyttos found at Pompeii, some of which also bear the initials MKN (Baldwin Bowsky 1999, 323, n. 58-9, 64). Another brick from Gortyna dated to the 1st century AD depicts the abbreviation MAP (Baldwin Bowsky 1999, 323).

⁹¹ The Hadrianic date is provided by a sample of brickwork originally assigned to the amphitheatre. However, recent investigations have led to the reidentification of this monument as the large theatre (Montali 2000, 61). Today the amphitheatre is recognised as incorporated into the oval church of Aghioi Deka (Vasilakis N.D., a, 102-4), the interior of which is thought to represent the original arena while foundations in the village environs represent the seating substructures (Di Vita 2000a, 11).

The operation of brick factories and the consequent mass availability of this raw material on Crete would have had a huge impact on the standardisation of architectural forms on the island. Such standardisation is reflected in the relatively successful application of dating through brick dimensions in Crete.

CHAPTER FIFTEEN

SPACER PINS IN CRETAN BATHS

15.1 Introduction

This chapter attempts to assess the spacer pin as a common architectural element within the functional systems of Cretan baths.

15.2 Spacer Pins

The presence of terracotta spacer pins throughout Crete is pertinent to this study as they are a feature almost exclusively associated with Roman baths. In nearly every case in the broader Empire terracotta spacer pins have been found in association with baths. The use of terracotta spool-headed spacer pins (French *clous d'écartement*/ Greek πήλινες σφήνες/ German *Tonnägel*/ Italian *chiodi distanziatori*) was to secure a series of large flat tiles in order to create a wall cavity for the circulation of hot air from the hypocaust of the bath (Farrington & Coulton 1990, 55). Their precise function was only fully understood when they were found *in situ* in the baths at Balboura in Lycia in 1986 (Farrington & Coulton 1990, 55, pls Va-b). Subsequently, their function within the provision of heated wall cavities was established at Pergamon, Kourion and Mactaris (Farrington & Coulton 1990, 64). The type of heating system which incorporates the use of the spacer pin constitutes the most prevalent system in Cretan bathhouses (**fig. 7**).

15.2.1 Description of the Spacer Pins from Crete

The spacer pins from Crete are of varying size but demonstrate a characteristically Cretan form. The shank is solid and tapers toward a spool head. The wider part of the shank has been trimmed to create a chisel-tip before the pin was fired (plates 83b-d). The fact that the spacer pins vary in size is not unusual and does not affect their application once their length and the neck of the spool head were

consistent (Farrington & Coulton 1990, 57). The shanks of the spacer pins would have been invisible when in use.

15.3 Distributions of Spacer Pins on Crete

Spacer pins feature in at least twelve sites throughout Crete (**fig. 7**). At the provincial capital of Gortyna the method for heating the walls and floor was found *in situ* in *caldarium* 13 of the Praetorium Baths (Livadiotti & Rocco 1986-7, 374, figs 24 and 25; *AR* 1989-90, 70). Spacer pins were observed littering the site in large quantities in 2000 (**plate 61b**) while their use is also indicated by cavities visible in the brick-faced mortared rubble of the baths (personal observations)(Colini 1973-4, 911, fig. 2; Livadiotti & Rocco 1986-7, 361, n. 7; Di Vita 1989, 447). In both the Praetorium Baths and the Megali Porta Baths at Gortyna cavities for the application for spacer pins are found in intervals of 0.54m-0.60m indicating that here they must have facilitated the use of *bipedales* which are traditionally 2ft long (0.6m) (Livadiotti & Rocco 1986-7, 376-7).

At Knossos, spacer pins were recorded in a 3rd-century AD destruction deposit located within the peristyle of the Villa Dionysus.⁹² It is significant that while spacer pins featured relatively frequently in the upper debris layers of the main building, they were not reported from the main strata of the villa. Consequently, it is possible that the villa was not their original context. The 3rd-century AD date for the upper debris in the Villa Dionysus coincides with the last phase of the private bathhouse (B 14) or the potentially public bath (B 15) in the vicinity (*AR* 1993-4, 75; 1995-6, 41). The fact that actual spacer pins were retrieved from the excavations of the former suggests that the spacer pins from the upper debris layers of the Villa Dionysus originally belonged to the private bath-suite 700m to the south (**plate 83b**).

The use of spacer pins on Crete did not occur only in the capital at Gortyna and the colony at Knossos. They were found throughout the island in both public and

⁹² In the original report of the Villa Dionysus excavations Hayes described the spacer pins as 'clay vault-pins' of 'doorknob shape' and interpreted them 'as anti-earthquake devices set into vaulted roofs' (1983, 103, no. 3, 135, fig. 14, nos 171-2). Hayes maintained that they were intrinsic elements pertaining to a vaulted ceiling over the *oikos* of the villa, which did not collapse, or was not demolished, until the 3rd century AD. He acknowledged that this theory relied on the assumption that these objects actually came from the structure of the villa, and not from some neighbouring building (Hayes 1983, 103, no. 3).

private bathing establishments. At the wealthy villa at Makriyalos the use of spacer pins is indicated by the presence of cavities in the *caldarium* of the private bath while actual examples from there are on display at the Sitia Museum (Livadiotti & Rocco 1986-7, 361, n. 7).

At Eleutherna, spacer pins were found associated with both public baths and a private bath-suite below the acropolis (B 28-30) (plate 83d) (Themelis 2002, 60-61). Surprisingly, Kalpaxis has also reported their discovery in the excavations of an archaic structure on the acropolis (cited in Empereur et al. 1991, 495, n. 25). This evidently constitutes a secondary context but their original context remains uncertain. Perforations for their application have not been cited in any elevations on the acropolis. It seems unlikely that a bathhouse was located at such an elevated point unless some water-lifting device was utilised. It is possible that the spacer pins were transported manually from below for some unknown reason and perhaps they adopted a secondary use in this instance which was distinct from their original function.

In the broader hinterland of Eleutherna, spacer pins have been found in the baths at Stavromenos Chamalevri, Alpha and Vizari (Livadiotti & Rocco 1986-7, 361, n. 7; Andreadaki-Vlazaki 1990, 446, pl. 222a; 1991-3b, 246; Vanos 1993, 487; 1994-6, 291; AR 1996-7, 124-5; Livadiotti Rocco 2000, 64). The use of spacer pins is also indicated by the presence of cavities in the baths at Lappa and Aptera (Livadiotti Rocco 2000, 64). At Lappa, an actual spacer pin was also found in the destruction level of a storage area of a Roman house (presumably fitted with a private bath) which was likely to have been in use in the 2nd century AD (**plate 83c**) (Gavrilaki-Nikoloudaki 1988a, 70, n. 13, pl. 13g). Spacer pins have also been found at Khania in unpublished material from Markoulaki's excavations of a villa (cited in Empereur *et al.* 1991, 495, n. 25).

The recent identification, by the present author, of spacer pins collected during the Malia Survey proves conclusively that a bath (either public or private) existed in the vicinity despite the fact that no architectural foundations were located in the field. The spacer pins were collected in the area of the Christian basilica which seems to be located in the heart of the earlier Roman settlement (personal observations). 93

⁹³ I am most grateful to Dr. Sylvie Muller for allowing me access to the material.

At Ini, two spacer pins were noted in 2000 in the fields associated with the aqueduct and bath (personal observation). At Itanos, in the far east of the island, spacer pins have recently been discovered in the area of Basilica A (Christina Tsignonaki, pers. comm. 2000). The reuse of marble and granite columns evident in the basilica hints at the existence of an earlier Roman building stripped of its marble furnishings (see 13.2). The presence of spacer pins found in the basilica area would suggest that this earlier building was a bathhouse but, as yet, its existence remains unsubstantiated.

15.3.1 The Production of Spacer Pins on Crete

The process of spacer pin production was quite simple as the whole pin could be thrown in one piece on a potter's wheel. Consequently, spacer pin production was fast, effective, economical and widespread. Their production has been attested at major amphora production sites on Crete and has been securely identified at Chersonisos, Tsoutsouros, Dermatos and Gortyna (Empereur *et al.* 1991, 495) while their production at Knossos is highly likely. At Chersonisos west of the harbour along the Vourlidias River two amphora production centres were located, one exclusively producing AC1 amphorae while the other predominantly producing AC2 (Empereur *et al.* 1991, 495). Spacer pins were found at both production centres and can be dated, through association with the amphorae, to the 2nd and 3rd centuries AD (Empereur *et al.* 1991, 498-9). At Dermatos the associated amphora production dates from the end of the 2nd and perhaps the start of the 3rd century AD (Empereur *et al.* 1991, 510-511).

Other potential production sites could be proposed on the basis of the discovery of spacer pins manufactured in local clays. At Gortyna there seems to be a strong resemblance between the clays of the AC1 amphorae and the spacer pins, suggestive of a local production centre (Empereur *et al.* 1991, 495, n. 26). At Knossos, two spacer pins were found in the excavations of the Unexplored Mansion, one of which was a surface find (Sackett *et al.* 1992, 256, no. U 165, pl. 217) while the second (found in a late 2nd-century AD fill) was manufactured in local clay (deposit R3) (Sackett *et al.* 1992, 246, n. R3, 3a, pl. 217).

15.3.2 Dating Cretan Spacer Pins

The introduction of the technique to Crete seems to have occurred in the 2nd century AD. Farrington and Coulton observe that most of the known examples throughout the Empire date to the 2nd century AD (1990, 64). Their presence in a bath at Quzayr 'Amra in Israel represents an uncharacteristically late example, dating to AD 712-715 (Creswell 1958, 91; Livadiotti & Rocco 1986-7, 386; Nielsen 1990, no. 287).

Their actual production on Crete at Chersonisos, Dermatos, Tsoutouros, Knossos and Gortyna can be dated to the late 2nd or early 3rd centuries AD (Empereur *et al.* 1991, 498-9). The fact that they were being produced on Crete in at least five sites indicates that they had become a common feature within the Cretan construction repertoire by this time. This was a necessary measure given the sudden profusion of baths constructed throughout Crete at this time (**figs 5 and 7**).

Farrington and Coulton regard the spacer pin as a variant of the *tegulae* mammatae technique which they view as an earlier system (1990, 55 and 66). They contend that heating systems incorporating *tegulae mammatae* represent an earlier version, if not the prototype, for the spacer pin method. Farrington presents a picture whereby *tegulae hamatae* and *tegulae mammatae* (the latter being used in association with metal pegs) were replaced by heating systems incorporating either *tubuli* or clay spacer pins associated with flat tiles (1995, 101-2).

Unfortunately, the sequence is not so simple and considerable confusion surrounds the application of *tegulae mammatae* in bath contexts. Yegül describes them as tiles which are notched in the corners to accommodate clamps or metal pegs (bow-nails) and, less commonly, spacer pins (1992, 363). Yegül categorises *tegulae mammatae* as elements of the earliest system of wall heating, a primitive version of which is achieved with the use of the spacer pin (1992, 363). However, the fact that *tegulae mammatae* were still in use until the 4th century AD in Athens would suggest that no single type exclusively replaced another (Young 1951, 283).

At Eleutherna *tegulae mammatae*, bow nails, spacer pins and terracotta *pilae* were all discovered in the hypocaust of the Small Bath (B 29) (Themelis 1994-6, 271). The recording of *tegulae mammatae* at Eleutherna is unique in Crete although

tegulae hamatae have been reported from Aptera by Ninou-Kindeli and Christodoulakos where the baths also incorporated spacer pins (2000, 34).

15.4 Wider Distributions

Outside Crete spacer pins have been cited in North Africa, Israel, Cyprus, Rhodes and Asia Minor (**fig. 8**). Rhodes, Israel, and Cyprus all yielded one site each. The example at Kourion in Cyprus reflects a slightly isolated example (Farrington 1995, 102 and 114, n. 7) while the bath at Quzayr 'Amra in Israel is, as already mentioned, remarkably late in date (Creswell 1958, 91; Livadiotti & Rocco 1986-7, 386; Nielsen 1990, no. 287). In contrast, ten sites are reported from North Africa, and fifteen from Asia Minor (eleven of which are from Lycia), while twelve sites on Crete have yielded spacer pins. It is important to note that these statistics are based on the published accounts.

In North Africa spacer pins were discovered at Colonia Claudia Caesarea (Cherchel) (Nielsen 1990, no. 226, fig. 191), Thamugadi (Timgad)(Nielsen 1990, nos 238, 240, 241, 242, 245, 250, fig. 199-204), Hippo Regius (Nielsen 1990, nos 231-2), Tehouda, Rusguniae, Cuicul (Djemila) (Nielsen 1990, nos 228-9, fig. 194), Banasa and Volubilis in Morocco (Nielsen 1990, nos 128-130; Yegül 1992, 465, n. 26), and Sidi Marzouk Tounsi and Mactaris in Tunisia (Farrington 1995, 102 and 114, n. 7). They have also been recorded from Leptiminus (Hazel Dodge, pers. comm.).

In Asia Minor large numbers of spacer pins were found in the Small Baths of the Middle City in Pergamon dating to the 2nd century AD (Radt 1999, 144, fig. 88), while other 2nd-century AD examples have been recorded at Ketiostal and in the Harbour Baths at Ephesus (Farrington 1995, 114, n. 7; Nielsen 1990, no. 295, fig. 223). The Hadrianic South Gymnasium at Perge is another possible contender (Nielsen 1990, no. 370; Farrington 1995, 170, n. 106).

Lycia yielded eleven sites where spacer pins (or spacer pin holes) were recorded. Farrington and Coulton report cavities for spacer pins in the baths at Limyra and Rhodiapolis, the Baths of Vespasian and the North and Southwest Baths at Patara, the North Baths and the Baths of Antoninus Pius at Kyaneae, the Baths ZB/ZC at Phaselis, the Sidyma Baths, Baths M1 at Oenoanda, both baths at Arif, Baths A at Tlos (1995, 154, nos 26, 20, 44, 50, 58). Farrington also records spacer pins *in situ* in

the baths at Balboura and in the Baths of Vespasian at Kadyanda (1995, 151, nos 12 and 14). Examples on Rhodes may reflect an extension of their distribution in Asia Minor forming an obvious stepping-stone between Crete and Lycia.

15.5 Conclusion

The baths of Crete almost exclusively employed the spacer pin to create a wall cavity for the diffusion of heat. He use of spacer pins on Crete has been recorded at Gortyna, Knossos, Khania, Chersonisos, Lappa, Aptera, Alpha, Makriyalos, Vizari, Eleutherna and Stavromenos Chamalevri. The present study adds examples from Ini, Malia and Itanos to this list, although these constitute chance finds removed from their bathing contexts. These discoveries also suggest that other examples may remain, as yet unidentified, at other Cretan sites. The fact that they are found in such quantity in Crete is significant since this distribution constitutes a large proportion of the overall corpus recorded in the Empire.

Their abundance on Crete is noteworthy as they are relatively uncommon within the Roman ambit (Farrington 1995, 102). Their application has not been found in Italy, northwest Europe or the Levant. Biers, in her account of the baths at Corinth, observes that the use of the terracotta "nail" is only common in North Africa, Asia Minor, including Rhodes, and also on Crete, but not elsewhere (Biers 2003, 311). This exclusivity is also endorsed by Yegül who observes that this heating method was common, yet confined to Asia Minor and the Mediterranean (1992, 363). Yegül's report of the use of spacer pins in the Baths of the Lechaion Road at Corinth is actually incorrect (1992, 465, n. 26), as the original report cites a variant of the technique, using spacer tubes (effectively hollow clay cylinders) and iron clamps, and Biers states conclusively that terracotta nails (i.e. spacer pins) were not used in the Lechaion Baths (1985, 46-7, n. 28), a fact which she has recently reiterated (2003, 310). Their profusion and diffuse distribution on Crete lies in contrast with their absence in mainland Greece, promoting direct links between Crete, North Africa and

⁹⁴ Other types of systems have not been identified in the bathhouses of the island, although many of the baths only partially survive.

⁹⁵ The bobbin spacers found in Britain are quite different from anything noted in the East (Webster 1979, 289, fig. 15.2).

Asia Minor (specifically Lycia).

Moreover, the type of spacer pin used in Crete is closely comparable to types in Asia Minor rather than North Africa. In particular, the type encountered on Crete is almost identical to the solid chisel-tipped variety found at Pergamon which can be inserted into any chink in the façade (Radt 1999, 144, fig. 88). The spacer pins at Balboura in Lycia are also similar to type C class IV in the baths at Gortyna (Rocco 2000, 65, n. 83). Like the Cretan variety, the spacer pins from Lycia also have a flat solid shank; however, most of those from North Africa are notably different (as at Mactaris, Thamugadi, Tehouda) (Farrington & Coulton 1990, 64).

Not only are the pins in Lycia and Crete similar but they have distinct applications, attesting an entirely distinct system. In these catchments the spacer pins tend to penetrate their associated walls, whereas at Mactaris (Tunisia) and Tehouda the pins only probe as far as the wall plaster, their adherence being achieved through applied mortar into which they are twisted (Farrington & Coulton 1990, 64).

This significant similarity between the spacer pins of Lycia and Crete suggests that the heating systems may also be symptomatic of the type of baths characteristic of these regions. Farrington and Coulton observe that major bath-complexes across the Empire almost always incorporate *tubuli* (box flues) whereas the smaller baths incorporated the spacer pin (Pergamon: 165m^2 ; Kourion 240m^2 while in Lycia mostly $200\text{-}700\text{m}^2$, with a few examples of larger baths occupying c. 1000m^2)(1990, 66-7).

Farrington & Coulton suggest that cost was the main factor in choice of heating system, although allowing for local habit as a strong determinant (1990, 66-7). Consequently, they associate their use with sites of limited public resources which demonstrate a predilection for simply-constructed heating systems which local artisans could produce, over the more elaborate, even if more efficient, system of *tubuli* (box flues) (Farrington & Coulton 1990, 67).

Admittedly, their mass-production on Crete was facilitated by the amphora production industry onto which they effectively piggy-backed. However, a model reflective of cost alone does not embrace the use of the spacer pin in the substantial Praetorium Baths at Gortyna, measuring over 1,000m² (Di Vita 2000b, xlviii), within the capital of the joint province of Crete and Cyrenaica. Moreover, other elements

present in several Cretan baths also indicate the sophistication of the heating systems, including *testudo alvei* in two of the *praefurnia* servicing *caldarium* 13 in the Praetorium Baths (Di Vita 2000b, li), a brick fire-chamber for supporting a furnace-boiler in the Small Bath at Eleutherna (personal observation; see **fig. 75** area 60) and a possible second such chamber in the private bath at Makriyalos in area K1⁹⁶. Therefore, it could be argued that the popularity of the spacer pin type is more reliant on areas of influence and the geographical dispersal of the technique throughout the Empire rather than simply a reflection of cost. The specific distribution and date of spacer pins establishes them as highly indicative of influence within the Empire exposing an influx of Eastern influence throughout Crete. Conversely, Biers has established that the spacer *tube* represents the characteristic type on mainland Greece, with sporadic examples in Spain and France, demonstrating a completely distinctive distribution from that of spacer pins (2003, 310, n. 36).

It is significant that Farrington and Coulton observe that both Lycia and central North Africa, the two areas where the spacer pin system was most popular, were occupied in the Imperial period by a large number of relatively small cities (1990, 67). A similar density of Roman cities has been established on Crete which would explain the profusion of spacer pins throughout the island (**fig. 7**). Therefore, the spacer pin is more truly characteristic of developments in Crete borne of a synthesis of Eastern influence with inevitable variation concomitant with the local workforce and the variety of available materials.

⁹⁶ This feature is found in the Large North Baths at Timgad (Yegül 1992, 369, fig. 463).

CHAPTER SIXTEEN

FLUCTUATING TRENDS IN DIACHRONIC BATHHOUSE DISTRIBUTIONS

16.1 Introduction

The aim of this chapter is to evaluate sequential bathhouse distributions on the island in order to reveal fluctuations of settlement patterns in different regions of the island throughout the Roman period. Such a compilation required that each individual bathhouse be assessed chronologically. Dating methodologies are presented in catalogue B under this heading.

16.2 Series of Coeval Distributions

Over half of the bathhouses in Catalogue B have been excavated and dated stratigraphically, yet many excavations still await publication, while others, although published, lack detailed stratigraphical analysis or section and elevation drawings. Excavations are often severely restricted by the encroaching modern environs. Rarely are sub-levels probed to establish a *terminus post quem* for the construction of the edifices, as happened in the Health Centre excavations in Kastelli Kissamou (*AR* 1996-7, 122; 1997-8, 126). Few of the unexcavated examples have been subject to detailed surface studies, as exemplified by the Megali Porta Baths at Gortyna (Masturzo & Tarditi 1994-5) and the sea-bathing establishment at Sitia (Davaras 1974).

Despite these problems there are some notable exceptions where systematic excavations were conducted and it is largely owing to these that any patterning can be formulated. Regardless of the difficulties in assigning dates to the bathhouses of Crete, contemporaneous distributions can generally be proposed.

16.3 The Earliest Roman Bathhouses on Crete

Evidence for pre-Roman public bathing on Crete is, at best, scanty. The potential for *gymnasia* at the large baths at Gortyna constitutes the only possible cases for continuum from Hellenistic to Roman within secular bathing contexts in Crete. This study has established that the earliest Roman bathhouses on Crete date from the turn of the 1st century AD i.e. Trajanic. Eight examples of Trajanic bathhouses throughout the island have been recognised. They seem to be strategically located, designed to act as controls and models for the indigenous communities. They are situated at Gortyna (B 18), Knossos (B 55*), Lappa (B 33), Khania (B 42), Kouphonisi (B 3), Minoa, Makriyalos and Myrtos (**fig. 11**). It has been argued that the early bathhouses were strategically placed for the highest impact on the rest of the Cretan population and landscape. We have to assume from the archaeological record that nothing like these bath buildings had been seen in Crete before and that their introduction would therefore have advertised and embodied the *delectationes* synonymous with Roman life.

The public candidates, represented by baths at Gortyna (B 18), Knossos (B 55*), Khania (B 42), Lappa (B 33) and Kouphonisi (B 3), are strategically placed at previously important Hellenistic centres.⁹⁷ At Gortyna, the central sector of the Praetorium Complex was only converted into a bath complex following a serious destruction in the second half of the 1st century AD (La Rosa 1990, 431; *AR* 1990-1, 68).⁹⁸ The earliest phase of the Megali Porta Baths is slightly later, dating to the Hadrianic period. This establishes the Praetorium Baths as the longest sustained baths on the island continuing in use from the Trajanic period until the 7th century AD (albeit as a much reduced module at this stage).

The suggestion of an early bath at Knossos is tentative, as it is only attested through its disarticulated remains (B 55*; see 18.2). Nonetheless, the presence of a Roman bathhouse in the colony at an early date in the history of the province would

⁹⁷ The bathhouse at Ini was originally dated to the Julio-Claudian period but this has been discarded in favour of a late 2nd century AD date (see 14.4.1)

⁹⁸ It was originally thought that the oldest part of the ruins of the *praetorium* dated to the 2nd century AD; however, Guarducci did not exclude the existence of an older *praetorium* while remaining evasive regarding the chronology of the whole 'semel atque iterum ... refectam' (IC IV p. 11).

present a fitting context for the introduction of Roman bathing to Crete as an institution.

The bathhouse at Lappa (B 33) represents the only unexcavated example within the group and has been dated according to the dimensions of its brick facing (Livadiotti Rocco 2000, 63-4). The large bath in Khania (B 42) has been dated through architectural phasing which indicates that the bath was already destroyed by the 2nd century AD when it was truncated by the construction of a stoa (Markoulaki 1990, 440).

The site at Kouphonisi is thought to represent the Hellenistic site of ancient Leuke (Papadakis 1983b, 58). It could be argued that the island's purple dye industry (which had become considerably lucrative in the Hellenistic period) was a decisive factor in the location of the Roman city on the island with the export of purple continued into the Roman period (Haggis 1996b, 201).

The private sites along the coast in this early distribution might reflect the role of trade. The bath-suite in the villa at Myrtos (B 5) was initially thought to date to the Late Antonine period (*ADelt* 29b², 1973-4, 908); however, the brick-faced mortared rubble and mosaic evidence suggested an earlier construction phase attributable to the late 1st or early 2nd centuries AD (Livadiotti Rocco 2000, 63-4; Sweetman 1999, 116, no. 58, pls 88-92). At Minoa (B 40), Raab has judged the villa as 'Early Roman' although its use, like all the sites mentioned here, continued into the late 2nd century AD and after (2001, 113). The Trajanic coin at Minoa, the presence of Hellenistic pottery and a Doric capital attest the longevity of the site location, although the villa itself was only established under Roman circumstances.

16.4 Cretan Bathhouses Constructed in the 2nd century AD (after the Trajanic period).

Major exponential growth in bathhouse construction on Crete occurred in the post-Trajanic 2nd century AD (**fig. 12**). Baths constructed in this century generally enjoyed a functional life lasting at least a century and in some instances surviving until the 6th century AD. There are several cases where a destruction date could not be ascertained, as represented by the bathhouse at Kastelli Kissamou (B 48) which was

definitely still in use in the 3rd century AD but perhaps longer.⁹⁹ Similarly, the bathhouse in Plateia Metropoleos at Khania (B 44), and the private villa of Pachyammos (B 8) were constructed in the 2rd century AD but their terminal dates are unclear.

16.4.1 Bathhouses dating from the 2nd until the 3rd century AD

It has been established that numerous baths built in the 2nd century AD continued in use over several centuries; however, some functioned for brief durations such as examples at Knossos (B 14), Eleutherna (B 28) and Khania (**fig. 12**). The private bath constructed at Knossos in the 2nd century AD was in disrepair by the 3rd century AD when intense stone robbing took place (Wardle *unpublished manuscript*). Wardle has proposed that a severe earthquake devastated the Roman city early in the 3rd century AD, as illustrated by the destruction of the Villa Dionysus (*unpublished manuscript*). A crack running through the massive wall of the public bathhouse (B 15) for its entire 6m height attests both the destruction of this bathhouse and the severity of the earthquake.

The Large Baths at Eleutherna (B 28) were probably constructed in the 2nd century AD but are so distinctly different from any other bath on the island that it is difficult to establish their place in any progressive sequence. The reused Hellenistic statuary retrieved from the bath was found in a 3rd-century AD destruction deposit which confirms the bath's abandonment at this stage. The private bath at Eleutherna (B 30) was subject to a violent destruction in the 3rd century AD, as indicated by the debris from the collapsed upper storey among which were 58 copper coins dating predominantly to the mid-3rd century AD (Themelis 1994-6, 269). Similarly, the smaller bath in the car-park in Khania (B 41) only enjoyed only a century of use although the reasons behind its sudden cessation are not clear (Markoulaki 1991-3, 206).

16.4.2 Baths dating from the 2nd until the 4th century AD

There are only two examples of bathhouses of this duration on Crete: the

⁹⁹ There is a possibility that this bath was actually constructed in the 3rd century AD, on the basis of its ceramic record, but the claim has not been fully explained in the report (Andreadaki-Vlazaki 1991-3a, 228).

baths at Chersonisos (B 10) and Kato Asites (B 16) (**fig. 12**). Sanders comments, rather unhelpfully, that the bath at Kato Asites lies 'earlier rather than later' in the Roman sequence (1982, 70); however, the dimensions of the brick-faced mortared rubble in the plunge-baths suggest a 2nd-century AD construction date (see 14.4.1). The 5th-century AD date for its conversion into a chapel is based on the comparability of its plan with the 5th-century AD martyrium at Gortyna (Sanders 1982, 113). Nonetheless, while its conversion dates to the 5th century AD, theoretically the bath could have been abandoned long before this.

The same argument can be proposed for the bath at Chersonisos over which a late-antique *triclinium* was constructed (B 10). The bath must have been abandoned by the 4th century AD when the *triclinium* was built reusing many of its architectural elements. It is possible that the bathhouse went out of use well before the construction of the *triclinium* and the sequence only represents a very loose horizon.

16.4.3 Baths dating from the 2nd until the 5th (and later) centuries AD

Only three bathhouses survive in use for this prolonged period and as such represent significant entries: the bathhouse at Stavromenos Chamalevri (B 26), the Megali Porta Baths at Gortyna (B 19) and the Small Bath at Eleutherna (B 29) (**fig.** 12). The bathhouse at Stavromenos Chamalevri demonstrates clear successive stratified phases from the 2nd until the 5th centuries AD (Andreadaki-Vlazaki 1991-3b, 246; 1991, 430). The Megali Porta continues in use into the 6th century AD and maintains its general layout throughout (Di Vita 1990-1, 447). The Small Bath at Eleutherna continues in use until the 6th or 7th centuries AD but undergoes a radical alteration in the 4th century AD when the two twin hypocausts are abandoned (Themelis 2002, 49).

16.5 Cretan Bathhouses Constructed in the 3rd century AD

The 3rd century AD witnesses the continuation of many of the bathhouses constructed in the previous century but also sees the construction of at least three more projects represented by baths at Lappa (B 34), Vizari (B 25) and Alpha (B 27) (**fig. 13**). The Lappa and Vizari examples are dated solely in terms of mosaic style (see 12.2.3) whereas the bath at Alpha is dated on even more unsatisfactory grounds

i.e. on the basis of surface finds (Vanos 1994-6, 290). The more dubious examples of baths attributed to the early 3rd or 4th centuries AD, as represented by Belli's plans of structures at Lappa and Lebena, must be excluded (see 11.3.1-2).

Moreover, Sanders' description of a bath at Malia must also be disregarded (1982, 147). Sanders' association of the alleged bath with an *opus signinum* floor prompted Sweetman to include this as a 3rd-century AD mosaic in her catalogue (1999, 154). On visiting the site in 2002 it became apparent that the structure is a cistern (A 6), not a bath, while no mosaic could be associated with the structure at all (**plates 8a-c**). Nonetheless, the identification of spacer pins by the present author in the storeroom at Malia indicates the presence of a bath somewhere in the general marsh area. The spacer pins in question were retrieved from a trench sunk through the floor of the basilica by van Effenterre in the 1970s while many others were collected more recently by the Malia Survey.

16.6 Cretan Bathhouses Constructed in the 4th century AD

Baths continued to be constructed on Crete in the 4th century AD and later (**fig. 14**). The construction of the baths located at the T-junction at Gortyna is the most securely-dated example (B 20). This bath was founded over an Imperial *nymphaeum* and was subsequently overlaid by a late-antique cemetery. These two stratigraphic events secure the bath's duration between the 4th and 6th centuries AD.

One of the large baths at Aptera might also be attributable to this century (B 38). The chronology of the baths at Aptera has been referred to only in the vaguest of terms; they were considered 'Late Roman' by Sanders (1982, 167, fig. 60) and 'Byzantine' by Drerup (1951, pl. 66). A close analysis of the stonework of the wall elevations of the western bath (B 38) would support a 4th-century AD date, although may represent later construction phases (see 14.6). There are some indications that the foundations might be significantly earlier. Certainly the use of spacer pins in the smaller eastern bath (B 39) would suggest an earlier date (Livadiotti Rocco 2000, 64).

The bath at Kastelli in Khania has similarly been assigned to the elusive 'Late Roman' period but the deductive processes are not clarified in the report (B 43)(Tzedakis 1978, 368). The argument for a 4th-century AD construction date for one of the baths at Kastelli Kissamou (B 49) is ambiguous. The construction date is based

on the presence of forty copper coins, most of which can be assigned to Constantine II in the *hypocaustal* area (Tzedakis 1979, 397; *AR* 1987-8, 76). Conversely, it is equally possible, in the light of the ruinous condition of the bath, that the coins point to a destruction, rather than construction, date.

16.7 Baths with no Assigned Date

Numerous baths on Crete exist as passing mentions in the published record, including those at Ano Zakro, Oleros, Hierapytna, Nibretos, Sybritos, Platani Soudas, Ligortynos, Plaka Kalis, Plakias, Loutro, Lissos, Koleni Kamara, the unsubstantiated baths associated with the 'Semi-Circular Mosaic' and the 'Temple Baths' (B 54*) at Knossos (Hood & Smyth 1981, 43, nos 115 and 121). Moreover, many of the chronological accounts are so general as to render them useless, such as the original reference to a bath at Preveli which is assigned a 'Hellenistic-Roman' date (Platon 1947, 638) with little further advancement on this date in recent years.

At Kastelli Kissamou, the bath in the Papadaki Plot (B 50) is described only very briefly with no attempt at establishing its date (Tzedakis 1967, 498-9). Similarly, no date was offered for the bath in the Aspetaki Plot at Chersonisos (B 9)(Englezou 1991, 402; Mandalaki 1999, 252-3), although its architectural construction suggests a 2nd or 3rd-century AD date. The bathing installation at Sitia (B 2), although published and planned, has not been dated (Davaras 1974). Other installations throughout the island were dated only by a *terminus post quem*, such as the bath at Loutro whose functional life was interrupted by the tectonic activity of the late 4th century AD.

16.8 Earthquake and Natural Phenomena; Effects on Cretan Baths

Natural phenomena can radically influence settlement patterns. Seismic activity substantially affected the settlements in Crete in the 4th century AD. There is some debate regarding the nature of this event. Seismologists such as Thommeret *et al.* support a single tectonic event in the 4th century AD while other scholars relate it to a series of events occurring between AD 365 and 460 (1981, 127-149). Regardless of its exact character it can be confidently stated that such activity, resulting in tectonic uplifts in the geology around the island, must have wrought dramatic repercussions on the bathhouses on the island.

Elsewhere in the Empire the cessation in the use of bathhouses is also attributed to seismic events. An inscription dating to the second half of the 4th century AD informs us that Furius Togius Quintillus, freedman of Gaius, funded a copious water supply to the Thermae Pentascinenses at Tarentum. The cause for such euergatism was that an earthquake had interrupted the water supply for the baths and, consequently, they did not function for a considerable, but undefined, span (*ILS* 5700). Similarly, at Allifae in the Matese Mountains in Italy, a governor restored the baths in AD 352/3 which had previously been destroyed by earthquake (Ward-Perkins 1984, 34).

Pliny too comments on the effects of earthquakes on water supply, claiming that sudden shifts could cause water to emerge or disappear from the surface. He reports this occurring several times around Pheneus in Arcadia and on Mount Korcycus, where a river dried up after such an event. He records that when Arcadia in Crete (possibly Arkades/Afrati; see Detorakis 1994, 99, no. 21) was stormed many springs and rivers in that region dried up only to reappear six years later when the town was rebuilt (Pliny *NH* XXXI xxx). Pliny attributes this phenomenon to cultivation of the soil, although its dramatic nature would be more characteristic of a seismic event.

Earthquakes constituted a threat to the island throughout the Roman and lateantique periods. Gortyna was rebuilt on several occasions as the result of seismic
activity. The Praetorium Complex suffered some catastrophe in the second half of the
1st century AD leading to a remodelling which incorporated the new bath complex (Di
Vita 1990-1, 431). In AD 415 an earthquake again destroyed the town while in AD
448 the Byzantine chronicler John Malalas wrote that 'in this year the state building –
unusual for having twelve rotundas – of the metropolis of Gortyna collapsed' (cited in
Detorakis 1994, 113). The collapse of the barrel vault of *caldarium* 13 (in the early 6th
century AD) has also been attributed to a seismic event on the basis of the
arrangement of the collapsed bricks (Livadiotti 2000, 808). Gortyna was again subject
to major earthquake damage which destroyed the city after AD 666-8.

Despite such intense sequences of seismic events, the 4th century AD is particularly renowned for intense earthquake activity. Zonaras mentions that during

¹⁰⁰ The text does not indicate who was attacking the city.

the years of Constans I a 'trembling of the earth' damaged many of the prefectures of the Roman Empire (*Compendium of History* XIV 19B). The Greek writer Libanius wrote that in the year AD 365 a violent earthquake shook the region of Cyrenaica 'like a restive horse, shaking off its back ... all the cities of Libya' (cited in Di Vita *et al.* 1999, 186-7).

On Crete the 4th century AD is characterised as a period racked by seismic activity affecting the entire island, as opposed to isolated or contained events. The dramatic nature of the event is expressed by modern scholars with Di Vita referring to a severe earthquake which 'destroyed Crete' in July AD 365 (2000a, 12) while Detorakis couples the AD 365 earthquake with a tidal wave (1994, 112). In AD 382-3 the *praeses* Ecumenius Dositheos Asklepiodotus erected a *kainon praetorion*, a new autonomous tribunarial basilica, to replace the one destroyed in AD 365 over the demolished northwest corner of the Praetorium Baths (Di Vita 2000a, 13). This would also have coincided with remodelling of the Megali Porta which has also been attributed to restructuring following the AD 365 earthquake (Masturzo & Tarditi 1994-5, 266). This restructuring is a significant alteration for a building which otherwise maintained the integrity of its original design for all of its functional life.

Several locations along the coast show clearly the effects of seismic activity. A seemingly single seismic event in the 4th century AD certainly raised pockets of west Crete by 3m to 4m; however, recent studies have shown that the tectonic effects were diverse with uplifts or depressions occurring even within tight catchment areas. Recent studies at Lissos, in west Crete, have revealed a dramatically sunken Roman harbour (Khatzidaki *forthcoming*). This change in the harbour levels is contemporary with damage to the temple in the 4th century AD (*Ena* 3/7/91, 90) and, as such, would have directly affected the associated bathing activity and establishments.

Several locations along the coast of Sphakia, not far from Lissos, indicate a dramatic uplift. At Loutro the effect was particularly dramatic where the uplift rendered the shallower western harbour unusable. Prior to the event, the harbour on the west side of the peninsula offered an ample anchorage, well-protected from storms and was probably the only winter harbour in Roman times according to the accounts of the voyage of Saint Paul (*Acts of the Apostles* 2.7.9; *IC* II xx 7). The cause of the abandonment of the baths at Loutro has been attributed to the uplift in the area which

is likely to have affected the water-table and cut off springs.

The springs at many coastal sites were contaminated by seawater due to seismic shifts. In the area of Minoa a downward shift can also be detected geologically where a large rock-cut cistern, furnished with descending steps, today holds only brackish water (**plates 37a-b**). The seismic shift would have had drastic effects on the nearby villa and its bath-suite (Jennifer Moody, pers. comm. 2000).

At Kastelli Kissamou the evidence for an earthquake in the 4th century AD is striking. In the Health Centre excavations, the skeleton of an individual carrying a glass container was discovered under wall-collapse in the kitchen of a private house (*Kathimerini* 31/1/93). This event may explain the possible cessation of two of the city's baths at this point. At Eleutherna three skeletons found in House 1 were also crushed by an earthquake which occurred between AD 360 and AD 370 (Themelis 1988, 300, pl. 6a; 2002, 75). At Kouphonisi (B 3) Leonard interprets a series of rebuilding, evident in the masonry of the bathhouse (which he refers to as 'building 1') as repair work necessitated by seismic disturbances (1972, 360). The interior of the apsed wall of pool Δ exhibits a 1m-long vertical crack which passes through brick, stone and mortar alike.

Other natural phenomena could be associated with such dramatic seismic activity on the island. These include massive landslides and erratic weather patterns. The Khania Plain was subject to a tremendous, and possibly abrupt, phase of erosion and deposition during the Roman period between AD 100 and 400 (Moody *et al.* 1990, 15). The sedimentation formed a substantial layer (2m-6m thick) which obscured earlier remains in this area. The deposit overlies Roman walls while the foundations of pre-medieval structures have not been identified over it. The correspondence between the general dates of the Roman sedimentary event and the date proposed for the great tectonic uplift suggests that the two events are related. It is quite possible that a serious seismic event could trigger off such a substantial landslide. It could also be argued that this sedimentation obscured evidence for the Roman aqueduct around the hinterland of Khania.

16.9 Conclusion

The study of distribution changes over a time-curve reflects the

dissemination and development of Roman bathhouses on Crete from their introduction in the late 1st century AD until the end of the 4th century AD, by which time the island undergoes a series of pattern changes. The Roman bathhouses belonging to this period on Crete form a cohesive group governed by a well-defined cultural *milieu* which bind them into a tangible framework for study. It is well documented throughout the Empire that the construction, life span and decline of these monuments were closely correlated with the life of their associated cities.

It can be deduced from a diachronic study of Roman bathhouses on Crete that Roman baths as an institution were introduced to the island in the late 1st century AD. This introduction was followed by intense bath construction in the 2nd century AD and this *floruit* can be clearly detected in the distribution maps relating to this century (**fig. 12**). The thirteen examples constructed in the 2nd century AD should be viewed along with the eight built in the 1st century AD which would yield a minimum total of 21 datable baths in use in the 2nd century AD. Moreover, many of the undated baths show architectural characteristics common to the securely dated 2nd-century AD examples and could feasibly fall within this date range, hence the total could rise dramatically as there are over 30 undated (or unsatisfactorily dated) examples. This Cretan *floruit* complies with general trends and Nielsen observes that in the Eastern provinces most baths were built in the 2nd century AD and presents this as evidence for prosperity and peace in the Roman Empire at this time (1990, 98).

The 3rd century AD is generally perceived as a period of decline throughout the Empire. Sanders presents a sweeping decline from the 3rd to late 5th centuries AD on Crete which he attributes to a series of earthquakes (1982, 30); however, the seismic destruction at Knossos in the 3rd century AD seems to represent a contained event which did not have an island-wide effect, as experienced in the 4th century AD. Some slight decline is detectable after the apparent dynamism of the 2nd century AD in the strikingly sparse presence of Cretan names in 'international' records of the 3rd century AD (Baldwin Bowsky 1995a, 52). Yet arguments for dramatic economic recession in Crete during the 3rd century AD are not persuasive despite some general adherence to trends within the Eastern provinces at this time.

Nielsen attributes the lack of construction in the 3rd century AD in the province of Asia Minor, which would usually signal demise, to a lack of need after

the extensive building activity in the first two centuries AD (1990, 98). The case may be paralleled in Crete where nearly all the baths built in the 2nd century AD continued in use into the 3rd century AD. The increase of baths in the area around Eleutherna (as represented by baths at Alpha and Vizari) reflects the development of a satellite network surrounding the main city.

The 3rd century AD saw an almost equal number of bathing installations as were in use as in the 2nd century AD. Indeed, a veritable boom in private building is evident in the west of Crete as represented by the lavish dwellings of Kastelli Kissamou. This residential area was thriving and it is logical to assume that private bath-suites will be discovered in future excavations in this elite quarter of the city.

It could be postulated that decline on Crete be more comfortably attributed to the late 4th century AD when most of the interruptions occur. Dramatic island-wide decline is specifically a feature of the later 4th century AD, as wealth is certainly attested in the first half of the century by the town-houses at both Chersonisos and Kastelli Kissamou which were still in use. The late 4th century AD sees a decline of profound proportions in the number of communal bathing installations across the island. This coincides with a general decline in sites throughout the island.

Admittedly, in certain areas of the island decline is apparent throughout the century. Raab, in her assessment of Watrous' survey of the western Mesara, notes that there was a clear decline in site densities throughout the 4th century AD, with only one-quarter of the former number showing evidence of 'Late Roman' occupation (2001, 29). Sweetman observes that in the 4th century AD there is a sharp decrease in mosaic numbers and distribution on the island, which is only reversed with the introduction of Christianity and the new church-building programme of the mid-5th century AD (1999, 399).

The decline in bathhouse construction probably narrowly precedes the boom in basilica building in the 5th century AD and in fact the two phenomena may be connected. Previously, Christianity had made almost no archaeological impression on the island except for the conversion of the temple of the Pythian Apollo at Gortyna and probably the early basilica at Olous (Sanders 1982, 133). The Temple of Pythian

¹⁰¹ This 4th-century AD decline is also attested elsewhere in the Empire. In Campania roads, harbours, drains, aqueducts, villas and field systems fall into disrepair (Arthur 1991, 102).

Apollo at Gortyna constituted possibly the most important pre-Roman temple on the island and was known throughout the Greek world (Detorakis 1994, 95). The temple was converted into a three-aisled basilica which continued as the religious centre of the city until c. AD 600 with the construction of Aghios Titos. A change in burial custom also accompanied this basilica-building horizon with simple cist burials becoming predominant.

Throughout the Empire other significant changes in lifestyle are reflected in the notable increase in private villa sites, and perhaps slightly later, villages rather than villas. Another element often found in the urban villa at this stage is the private bathhouse, sometimes added on to an existing structure. At Ostia, wealthy homeowners distanced themselves from the masses that frequented the public bathhouses by equipping their large houses with expansive baths complete with hypocaust systems and private latrines (Hirschfeld 2001, 261).

These changes are not tantamount to complete discontinuity between the Roman and late-antique period and in the more prosperous cities a degree of progression is apparent. At Gortyna a new installation, constructed in the 4th century AD (B 20), actually functioned simultaneously with the Megali Porta Baths and the Praetorium Baths, attesting the dominant social place bathing retained in the capital. The Praetorium Baths continued from the Trajanic period until the 7th century AD constituting the longest-operating Roman baths on the island. At least one of the bathhouses at Aptera was in use, if not constructed, in the 4th century AD, while the smaller baths at Eleutherna (B 29) and Stavromenos Chamalevri (B 26) also continued into the 5th century AD and later.

Communal bathing never ceased completely in Crete and remained popular well into the medieval period; however, the type of public bathing which emerged after the 4th-century AD decline was of a modified nature, regulated by different social conditions and standards. The 4th-century AD watershed was prompted by a series of catalysts including seismic activity and climate change leading to inevitable social and economic decline. A closing juncture was reached with the introduction of ecclesiastical architecture to the Cretan landscape in the early 5th century AD. This study technically ends with the impending imprint of Christianity, yet it is not the end of public bathing in Crete and the distributions of late-antique baths over the island

demonstrate that the activity transcended the social circumstances which heralded its introduction. These later baths have been grossly neglected by previous scholarship and the identification of many more examples of late-antique baths throughout the Cretan landscape can be anticipated as the study of bathing develops.

CHAPTER SEVENTEEN

THE WATERSHED AND THE RISE OF PUBLIC BATHING IN LATE ANTIQUITY

17.1 Introduction

The present work concentrates on the baths of the 1st to 4th centuries AD on Crete; however, this chapter will focus on the baths of late antiquity in order to emphasise that public bathing survived the decline of the 4th century AD. The inclusion of late-antique baths in this work serves to emphasise the fact that although communal baths are emblematic of all things Roman, they are not exclusively a Roman phenomenon. The practice continued into late antiquity and finally remerged in Islamic and Turkish variations. These later versions share such common elements with the Roman format that they are often interpreted as the ultimate product of the Roman archetype (Yegül 1992, 350-1; Arthur 1999, 142).

Continuation of the bathing practice on Crete is attested by the construction of baths at Gortyna, Aptera and at Phaestos. The significance of these constructions lies in the specific timing of their foundation, coinciding with the introduction of Christian architecture to the island. At Gortyna the plan of the baths constructed in the 4th century AD (B 20) can be comfortably grouped with Sanders' compilation which includes the Panayia Bath, the Zevgolatio Bath and the Lechaion basilica baptistery (1999, 474) (**fig. 70**).

Other Roman baths, which were originally constructed between the late 1st and 4th centuries AD, survive into the 5th century AD breaching the traditional social transition. These enduring examples convey how deeply ingrained the tradition of public bathing was during the Roman period on Crete. Such longevity may be expected at Gortyna, the Roman capital, where the tradition was most strongly established.

It is specifically the new bath foundations of the 4th, 5th and 6th centuries AD that demonstrate acutely the perseverance of this well-established facet of Roman life under the auspices of the Church regime. These baths represent an ecclesiastic tolerance, if not an adoption, of this Roman institution ensuring that public bathing continued in Crete into the Second Byzantine (i.e. AD 961-1204) and Venetian periods (AD 1204-1669), albeit under altered perceptions and with a considerably diluted ablutionary fervour checked by Church tenets. Its perseverance is clearly attested at Herakleion by a well-preserved bath dating to the 11th century AD (*Prote* 13/6/90; *AR* 1990-1, 68).

It was not until the Ottoman period that public bathing regained an intensity comparable with the height of the Roman period. Unfortunately, Turkish baths on Crete have never been studied as a collective group, but glimpses of their former prevalence throughout the island are afforded through historical documentation. Pashley's casual commentary on the excellence of the *hamam* of Herakleion, when compared to the average *hamam* in Khania, shows them to have been commonplace features within the urban landscape (1837, I, 183). During the Ottoman period the churches in Herakleion (113 Orthodox and 16 Catholic) were either destroyed or converted into baths, mosques, storehouses, barracks or even public latrines (Detorakis 1994, 387). Illegitimate infants were often exposed in the doorways of *hamams* or mosques in Crete by the *kapatmar* or *peslemer* (Detorakis 1994, 269). The social connectivity of baths and mosques illuminates their correlated central role in Cretan communities at this time.

17.2 Public Baths in Crete in Late Antiquity

This study technically ends with the close of the 4th century AD; however, the endurance of the practice of public bathing on Crete into late antiquity is relevant on two levels. Firstly, such a continuation demonstrates that the practice, and hence its architectural manifestation, was sufficiently ingrained to survive beyond its formative circumstances. Secondly, any differences between the two bathing constructs (i.e.

 $^{^{102}}$ The *kapatmar* or *peslemer* was a Christian woman who cohabited with a Muslim without sanction of a lawful marriage.

Roman and Late-Antique baths) serve to consolidate the Roman baths into a cohesive group, determined by common social spheres of influence, which are distinct from those of the superseding thematic variation.

Gerola is the only past scholar to address the late-antique baths of Crete (1932-40, IV, 76-7). He recognised their potential throughout the Cretan landscape observing that besides wells, cisterns and reservoirs, there were also the enigmatic ruins where their purpose for retaining liquids is attested by their mortar-lining (Gerola 1932-40, IV, 76). He admits that while these structures could be confused with πατητήρια (grape-presses) it is equally likely that they could represent 'balnearie', dating back, not to the Venetian, but to the 'Byzantine' epoch. Gerola cites 'Byzantine' bathing establishments at Silamos, Phournopharangi, Aghios Ioannis (Phaestos) and two near Kanli Kastelli; one known as Khamamakji and another near the church of Santo Giovanni Battista at Roukani (1932-40, IV, 76-7) (fig. 14). Conversely, Curuni and Donati cite only the bath, that of Saint Antony at Silamos, in their related work on Venetian architecture (i.e. covering AD 1204-1669) (1988, 442, no. 1336).

17.3 A Change of Attitude towards Bathing in Late Antiquity

Despite the efforts of John Chrysostom, Patriarch of Constantinople, who finally issued a total condemnation of the baths at the end of the 4th century AD, an ideological dichotomy persisted regarding bathing activity. Undeniably, with the rise of Christianity the nature of bathing was fundamentally altered, as its previous practice as a luxurious pastime was in direct conflict with the teachings of the Church where modesty, frugality and self-denial were espoused as virtues. Washing was generally discouraged in the name of modesty (Maas 2000, 39-40) culminating in the formation of the sect of *Alousia* (the Alousioi being the unwashed), particularly popular in the East during the 4th and 5th centuries AD, who underlined baptism as the only acceptable form of Christian bathing (Yegül 1992, 318).

Yet bathing continued to be tolerated, albeit preferably as a necessity rather than a luxury, as is evident from the writings of those even in the uppermost echelons of Christianity. Pope Gregory the Great (writing in AD 590) tolerated baths if they were 'for the needs of the body', not 'the titillation of the mind and for sensuous

pleasure' (Ewald & Hartmann 1891-99, I, xiii 3). Similar views are perceptible in an inscription placed by Leo I over a fountain which he erected in the atrium of St. Paul-Outside-the-Walls in Rome declaring that

'Water removes dirt from the body; but faith, purer than any spring, cleanses sins and washes souls. You who enter as a suppliant at the shrine of Saint Paul, made holy by his merits, wash your hands in the fountain' (cited in Ward-Perkins 1984, 141).

Attitudes were clearly ambivalent within the Church, and the admonitions of Chrysostom were not strictly heeded. Double standards developed concerning the habits of leading Church figures and the upper tiers of society, where the prestige associated with the bath had not been lost. Saints such as Basil and Gregory Nazianzen indulged in heated baths (Saint Basil *Letters*, 137; Saint Gregory *Letters*, 125-6) while Sidonius Apollinarus, Bishop of Clermont in AD 471, owned facilities for hot and scented baths fitted with a semi-circular bathing pool. If the tradition of luxurious bathing disappeared among the people at large, it was deliberately maintained at the Imperial court (Mango 1981, 340-1). Yegül claims that Imperial and episcopal palaces and residences were purposefully equipped with private baths almost to the same degree as their pagan prototypes had been (1992, 319). In late antiquity substantial baths were still being constructed in the furthest cities and provinces of the Roman Empire, being attested at Vienna, Trier, Badenweiller, Sanxay, Paris, Nîmes, Arles, Thamugadi, Carthage and Volubilis amongst others.

The association between the institution of bathing and the Church was very strong, and it is often within the context of monastic complexes that extant late-antique baths survive. Bathing complexes are intact in the monastery of the Virgin near Derbenosalesi at Kaisariani in Athens (Argyropoulo 1962, 71-5). The bathhouse of Santa Chiara in Naples predates the monastic environment in which it is set, therefore constructed before AD 1313 (Arthur 1999, 141), and its deliberate inclusion within the confines of the monastery is symptomatic of the Church's adoption and manipulation of the activity, even at this late date. Their popularity is conveyed by Ward-Perkins' observation that 'the baths were in late antiquity much the most

popular area of what remained of secular public buildings' (1984, 128), a claim which has been subsequently reiterated by Mango (2000, 934).

17.4 Bathing Adopted by the Church

Ward-Perkins observes that the new Christian patronage catered not only for the clergy themselves but also for the needy and the sick (1984, 138). It is perhaps in this light relevant that Sanders attributes the decline of the 4th century AD in Crete to both seismic activity and plague (1982, 447). Duncan-Jones comments on a seeming duality of plague and earthquake in the ancient sources (1996, 110). Detorakis rather bleakly includes incursions, famine, plague and earthquakes under the heading of 'Main Historical Events in the Early Byzantine period' on Crete (1994, 112). If the after-effects of earthquake catastrophes triggered plagues then Crete would have had its fair share of pestilence.

Leprosy was originally endemic only to Egypt and Israel, and possibly also to Persia, but its subsequent spread was correlated to the decline of the hygiene habits of antiquity. The establishment of special baths for lepers was part of the general effort of the ecclesiastical and civil authorities of the Early Middle Ages to contain the disease. In keeping with the charitable image projected by the early Church, bishops and emperors built leper asylums from the mid-4th century AD (Mazor 1999, 302).

The situation was aggravated by the fact that, following earlier precedents, law forbade lepers to enter the *forum* or to use the public baths (John Chrysostom *Consolatio ad Stagyram* III, 13, *Patrologia graeca*, 47, col. 189). The setting apart of a special bath for lepers became mandatory and often the position of these baths was well outside the city. This seems to be reflected at Scythopolis, where a 6th-century AD inscription, attributing baths to lepers, was located 70m beyond the southeastern corner of the ancient city-wall in the direction of the springs (Avi-Yonah 1963, 326). Its findspot intimates that the position of these baths complies with the segregation suggested above. Similarly, at Gadara (Israel) the lepers' baths, known as the Baths of Elijah, are located three miles from the city (Maas 2000, 39). The same principle can be traced in the injunctions of medieval writers to avoid public baths for fear of contracting plague. This is taken to an extreme in the 14th-century AD regulations of Dijon and Rouen stipulating alternate days at public baths for men, women, Jews and

actors (Fagan 1999, 185, 207, n. 54; Vigarello Concepts 29).

On Crete the bath at Aghios Ioannis at Phaestos has recently been interpreted as a lepers' bathhouse which refutes Taramelli's original claim that the structure represented a villa (La Rosa & Portale *forthcoming*; Taramelli 1901, 426). This reidentification is particularly relevant to the present study since its construction has been attributed to the 5th or 6th centuries AD. Consequently, it represents one of the few baths to be newly constructed at this crucial transitional juncture between Roman and late antiquity on the island (**plates 79a-c**).

Furthermore, the fact that the bath at Aghios Ioannis near Phaestos is located close to a later baptistry has resounding significance since sites dedicated to Aghios Ioannis (Saint John) were imbued with the potential to redeem and cure. Bathing in the River Jordan, and at baptismal sites in general, was regarded as a sovereign cure for leprosy according to Gregory of Tours (*De Gloria Martyrum* 18) (Avi-Yonah 1963, 326). A foundation inscription dating to AD 1303, found near the baths at Phaestos, recalls the inauguration of the rebuilt church at the site of the baptistry and notes significantly that it was located at the toponym of Elleniko Loutro (Greek Bath) (Vasilakis N.D., b, 90-1). At Aghios Ioannis in Arcadia, a church was built directly over a Roman bath which is also associated with the toponyms Elleniko and Loutro (Philadelpheos 1931-2, 58-70). It may also be relevant that the late-antique bath recorded by Gerola at Temenos on Crete is also located near the chapel of Santa Giovanni (1932-40, IV, 76, fig. 53).

By inference, it is equally feasible that baths were closely correlated with baptisms *per se*, rather than represent a measure to contain leprosy or disease. The specific correlation between 'Aghios Ioannis' and bathing in late antiquity may be rooted in the liturgy itself. The architecture of some baptistries demonstrates that a ritual bath was a necessary prelude to baptism, a physical cleansing to prepare for a spiritual cleansing. At Cuicul (Djemila) a small bath-suite is included in the west part

¹⁰³ It is clear from Sieber's description of the miserable huts occupied by lepers outside the wall of Khania that leprosy was rife on the island in the early 19th century (cited in Pashley 1837, I, 262, n. 16). The disease continued unabated until the early 20th century when it had become endemic in Crete; a situation which is poignantly portrayed in Spratt's accounts of the lepers' villages on the island (1865, I, 265-273). Among the first public health measures taken by the government of the Cretan State was the effective protection of the people from leprosy. A special hospital was founded in 1903 on the island of Spinalonga securing isolation of, and health-care for, the victims of the disease (Detorakis 1994, 407).

of the baptistry, while at Tipasa (Algeria) there are baths behind the baptistry. At Thamugadi they form part of the baptistry itself (Wilson, A.I. 1997, 143). A curious reference by Gerola to an unidentified structure near the Khamamakji bath in Temenos near 'Santa Giovanni Battista' is also enticing in this respect (1932-40, IV, 77, n. 1).

In the baptistry at Boutrint (Albania) a hypocaust was used to heat the baptismal water according to the liturgy (Volanaki 1976, 87). The hypocaust and cistern were discovered between the inner circle of the baptistry and its outer containing wall. Similarly at Thasos, a hypocaustal element has been proposed for one of the rooms in the baptistry (Orlandos & Delvoye 1949, 552-3; Volanaki 1976, 99) while other water-heating constructs have been identified at Basilica A at Thebes and at Delos. These examples demonstrate that certain functional formats which were primarily associated with bathing structures, transcended their secular bathing contexts.

17.5 Ambiguity in Early Church Design

The extent of the permeation of late-antique baths through the landscape of Crete has gone largely unexplored, if not completely unnoticed. The factors obscuring their presence in the Cretan landscape must be addressed. A degree of ambiguity and reticence in Church attitudes towards the baths is reflected in the architectural bath structures of late antiquity. It may not be coincidental that Gerola states that the bath, known merely as Khamamakji, could easily be mistaken for a church yet traditionally it was known, not as a church, but as a bath (1932-40, IV, 77).

Similarly, the bath at Silamos is popularly referred to as the church of Saint Antony and to all outward appearances is a chapel (Gerola 1932-40, IV, 77). It is tempting to associate this bath with a reference in the *Catasticum Ecclesiarum* mentioning a bath in Candia (*balneum de burgo apud S. Antonium*) which belonged successively to Romeo Griglioni and Nicolo Stadi (*Catasticum Ecclesiarum* V. B. M.: Lat, IX, 179). The fact that this manuscript is essentially a corpus of ecclesiastical architecture of suburban Candia in the 13th century AD indicates that the baths mentioned constitute church property. The fact that most baths were dedicated to a saint and that they are easily confused architecturally with churches suggests that they

have a dual significance.¹⁰⁴ Two more Cretan baths are actually known to have been in use in the 12th century AD from their inclusion in another Church document (*Codice Diplomatico Veronese* I no. 242). The fact that baths are included in these two documents demonstrates that they were considered Church property which might imply that the bathing conducted therein was performed in a sacred context, perhaps indicative of an association with baptism.

It has been established in the preceding chapter that the decline of the 4th century AD was immediately followed by the introduction of Christian architecture to the island. The introduction of ecclesiastical architecture corresponds with the decline in the use of the Roman bathhouse (although public bathing establishments persisted into the medieval period) heralding a significant change in the cultural heritage on the island at this watershed. Christian merchants are recorded on Crete in AD 431 when there was large-scale conversion from Judaism to Christianity after a false messiah instigated a mass suicide (Maas 2000, 203-4).

The interface between sacred and secular architectural contexts was not clearly defined in the early history of Christianity with baptisms often conducted in Roman baths in the 2nd century AD (White 2000, 738). The *Martyrdom of Justin*, relating to the mid-2nd century AD, reveals that the Christians customarily met in rooms above the baths and it has been suggested that the associated baptisms occurred downstairs in the baths (White 1990, 110).

Even as the sect stabilised the distinction between chapel and bath architecture remained equivocal. There seems either to have been a concerted effort to build the churches directly over the Roman baths or to model the late-antique baths on church architecture. Both methods herald the appropriation of the practice by the Church and their control over the activities therein.

The reuse of Roman bath foundations, which effectively preserved the preceding monument and was witness to its supersession, represents an interesting phenomenon encountered in the ecclesiastical architecture of Crete. The trilobate bath at Kato Asites represented the best Cretan example as it was converted into the chapel of Aghia Katerina in the 5th century AD (B 16) at a pivotal point in the island's

¹⁰⁴ Rowland suggests that in Sardinia the association of saints' names with Roman baths dates to the late Imperial period (2001, 132-3).

transition to Christianity.

The correlation between bathhouse and church architecture is a recognisable partnership open to various nuances of interpretation within the landscape of Crete. Whether this symbiosis merely reflects an expedient architectural complement or whether the connection is a symbolic manifestation is difficult to prove. Volonaki adopts a pragmatic approach, identifying water sources as the cogent determinant for the location of baptistry sites (1976, 12), a determinant which is naturally also a major concern for bath placement.

Conversely, White argues that attitudinal factors were among the considerations to assess in choosing a building to adapt and that the community's perception of the initial building was pivotal to its conversion (1997, 22). The Church effectively used the bathing landscape of Crete as a palimpsest for its own devices and the stamp of ecclesiastical architecture over bath sites served to obfuscate the older traditional presence in that exact location. Such manifest supersession maintaining spatial continuity is clearly significant in terms of public meaning. Salzman claims that as the staunchly pagan urban elite gradually turned to Christianity over the period of the 4th and 5th centuries AD, emperors and bishops responded positively to their desires to maintain pagan spaces as a link to the past and their role as civic leaders (1999, 123). He states that Christian sacred space was monumentalised in areas deliberately distinct from pagan sacred space (Salzman 1999, 127). Surprisingly, he makes no reference to the baths as an optional area for continuation within a secular context.

White observes that the basilica, derived from civic halls, Imperial palaces and classical hypostyle architecture, was modified to cater for the new social position of the Christian Church under Imperial patronage (1990, 18). Equally, the architects of the earliest basilicas of the Empire could not ignore the architectural potential offered by the dimensions of some large baths. Their position in the public heart of the Roman cities, their social familiarity and their relative religious neutrality compared to temples all present a tempting platform for the construction of the new basilicas. Mango states clearly that the Roman bath chamber was the architectural predecessor, not only of the late-antique bath, but of the Byzantine Church as well (2000, 934). White reports that a series of medieval churches in Rome revealed the

presence of bath foundations indicating their suitability for basilical church buildings (1990, 18-20). It can be argued that while Christian basilicas were ultimately derived from a range of Roman architectural prototypes, the solidly-built Roman bathhouse (specifically the *basilica thermarum*) was a favoured focus for conversion.

Nonetheless, such pragmatic considerations cannot explain the motivation behind all of the architectural conversions, some of which seem to indicate more symbolic interpretations in the transformation processes of this architectural space. Significantly, in Crete it is not only the basilicas but also the later smaller chapels which were superimposed on the defunct vestiges of the baths. Unlike the earlier basilicas, these chapels had little dominance of place and were not monumental enough to avail of the potential offered by the larger bath architecture with the majority of chapels occupying only one compartment of the earlier bath. In Thessaloniki, Aghios Dimitrios is built over a Roman bath (Volanaki 1976, 99), while on the island of Kos two churches were built in the West Thermae c. AD 469, one over the *frigidarium* and the other over the *caldarium* (Volonaki 1976, 119-121). It can be hoped, if not expected, that more churches hold the (yet undiscovered) remains of Roman bathhouses.

In the Athenian Agora Frantz observes two distinct categories of structures designed for worship dating to the 5th, 6th and 7th centuries AD (1988, 72). He regards totally new structures for worship, such as basilicas and temples, as earlier in the sequence, and various ancient monuments converted into churches as later (Frantz 1988, 72). White similarly observes that in the post-Constantinian era new churches were often founded 'by loosely adapting existing buildings to a rudimentary basilical plan', as occurred at Ostia where a bath was combined with an adjacent building to create an assymetrical basilica (2000, 730). This architectural progression was not exclusively a Christian phenomenum. In the 3rd century AD at Sardis the Jews were presented with a portion of the municipal bath-*gymnasium* and in the course of one century they converted the structure into an elaborate basilical synagogue; however, White attributes this architectural conversion to influence from developments within Christian architecture at the time (2000, 731).

Wharton notes that parallel to the conversion of the populace of the city is the conversion of the city's space (1995, 102). At Gaza, Porphyrios reports that marble slabs from the ancient temple's Holy of Holies are deployed as paving stones for the street leading to the church (Caseau 2001, 32). This is not an insignificant use of stone but rather a public display of *spolia* and Mark the Deacon points to the deliberate defiling of the marble slabs, placing them where they would be trodden upon by men, women and animals.

In Jerash, the Artemision ceased to operate only in the 5th century AD and actually functioned concurrently with the neighbouring Christian cult up until this juncture. Subsequently, it seems to have been inserted into the expanded territory of Christianity as a ruin and a quarry (Wharton 1995, 98). The desolation of the Temple of Artemis announced unequivocally that the goddess was gone forever, signifying the perpetual and public dominion of the Christian deity. In this case it seems that such ostentatious destruction manifested a reification of power (Caseau 2001, 39-40).

The overlap between these architectural formats on Crete is an interesting observation as it could be argued, especially for the 5th-century AD conversions, that the absorption of bath structures into the Christian architectural repertoire contributed to the survival of the bath building beyond the demise of its formative dynamics. By the same token, its familiar and accepted spatial context might also have accelerated the acceptance of Christianity throughout the island and, indeed, the Roman Empire.

It could be argued that in Crete the purposeful overlay of ecclesiastical architecture on Roman bathhouses was both pragmatic and symbolic. Water was a fundamental and essential element for both architectural types, and bathing, regardless of its nature (be it spiritual, symbolic or pragmatic) was an activity common to both contexts. The *Didache* clearly establishes the centrality of baptism in the Christian cult before Constantine and it may be of no coincidence that the churches most strongly associated with baptism, such as those dedicated to Saint John the Baptist, are located over Roman baths. The baptismal areas of the subsequent ecclesiastical structures signify a denouncing of the old regime and absolution from any pagan associations for both the site and the initiates. The overlap in the ablutionary activities (secular and sacred bathing) forms the crux for the longevity of place and the acceptance of the new order. The cogency of such transitional architecture is that the space is transformed to project an altered aspect which both captures and manipulates the memories accommodated within. In this respect the late-antique baths of Crete

represent the potent afterlife of Empire envisaged by Alcock (2001, 350).

17.6 Later Conversions

Distinctive dynamics are responsible for the later partial conversions of the bathhouses into chapels. Like Crete, Sardinia yielded an abundance of baths converted into churches. Pautasso interprets such adaptations as motivated by the fact that people were accustomed to gathering and socialising in Roman baths and that this magnetic social role would persist in their church conversions (1985, 224). Yet Rowland rejects Pautasso's theory on the grounds that there was a gap between the baths' abandonment and the foundation of the churches and argues that the architecture of the baths was a rational choice for the new foundations (2001, 105). Certainly the Crusaders' reuse of the Arab *hamams* for the construction of their baths was owed to strictures imposed by the established water supply which still incorporated the ancient aqueducts (Prawer 1977, 186).

Nevertheless, given the extent of the phenomenon in Sardinia, it is tempting to view the attraction of the ruins in both pragmatic and symbolic terms, even when incorporating a notable time lapse, as this does not necessarily undermine the potency of message displayed through the conversion. Vassilakis-Maurakakis records over 1,000 churches dating from the 14th and 15th centuries AD in the hinterlands of Crete (1986, 66-70). These churches were funded by the elite families in the areas with close ties with the Byzantine Church and its monks. While associations between the foundations of these establishments and Roman bathhouses cannot have had the same impact or purpose as the modifications of late antiquity, these later Greek churches had a vital role in strengthening Orthodox religious feeling and in fostering the ethnic identity of the Greek rural population. Consequently, any placement over the ruins of Roman structures (as at Koleni Kamara) may reflect an aspect of the Venetian desire to stress the continuity between the island's precolonial society and the advent of the Venetian colonists in the 13th century AD. This would also present a comparable model for the transition between Roman and late-antique Crete.

Substantially later conversions such as those of the baths at Aghios Nikoloas at Lappa (B 33), Aghia Triada at Ligortynos (B 13) and at Koleni Kamara (B 52) do not involve such tight sequentiality. The cause and effect of these later

transformations are not immediately recognisable. The church of Aghios Nikoloas is founded upon late 1st or early 2nd-century AD bath foundations. At Koleni Kamara (B 52), a compartment of a Roman bath was converted into a Venetian chapel. The resulting juxtaposition of the reused Roman brick and the inserted *bacini* over the lintel of the doorway lends intricacy and charm to the chapel (**plate 78b**). The original brick-faced mortared rubble of the Roman bath is visible in the foundations of the chapel (**plates 78a-d**). The area was excavated in recent years, revealing an extensive bathhouse, although the site is as yet unpublished.

Bath foundations are evident in the medieval church of Aghia Triada at Ligortynos (B 13) and the conversion seems to represent a late feature within the life of the monument. The church is largely collapsed but the presence of an earlier bath is intimated by brick-faced mortared rubble and marble columns incorporated into the elevations (plate 54c). Platon recorded a hypocaust, heating and ventilation pipes and a type of cistern within the cruciform area of the church (1952, 479). The fact that the site is also known as Loutres and Baptisteres in conjunction with the baptismal connotation of dedications to Aghia Triada (Volanaki 1976, 17, n. 1) is suggestive of a bathing association (Platon 1952, 479). Moreover, an emphasis on water is evident in the succeeding ecclesiastical site through the presence of fountains and water channels in the immediate vicinity. Considerable sedimentation on the site since Gerola visited covers many of these details. The extent of the clay deposit is clearly demonstrated through a comparison of Gerola's photographs (plate 55c) with those taken in 2003 (plates 55a-b). Field-walls and stone basins, clearly evident in Gerola's photograph of one of the fountains in the immediate vicinity of the church (plate 55c), are now no longer visible (plates 55a-b). In fact, it is only from studying Gerola's photograph that the structure could be identified as a fountain house at all as the photograph reveals the three stone collection basins embedded in the ground in front of the edifice (plate 55c).

17.7 Late-Antique Baths in the Cretan Landscape

Both the literary sources and the toponymic record of Crete indicate the potential for future discoveries of late-antique baths on the island. There are striking discrepancies between the written record and the evidence in the field. Archaeological

research regarding late-antique baths in Crete is negligible despite indications that bathing in late antiquity was widespread. Monastic remains from the First Byzantine period (AD 330-824), where baths would surely have existed, have not been found on Crete (Detorakis 1994, 119) and Gerola classifies only five baths as Byzantine (1932-40, IV, 77).

Rackham and Moody observe that most place-names on Crete were established in the 'Byzantine' and Arab periods (presumably from AD 330 until 1204) allowing for little subsequent change (1996, 108). Their testimony redresses a bias in the written history, as the multiplicity of place-names related to bathing is often the only evidence of a tradition otherwise imperceptible.

Toponyms often indicate areas for washing or bathing, many reflecting baptistries of late-antique date (**fig. 15**). Gerola's brief account of baths of the 'Byzantine period' includes a list of place-names derived from the Greek word *loutro* (a bath). He cites the port of Loutro in Sphakia, a 'Lutra' in the province of Rethymnon and two 'Lutrakji' in the province of Canea and Malevisi respectively (Gerola 1932-40, IV, 77).

The present study has secured the presence of bath remains at numerous sites with toponyms relating to baths or bathing. This architectural affirmation negates Gerola's fears that the names may have derived through analogy with the physical topography rather than from the existence of real baths (1932-40, IV, 77). Gerola's reference to a 'Lutra' in Rethymnon must refer to the Roman bathhouse found in the locale of Stavromenos Chamalevri located in the area of Loutra (fig. 15, no. 6). The toponym of Loutraki in the area of Khania must reflect that of the Roman bath at Loutraki-Minoa (fig. 15, no. 4; Raab 2001, 110-3). The most famous Loutro on the island is that of the harbour constituting the main focus of the Sphakia Survey (fig. 15, no. 3). The site of Finikias-Loutro just west of Plakias may also be associated with a bath recorded in the vicinity by Tzedakis (fig. 15, no. 16) (1976, 372; Markoe 1998, 241 discussion; also marked on a sketch published by Hood & Warren 1966, 183, fig. 9). Spratt visits a Palio Lutro near Preveli which perhaps relates to the Roman bath recorded here by Platon (fig. 15, no. 5) (Spratt 1865, II, 269-70; Platon 1947, 638). The Bay of Lebena was known as Ormos Loutra which undoubtedly reflects the nature of the site in Roman times (fig. 15, no. 15; Vasilakis N.D., b, 11 on map). The

exact location of the cisterns and aqueduct reported from the area of Kastelliana was pinpointed at the locale known both as Loutra and Sternes (**fig. 15**, no. 10) (AA 1916, 156). The toponym Sternes (Cisterns) must relate directly to the cisterns, although no associated bath has been attested.

An area known locally as Loutres just east of the modern village of Mochlos also yielded the remains of a late-antique barrel-vaulted cistern (fig. 15, no. 14) (Jeffrey Soles, pers. comm. 2001). The toponym suggests that this is also a good candidate for a late-antique bath (plates 80a-c). The complex consists of a barrel-vaulted cistern associated with a series of outlying walls in a levelled area. A late-antique occupation has been recorded in the general Mochlos area and another barrel-vaulted cistern is evident on the islet itself associated with substantial housing (Soles & Davaras 1992, 442-3). The structure at Loutres (directly opposite the islet) could represent a bathing installation comparable to that at Aghios Ioannis at Phaestos.

Platon informs us that the site of the church and Roman bath at Ligortynos was known as Loutres or Baptistires (**fig. 15**, no. 9) (1952, 479). Similarly, the area around the bathhouse at Phaestos was also called Lutra/Loutres and Baptistira (**fig. 15**, no. 7) (La Rosa & Portale *forthcoming*; Vasilakis N.D., b, 90). The latter may refer directly to the church establishment on the site or a bathhouse discovered in the fields around the village of Aghios Ioannis in the area Ellenika Loutra (or simply Loutra) (Sanders 1982, 161). Taramelli reports that near the church of Aghios Paulos, known by the peasants as the $E\lambda\lambda\eta\nu\iota\kappa\acute{o}\lambda ov\tau\rho\acute{a}\kappa\iota$, a semi-circular basin was found 'still entirely lined with painted pottery' and he concludes that it was probably a bath or a reservoir for water (1901, 426).

The partnership between the toponymic record and actual bath remains implies that the presence of a bathing-related toponym, when no bath is extant in the field, is a strong indication that such a monument existed. Consequently, the site of the village of Loutraki north of Ano Viannos could be a strong contender for a bath although no architectural attributions have been associated with the name (**fig. 15**, no. 11) (Nowicki 1999, 167; 2000, 136). Similarly, another Loutraki in the *eparchia* of Temenos is marked as both Ano and Kato Loutraki on the 1:50000 maps of Crete (Sheet 10 *Iraklion* and Sheet 19 *Arkhanai*) but it is yet to be associated with any architectural bathing remains (**fig. 15**, no. 8). Likewise, the Loutra marked on

Bousquet's map of the promontory of Spinalonga, located on the summit overlooking the basilica at Olous from the east (Bousquet 1938, pl. XLII) could also indicate a bathing area (**fig. 15**, no. 13).

This proliferation of place-names associated with bathing is to be expected in a region studded with so many examples of the associated architectural type. Some examples clearly attest Roman baths (as at Minoa, Stavromenos Chamalevri and Loutro in Sphakia), but others demonstrate definite associations with late-antique remains (as at Aghios Ioannis at Phaestos) suggesting that such toponymic distributions are the remnants of a widespread and durable bathing practice.

Moreover, several churches incorporate Roman foundations of unidentified Roman structures which could possibly be baths. In Amari, the church of Aghios Ioannis (located 7km south of Ano Meros) represents a potential candidate where the remains of an unidentified Roman building were reused in the church (Sanders 1982, 162, no. 12/15). A similar conversion is evident at Aghia Sophia, 1km west of Aghios Ioannis, which also reuses a Roman structure, the masonry of which stands 3m high at the southwest corner of the church (Dunbabin 1947, 188; Hood et al. 1964, 78; Sanders 1982, 162). At Sybritos, the mosaics of the basilica in the plateia indicate that it overlies a potentially important building (Sanders 1982, 114). Similarly, Sanders suggests that the basilica at Malia is built over a 4th-century AD structure (1982, 147). Certainly, van Effenterre described floors in the deep trench dug through the basilica (1976b, 530), yet there is no conclusive evidence that these earlier layers pertain to a bath building despite the discovery of several spacer pins from the area (personal observation). At Lyttos the church of Aghios Georgios on the southern peak was founded over a 2nd-century AD structure, associated with painted wall plaster, although again its identification is not secure. At Vasiliki, in east Crete, Sanders also records that the basilica was built on top of an earlier important, but unidentified, building (1982, 140, no. 2/13). This clear propensity towards converting Roman foundations into ecclesiastical structures adheres to the model previously outlined in this chapter.

17.8 Conclusion

In the light of the ambiguity surrounding the dynamics motivating the

construction of late-antique baths, the factors supporting the tradition should be outlined. It is often claimed that the earliest baths under the late-antique regime were patronised under the auspices of charity for the poor, and basic hygiene associated with Christian ritual cures (Ward-Perkins 1984, 135). Such motives have been offered to explain the new clergy's adoption of the bathing ritual, and although this could be argued at a more developed stage in the establishment of Christianity, it seems doubtful that these were the initial incentives. The tight sequentiality (bordering on synchronicity) for the dramatic decline in baths at the end of the 4th century AD and the introduction of church architecture on Crete is not merely coincidental. The conscious reuse of bath architecture by Christian authorities betrays a design to harness old traditions and institutions to the new regime, in order to ease transition and to present Christian architecture as a familiar and attractive alternative to the local population. There can be little doubt that the exploitation of a well-established familiar tradition, such as public bathing, won favour for the new religious regime.

Ward-Perkins notes that there were fundamental differences in the role of the new baths which mostly catered for the poor and the clergy themselves, while a large portion of society was not catered for at all (1984, 140). Roman baths were an integral part of society, but it seems that the new baths were not so firmly focal. La Rosa and Portale's suggestion that the small late-antique bath at Phaestos was a lepers' bath would imply that the bath serviced the outcasts of society and was essentially asocial. This seems to be reflected in the environs of Aghios Ioannis where a decline in the Roman settlement on the rise of Phaestos is followed by fragmented rural habitation in the lowlands (La Rosa & Portale forthcoming).

Furthermore, the link between illness and bathing is thought to have shaped the design of the late-antique baths (Ginouvès 1955, 150). It was believed that the precept of isolating disease was reflected by movement away from collective social bathing to spatially distinct individual areas within the complex and Ginouvès recognises this trend in the 4th-century AD baths at Epidauros, Delphi and Argos (1955). Nonetheless, this model is marked with inconsistencies, and although the picture might be supported by the current limited evidence in Crete, indicative of small and rural bathhouses catering for the poor and diseased, it is not strictly upheld by evidence elsewhere.

Corinth tells a different tale where although the Panayia Bath, built in the 6th century AD, is relatively small, it constitutes an elaborate and centrally-located bath serving the city (Sanders 1999, 475). Their presence, together with the simultaneous restructuring of the Lechaion Baths, confirms that the city's population was not so drastically reduced by plague and earthquakes as previously posited. The erection of these baths casts doubt on the theory of a demographic exodus incurred by Slavic invasion (Sanders 1999, 475). On the contrary, the numerous later baths (two others being built in this period and four in the 11th and 12th centuries AD) attest the city's longevity and the entrenchment of the bathing tradition (Sanders 1999, 473). ¹⁰⁵

The evidence for thriving bathing traditions at Corinth highlights the ambivalent and contrasting formats for bathing in the late-antique and medieval world. The Corinthian paradigm stands as an important contradistinction to that of Crete, where the meagre late-antique evidence paints a picture of a much-declined tradition under the patronage of the Church. This picture could radically alter when a deeper appreciation of such monuments in Crete develops, as has happened at Corinth.

In conclusion, despite the varying tolerance with which the clergy regarded bathing, the practice continued. Its perseverance attests the pivotal position of bathing in Roman society and pays credit to the calculations of the Church in absorbing this architectural context in introducing the new order. The adoption of the bath by the Church secured the survival of the bath as an institution, and ensured its established position in late-antique society.

¹⁰⁵ Similarly, at Patras, while the town undoubtedly shrank 'in the last period of antiquity', new baths continued to be founded (Petropoulos & Rizadakis 1994, 205).

CHAPTER EIGHTEEN

ROMANISATION AND ITS MANIFESTATIONS

18.1 Introduction

The study of aqueducts and bathhouses of Crete as a window onto Romanisation examines the extent of the dissemination of Roman influence throughout the island recognisable to both the modern scholar and the inhabitants of provincial Crete two millennia ago. It is apparent from the evidence presented in this thesis that Roman aqueducts and bathhouses were lasting and widespread architectural institutions in the Cretan landscape. Given their preponderant and diverse distribution on Crete it remains to explain how such constructions reflect the nature and extent of Roman influence on the island. How does their presence in the landscape portray the pervasiveness of Roman influence, regardless of whether that change is manifested in Hellenisation, Romanisation or urbanisation?

18.2 Romanisation and Architectural Change: Colonia Iulia Nobilis Cnosos

Forster notes an overlap between Hellenistic and Roman periods in the ceramic record at Knossos and observes that the majority of the pottery dating to the mid- to late 1st century BC was classified as Hellenistic on stylistic grounds (2001, 137). Eiring also reports that the repertoire of Hellenistic shapes continued unaffected by the change in political status and prevailed throughout the 1st century BC (2001, 91). Sweetman pushes the horizon even later claiming that the real change in pottery types came at the end of the 1st century AD (*forthcoming*). Yet, Forster's findings seem to contradict this, as he claims that *Eastern Sigillata A* became a standard import at Knossos during the 1st century AD and that the Italian wares peaked in popularity by the middle of that century when a competitive alternative *Eastern Sigillata B* gained a more dominant position in the Knossian markets (2001, 139). Forster's

commentary would suggest that the change occurred earlier in the 1st century AD than Sweetman has suggested.

Downs minimises the relevance of local imitations of *terra sigillata*, maintaining that they indicate only that the inhabitants used a widely diffused type of locally-produced Roman pottery (2000, 209). He is emphatic that it cannot, and should not, be used to ascribe cultural or ethnic identity to the user (Downs 2000, 209). While this may be true, the imitation of Roman wares in local clays is surely the ultimate compliment to Roman culture as expressed in terms of a dialectic development and in itself would be a strong indicator of cultural receptivity. Pottery is not necessarily an 'ethnic marker', yet it signals a significant degree of adoption of Roman material culture.

Architecturally, it is specifically the cityscape with its monumental buildings which visualises concepts of change and any evidence for Roman architecture at Knossos in the 1st century AD would present a solid indication of societal change at an early point in the life of the colony. Sweetman observes that the transformation or Romanisation of Knossos is not apparent architecturally in the 1st century AD and that a complete century passed before Knossos adopted the trappings of a Roman city (forthcoming). Sweetman claims that archaeological evidence from Knossos indicates that the layout and function of specific space remains unchanged from the 1st century BC until the 1st century AD (Sweetman forthcoming). This period of relative architectural conservatism is terminated by a 2nd-century AD horizon of standard monumental Roman types within the cityscape. The majority of Roman architectural structures at Knossos have been dated to the 2nd century AD, but as this is also an island-wide phenomenon it does not necessarily indicate the specific effects of colonisation, as distinct from the processes of Romanisation pertaining to the island as a whole.

Lavish town-houses, such as the Villa Dionysus, and more modest residences, represented by the House of the Diamond Frescoes, do not appear before the end of the 1st century AD. Aqueducts and heated baths, regarded in the present work as key symbols of Romanisation, generally appear at Knossos in the 2nd century AD. The monumental hydraulic structures of Roman Knossos date overwhelmingly to

the late 1st and 2nd centuries AD demonstrating that the architecture only showed a Roman character a century after the founding of the colony.

Nonetheless, there are some Roman architectural features within the city which could pre-date the late 1st or early 2nd-century AD horizon and, intriguingly, they are associated with water. This complies with Nielsen's observation that baths were among the first buildings erected in the colonies and conquered towns (1990, 1). Lolos maintains that every respectable city of the Empire, particularly a colony, would have had elaborate fountains, a number of large baths, and aqueducts supplying the water (1997, 302).

A discovery at Knossos could possibly reflect the existence of a 1st-century AD bathhouse in the city (B 55*). Architectural modifications to the Room of the Polychrome Paintings in the early 2nd century AD incorporate circular *pilae* set on a new floor and other *pilae* and terracotta pipes placed on top of the walls (*AR* 1978-82, 93-4, fig. 27). These elements are commonly found in Roman hypocausts. Consequently, the presence of these reused bathhouse elements in early 2nd-century AD renovations would intimate that prior to this a bathhouse existed in the vicinity.

Similarly, spacer pins discovered in the excavations of the Unexplored Mansion also represent a dismantled bathing installation. The fact that one of these spacer pins, manufactured in local clay, was found in a secondary deposit dating to the late 2nd century AD is again indicative of an earlier bathhouse (Sackett *et al.* 1992, 246, no. R3, 3a, pl. 217). The local production of this Roman element is also reflective of the degree of acceptance of the overall type.

The Apollinaris Mosaic has also been associated with a bathhouse (Sweetman, pers. comm. 2001). This constitutes a significant context as the mosaic represents the earliest mosaic at Knossos, dated to the late 1st or early 2nd century AD by both Sweetman (1999, 82-3) and Sanders (1982, 53), while Ramsden supplies a date in the 1st century AD (1971, 229-231).

In the light of the overall evidence it seems that in architectural terms the Romanisation of Knossos mainly occurred in the 2nd century AD, as represented by the addition of at least two bathhouses (B 14-15), an impressive Hadrianic aqueduct, a theatre, a civic basilica and various sumptuous private houses (some built in the late 1st century AD). The Roman aqueduct tract associated with the North House

excavations is dated by a Hadrianic destruction deposit and also cuts a Severan deposit (Sackett *et al.* 1992, 47, pls 3, 4 and 40a). A 2nd or 3rd-century AD date has been attributed to the civic basilica (Sanders 1982, 68), but the theatre is impossible to date more precisely within the Roman period due to its negligible surface remains.

Despite this predominantly 2nd-century AD horizon at Knossos, evidence suggests that Roman architectural types were introduced in the 1st century AD. The potential for 1st-century AD bathhouses at the site is tantalising and it could be suggested that the architectural type was introduced by an initial small influx of elite Roman settlers early in the life of the colony. The limited nature of the evidence seems to reflect a contained presence rather than an overall change in the nature of society at Knossos. The more secure architectural evidence indicates that the intensive Romanisation of the city only occurs over a century after the establishment of the colony.

18.2.1 Romanisation and Custom Change: Mixed bathing at Ini

The nature and extent of Roman assimilation is revealed by an inscription discovered at Ini laying out separate bathing hours for the sexes (Herakleion Museum no. 346; *SEG* XXVI 1044; Ducrey & van Effenterre 1973, 281). Its social significance secures it as one of the most enlightening discoveries regarding Roman baths on Crete (see 7.2.10). The practice of mixed bathing, as regards women, may have been largely restricted to courtesans and condemned by respectable citizens, although this is a point of heated debate. It was allegedly prohibited by the emperors Hadrian, Marcus Aurelius (Dio LXIX viii 2) and Severus Alexander (Wikander 2000, 572). Ducrey and van Effenterre have attributed the date of the inscription from Ini to the reign of Marcus Aurelius which would accord with the segregation of bathers decreed by Rome at this time (1973, 281). The text of the Ini inscription reveals that Crete was in harmony with the trends of Rome and that its bathing culture adhered to Imperial regulations.

During the reign of Caracalla the mixing of the sexes was re-introduced due to popular demand and the baths, which were usually only used during the daytime, were open all night. Such liberties survived for only a century, since women were forbidden access to the *thermae* by the Council of Laodicea in AD 320, although the

reimposition of such a prohibition by John Chrysostom at the end of the 4th century AD suggests a lapse in adherence to these regulations.

The segregation of the sexes could be achieved in two ways: through the use of a timetable, as at Ini, or through the use of alternative establishments. The inscription from Ini outlines the separate bathing hours for the sexes indicating that women would bathe from (such) an hour to (such) an hour while the men from (such) an hour (Ducrey & van Effenterre 1973, 281). The specific figures are not cut in the stone and were presumably painted on to allow for changes to the prescriptions according to the season. The fixing of a timetable for the opening hours of a public building is a regular occurrence in Roman society, as attested by the regulations of the library of Pantainos in Athens which reveal that the library was open from the first hour until the sixth (Ducrey & van Effenterre 1973, 287). The regulation of a public bath, however, differs appreciably from that of a public library.

This epigraphical evidence suggests a model for the workings of the baths at Ini and the presence of such a timetable implies that there was no need for the architecture to demonstrate distinct areas for men and women. It is usual for women to bathe first, probably in the morning or in the early afternoon, while men entered the same rooms later after they had been vacated. The fact that the Ini inscription omits the hours during which the baths were frequented even makes it feasible for the baths to open overnight.

At Kouphonisi the implementation of segregated bathing may be reflected architecturally in the subsequent addition of a smaller hypocaust to the bath installations. The excavator suggested that its later addition reflects the separation of sexes in bathing practices decreed by Hadrian and Marcus Aurelius and that this area served the female population of the island (Papadakis 1986, 229). This is definitely not the case at Kato Asites, where van Effenterre incorrectly attributed the different plunge-baths to different sexes (1976a, 208). The visible remains at Kato Asites possibly represents a *caldarium* module belonging to a much larger complex as is evident from the fact that foundation walls visibly extend to the southwest from the

The use of running water was limited to times when the baths were open, at other times the supply could be interrupted with the use of a stop-cock (Wilson 2001, 93).

¹⁰⁶ Nielsen refers to the inscription at Ini as a graffito (1990, 135, n. 4). This is misleading as the main body of text survived as an inscription and only the hours were painted.

main rectangular hall (personal observations). In general, the bath architecture of Crete does not demonstrate distinct areas for men and women and it could be proposed that segregation, achieved with the use of a timetable, was the general practice throughout the island.

18.3 Backwater Provincialism or Progressive Hub?

On an island-wide scale a general model of conflicting parallelism in terms of Roman receptivity has been applied to 'city versus countryside' dynamics. The situation seems quite complex, as demonstrated by Baldwin Bowsky who initially derived an overall pattern of backwater provincialism from the onomastic evidence (1995b, 280) only to refute her initial findings in a subsequent article (1995a, 42 and 62). Clearly, the archaeological evidence promoting a more in-depth form of Romanisation is growing exponentially and theories have to be modified accordingly and at the same rate. The initial model presented coastal and urban areas as progressive and Roman-receptive, and interior and rural areas as regions which displayed, in their onomasticon at least, a mixture of conservatism and progressivism. Recent reassessments allow for a more protean concept of Romanisation which was inclusive and far-reaching throughout the island.

An excursus on Sardinia is useful to the present study as it represents an area where a competing model of Roman influence has been applied. Tronchetti envisages a conservative rustic community in Roman Sardinia who upheld the older traditions, only cautiously relinquishing their inherited customs in favour of the novel designs (1987, 246). A more stark difference was perceptible in the large coastal cities which were occupied by the majority of the Roman elite. These urban landscapes were modified according to Roman customs and were furnished with edifices that were typically Roman, yet even in these cases the Semitic substratum could not be completely eclipsed (Tronchetti 1987, 246). In essence, Tronchetti presents a model of backwater provincialism, as defined by Baldwin Bowsky (1995b, 280).

Rowland supports this model for the Early Roman period in Sardinia, which allowed for a 'negotiated syncretism of the two cultures' i.e. indigenous and Roman (2001, 96).

Dyson claims that in Sardinia sites are mainly focused on the coast, a distribution which either represents continuity from the Punic past or new centres that developed in response to Roman administrative and economic needs (2000, 191). Dyson does not refer to Rowland's distribution map of bathhouses in his report claiming coastal preference in Roman times. Rowland's distribution of baths throughout the landscape of Sardinia undermines models of conservatism in the rural landscape (fig. 18: Rowland 1981, fig. 3). It can be deduced, from Rowland's distribution map, that baths constituted the most common Roman remains throughout Sardinia, with 57 examples indicated, many of which are located in the interior of the island (fig. 18: 1981, fig. 3). The fact that each survey conducted in Sardinia in recent years has increased the number of Roman sites, in many survey areas by 600%, might also affect such claims (Rowland 2001, 105). Dyson relates the prevalence of bath structures to the Nuragic tradition of spring cults as much as to any Roman civic improvements (1992, 488). Even so, the bathhouse distributions would thereby reflect a clever facet of Romanisation which purposefully presents the resilient survival of a pre-Roman culture as a tradition which is afforded continuity only through the Romanisation of the rural landscape.

Moreover, as many baths in Sardinia represent villas (Rowland 2001, 183-7), their presence refutes Dyson's observations that substantial remains of villas in the interiors are rare and that most of the villas on the island are coastal or located near cities and therefore constitute *villae maritimae* or *suburbanae* (1992, 488). The explosion of villa sites furnished with private bath-suites throughout the rural interior of Sardinia demonstrates the extent of the dispersal of Roman architecture throughout the interior of the island by the 2nd century AD (Rowland 2001, 105).

The development of the typical villa/farmstead in the countryside surrounding major towns has long been accepted as one of the defining characteristics of Romanisation. Percival notes that modern definitions of the villa have nearly all included a reference to Romanisation (1976, 14). A city-country interdependence is one of the processes of urbanism which established a thoroughly integrated province in the Roman economy (Downs 2000, 208). Roman cities and towns generated

¹⁰⁹ Percival notably omits mainland Greece and Crete from his study (1976), omissions repeated by Smith in his exhaustive account of Roman villas (1997).

satellite systems of Romanised rural centres in their hinterlands by design, as is evident in the landscape around Cosa (Dyson 2000, 192). The villa is a testimony to the success of the Roman model which not only created urban structures but also transformed rural life (Dyson 2000, 192).

Surprisingly, villa sites on Crete have been largely ignored: sites such as Pachyammos have not been properly examined since 1903 (Boyd 1904-5). Yet the presence of at least three satellite villas in the hinterland of Hierapytna portrays the *polis* as a wealthy power in the Early Roman period which played a significant role in promoting Roman administration in the wider rural area. These satellite villas also indicate the extent of the territory of Hierapytna, which has been compared to the combined area of the modern *eparchies* of Sitia and Ierapetra (i.e. *c.* 1,050km²) (Bennet 1990, 202). This hypothesis establishes Hieraptyna's control over the isthmus and, consequently, commercial trade to the east of the island. The location of the villas underscores an interest in commercial regulations while their private bathsuites, water supplies and attractive décor establishes them as a role model for Romanisation to the surrounding populace. It could be argued that the purpose of these villas within the Roman Cretan landscape was to secure Roman administration at key points in the hinterlands of the major cities.¹¹⁰

Lastly, the profusion of bathhouses in Sardinia indicates that Crete is not unique in its abundance of baths. Such densities of bathhouses are not atypical and are reflective of general trends in diverse areas of the Empire. The bathhouse distributions presented in this study should prompt re-evaluations for the Romanisation of Crete, since the distribution patterns demonstrate more effective Roman influence in the interior, and more rural sectors, of the island than previously thought (**fig. 5**).

18.4 Conclusion

It has been argued that in Crete the Hellenistic traditions continued for at least the first century of Roman rule, as exemplified at Knossos where Hellenistic ceramics and burial traditions indicated little change in that century (Sweetman

¹¹⁰ A potential villa at Zaros is also thought to be the summer residence of the provincial governor of Gortyna (Taramelli 1902, 102). Unfortunately, the villa has not been relocated since Taramelli's observations (Sanders 1976, 134; 1982, 22, 155).

forthcoming). Nonetheless, it can be argued that the earliest Roman influence on the island came from Campania via the colony at Knossos and the capital of Gortyna. In essence, the Praetorium Baths represent a simplified version of a prototype that emerged in the 2nd and 1st century BC in Campania (Farrington 1995, 137). At Knossos such Campanian influence is detectable in the earliest mosaics such as the Apollinaris Mosaic, significantly thought to be located in a bathhouse, as the appellation is believed to represent an Italian immigrant due to the frequency of the onomasticon in Campanian inscriptions. The epigraphic record also reveals close links between Knossos and Campania through its frequent use of the *agnomen* Campanus (Ducrey 1969, 846-852; Rigsby 1976, 324; *IC* IV 295; *CIL* X 1433).

The presence of Campanian pottery at Knossos in the 1st to 3rd centuries AD supports such epigraphic findings (Hayes 1983, 97-169; *AR* 1987-8, 88-104; Sackett *et al.* 1992, 147). Whether these links arose because the original colonists who settled at Knossos were from Campania or reflect a wider pattern throughout the island is not yet established. A wider interface is clearly detectable in the Cretan wine trade, with wines from both Lyttos and Aptera becoming available to Pompeii and Herculaneum in the mid-1st century AD (Chaniotis 1988, 75; De Caro 1992-3, 307-312; Baldwin Bowsky 1995a, 50 and 57).

It was only in the 2nd century AD that the architectural components of the island truly reflected its active role in the Roman Empire. It is at this stage that influence from Lycia and central North Africa becomes apparent, demonstrated by the preference for the spacer pin heating system associated with small baths in these regions. Significant features were common to Crete and Lycia and Crete and Cyrenaica, with Crete acting as an intermediary between the two regions. Lycia and Crete specifically share stone-piped inverted siphons and a variety of sculptural trends (Vermeule 1968, 41) while Crete and Cyrenaica demonstrate distinctive mosaic styles and a tight amphora trade network (Marangou-Lerat 1995, 158, pl. xlix; Kondoleon 1995, 329-330; Michaelides 1998, 137).

Both baths and aqueducts were widespread by the 2nd century AD synchronising with a burst of construction throughout this century characteristic of Roman rule. Clusters of bathhouses appear at centres from the 2nd century AD on,

notably at Gortyna, Khania, Lappa, Eleutherna, Knossos and Kastelli Kissamou, while also appearing as isolated constructions throughout the Cretan landscape.

The distributions of aqueducts and bathhouses on Crete display a slight predilection for the coast over the inland pre-Roman sites (**figs 1** and **5**); however, to say that the Romans ignored the interior of the island, as has been previously implied is unfounded. There is a significant number of flourishing inland Cretan cities; these include Ini, Lyttos, Gortyna, Lappa, Elyros, Eleutherna, Sybritos and Axos. There are others of less renown at Plora, Vizari, Kato Asites, Ligortynos and Oleros.

Coastal locations are represented by Kastelli Kissamou (B 49-52), Khania (B 41-44), Aptera (B 38-39), Stavromenos Chamalevri, Knossos (B 15), Chersonisos (B 9-), Sitia, Kouphonisi, Hierapytna, Lebena (B 21-23), Plakias, Loutro, Souia and Lissos. If location alone is considered, as opposed to quantity, there is not such a huge disparity between the number of sites with public bathhouses in the interior of the island and those located coastally (**fig. 6**). However, the coastal sites incorporate a multiplicity of bathhouses and if baths rather than cities are counted, then the statistics lean favourably towards coastal siting. It can be concluded that while the island demonstrates a high degree of Romanisation percolating into the interior there is still a majority of wealthy and developed Romanised centres along the coast. Romanisation may have been initially spurred on by the wealthy elite who had much to gain but was clearly also palatable to the indigenous masses who benefited from the salubrious nature of Roman urbanity.

OVERALL CONCLUSION

The present study has established a profusion of aqueducts and bathhouses on Crete that has hitherto gone unnoticed (**fig. 1**). The study has located at least 52 bathhouses and 23 aqueducts constructed between the 1st and 4th centuries AD. This constitutes a substantial proliferation of both monument types in an area with no obvious Hellenistic prototypes for these architectural formats.

The resulting lush Roman landscape contrasts with the traditional model for Crete which presents the reduction in the number of cities in the Roman period (when compared to the number of Hellenistic city-states) as an economic recession. The extent of the bath-building programme in any given province has been greatly underestimated in the past, as demonstrated by the recent abundance of baths discovered in Lycia (Farrington 1995). On Crete, the slight decrease in site numbers (from the Hellenistic period) does not necessarily reflect an economic down-curve as has previously been suggested, since the surviving Roman centres were clearly larger and more lavishly equipped than their Hellenistic counterparts. Rather, it could be argued that the major cities with developed water supplies exerted a centripetal magnetism drawing demographic movement towards them at the expense of more minor centres. The Roman bath was an integral part of Roman society and is a clear indicator of Romanised centres. Cities which were home to multiple public baths (such as Kastelli Kissamou, Gortyna, Lappa, Knossos, Khania, Chersonisos, Ini, Aptera and Eleutherna) generally represent the most important urban centres.

The factors contributing to this abundance of both baths and aqueducts on the island are regionally and historically specific. The first agent leading to their copiousness is deeply rooted in the island's past history. The number of baths and aqueducts in Crete was directly influenced by the preponderance of cities in the Hellenistic period and their progression into the Roman period. The survival of such urban centres presupposed the construction of public baths, as a bath (regardless of its size) was necessary for civic self-esteem in the Roman period. A bath was a

¹¹¹ Pliny writing in the 1st century AD presents a plethora of cities in Crete (NH IV xii 59).

definitive monument of the Roman city and constituted a measure of civic status, ensuring their construction at the majority of Roman centres. Hence, the density of the distributions of both baths and aqueducts was necessitated by the fact that Crete was an area of numerous yet small cities.

Equally, the high quantity of baths in Lycia may have resulted from the fact that the region was liberally studded with cities in Classical times (Harrison, R.M. 1977, 10). In the Imperial period Lycia continued to be occupied by a large number of relatively small cities, a phenomenon which also occurred in central North Africa (Farrington & Coulton 1990, 67). The parallels between Crete, Lycia and central North Africa is not limited to their abundance of bathhouses, they also exhibited similarities in their preferred bathing model representing regions where the spacer pin heating system was most popular. Moreover, the type of spacer pin common to the baths of Lycia and Crete is identical, intimating similarities in the design of the associated baths.

A second major factor contributing to the number of aqueducts, and hence baths, on Crete is the island's topographic landscape. As aqueducts function on gravity flow their operation relies on the declivities of the terrain which in itself has obvious major, but often overlooked, implications for site placement. The Cretan landscape would fulfill all the basic prerequisites for the ease of aqueduct construction. These needs are relatively basic but they are also landscape specific. Naturally, the aqueduct source has to be higher than the destination to be watered. Consequently, the ultimate criterion of whether a site can be supplied by water is its altitude relative to its source of water. Once this stipulation is met, and it is relatively easily accomplished in most cases, then the process can be fine-tuned. Aqueducts built along valley contours afford the easiest, most economical and rapidly-built means of construction. Therefore, it is ideal, in terms of aqueduct construction, if there is an intervening valley between the source and destination of the water. Fortuitously, in Crete there are perfect geological conditions lending to an almost 'purpose-built' landscape for aqueduct construction which avails itself of the numerous valley contours descending towards the coast. Such suitability is aptly portrayed by the purple passages of Taramelli when he refers to the area of Zaros where the source of the Gortyna aqueduct is located. He observes that

'from the southeast declivities of the higher range of Ida (now called Nida by the Cretans) spreads a copious ramification of valleys, all very steep and rich in springs which uniting together a little above the village of Courtes form a pretty abundant stream which flows by Potamitis and Vori and falls not far from Dibaki into the gravelly and muddy malarious marshes of the Geropotamos. The largest valley has the chief town of Zaros. The salubrity of the place and also its relative wealth are due to the very remarkable abundance of water' (Taramelli 1902, 122).

The ease of aqueduct construction afforded by these topographical and geological conditions naturally contributed to the large number of bathhouses on Crete. The multiplicity of baths in major centres could only be sustained by aqueduct supplies.

However, not only did Cretan urbanisation include a great many baths and aqueducts, but urban plans also accommodated their ease of construction, as reflected in site settlement patterns. In Hellenistic Crete the settlement distributions followed a rigid pattern whereby mainly upland sites incorporated a form of acropolis which had control of one or multiple ports, such as Praisos having control of the ports of Stalis and Sitia (*IC* III vi 7). Conversely, in the Roman period the port sites grew in strength, becoming autonomous cities with the upper sites being often, but not always, abandoned, or at least reduced, in favour of the port. It could be argued that site relocation, or changes in the aspect of the site (when the city slid off its peak to occupy the immediate lower ground) facilitated aqueduct and bath construction, and that this consideration had as much impact on the shift in site patterns as any other variable.

Naturally, there are many components at play and no single dynamic prevails in exclusively determining shifts in site placement but, equally, none can be overlooked. Certainly, an increasing sense of security was an important consideration, as clearly demonstrated in Sicily, where Wilson attributes the gradual decline and abandonment of most Sicilian hill-towns during the later Republic and early Empire to the general inconvenience of life on a mountain when military security was no longer an issue (R.J.A. 2000, 18). Indeed, throughout the Roman world the image of

aqueducts leading directly into the cities conveys the confidently peaceful attitude of Roman citizens (Rakob 2000, 75-6). The presence of aqueducts in the landscape consolidated the image of the *Pax Romana* contrasting sharply with the ominous fortifications in Greece's earlier fragmented and tense state. Coulton observed this development and concluded that

'the absence of earlier Greek parallels for the aqueducts of Rome was not due to poverty, ignorance or inefficiency but to the very obvious dangers of dependence on a visible and vulnerable lifeline from outside' (1987, 73).

The symbolism of Roman aqueducts as a piece of monumental architectural display was a demonstration of the power of Rome, security of place and confidence in duration. The recognition of Roman symbolism in the landscape exuded a perception of control which could be expressed in terms of harnessing and channelling natural resources to serve human needs (Alcock 1993a, 126).

Alternatively, Raab points to a widening of economic parameters as the catalyst for the relocation (and subsequent development) of many Cretan cities to the coast (2001, 33). Indeed, many sites along the south coast of Crete had little or no good agricultural land (e.g. Souia and Lissos) and consequently their prosperity was explained in terms of trade. Sanders observed, when viewing general city distributions, that the most important sites were the big cities on or near the coast (1982, 31). Undeniably, trade made coastal siting most attractive and lucrative and sites on the south coast certainly benefited from the routes that ran along the south coast of Crete from Egypt and Syria to Rome.

However, while Roman sites exhibit a predilection for coastal positioning which can be translated into commercial terms, this does not preclude other motives in site placement. Coastal locations do not exclusively reflect concerns for trade. It is easier to water a city on the coast specifically because it is low-lying, while the positioning of Roman cities within a river delta (the preferred location for coastal Roman cities on Crete) would accommodate aqueduct contour-line construction. Therefore, the shift can also be understood in terms of altitude and valley-contour aqueduct construction rather than purely inland-coastal dynamics. The growing

popularity of daily bathing would have influenced shifts towards the coast where bathing installations could be more easily supplied by aqueducts. Consequently, it is hardly surprising that the high plains of Lasithi and Omalos remain markedly devoid of bathhouses while bathhouse distributions to the far east and far west of the island are almost exclusively coastal.

This dynamic is easily demonstrated on Crete through a study of demographic fluctuations in the eparchia of Kissamos. Polyrhennia was a thriving Hellenistic city-state in this region which fell into decline in the Roman period. The absence of a bathhouse at Polyrhennia signals the demise of this upper city in favour of its thriving port site at Kastelli Kissamou in the Imperial period. An aqueduct, designed to feed the lower city of Kastelli Kissamou, taps springs at Polyrhennia; however, the water demands of the lower city did not preclude the development of a small Roman settlement on the site at Polyrhennia which would have also availed of the spring water. Nevertheless, the overall design for the aqueduct was geared towards the numerous bathhouses of Kastelli Kissamou and the conduction of the water was sure to have acted as a lure in the demographic trend towards the coastal site. It is likely that the centripetal attraction of the lower city with its multiple bathhouses, fountains and sanitation would attract inhabitants at the expense of the smaller and inconveniently-placed upper site. Demographic trends from Polyrhennia towards Kastelli Kissamou were inevitable once numerous baths were constructed following the erection of the aqueduct. The fact that the aqueduct leads to Kastelli Kissamou would afford this city the prestige of its technical achievement and the potential to express itself further through the bathhouse architecture on the site. Nonetheless, this model is not one of purely urban consumption and Roman sites did persist (and were probably encouraged and supported by the dominant city) in the countryside; however, the city which constituted the terminal of the aqueduct stood at a distinct advantage in terms of urban potential.

The density of baths and aqueducts on Crete can be understood as a regional variation on an accepted theme prevalent within the wider Empire. The many functions exercised through these institutions, their widespread occurrence and their long period of existence, serve as prerequisites for their diverse formats throughout the Roman Empire. Despite regional differences dependent on local practices,

architectural traditions and building materials, aqueducts and bathhouses were recognisable as institutions and formed architectural insignia heralding all the *delectationes* which Rome had to offer.

It seems that Roman aqueducts and public bathhouses were recognisably new features in the previously Hellenistic landscape of Crete. There was nothing comparable to these types in the pre-Roman Cretan landscape and their imprint over the Hellenistic palimpsest heralded the dawn of a new era. The presence of these new monument types in Crete was charged with a resonance which would change the course of everyday life on both an ablutional and cultural level. The kudos transferred by such architectural expression would have visibly heightened the status of the associated city among the contemporary centres, not only on a local level but also within the broader Empire (Lolos 1997, 302).

Yet, the specific characteristics of the Cretan baths and aqueducts were that they were relatively less monumental (although perhaps relatively more widespread) than elsewhere. In fact, many Roman aqueducts were not monumental yet still exuded a confident control over their landscape achieved through the creation of a monument of such long-term potential empowered with the *auctoritas* to traverse various territories beyond its civic focus. If the aqueducts and bathhouses of Crete do not provoke the same visual impact as the famous Pont du Gard or the Baths of Caracalla, their affiliation to such imposing models would reify their own resonant symbolism.

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