EARLY PREHISTORIC ISLAND ARCHAEOLOGY IN CYPRUS

EARLY PREHISTORIC ISLAND ARCHAEOLOGY IN CYPRUS: CONFIGURATIONS OF FORMATIVE CULTURE GROWTH FROM THE PLEISTOCENE/HOLOCENE BOUNDARY TO THE MID-3RD MILLENNIUM B.C.

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ABSTRACT

This dissertation studies the early prehistoric cultures of Cyprus from the beginnings to the Chalcolithic-Early Bronze Age transition in the 3rd millennium BC. Its aim is not to provide a culture-historical review, but to define, examine and explain processes of formative culture change in light of island biogeography and new evidence which has accumulated during the last decade.

Current excavations on the South Coast not only indicate what may be the earliest instance of Mediterranean island colonization, but they also hint at the existence of a proto-neolithic occupation prior to the aceramic Khirokitia Culture. This evidence is interpreted in terms of the causality of Quaternary biogeographic conditions and island colonizations by man and animals. Specifically, the discussion addresses the problem of inhibitive factors, the triggers required to overcome them, and the adaptive responses of the founder populations.

Following colonization, excavated and surveyed sites attest to a widely distributed and culturally homogeneous aceramic occupation which lasted for over one millennium before disappearing in a lacuna in the archaeological record. A locational analysis attempts to define the rate of intra-island dispersal of this and the subsequent ceramic cultures, and it is argued that the use of a statistically meaningful sample of datable sites and the demographic trends it evidences contradict the hypothesis of an occupational gap.

The themes of cultural continuity vs. discontinuity and demic diffusion are further explored within the framework of absolute chronology. A date-by-date discussion of ^{14}C determinations for the Formative Period in light of advances in calibration and settlement stratigraphy is put in the context of artifactual and paleoenvironmental data and used as the chronometric underpinning for an explanation of the configuration of culture growth in an early island ecosystem.

Fieldwork data are appended in a *Gazetteer of Early Prehistoric Sites Supplement* and a *Gazetteer of Pleistocene Fossil Sites*.

David L. Clarke *in memoriam*,

Alexandra in loving gratitude

—and for the swimmer in a secret sea.

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CHRONOLOGICAL TABLE

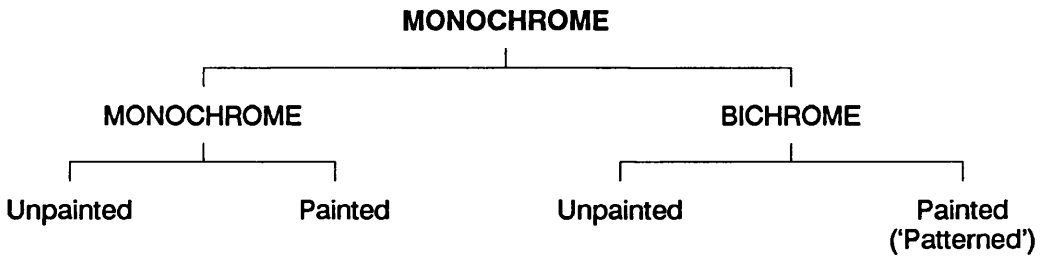
Eras	Periods	Systems/ Epochs	Approximate dates in 10^6 yr BP (isotopic)	Orogenic Revolutions
CENOZOIC	QUATERNARY	Holocene/Recent	0.01	
		Pleistocene	1.6/1.8	
	Neogene	Pleiocene	5	——?——
		Miocene		
	TERTIARY		26	
	Paleogene	Oligocene		
		Eocene		
		Paleocene	65	
MESOZOIC	CRETACEOUS	Late	100	
		Early	136	
	JURASSIC	Late	160	
		Middle	176	
		Early	190	
	TRIASSIC		225	
PALEOZOIC	PERMIAN		280	HERCYNIAN OROGENY
	CARBONIFEROUS	Pennsylvanian		
		Mississippian	345	
	DEVONIAN		395	CALEDONIAN OROGENY
	SILURIAN		430	
	ORDOVICIAN		500	
	CAMBRIAN		570	CHANIAN OROGENY
PRECAMBRIAN			4,550	

Table 1: Geologic Time Scale

KEY TO EARLY PREHISTORIC CERAMICS

1. Primary Classification:

(According to Surface Finish)



2. Wares:

(Main wares in capitals; sub-classes hyphenated; Dikaios' types superseded by new classification in brackets)

Early Formative (KCU-SCU):

C, CW	Coarse
CB	Combed
DFB	Dark-Faced-Burnished
G, GW	Gray
[PCB]	Painted-and-Combed=RW-Cb. or variant of CB
[PW]	Plain White=poss. weathered CB/RL/RW/RW-Cb.
RB	Red-and-Black
RL	Red Lustrous
[Res. Sl.]	Reserved-Slip=RW-Res. (or CB at Erimi?)
RR	Red-on-Red (possibly a variant of RW at Erimi)
RW (i.e., RW-Bl.)	Red-on-White (i.e., Red-on-White Broadline)
RW-Cb.	Red-on-White-Combed (see [PCB], above)
RW-Res.	Red-on-White-Reserve-Pattern
RW-Rp.	Red-on-White-Ripple-Pattern

Late Formative (ECU and ECU-PCU Transition)

BK	Basket
BSC	Black-Slip-and-Combed
BT	Black-Topped
C, CW	Coarse
CP	Coarse-Painted
GB	Glossy-Burnished
Proto-DPBC	Proto-Drab-Polished-Blue-Core
[PW]	Plain White=poss. weathered RW/RL
RB/B	Red-and-Black-Stroke-Burnished
[RB-Lus.]	Red-and-Black-Lustrous=BT and/or RL, or RB/B
RL	Red-Lustrous
RMP	Red-Monochrome-Painted
[R. Sl.]	Red-Slip=poss. RMP
RW (i.e., RW-Cl.)	Red-on-White (i.e., Red-on-White-Closeline)
RW-Ml.	Red-on-White-Miliou (Khrysokhou region)
RW-Gn.	Red-on-White-Ginger (Khrysokhou region)
RMP-Gn.	Red-Monochrome-Painted-Ginger (Khrysokhou r.)

Late Formative-Early Florescent Transition (PCU) and EFL-MFL

BP	Black-Polished
DPBC	Drab-Polished-Blue-Core (South Coast MF)
Proto-DPBC	Proto-Drab-Polished-Blue-Core
PRBP	Philia-Red-and-Black-Polished
PRP	Philia-Red-Polished
PRW	Philia-Red-on-White (=Stewart's WP [Philia])
RP	Red-Polished (=Stewart's RP I+II)
WP	White-Painted (=Stewart's WP I)

EXPLANATORY NOTES

1. Terminology:

The terminology of time used in this dissertation represents a conscious and deliberate break with the traditional Three Age System and its refinement by means of elaborately constructed techno-typological subdivisions. Although still largely entrenched in the Old World, Thomsen's simplistic system and its unilinear view of cultural evolution are increasingly contradicted by regional evidence in various parts of the world as well as being at odds with a more catholic outlook of archaeology in general. Similarly, criticism has been mounting of the long-established and persistent practice of constructing rigid chronological frameworks solely on the basis of classified, and often over-classified, ceramic sequences. There is growing discomfort with the way in which pottery seriation has in the past been transformed from a simple heuristic device into a 'reliable' time-stratigraphic indicator of cultural change, variation and, implicitly, development. This unease is coupled with a growing awareness that periods erected on the basis of ceramic sequence dating alone are little more than artificial templates forced on the archaeological record and a poor reflection of the identities, duration, and transition of entire cultures.

In Cypriot prehistory, advances in fieldwork and an increasingly theoretical, processual approach to interpretation over the last decade have made a critical re-evaluation of traditional periodization and the temporal concepts it implies inevitable. A comparatively subdued terminological debate has consequently been in progress, chiefly concerning the island's earliest prehistoric periods. Proponents of terminological revisions (e.g., Frankel 1988b, Held 1982, Knapp and Held 1990, Peltenburg n.d.a, Stanley Price 1979b) endeavor to move away from a purely idiographic approach to reconstructing culture history and to devise a terminology of time that asserts both the validity of calibrated ^{14}C dating and the applicability of a systemic view of culture. Both concepts are intrinsically opposed to the use of a single, subjectively selected criterion (such as pottery) in order to fabricate temporal units. As novel and unfamiliar (to some at any rate) ideas are wont to do, these proposals have provoked measured as well as occasionally vehement rebuttals by archaeologists working in the 'Bronze Age' and later periods (Merrillees 1985). On the whole, however, the recent pace of discovery has made especially those researching the pre-Bronze Age cultures of Cyprus fully aware of the necessity of matching new

facts with novel interpretation and to engage in a continual and unapologetic process of revising existing concepts and models as further evidence comes to light. The caveat of future revision also applies to the following terminology, which will have served its purpose if it stimulates the current debate and leads to further refinements.

Prehistoric Period: The entire segment of the history of human settlement on Cyprus from the initial colonization (currently at or shortly after the Pleistocene-Holocene boundary) to the time preceding the advent of writing, urbanization, and state formation; i.e., 'Neolithic' through 'Middle Bronze Age'/ 'Middle Cypriot.'

Early Prehistoric Period: The pre-Bronze Age periods; i.e., 'Neolithic' and 'Chalcolithic.'

Late Prehistoric Period: The prehistoric Bronze Age (see infra); i.e., the 'Early Bronze Age'/ 'Early Cypriot' and 'Middle Bronze Age'/ 'Middle Cypriot.'

Prehistoric Bronze Age: Same as the Late Prehistoric Period. The new term 'Prehistoric Bronze Age Culture' takes account of the lack of non-ceramic diagnostic culture traits that would justify the traditional subdivision into 'Early Cypriot' and 'Middle Cypriot.'

Formative (Period): Culture-evolutionary synonym for the Early Prehistoric Period.

Florescent (Period): Culture-evolutionary synonym for the Late Prehistoric Period and the 'Late Bronze Age'/ 'Late Cypriot.'

Early Formative (Period): The segment of the Formative from the initial colonization to the 'Neolithic'-'Chalcolithic' transition.

Late Formative (Period): The segment of the Formative from the 'Neolithic'-'Chalcolithic' transition to the Formative-Florescent (Early Prehistoric-Late Prehistoric, 'Chalcolithic'-'Early Cypriot') transition.

Akrotiri Phase/Focus: An 'epipaleolithic'/ 'pre-neolithic'/ 'proto-neolithic' manifestation at one site on the Southern Seaboard at the start of the Early Formative that appears to precede the earliest 'neolithic' culture, but whose cultural affiliation, duration, and extent remain to be defined.

Khirokitia Culture: The first full-fledged Early Formative, 'aceramic neolithic' culture.

Sotira Culture: The second Early Formative, 'ceramic neolithic' culture.

Erimi Culture: The single culture of the Late Formative, 'chalcolithic' period.

Philia Culture: Culture marking the Late Formative-Early Florescent ('chalcolithic'-'Early Bronze Age'/'Early Cypriot') transition.

Where convenient for the purpose of comparison, denotation or connotation, traditional terms such as 'Aceramic Neolithic' and 'Early Cypriot' are used alongside the new terminology, offset by apostrophies.

2. Place Names, Transliteration, and Spelling:

In line with modern preference, anglicized names for geographic and topographic features are here discarded in favor of their Cypriot (Greek or Turkish) counterparts (e.g., 'Pentadaktylos' instead of 'Kyrenia Range'). Cypriot names are obviously used where no English versions exist (e.g., 'Pitsilia,' 'Marathasa,' 'Solea,' 'Tylliria'). Exceptions to this rule are capes (e.g., 'Cape Kormakiti,' not 'Akrotiri Kormakiti') and instances when the context calls for explicit descriptive terms (e.g., 'Central Plain' instead of 'Mesaoria'/ 'Mesarka,' 'Karpas panhandle,' instead of 'Karpasia'). In the case of several villages having the same name, the modern administrative district is added in parantheses (see **ABBREVIATIONS**, infra).

Sources for the spelling and transliteration of Cypriot place names are varied and unfortunately often contain disparate and inconsistent information. The recently proposed adoption of the U.N. Standard Greek Transliteration System (Christodoulou and Konstantinidis 1987) is at variance with cartographic spelling and phonetically unsatisfactory, and therefore it is not used in this dissertation. The names of villages and towns are spelled according to the current Administration and Road Map of Cyprus (SCARM 1978), while topographic maps (GSGS 1973, TMC 1977) and cadastral plans were consulted for the spelling of toponyms and other geographic names (see notes on the variability of place names in **APPENDIX 2**, Introduction, infra). Many toponyms, which play an important role in the designation system used for archaeological sites in Cyprus, denote land ownership (e.g., 'Perivoli tou [Name]/ tis [Name]'); features of local topography, vegetation, or soil conditions (e.g., 'Pera Moutti,' 'Vrysi ton Teratsion,' 'Asproyi'); loci of specific human activities (e.g., 'Lakkous,' 'Kaminoudhia,' 'Alonia'); or saints, shrines, and local lore (e.g., 'Ayios Yeoryios,' 'Tenta,' 'Neraidhes'). Thus they are an important source of information for fieldworkers (see Swiny 1981 for sample translations of survey site toponyms, Goodwin 1984 for a comprehensive historical toponymy of Cyprus, and Christodoulou and Konstantinidis 1987 for an extensive, island-wide list of toponyms including UTM grid-square coordinates).

3. Site Designation System:

In an effort to standardize the designation of prehistoric and later sites in Cyprus, the widely followed convention now is to assign the name of the village in whose land a site is situated and

add the locality name in italics. The spelling of the toponym, which may be obtained from a cadastral plan, a 1:5000 topographic map (TMC 1977), or from local informants, is usually as published in the relevant archaeological reports (i.e., 'Kaminoudhia,' rather than 'Kaminouthkia,' but 'Mylouthkia' instead of 'Myloudhia').

In addition to a site's name, the existence of an up-to-date inventory of EP sites in the form of the *GEPS* (Stanley Price 1979c) and now the *GEPS SUPPLEMENT* (**APPENDIX 1**, infra) allows the assignation of site numbers. These site, or catalog, numbers can take the following form: a) ordered by administrative district, numbers up to and including N.51, K.90, F.31, La.30, Lm.36, and P.75 refer to *GEPS* entries and higher numbers to *new GEPS SUPP.* entries; b) new 3-digit catalog numbers of the form N/000, K/000, F/000, R/000, S/000, and P/000 are introduced in the *GEPS SUPP.* as an alternative system of consecutive numbers for all EP sites on the island (see **APPENDIX 1**, Introduction, infra).

4. Absolute Dates and Chronometric Dating:

Absolute ages and dates discussed in this dissertation are based on conventional ^{14}C ages, with the single exception of two thermoluminescence dates for the Sotira Culture occupation at Klepini *Troulli* II (#K/037). All ^{14}C quotations are in accordance with international conventions reaffirmed at the 12th International Radiocarbon Conference, Trondheim 1985, and the high-precision calibration curves approved at the same conference are used throughout (Kra and Stuiver 1986). The exception to this rule is the occasional use of lower-case bc for uncalibrated dates and of capital BC for true/ calendric (=calibrated) dates as a space-saving measure. Elsewhere, radiocarbon ages and dates are indicated by capital BP and BC, respectively, true ages and true/ calendric dates (after calibration) by cal BP and cal BC, respectively. The term 'conventional age' (T) refers to a ^{13}C-corrected radiocarbon age (BP), and for reasons explained in the introduction to **APPENDIX 4**, infra, laboratory-quoted errors (1 sigma/1 standard deviation [SD]) are cited only with radiocarbon ages (whether conventional or not, as may be the case).

Error multipliers established for individual laboratories have not been included for lack of information unless stated otherwise.

Laboratory-quoted ^{14}C ages are always based on the short (Libby) half-life of 5,568±30 years, which also provides the baseline for high-precision calibration and 'best estimates' (see below). For the purpose of interpreting the archaeological record, however, uncalibrated ages and dates are, in the following discussion, converted into the more accurate long half-life of 5,730±40 (by

a factor of 1.03). In those instances, the uncalibrated age or date is followed by the designation [LHL]. The long half-life has also been used in the quantile calculations of the ^{14}C dispersions (Table 6) and the ^{14}C dispersion diagrams (Figs. 16, 18) in **CHAPTER 4**.

Marine samples have been adjusted downwards for an estimated Mediterranean Delta R value (reservoir effect) of 690 years and are marked *.

Calibration is based on decadal and bi-decadal datasets for samples of marine and terrestrial carbon sources compiled from historically dated (fossil-fuel adjusted) shells and tree-ring chronologies of German and Irish oak and U.S. bristlecone pine. At the time of writing, the lower (oldest) range limits of these datasets are 7,190 cal BC (ca. 8,580 BP) for MARINE.14C, and 7,210 cal BC (ca. 8,100 BP) and 2,490 cal BC (ca. 3,950 BP) for ATM20.14C (bi-decadal) and ATM10.14C (decadal), respectively. The individual curves from which these datasets have been compiled are referenced in **APPENDIX 4**, infra.

Ages beyond these range limits cannot yet be calibrated but may be expressed calendrically as 'best estimates.' Klein et al. (1982:117) have suggested that 'best estimates' are approximated by the conventional age converted to the long half-life within a single band-width of 2,000 years. Such a large uncertainty at 68.3% is no less depressing to the prehistoric archaeologist working near the Pleistocene/ Holocene boundary than having no 'best estimate' at all. Work is underway, however, aimed at extending currently available tree-ring chronologies, and preliminary data obtained from floating chronologies (Donau 6 Main 4/11 series) and varve sequences (Lake of the Clouds series, Ängermanälven series) already allow the tentative extension of the calibrated time-scale back to 13,300 cal BP. In that part of the curve, true ages appear to be 900-1,000 years older than their conventional ^{14}C equivalents (Stuiver, Kromer et al. 1986).

References for ^{14}C samples published during the past ten years are provided in the entries of ^{14}C-dated sites in **APPENDIX 1**, infra. References for older citations can be found in Coleman (n.d.), Stanley Price (1979c), Toumazou (1987), and in the excavation reports for individual sites.

Modern Dates: All modern dates cited in this dissertation (mainly in **APPENDIX 1** and **APPENDIX 2**) follow the form **Month/ Day/ Year**.

ABBREVIATIONS

1. Publications:

AA	*American Antiquity*
AJA	*American Journal of Archaeology*
AR	*Archaeological Reports*
ARCA	*Annual Report of the Curator of Antiquities (Cyprus)*
ARDA	*Annual Report of the (Director of) the Department of Antiquities (Cyprus)*
AS	*Anatolian Studies*
BASOR	*Bulletin of the American Schools of Oriental Research*
BCH	*Bulletin de Correspondance Hellénique*
GEPS	*Gazetteer of Early Prehistoric Sites (in Stanley Price 1979c)*
GEPS SUPP.	*Gazetteer of Early Prehistoric Sites Supplement* (**APPENDIX 1**, infra)
JFA	*Journal of Field Archaeology*
JHS	*Journal of Hellenic Studies*
KS	*Kypriakai Spoudhai*
Op.Ath.	*Opuscula Atheniensia*
PEQ	*Palestine Exploration Quarterly*
PPS	*Proceedings of the Prehistoric Society*
RDAC	*Report of the Department of Antiquities, Cyprus*
SCE	*Swedish Cyprus Expedition*
SIMA	*Studies in Mediterranean Archaeology*
SMEA	*Studi Micenei et Egeo-Anatolici*
UMG	*University of Melbourne Gazette*
WA	*World Archaeology*

2. Institutions, Scientific Bodies, and Research Projects:

AMNH	American Museum of Natural History, New York City
APS	Akrotiri Peninsula Survey, 1980. B. L. Pile

ARK	Archaeological Reconnaissance of the Khrysokhou Drainage, 1972-73. U. Pittsburgh, Director J. M. Adovasio
ASOR	American Schools of Oriental Research, Philadelphia
AVS	Alekhtora Valley Survey, 1982. S. O. Held and S. Swiny
BM	British Museum, London
BMNH	British Museum (Natural History), London
CAARI	Cyprus American Archaeological Research Institute, Nicosia
CM	Cyprus Museum, Nicosia
CPSP	Canadian Palaipaphos Survey Project, 1979-1986. Brock University, St. Catharines, Ont., Director D. W. Rupp
CNRS	Centre National de la Recherche Scientifique, Paris
CS	Cyprus Survey, Nicosia (discontinued)
DAC	Department of Antiquities, Cyprus
DLS	Department of Lands and Surveys, Nicosia
EM	Episkopi Museum (Kourion House Museum), Episkopi
FM	Famagusta Museum (currently inaccessible)
GSD	Geological Survey Department, Nicosia
HLD	Hessisches Landesmuseum, Darmstadt
HUJ	The Hebrew University of Jerusalem
KCM	Kyrenia Castle Museum (currently inaccessible)
KM	Kouklia Museum
KSU	Kent State University Expedition to Phaneromeni, Cyprus, 1975-78. Director J. R. Carpenter
KSUS	Kent State University Survey, 1978. Survey Director S. Swiny
LAM	Larnaca Museum
LAP	Lemba Archaeological Project, Cyprus, 1976-. U. Glasgow/U. Edinburgh, Director E. J. Peltenburg
LAP DS	Lemba Archaeological Project, Drousha Survey, 1983. Survey Director D. Baird
LAP PS	Lemba Archaeological Project, Peyia Survey, 1982-83. Survey Director D. Baird
LAP SPS	Lemba Archaeological Project, Stavros-tis-Psokas Survey, 1979/85. Survey Directors A. Sheen (1979), D. Baird (1985)
LIM	Limassol Museum

MCZ	Museum of Comparative Zoology, Harvard U., Cambridge, MA
MNH	Muséum d'Histoire Naturelle, Geneva
PANS	Philadelphia Academy of Natural Sciences, Philadelphia
PCG	Natural History Collection, Pancyprian Gymnasium, Nicosia
PFM	Pierides Foundation Museum, Larnaca
PM	Paphos Museum
QIS	Quaternary Isotope Lab, Quaternary Research Center, U. Washington, Seattle
RS	Rizokarpaso Survey, 1971. Centre National de la Recherche Scientifique, Director A. Le Brun
RU	Rijksuniversiteit Utrecht, Geologisch Instituut (also as 'Utrecht')
SKS	Sotira *Kaminoudhia* Survey, 1983-84. ASOR/U. Minnesota (Duluth), Survey Director S. O. Held
SUNY AS	State University of New York at Albany, Akamas Peninsula Survey, 1982. Survey Director P. W. Wallace
TVP	Tremithos Valley Project, 1981-1983. U. of Umea/ SCE (Hala Sultan Tekké), Survey Director E. Baudou
UPI	Uppsala Universitet Paleontologiska Institutionen, Uppsala
VVP	Vasilikos Valley Project, 1976-. Brandeis U., Director I. A. Todd

3. Chronology:

c.bc (c.BC)	Century BC (cal BC)
m.bc (m.BC)	Millennium BC (cal BC)
EP	Early Prehistoric (pertaining to the Formative Period; i.e., the 'Neolithic' and 'Chalcolithic' in traditional terminology)
LP	Late Prehistoric (pertaining to the Early and Middle Florescent Periods; i.e. the 'Early Bronze Age'/ 'Early Cypriot' and 'Middle Bronze Age'/ 'Middle Cypriot' in traditional terminology)
EF	Early Formative (Period). Encompasses the Early and Late Neolithic in traditional terminology.
LF	Late Formative (Period). Corresponds to the Chalcolithic in traditional terminology.

EFL	Early Florescent (Period). Corresponds to the Early Bronze (Age)/ Early Cypriot in traditional terminology.
MFL	Middle Florescent (Period). Corresponds to the Middle Bronze (Age)/ Middle Cypriot in traditional terminology.
LFL	Late Florescent (Period). Corresponds to the Late Bronze (Age)/ Late Cypriot in traditional terminology.
KCU	Khirokitia Culture (Early Formative/ 'Early Neolithic')
SCU	Sotira Culture (Early Formative/ 'Late Neolithic')
ECU	Erimi Culture (Late Formative/ 'Chalcolithic')
PCU	Philia Culture (Late Formative/ 'Chalcolithic'-Early Florescent/ 'Early Cypriot' transition)
EC	Early Cypriot
MC	Middle Cypriot
LC	Late Cypriot
BA	Bronze Age (=Florescent Period)
EB(A)	Early Bronze (Age)
MB(A)	Middle Bronze (Age)
LB(A)	Late Bronze (Age)
cal	calibrated/ calendar
SD	Standard Deviation
LHL	long half-life (5,730±40)
SHL	short half-life (5,568±30)
T	conventional radiocarbon age

4. Miscellanea

asl	above sea level
CC	Carrying Capacity
CPD	Critical Population Density
km	kilometer(s)
m	meter(s)
N, E, S, W	cardinal points
PD	Population Density

UD	Undiagnostic
NIC (N)	Nicosia District
KYA (K)	Kyrenia District
FAS (F)	Famagusta District
LAC (R)	Larnaca District
LIS (S)	Limassol District
PAS (P)	Paphos District

GLOSSARY

ACERAMIC: In Cypriot archaeology, this term is synonymous with the pre-pottery Khirokitia Culture and thus has a generic meaning. Cf. NON-CERAMIC, infra.

ALONI: Threshing floor.

ARGAKI(N): Creek, stream.

ASSARTING: In agriculture, the cultivation of hitherto uncultivated land, or the recultivation of land having lain fallow for a long time. Involves the clearing of original or regenerated herbaceous and arboreal growth.

AYIOS (masc.), **AYIA** (fem.): Saint.

AYII (masc.): Saints.

BIOME: In ecology, a major climax plant formation. Tundra, taiga, deciduous forests, tropical rain forests, grasslands, and deserts constitute the world's principal latitudinal biomes and are often reflected on a regional scale by altitudinal biomes.

BIOTA: In ecology, the entire organic community of a region or ecological zone, comprising its flora, fauna, and all vegetal and animal micro-organisms. The quantitative expression of a BIOTA is termed its BIOMASS.

CHIFTLIK: Farm.

CLINE: A gradation of structural differences among the members of a species which is correlated with ecological or geographic distribution. Populations at each end of a cline may differ substantially from one another.

COLONIZATION: In island ecology, the relatively lengthy persistence of an immigrant species on an island, especially where breeding and population increase are accomplished.

DHOUKANI (alt. VOUKANI): Cypriot threshing sledge (Pearlman 1984).

DHOUKANI FLINT: Chert flake utilized as a blade on the underside of a Cypriot theshing sledge. Dhoukani flints, correctly referred to as "flake-blades" due to their morphological and functional attributes, are frequently encountered on the surface and sometimes erroneously identified as prehistoric chipped stone tools.

DISANTHROPOUS: In botany, plants having characteristics unsuitable for use by, or unattractive to, man only (as opposed to *anti-zoic*).

ECOLOGICAL RELEASE: The enlargement of the niche of a species due to the removal of a competitor or some other species whose presence would be restricting.

ECOTONE: Transition zone between two major environmental zones.

EKISTICS: The 'science' of human settlements (Doxiadis 1968). Specifically, the study of historically documented settlements couched in the theory and methodology of urban planning, architecture, and sociology.

EQUILIBRIUM: In ecology, the state in which the rate of death of organisms in a population of organisms equals the rate of birth, or in which the rate of extinction of species in a biota equals the rate of immigration of new species (=input-output balance). Cf. SATURATION, infra.

FARRAS: Cypriot name for barley used green either as a grazing or as a soilage crop.

FOUNDER EFFECT: In genetics, a genetic alteration in a colonizing population that is ultimately due to chance deviations in the make-up or proportions of the genes in the propagules from those in the source population or other colonizing populations. The divergence can be due to sampling error alone; i.e., genetic drift, or to an interaction between sampling error and selection. Significant for archaeology is the analogy of this genetic phenomenon with the alteration and loss in transmission of artifactual or non-artifactual traits from parent cultures on the mainland to island cultures.

FOUNDER PRINCIPLE: The principle that progapules starting a new population will contain fewer genes than the mother population from which they originated. The founder principle can—theoretically at least—lead to the FOUNDER EFFECT.

HABITAT: In ekistics, the overlap of settlement systems and ecosystems; in other words, that part of a given environment which contains, and interacts with, human settlement.

HAVARA: Cypriot term for soft, amorphous limestone occurring in Pleistocene sedimentary formations. Havara is secondary limestone, meaning that it was redeposited near the surface during the dry seasons by means of capillary action on water-dissolved calcium carbonate. Often synonymous with bedrock on local excavations.

***K*-SELECTION:** In ecology, selection favoring a more efficient utilization of resources, such as closer cropping of the food supply. This form of selection will be more pronounced when a species is at or near *K* (=carrying capacity). Cf. *r* SELECTION, infra.

KAFKALLA: Cypriot term for a hard, calcareous crust of varying thickness, more or less impermeable to water, occurring at or below the ground surface. Frequently associated with terra rossa soil. Can be artifact-bearing.

KATO: Lower.

KHORAPHI: Field.

KHORIO: Village.

LAKKOS: Pit, hollow.

MANDRA (pl. **MANDRES**)**:** Fold, animal pen, used for sheep and goats.

MARATHASA: Major river valley in the north-central Troodos.

MARGINAL HABITAT: In ecology, a habitat containing relatively low species diversity. The impoverishment is sometimes due to marginal physical conditions (e.g., tundra, desert) and sometimes to other causes.

MERRA: Village common land, usually rough grazing (or a soccer field).

MESAORIA: Strictly speaking, the central and western parts of the Central Plain.

MESARKA: Strictly speaking, the eastern part of the Central Plain only.

MYLOS: Mill.

NETWORK: In ekistics, a natural or artificial system serving the circulation of man, energy, materials, and refuse; vital to the metabolism (functioning) of a settlement.

NON-CERAMIC: In Cypriot archaeology, this term should be used to describe assemblages without pottery that are *not clearly attributable to the ACERAMIC Khirokitia Culture.*

PALEOEKISTICS: The study of archaeologically documented, and in particular prehistoric, settlements, couched in an interdisciplinary approach to ekistics theory and spatial archaeology (Held 1979).

PANO: Upper.

PENTADAKTYLOS: 'Kyrenia Range,' or 'northern range.' One of the three principal physical features of Cyprus (cf. MESAORIA/ MESARKA, supra, and TROODOS, infra).

PERIVOLI: Orchard, cultivated field with intercropped fruit-bearing trees.

PITSILIA: Mountainous region in the northeastern TROODOS.

POTAMOS: River.

PRESEGETAL ERA: Refers to the time before artificial dissemination of seeds; i.e., prior to cultivation (cf. SEGETAL ERA, infra).

PROPAGULE: In island ecology, the minimal number of individuals of a species capable of successfully colonizing a habitable island. A single mated female, an adult female and a male, or a whole social group may be propagules, provided they are the minimal unit required.

***r* SELECTION: In ecology, selection favoring a higher population growth rate and higher productivity. This form of selection will come to the fore during the colonizing episode, or in species which are frequently engaged in colonizing episodes and hence must frequently build back up to *K*.** Cf. *K*-SELECTION, supra.

SATURATION: In ecology, the equilibrial condition; i.e., the state in which immigration is balanced by extinction. The equilibrium in this case has reached the maximum which can be sustained in a given region. Cf. EQUILIBRIUM, supra.

SEGETAL ERA: Refers to the time of artificial dissemination of seeds; i.e., following the inception of agriculture. Cf. PRESEGETAL ERA, supra.

SOHORAPHA: Infields.

SOLEA: Major river valley in the north-central Troodos.

SPILIA (pl. **SPILIES**)**:** Cave.

STAGING AREA: A habitat or particular locality from which, by virtue of its structure or location, propagules are unusually likely to cross barriers or proceed outwards for long distances. In island archaeology and paleoekistics, referring specifically to the region on a continent from which an island was, or is thought to have been, colonized successfully.

TESSELLATION: In paleoekistics, the pattern formed by the external walls of structures which must be at least partially contiguous and contemporary within a given period of occupation; since this excludes patterns resulting from superimposed building episodes, tesselation can only be determined once the stratigraphy of a site has been established. Tesselation combines with intramural open spaces and vertical stacking to represent the texture of built-up settlement.

TROODOS: 'Central massif,' or 'southern range.' One of the three principal physical features of Cyprus. Cf. MESAORIA/ MESARKA, PENTADAKTYLOS, supra.

VOUNO: Hill, mountain.

VRYSI: Spring.

XOHORAPHA: Outfields.

PREFACE AND ACKNOWLEDGMENTS

When in 1884 Max Ohnefalsch-Richter excavated a tomb in the newly discovered Bronze Age necropolis of Nicosia *Ayia Paraskevi* containing Red Polished pottery, he could be said to carry out the first controlled investigation of the early prehistory of Cyprus. The plain appearance and unassuming shapes of the vessels, and the fact that seemingly identical red monochrome sherds were then being found on the surface of an increasing number of sites together with groundstone artifacts but without associated metal, led Ohnefalsch-Richter and John Myres to view these ceramics as representing the first attempt at pottery-making after an aceramic Stone Age.

Many years of painstaking research have meanwhile proved that the earliest facies of Red Polished belongs to the Philia Culture, and that the latter properly belongs neither to the Stone Age nor to the Bronze Age but constitutes a truly transitional phases between the two. Moreover, it has been established that red monochrome and patterned ceramics and a varied groundstone industry were thriving together from the 'late neolithic' Sotira Culture well into the prehistoric Bronze Age, or Middle Florescent ('Middle Cypriot') culture. But the failure of early scholars to differentiate 'Stone Age' and 'Early Bronze Age' pottery was to be far less important for the subsequent course of Cypriot archaeology than their recognition that even on Cyprus there had been life before the 'Bronze Age' and that its vestiges awaited the archaeologist's spade. However, given the preoccupation in those days with the description of ancient monuments and artifacts that were sufficiently diagnostic to permit their interpretation in terms of the known history, art, and religion of the ancient Near East, it is not surprising that the humble remains of early prehistory did not elicit more than ephemeral interest.

It was not until the end of this first stage in the development of Cypriot archaeology, which may be termed the *Antiquarian-Descriptive Period*, and the arrival of the Swedish Cyprus Expedition in the early 1920s that the first 'Stone Age' sites were located and excavated. Hardly ten years later, while V. Gordon Childe developed his models of prehistoric evolution in the Old World, the study of the 'neolithic' and 'chalcolithic' periods was greatly advanced by the work of Porphyrios Dikaios, then Curator of the Cyprus Museum. Even so, archaeology continued essentially as a descriptive discipline in which the classification of a burgeoning body of material from several

major excavations, numerous soundings, and countless surface collections, and the construction of an early prehistoric chronology took priority over the explanation of the past.

As Cypriot prehistoric archaeology passes through its centennial decade, the enrichment of museum exhibits and an explosive growth of the literature attest to achievements which owe much not only to the caliber of scholarship involved, but also to the fact that Cyprus, political adversities notwithstanding, has always been a particularly hospitable turf for archaeologists. At the same time, there are signs of a methodological rift between early prehistoric archaeology, which embraces what in this dissertation is called the Formative Period (see **EXPLANATORY NOTES**, Section 1, supra), and the archaeology of the 'Bronze Age' and historical periods. By extension, it mirrors the dichotomy in Old World archaeology between the anthropological outlook and the 'classical', or traditional, persuasion. Partly due to real differences in their respective archaeological records and partly because of perceived differences instilled by different training, archaeologists working on Cyprus duplicate the situation elsewhere in that their approaches to early prehistory and to the later periods are greatly at variance.

Classical, in the wider sense of traditional, archaeologists tend to have a view of their discipline as an integral part of ancient history that is basically artifactual typology writ large. As such, their attitude is much more forthright than that of anthropological archaeologists. Because they subsume archaeology under anthropology, the latter see their aim not merely in a descriptive reconstruction of the cultural past but in the explanation of the mechanisms of cultural change and evolution and in the recognition of interregional and cross-cultural patterning; in short, their overriding concern is not with how past cultures look through their remains but with what made them tick.

After going through a period of stagnation in the late 1950s and early 1960s, early prehistoric archaeology in Cyprus was only slowly drawn into the mainstream of the New Archaeology beginning about 15 years ago. Yet, with the emergence of a second generation of prehistorians in the late 1960s and early 1970s and with a third generation beginning to make its mark in local research, it has now entered a phase of unprecedented activity reflected in an impressive array of hypotheses, methods, and scientific techniques applied to the study of the Formative Period, which, with a duration of approximately 6,500 years, is the longest and least-known stage in the island's occupation by man.

This influx of new talent and innovative approaches has brought about a state of intellectual fermentation, and as in every field of learning progress has meant not only answers to longstand-

ing questions but also the emergence of new problems and a keener awareness of old ones unsolved. The Philia Culture, after many decades of being known only through tomb groups like Ohnefalsch-Richter's, is finally revealing itself through settlement sites that have begun to yield valuable information on its economy, demography, ekistics, non-mortuary artifact assemblage, and its links with the preceding Late Formative Erimi Culture. Survey projects in various politically accessible regions of the island have resulted in a dramatic increase in the number of early prehistoric sites. Advances have been made in lithic use-wear analysis and in the functional analysis and typology of the groundstone assemblage of the Erimi Culture, while the chipped stone industries of the earlier Khirokitia and Sotira cultures, whose lack of obvious morphological and functional attributes has long discouraged serious quantitative study, are now being examined for production techniques, types of raw material, and for comparison with recent local chert-knapping traditions. New insights have also been gained into the settlement evolution and spatial organization of Formative communities and into factors which determined the course of the Early Formative-Late Formative transition and the regional population movements by which it seems to have been accompanied. A clearer picture is emerging of the early prehistoric subsistence base and strategies of resource exploitation due to the work of zooarchaeologists and paleoethnobotanists, with archaeologists, ethnographers, and geologists conducting surveys of raw material source locations and studying the nature and extent of craft specialization, pastoralism, as well as regionalism and interregional contact and exchange. Models and hypotheses are being developed in an effort to define and explain such paramount issues as the date, cause, and origin of the initial colonization of Cyprus, the identity and duration of the Akrotiri Phase, the transition from the aceramic, surprisingly uniform Khirokitia Culture to the ceramic, regionally differentiated Sotira Culture and the origins of ceramic technology, the extent of regionalism, cultural interaction spheres, and chronological overlap during the Late Formative-Florescent transition, and finally—the most complex and fascinating question of all—the ways in which the insularity of Cyprus has acted as a determinant and modifier of the process of culture change, from the beginnings of the early prehistoric sequence up to the protohistoric period, when the island began to be drawn irrevocably into the expanding circum-Mediterranean web of interregional contact and exchange.

Lastly, one of the most dramatic and more widely publicized advances in Cypriot prehistory has been the steady raising of the start of the culture sequence through the obtainment of increasingly high radiocarbon measurements, from the traditional benchmark of 5,800 BC to

6,500 cal BC, 7,500 cal BC, and now close to 9,000 cal BC. Cypriot sites are generally poor in charcoal, a disadvantage which renders the present corpus of ^{14}C samples all the more impressive. It also means that current and future dating needs stand to benefit greatly from accelerator mass spectrometry (AMS) and its small sample requirements.

A collateral problem arising from these parochial advances in fieldwork and analysis is their interpretation within the larger context of epistemological, methodological, and theoretical issues that are hotly debated among British and American archaeologists. So far, archaeological researchers working on Cyprus have managed, out of ignorance or by design, to remain outside the paradigmatic fray between the positivist/ processualist, symbolic/ structuralist, and contextualist camps, instead getting on quietly and steadfastly with the job of producing data. While there is nothing to be held against such a pragmatic approach as long as the archaeological record is too fragmentary for empirical pattern recognition, there must be cause for disquiet when the rate of information retrieval far surpasses attempts at hypothesis testing, model construction, and theory building through which initially to elucidate the formation processes that generated the record in the first place and then to translate the latter into generally stated observations about past cultural systems. And although Cypriot prehistory, early as well as late, has meanwhile been sufficiently studied at the regional, intersite and intrasite levels to permit the conceptual leap from a particularistic to a holistic outlook, with a few notable exceptions the literature is riddled with status quo apologetics and permeated by a deep-seated reluctance to evaluate the facts by means of middle-range research that is usually masked by the caveat that "the evidence just isn't in yet." The complete evidence will never be in, and hiding behind this truism merely contributes to interpretive paralysis. A beneficial strategy for prehistoric archaeology in Cyprus may well be to move away from the shore of instinctive fieldwork, steer clear of abstract theorizing, and pursue a positivist middle course that focuses on theories of social structure and spatial interaction.

The latter is a recurring theme in the pages which follow, couched in an approach to interpretation that combines functionalism and context in an attempt to reconstruct early prehistoric culture process and that is thus closely related to the 'conjunctive approach' advocated by W. W. Taylor (1948). The reason for consciously borrowing the title of this study from A. L. Kroeber (1963) therefore lies in its subscription to the functionalist view of cultures as distinctive configurations of interconnected systemic parts (and particluarly distinctive in the case

of island cultures), and not in a return to the cultural particularism of the Boasians that marks some recent writings on Cypriot prehistory.

Throughout the process of researching, mulling over, and writing up the various aspects of this study, I have incurred many direct and indirect obligations to friends and fellow archaeologists on Cyprus and elsewhere. Their knowledge, either through the contribution of hard data or through distillation, has helped me gain a clearer focus of the issues I set out to discuss, and hopefully it has enriched the manner in which they are here presented.

A lasting debt is owed to those who have shaped my notions of prehistoric archaeology, each in his own inimitable way: John D. Evans (Institute of Archaeology, University of London), Kent V. Flannery (University of Michigan, Ann Arbor), and Brian Hayden (Simon Fraser University, Vancouver). Also to those whose seminal work in Cypriot prehistory prevented me from applying these notions elsewhere and convinced me, at least temporarily, that no island is too small for a breeding population of anthropological archaeologists: David Frankel (La Trobe University, Bundoora, Victoria), A. Bernard Knapp (University of Cambridge), and Nicholas P. Stanley Price (The Getty Conservation Institute, Marina del Rey). During more than a decade of involvement in Cypriot archaeology I have benefited on numerous occasions from the research and expertise of Drs. Alain Le Brun (CNRS, Paris), Edgar J. Peltenburg (University of Edinburgh), Stuart Swiny (CAARI, Nicosia), and Ian A. Todd (Brandeis University, Waltham, MA), who all provided information of one kind or another. Of these, I am particularly beholden to Dr. Stuart Swiny who, besides being a knowledgeable companion on countless field trips, afforded me unrestricted access to unpublished material in his possession. Drs. Alain Le Brun, David Rupp, Nicholas Stanley Price, and Ian Todd kindly allowed unpublished results of their respective surveys to be incorporated in the *Supplement to the Gazetteer of Early Prehistoric Sites* (**APPENDIX 1**), David Rupp and Ian Todd provided helpful comments on drafts of it, and the latter communicated several ^{14}C corrections by the British Museum to me for inclusion in the present study. To all of them I tender my heartfelt thanks.

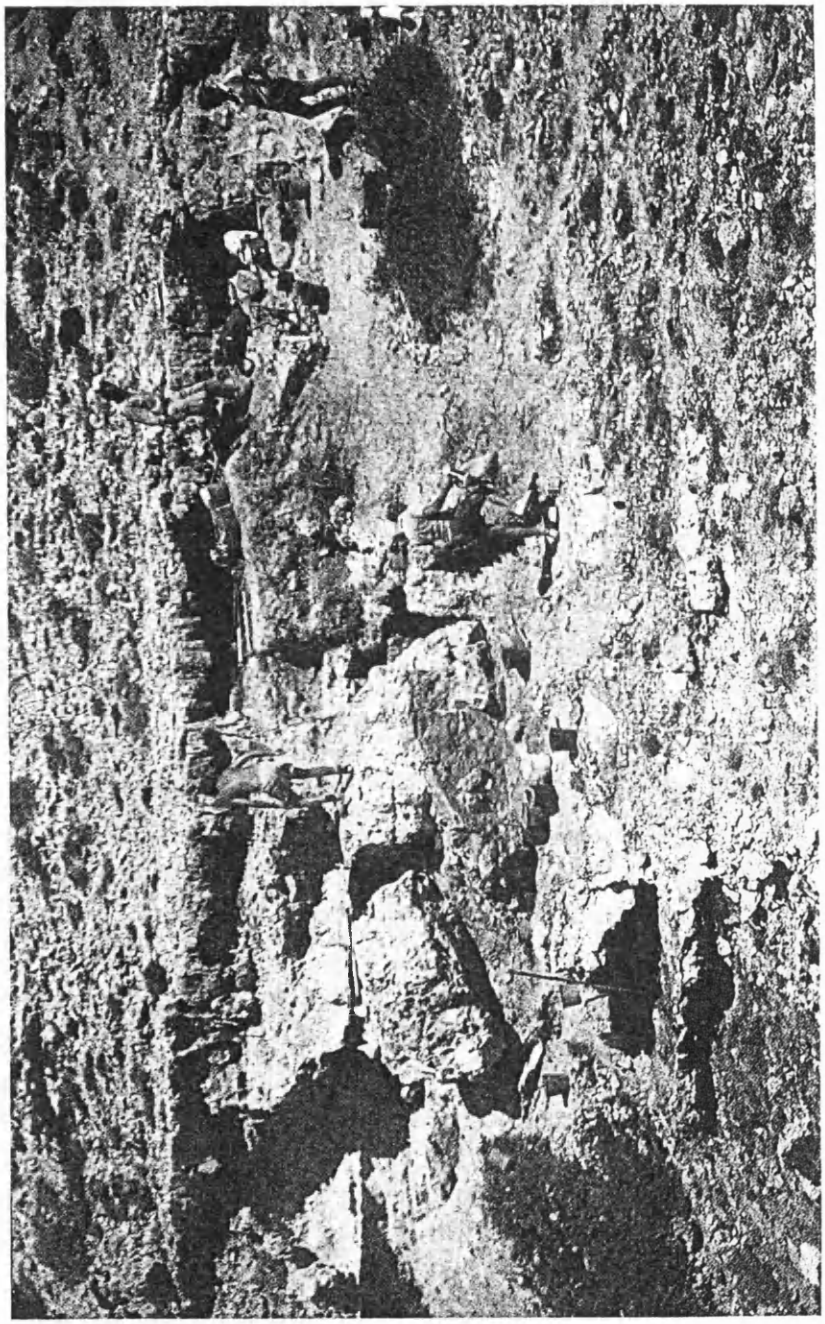
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On a personal level, I must single out the encouragement, constructive criticism, and guidance of Dr. A. Bernard Knapp, who taught me that Thai food is an integral part of archaeological interpretation. Bernie cooked, bullied, and scrutinized, and my wife Alexandra coaxed and cajoled; at least this once cause and effect are not in doubt.

Nicosia, May 1989.



CHAPTER 1
Introduction: Eagle Cliff, Akrotiri Peninsula

One day in 1961, perhaps one of those fine clear days cooled by a southwesterly sea breeze that are common on the south coast of Cyprus, a 14-15 year-old boy combing the cliffs of the Akrotiri Peninsula for antiquities came across a single chert flake above a small headland, called 'Submarine Point' because of a rock formation which the wind had honed into a shape resembling a conning tower. Unaware of its age, David J. Nixon left the flake on the surface and made for the next headland east, a steep sedimentary talus jutting into the sea below an eroding cliff-face marked *Aetokremnos* ('Eagle Cliff') on Kitchener's survey of 1882. Instead of live eagles, young Nixon found dead hippopotami whose remains were strewn midway down the precipitous scree-covered slope in a scatter of weathered bones, chipped stone, and shell. Not recognizing the bones and artifacts for what they were, Nixon, who had been interested in archaeology since he was ten, was nevertheless intrigued by them and later photographed, mapped, and collected from the site, which included an exposed section with further bones and an overlying thick layer of broken shells clearly visible. The boy picked up five chert flakes, a small quantity of shell, a hippopotamus tooth and numerous bones looking deceptively human—particularly the proximal part of a mandible—and took his finds home. Shortly thereafter his father, who was serving at RAF Akrotiri (within whose perimeter the site is situated), was posted back to England, and when there was no room to pack all of the bones, five or six of them were unceremoniously dumped at the last minute in an empty lot next to 27 Patch Crescent.

1. Background

The history of what is currently the earliest prehistoric site on Cyprus consists of a peculiar combination of circumstances which eventually led to its excavation. Like many of the most important archaeological sites everywhere, the discovery of Site E as just recounted was a fluke rather than the predictable result of painstaking systematic survey, only in this case the amateurs who found it on two separate occasions seemed more aware of its potential than the professionals who for years ignored it. Soon after leaving Cyprus, Nixon began to suspect that the material he had brought back from Akrotiri Peninsula might be older than he had first assumed. On

examination by the late Kenneth P. Oakley of the BMNH in 1966, it turned out to consist of pygmy hippopotamus, "...characteristic of the Pleistocene of Cyprus," shells of the marine gastropod *Monodonta turbinata* Born, and five chipped stone artifacts, which were described as "undoubtedly elements of a prehistoric flint industry, but not clearly attributable to a particular culture" (letter from K. P. Oakley to D. J. Nixon, February 3, 1966). Two of the three bones and one tooth identified by Oakley were slightly charred, an observation which has since been abundantly confirmed by the excavated faunal remains (see below). Oakley's identifications prompted Nixon, who was by then well aware that the oldest cultural remains on the island were traditionally associated with the 'neolithic' Khirokitia Culture, to report his discovery to the Department of Antiquities in Nicosia in a letter dated May 16, 1971 (CM File #196/36/9). After the report had been acknowledged and further information requested, the material was returned to the Department six months later accompanied by detailed notes, sketch maps, drawings of the chipped stone, and photographs (CM File #195/36/10). Archival research conducted by the present writer in 1988 led to the tentative identification of the fossil bones returned by Nixon as part of CS.1849, but the presence in the same collection of three large pieces of bone breccia unlikely to have been taken to England and the most unfortunate disappearance of the four original flakes raise a number of questions. It is not known whether the Department acted on receiving the report and material from Site E; notwithstanding two further letters by Nixon dating from 1979 and 1980 concerning the matter, the archaeological community remained ignorant of his discovery. Thus, while the Pleistocene fossil sites became the object of renewed investigations (Boekschoten and Sondaar 1972), while two decades of steadily intensifying fieldwork spurred repeated (and feeble) claims of 'paleolithic' chipped-stone assemblages (Adovasio et al. 1975, 1978; Baudou 1982, 1983; Baudou and Engelmark 1983; Baudou et al. 1985; Stockton 1968; Vita-Finzi 1973), and while prehistorians wondered aloud whether the aceramic Khirokitia Culture represented indeed the 'initial colonization' of the island as posited by Stanley Price (1977a, 1977b), the answer was lying in a forgotten file in Nicosia and in an old box in Suffolk, England.

By coincidence, in the fall of 1980, at almost exactly the same time Nixon made a further inquiry with the Department of Antiquities (letter to V. Karageorghis dated September 27, 1980), the Eagle Cliff site was rediscovered by another RAF serviceman conducting a spare-time survey of the peninsula, Flight Lieutenant Brian L. Pile. By a further curious coincidence, both Nixon and Pile designated the fossil exposure at *Aetokremnos* as 'Site E', the name by which it is now

colloquially referred to.[1] This time the discovery was made known to Stuart Swiny, Director of CAARI, who, after visiting Eagle Cliff and collecting some material from the surface on and near the site, filed a new report with the Director of the Department of Antiquities (see Swiny 1988 for a fuller account). Several prehistorians visited the site in the early 1980s, including E. J. Peltenburg, A. Ronen, A. H. Simmons, N. P. Stanley Price, and the present writer, who on the whole agreed that although a stratigraphic connection between the surface lithics and the exposed section showing bones and marine molluscs was not readily apparent, the distribution of chert (which does not occur naturally on the peninsula) relative to the section at the very least did not preclude such a possibility, and that an association between the faunal and cultural components could therefore not be ruled out. Despite the difficulty of estimating the size of the deposits on the basis of the observable evidence, the juxtaposition of quantities of chipped stone and Pleistocene faunal remains, the fresh state of the bones embedded in the section, as well as the thick layer of broken shells collectively distinguished the exposure from any other recorded paleontological or archaeological site on the island. Both Swiny and the present writer became convinced that Site E was a) cultural, b) chronologically and culturally anterior to the Khirokitia Culture, and c) represented the first recorded instance of an association between Pleistocene megafauna and humans in a Mediterranean island ecosystem (Held 1982:6). By another remarkable coincidence, while these workers began championing the site and formulating a number of preliminary hypotheses about the nature of its occupation (Held 1983:221-233), a Dutch-Italian team directed by Paul Y. Sondaar and Mario Sanges commenced excavations at Corbeddu Cave which shortly led to similar claims being put forward for Sardinia (Klein Hofmeijer, Sondaar et al. 1987; Klein Hofmeijer, Martini et al. 1987; Sondaar et al. 1984; Sondaar, Sanges et al. 1986). At Akrotiri, regular visits to the site and continuous re-examination of the available evidence strengthened the belief that it had potential, besides being in great danger of erosional destruction. Taken together, these factors made it imperative that a test excavation be undertaken as soon as possible.

2. Hypothesis Formulation—Defining the Problem:

A major difficulty encountered from the outset was to convince the scientific community and particularly funding bodies of the likelihood that Site E represented a stratigraphically intact cultural focus and not merely a pure fossil deposit disturbed much later by intrusive human activities, and further that if it did indeed prove an overlap between dwarfed island fauna thought

to have gone extinct during the Pleistocene and early human groups, its significance would be far-reaching and interdisciplinary. Concerning the archaeological nature of the exposure, the suggestion that hippo hunters might have been present on the island long before the emergence of the Khirokitia Culture provoked reactions ranging from healthy skepticism to derision leavened with a hefty dose of paradigmatic bias against ephemeral occupations that lacked the familiar appurtenances of Cypriot EP settlement sites; i.e. walls, postholes, pits, abundant groundstone artifacts, and in many cases ceramics. As regards the ramifications of the hippo-hunter hypothesis, the prospect that Site E might extend the prehistory of Cyprus up to or even beyond the Pleistocene/ Holocene boundary was almost incidental to the thrust of the inquiry; far more important seemed its promise to provide new insights into the chronology and range of human island colonizations in the Mediterranean and elsewhere—particularly in light of Cherry's (1981, 1984, 1985) model for the former region and research into Late Quaternary maritime dispersal in northwestern Melanesia (Allen et al. 1988; Wickler and Spriggs 1988; Groube and Pernetta 1989). Two equally important questions which it was hoped Site E would at least partially answer pertained to the Late Pleistocene-Early Holocene paleoecology of Cyprus and to the wider issue of Pleistocene faunal extinctions (Martin and Klein 1984). A final point concerned the cultural identity of the site: if it proved to predate the aceramic 'neolithic' Khirokitia Culture, would the assemblage be typologically similar to mainland 'paleolithic' or 'epi-paleolithic' industries, as speculations about a pre-KCU occupation of the island had always presumed? These four theoretical aspects will be discussed in greater depth in the next chapter.

Preliminary indications that the focus on Akrotiri Peninsula pre-dated even the highest KCU assays (for Kalavasos *Tenta*, see **CHAPTER 4**, Table 6, infra) came in the form of several ^{14}C dates obtained by the Pretoria and Beta laboratories from pre-excavation samples. Two of these consisted of the inner and outer fractions of a single *Monodonta* shell that had been extracted from the exposed shell layer 30 cm below the surface; they yielded $^{12}C/^{13}C$-corrected determinations of 11,000 ± 100 BP (SHL, Pta 3112) and 10,970 ± 100 BP (SHL, Pta-3322). Even after these assays had been adjusted downward for Delta-R—initially by 400 yr and more recently by 690 yr—they still amounted to 10,310 BP (SHL)/10,619 BP (LHL) and 10,280 BP (SHL)/10,588 BP (LHL), respectively, i.e. more than 1,000 years older than the earliest *Tenta* date (P-2972). However, four further results were equivocal: a charred hippopotamus bone from the original section, ca. 50 cm below the surface and below the shell layer, returned a date of 9,250 ± 150 BP (SHL, Pta-3128), the charred segment of a second bone, from the surface below the section,

yielded a date of 8,330 ± 100 BP (SHL, Pta-3281) and its uncharred segment a date on collagen of only 3,700 ± 60 (SHL, Pta-3435), and a third charred bone from the surface was dated to 6,310 ± 160 BP (SHL, Beta-3412). While there could be little doubt that the last pair of determinations was far too young, the other two bone dates and the two shell dates were so evenly spaced that each had an equal chance of representing the true age of the site. Thus, by 1984, Site E was still not giving its age away: the four credible determinations were such that neither statistics nor the context and characteristics of the samples could be used to establish the correct age.[2] On balance, however, greater risk of contamination for the eroding surface material posed by the visible formation of calcium carbonate ('kafkalla') on the ground and by other agents suggested that the three older dates from the less exposed original section were *a priori* more reliable than the three younger dates obtained from the two weathered surface bones. Hence it was postulated that the site dated from somewhere between the mid-9th and the mid-8th millennium BC (i.e., mid-10th and mid-9th millennium estimated cal BC).

The exposed position of the talus below Eagle Cliff was continuously affecting the original section and the condition and composition of the surface scatter. A stiff sea breeze, heavy winter rains, relentless sandblasting by eolianites scoured off the adjacent cliff slopes, and other sorts of mechanical weathering brought about a perceptible deterioration of the site even in the short period of 1980-1985. Its appearance at that time can be summarized as follows:

The exposure lies in an extremely dangerous location in the upper third, western half of the talus at a height of ca. 40 m asl. The talus consists of a bedrock formation of biocalcarenite and sandy marls of the Lower Pleistocene Athalassa Formation (GMC 1979) and a ca. 50 cm-thick mantle of unstratified, poorly sorted colluvium. The central slope profile has a gradient of approximately 30°, but on the western side directly below the site the gradient increases to almost 45° for approximately 20 m before reaching a vertical drop to sea level. Since the western part of the site, from where most of the material has so far been retrieved, is set into this steep slope, it is probable that the original deposits have been severely attacked by mechanical weathering and loss through down-slope movement in that sector. Immediately above and behind the exposure, a ca. 10 m long bedrock ledge protrudes from the slope colluvium which represents the break line of a former overhang. This feature and the presence of large rock debris directly in front and below it indicate that Site E is a collapsed rockshelter whose roof caved in as erosion of the rear wall gradually undermined its cantilever. The same process of stadial collapse is visible

in numerous rockshelters along the adjacent sea cliffs: wind erosion eats cavities into the porous bedrock, deepening the evolving shelters until the caprock sloughs off. The roof debris buries the floor of the shelter or plummets into the sea below; those fragments which remain in situ trap windblown sand until the residual shelter is choked off, sealing its floor. Since mechanical and chemical weathering simultaneously affects the entire talus, however, the outer edge of the buried shelter floor eventually reappears when the slope profile has receded far enough. In the case of Site E, this cutting back of the slope led to the exposure of two separate areas of bone breccia (Area A and B) without molluscs or chipped stone, as well as of a stratified section of bone and shell (Area C). The latter, also referred to as the 'original section', was a wedge-shaped section approx. 2 m in length and 35 cm thick at the N end, which lay upslope, whereas the S end represented the point where the section had been truncated by the slope. Area C, which was the site's paramount feature inasmuch as it demonstrated the presence of a stratified deposit, was bounded on two sides by large boulders representing roof debris, and on the downslope side by low evergreen groundcover. The stratification visible in this section consisted of a layer of burnt and cracked marine molluscs (mostly *Monodonta turbinata* Born, with a few specimen of *Patella* sp.), superimposed on a layer containing unidentifiable bones and one piece of chert in an ashy matrix. The depth of the bone layer could not be determined because it was obscured by the steep, scree-covered slope surface. Among the scree was an extensive scatter of bones, shell, and over 30 pieces of chipped stone, which was localized *below* Areas A-C in such a way that it had to have originated in them. No chipped stone, bones, or other cultural material with the exception of a thin scatter of Roman pottery was found on either side or above the exposure, an observation critical to understanding the taphonomy of the site.[3] Preliminary identification of the abundant surface bone down to the genus level established that the overwhelming majority of the faunal remains belonged to the endemic pygmy hippopotamus of Cyprus, *Phanourios minutus*, with the endemic dwarf elephant, *Elephas cypriotes*, represented by a fragmentary adult molar, a milk molar, and a radius/ulna. Most of the nondescript chipped stone consisted of flakes with little or no retouch and included a number of scrapers; groundstone objects, prehistoric ceramics, and other artifacts—diagnostic or otherwise—were not in evidence.

As indicated at the beginning of this section, the key question which needed to be addressed in formulating a research design for Site E was whether or not the deposition of the material was anthropogenic. The hypothesis that the exposure (incl. Areas A-C and the surface scatter) was

the undisturbed residue of an EP rockshelter occupation linked in some way to the processing of a Pleistocene 'mini-megafauna' had the following test implications:

I_1: The bone breccia in Area A and B and the bone layer in Area C were primary deposits.

I_2: The shell layer overlying the bone layer in Area C was also a primary deposit and furthermore datable to the same occupation which produced the bone layer.

I_3: The deposits apparent in Areas A-C were the only possibly source for the surface material.

I_4: The micro-taphonomy of the deposits had to be such that if artifactual material (especially the chipped stone already visible in the original section) was stratigraphically associated with the faunal remains (bone and shell), it could not have filtered down consequent to a later occupation of the site. If intrusive material such as Roman ceramics were to be found in the deposit, it ought to be confined to superficial layers.

I_5: The macro-taphonomy of the site had to confirm the assumption of a collapsed rockshelter, precluding alternate formation processes such as the erosion of a sinkhole which could have acted as a natural animal trap.

I_6: The animal remains could be expected to be disarticulated, and the burning evident on some of the bones must be shown not to have resulted from a later occupation or from a natural brush fire.

I_7: Further radiometric dates from excavated contexts would have to be more consistent than the initial set of six superficial dates, and moreover they ought to be consistently early—preferably in the vicinity of the two shell dates and at any rate older than the range of KCU dates from other sites.

The first two implications seemed to be validated by the physical properties of the exposure in Area C, none of which indicated secondary deposition. Not only was the section firmly embedded in the original slope of the talus, but its position immediately in front of and below the bedrock ledge afforded an effective protection from vertical slope movements and shielded it against rocks and boulders breaking loose from the cliffs overlooking the talus. The possibility that the material was emplaced by transverse earth movement (i.e., across the talus, from W to E or vice versa) seemed remote, for the ridge of the talus is of sufficient width to form a stable horizontal

surface. Furthermore, the original section showed the bone layer to be subjacent to the shell layer with no intervening surface, suggesting that the latter was deposited soon after the former with no intervening break. The presence of marine molluscs 40 m above present sea level could only be explained in two ways: either they belonged to a fossil beach, or they were left by humans. In theory, the existence of a Late Quaternary raised beach would be possible despite the depression of Pleistocene sea levels below their post-Flandrian heights, because Eagle Cliff lies only a short distance west of a geologic fault separating an igneous outlier from the surrounding sedimentary rock (Morel 1960) and probably witnessed more rapid isostatic sea level fluctuations than the rest of the southern seaboard (W. Farrand, pers. comm. 1988). In practice, however, if the exposure had ever been part of a beach zone the bone layer and its ashy matrix would certainly have been destroyed; therefore, natural deposition of the shells could almost certainly be discounted. On the contrary, the dense concentration of broken and burnt marine molluscs—whose economic and ornamental use by Early Holocene human groups has been attested elsewhere in Cyprus and the Near East (e.g., Reese 1978, 1982; Stanley Price 1976a)—indicated the presence of a kitchen midden reflecting the exploitation of aquatic resources—in this case for food rather than ornaments.

Concerning the third implication, the spatial distribution of the surface scatter clearly seemed to result from erosion of the exposure, militating against the possibility that the chipped stone in particular had been washed in from above. This conclusion also agreed with the fact that the bones on the surface were in various stages of calcification, which indicated that the assemblage was in the process of being eroded out of the slope and had not been transported to its present position over a great distance.

Lastly, the validity of the fifth implication seemed assured by the coastal topography in this part of the Akrotiri Peninsula. The alternative scenario of depressions and sinkholes in which Pleistocene herbivores might have been trapped required a radically different appearance of the supralittoral zone during terminal Pleistocene/ Early Holocene times from what it is at present. As expected, a subsequent survey of the area's geomorphology confirmed this conclusion and provided evidence for local rockshelter evolution, making it possible to determine the previously outlined macro-taphonomy of Site E.

Before proceeding to the excavation results, it is worthwhile outlining a few further scenarios concerning a possible natural deposition of the faunal remains. These were formulated essen-

tially as null hypotheses which, it was hoped, subsequent investigations would disprove. Barring the sinkhole scenario, another variation of the natural die-site theme was that in parallel to many of the other fossil deposits on the island hippopotami and elephants had either lived and died in the rockshelter, or that old or ailing animals had sought out this particular locality to die. The strongest ad hoc argument against this is once again the topography of the sea cliffs: the position of Site E is by far the most perilous and inaccessible of all recorded fossil beds except the Cape Pyla Caves (see **APPENDIX 2**, infra, #FOS-23R-27R), and for bulky animals the terrain is likely to have been difficult to negotiate even before erosion had reduced the talus to its present shape and angle. Obviously, this caveat would apply in particular to old or sick individuals. The only feasible access to the site would conceivably have been from an ancient beach below it. Due to the already mentioned tectonic instability of the tip of the Akrotiri Peninsula, such a beach may have existed above or below present sea level at the time Site E was occupied, yet further geomorphologic examination of the supralittoral as well as of the sublittoral zones around the talus is required to determine what configuration of eustatic and isostatic sea level change obtained ca. 10,000 BP. Approaching the issue from an anatomical angle, it could be argued that if the animals in questions suffered a natural death inside the rockshelter and their remains were in situ, a certain degree of articulation should be evident in the assemblage. Given the absence of ground-living predators prior to the human introduction of the fox during the Khirokitia Culture, the only nonhuman disturbance processes which might have effected disarticulation would have been the collapse of the shelter roof and various forms of pedoturbation brought about by the actions of wind, rain, temperature changes, and subsurface animals (see Schiffer 1987:199-234 for a detailed discussion of site disturbance processes). However, this assumption was only valid provided the taphonomy of Site E differed completely from that of other Pleistocene fossil deposits, where faunal remains never occur in an articulated state even though human agency can most definitely be ruled out. A further scenario involving natural death was that the animals occasionally fell over the cliffs above the site, yet this argument was easy to refute by means of the slope geometry of the talus and the physics of moving bodies. If the bone deposit at Site E were the result of a natural accumulation of hippopotamus carcasses due to accidental falls, one would first expect a much wider lateral and vertical spread of their remains. As has already been pointed out, however, both the surface scatter and the exposure from which it is derived were extremely localized, and moreover the former clearly seemed to result from erosional disturbance of the latter and not from a litter of hippo carcasses covering the talus

slope. Secondly, the local topography is so precipitous that any rotund object weighing several hundred pounds, such as the two species involved, would certainly have cartwheeled down the talus slope and plunged into the sea without stopping. Thirdly, it is hard to explain how such a rolling object could have come to rest inside a rockshelter, whose roof would not have slowed its fall but propelled it beyond the present position of the site. Finally—and this observation also pertains to possible modes of hunting dwarf elephants and pygmy hippopotami at the site—studies of bison jumps in the U.S. have demonstrated a high incidence of torsional fractures of the animals' limb bones (E. Johnson, pers. comm. 1988). Without preempting the next section, excavations have since shown that such a characteristic symptom of falls is not present among the faunal remains of Site E, where no pre-depositional long bone fractures of any sort have yet been recognized.

Much more plausible than these various scenarios envisaging a natural die site was the hypothesis of human causation for what appeared to be not a diffuse but a very discrete accumulation of faunal remains. Previous survey work covering the entire length of sea cliffs on Akrotiri Peninsula had failed to produce other exposures or similar surface scatters, which suggested that Site E represented a single and very localized event. This was another aspect in which it differed from fossil deposits elsewhere, the majority of which occur in clusters whose constituent sites are rarely more than a few kilometers apart (see **CHAPTER 2, Fig. 11**). The question whether such an event involved a single butchering or processing episode, or a sequence of seasonal activities connected with the existence of a surviving 'resident' herd of Pleistocene herbivores on the peninsula could not be answered by the scant evidence of the exposure. Therefore, in 1985, the first concrete steps were taken towards a limited investigation of Site E.

3. Hypothesis Testing—Excavation Results:

Despite the failure to secure funding, a brief test excavation was conducted in July 1987, directed by Dr. Alan H. Simmons (Desert Research Institute, U. Nevada System). The results of this volunteer effort were sufficiently encouraging to attract limited financing for a longer season in September-October 1988, and a proposal for a third, and probably final, season to be conducted in the fall of 1989 is currently under review.[4] During the 1987 season, a systematic surface collection of the slope scatter and the excavation of merely 3 m^2 not only led to a greater

retrieval of artifacts but also demonstrated the existence of much more extensive intact deposits than the original section and the bone breccia in Area A and B had indicated. In the following year, therefore, the excavation was expanded by an additional 23 m^2. Although a total excavated area of 26 m^2 is small by the standards of traditional EP settlement sites on the island, especially in light of the fact that not all units have been excavated down to bedrock, it has already yielded a prodigious amount of faunal material and sufficient artifactual remains in stratified contexts to confirm the association of extinct fauna and cultural residues that was posited in the principal (and contested) hypothesis about the site. Since the main strategy of excavation is to advance from the shallow outslope deposits towards the deep inslope deposits, a method designed to allow maximum stratigraphic control and close monitoring of micro-taphonomic changes between eroded and sealed strata, it is anticipated that a much greater volume of intact deposits still remains in back of the shelter (Fig. 1). Preliminary evidence for this was obtained in 1987 by sinking a 1x1 m telephone booth into the NW part of the site, where the deposits are truncated by the precipitous west slope of the talus and the underlying bedrock surface meets the rear of the shelter (Unit N98/E88-87). This test pit, which has since been enlarged, revealed a deep, uneroded, stratified deposit which will be discussed below. Further outslope from this area, excavation directly in front of the original section (N93/E88, N94/E88, N95/E88) exposed more of the bone deposit visible in the section and led to the discovery that although the faunal remains closest to the eroding edge of what appeared to be the floor of the shelter were covered with calcium-carbonate as the result of weathering, the bones further inslope from the edge, and hence still covered by topsoil, were in a nonfossilized state and appeared much fresher than those commonly found in other Pleistocene fossil beds on Cyprus. The density of faunal remains in this basal stratum (comprising two layers, Level 3 and 4) was so high that the dark, ashy soil was intermixed with them rather than forming a true matrix. Numerous rocks of varying size found embedded in this stratum probably represent roof fall. More importantly, it also contained a small number of chipped stone among the bones. The thickness of the bone deposit ranged from ca. 50 cm inslope to almost nil outslope, where the faunal material still in situ was already partially exposed. This stratum was overlain by a 10-15 cm-thick layer of shells, most of which were cracked and many of which bore signs of burning (Level 2). As had already been evident in the original section, the large majority were top shells (*Monodonta turbinata* Born), followed by limpets (*Patella* sp.). Other marine invertebrates—which also occur in small quantities in some of the other excavated levels—are dove shell (*Columbella rustica*), cone shell (*Conus mediterraneus*),

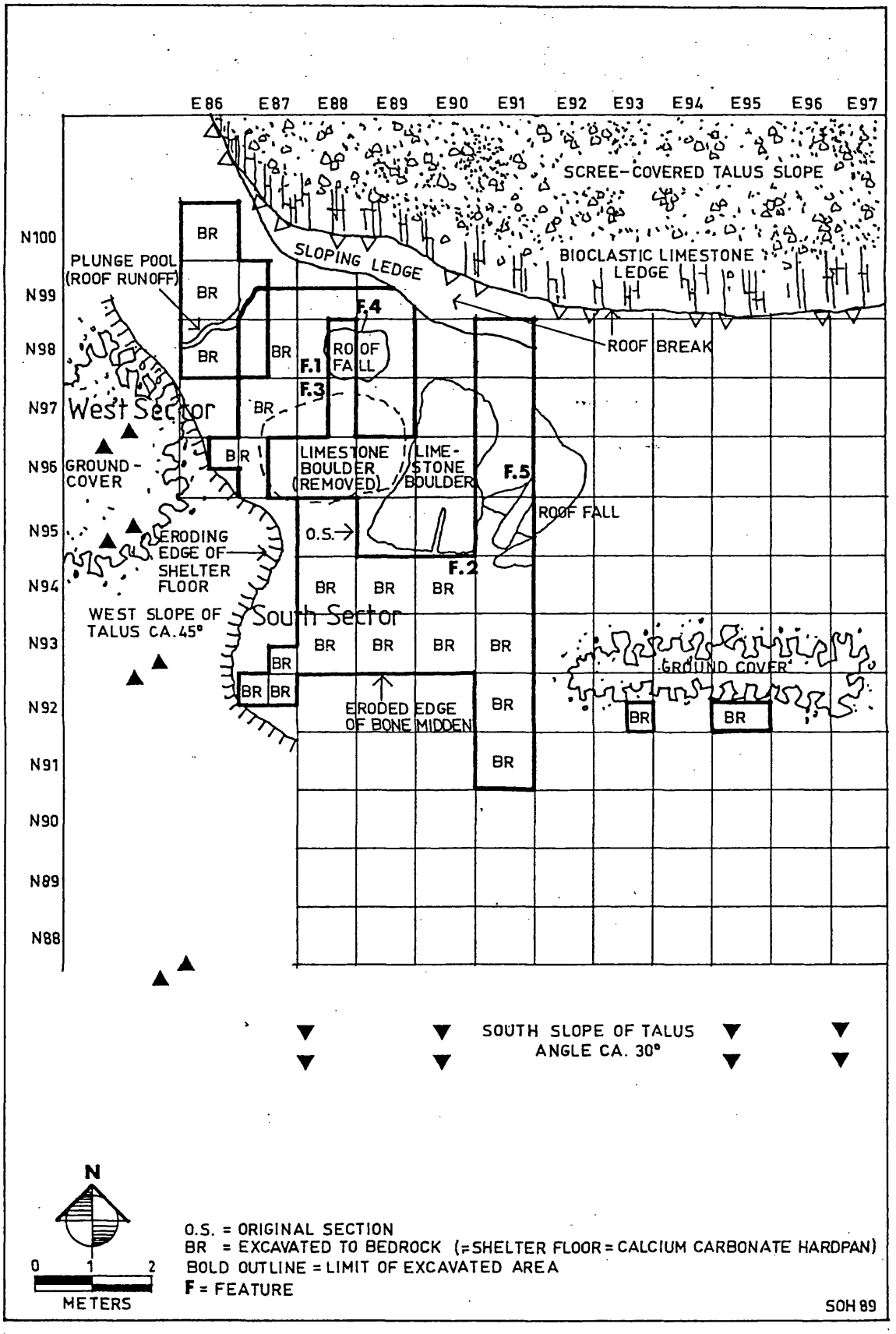


Fig. 1: Site Plan of Akrotiri *Aetokremnos*, 1987-1988 Seasons.

and tusk or tooth shell (*Dentalium dentalis*), and a minute quantity of crab and sea urchin remains has also been recovered. The shell layer was covered by topsoil (Level 1) which was sterile above sealed deposits in all excavated areas of the site except for a small number of intrusive Roman pottery and glass. As a rule, chipped stone and other cultural remains, such as beads and features (see below), were only encountered from a certain depth downward. Faunal remains (bone and shell) were in a few instances found in a superficial context, but only where the main bone deposit had obviously been telescoped into the topsoil by the impact of roof fall or where it had been truncated by slope erosion. The role of these two natural, post-depositional disturbance processes is crucial to the argument that the stratification of the material is by and large intact and that reworking, where probable, did not result from a later human occupation of the site.

The bone deposit (Level 3) continued eastward for ca. 2 m to N93-N94/E91, where it appeared to end. These two units formed part of an 8x1 m test trench running from the edge of a calcium carbonate hardpan (possibly marking the drip line of the brow of the former shelter) due north towards the rear of the shelter. This trench was choked by roof fall that had reworked the deposits, yet intact stratification resumed towards the back of the shelter, where the Level 3 bone deposit was found again in the SE Quadrant of N96/E91. Enlargement of this unit, which is inslope and hence sealed by a thick layer of topsoil, promises to allow the determination of the extent and depth of deposits in the central area of the former shelter. However, the area between it and the western sector of the site is occupied by two large boulders which will have to be removed in order to gain unhindered access to the central area. This obstruction currently also conceals the inslope edge of the bone deposit (Level 3-4) and of the shell layer above it (Level 2) in units N94/E89, N94/E90, and N95/E88.

In summary, the stratigraphy of the areas just described consists of a dense bone deposit with little or no internal stratification resting directly on the bedrock floor of the shelter's outer SW sector and covering ca. 7 m^2 so far, overlain by an equally dense but less extensive and thinner shell layer, which is in turn sealed by topsoil. Given the absence of interbedded sterile layers or lenses, this indicates that both layers were deposited in fairly rapid succession on a floor which seemed as clean as if it had been swept. Coupled with the composition of bone and shell layers, in which burnt and unburnt faunal remains and a limited number of artifacts are mixed indiscriminately, the evidence is thus compatible with a midden representing a single phase of occupation.

However, in the western area, where the greater thickness of sediments as well as heavy roof fall have preserved the sort of multi-layered stratification that is typical of deep rockshelter and cave deposits, the stratigraphy is more complex. Because this sector is located near the backwall as well as on the edge of the floor of the shelter, it encapsulates the entire transition from sealed and protected inslope deposits to telescoped and truncated outslope deposits in an area of only about 4 m^2. The impact of slope geometry on the vertical separation of layers is illustrated by Section A and Section B (Figs. 2-3), which show the excavated area at the end of the 1988 season. Both sections are perpendicular to each other, so that the right edge of Section A matches up with the left edge of Section B at a 90° angle to form the SE corner of the trench, providing an exploded view of its east (A) and south (B) sides. Section A, which appears when looking east towards the center of the talus and the former shelter, conveys an idea of the thickness of sediments that can be expected to be in situ in the central area of the site (see above). A ledge of calcarenite which projects above the area in the upper lefthand corner of Fig. 1 marks the underside of the remnant roof where it joins the back wall of the shelter. The back itself is still covered by a shallow layer of strongly laminated sandy sediment. The stratigraphy may be summarized as follows: A very dense accumulation of faunal bones formed directly on the clean bedrock floor of the shelter (Level 4). This layer, which contains fine, dark gray intersticial sediment evidently filtered in among the bones from above, represents the northwestern end of the bone midden (corresponding to Levels 3-4 previously described for the area further south and southeast). A limited amount of chipped stone and shell beads was found in this layer, as were a number of rocks with a very smooth, pitted, pinkish surface. The latter look oddly worn and are so different in color and texture from the calcarenite surrounding the site that they have been interpreted as 'old' rocks, whose appearance is in some way linked to the use of the shelter. In the section, and so far only sampled for the purpose of ESR dating, there is a discrete concentration of heavily charred bone, sufficiently localized and distinct from the surrounding bone midden to warrant consideration as a feature (Feature 3). Partly above it lies a row of stones with blackened surface which caps the bone midden in this spot; since they show no traces of heat fracturing, analysis is planned to determine whether the dark color is due to burning, or to the leaching out of iron oxide that is a common weathering symptom of Cypriot limestone. The next higher stratum consists of three layers of sandy sediment (Levels 4C.1-3) and is completely sterile, in effect sealing the bone midden and the row of blackened stones ca. 30 cm above bedrock. Level 4C is overlain by a thin layer of red silt which becomes somewhat patchy towards

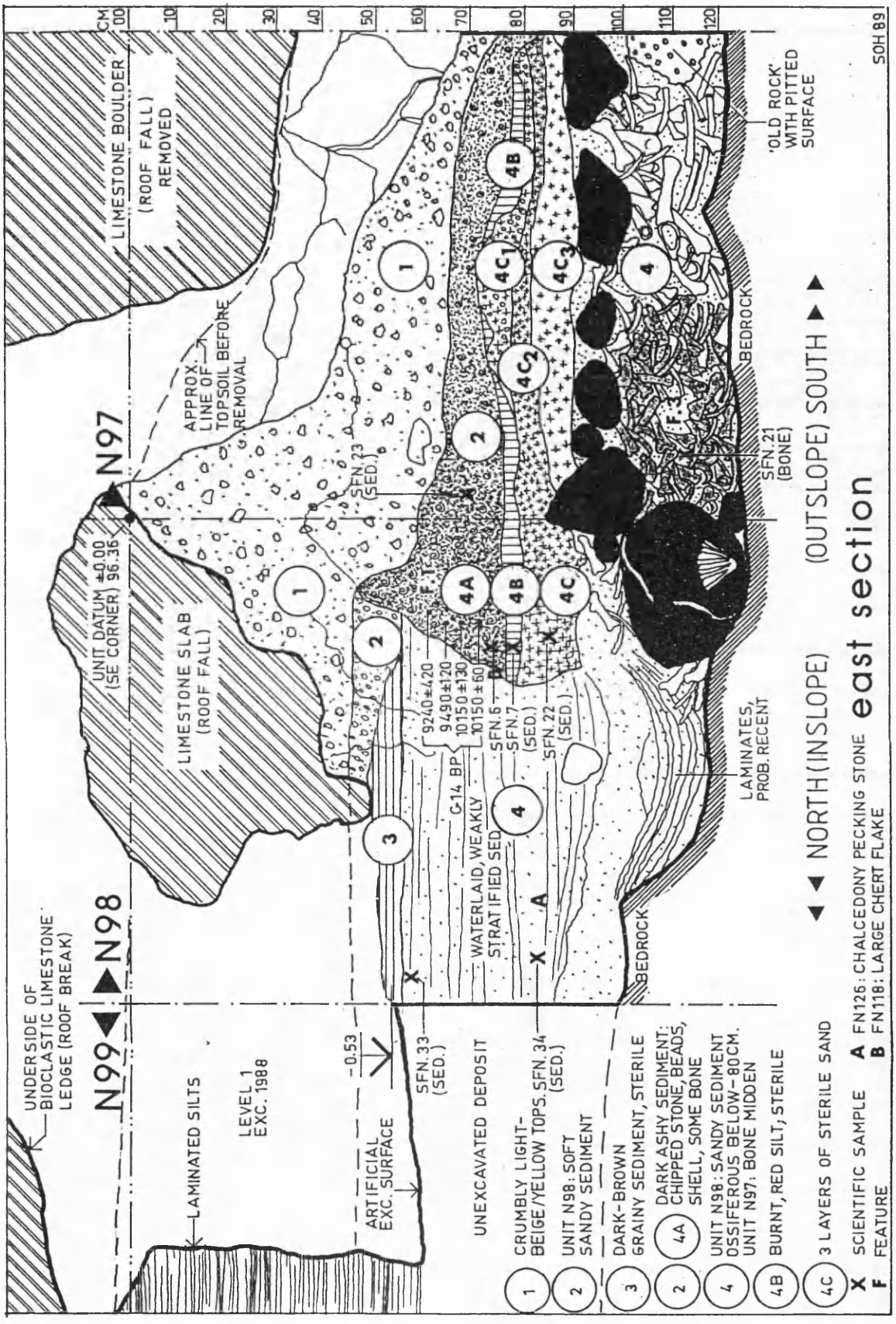


Fig. 2: Akrotiri *Aetokremnos*, West Sector, Units N98-97/E88, Section A.

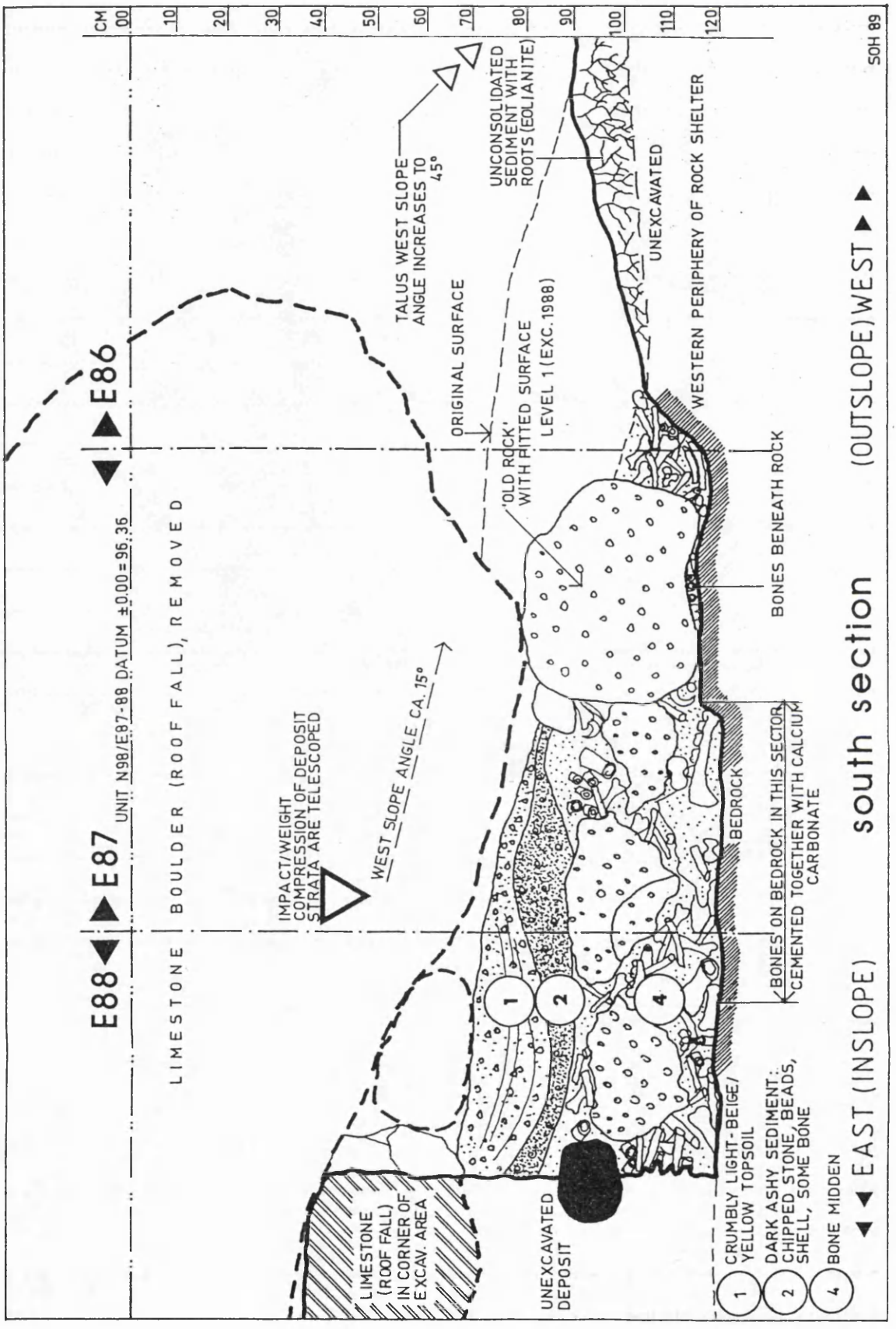


Fig. 3: Akrotiri *Aetokremnos*, West Sector, Units N97/E87-88, Section B.

the southern (righthand) end of Section A. This distinctive layer (Level 4B), is in fact the intensely burnt top part of the uppermost sterile layer, Level 4C.1. The source of this heat is found in the next layer (Level 4A in N98/E88, corresponding to Level 2 in N97/E88). This is an ashy cultural deposit distinguished by a comparatively high density of chipped stone, beads, and marine molluscs, but also containing a number of small-size faunal remains. First considered to be a roughly conical heap of ash (Feature 1) in the SE corner of the original telephone booth (N98/E88-87), it has now been shown to cover a wider area and seems to represent an activity area where hot ashes were dumped on a sterile surface. Above the feature lies a superficial stratum of crumbly beige-yellowish sediment which shows signs of reworking by pedoturbation, including root penetration and rodent holes, and by the impact of roof debris, a large slab of which rests over Feature 1. The fact that natural disturbance processes did not entirely spare the areas in back of the shelter is evidenced by a truncation which abruptly terminates Feature 1 and the strata beneath it in the northern (lefthand) third of the excavated area. Here, a thick layer of laminates resulted from a flow of water that cut through the cultural deposits and shortly afterwards replaced them with allochthonous sediments. A clue to the direction of this flow can be found directly in front of Section B (Fig. 3). Here the deposit abuts a very large example of the type of 'old' rock mentioned earlier. Unlike the remainder of the bone midden (Level 4), which particularly in this sector of the site is characterized by very fresh-looking, loose faunal remains, this corner contains an unusual concentration of bones which are firmly cemented together, including the femur, ribs, and large mandible fragment of a hippopotamus. Since this part of the midden was still buried and hence was not subjected to the adhesive calcium-carbonate coating which characterizes eroded material at the site, it appears that the flow of water and sediment from the rear of the shelter moved from NE to SW and was blocked by the large rock, next to which it ponded. That this rock did not form part of the shelter floor before it was occupied but may have been placed there deliberately, perhaps as a seat, is suggested by the fact that it rests on a thin layer of bones. Section B further shows that the bone midden (Level 4) is directly below the artifact-rich dark ashy deposit (Level 2) associated with Feature 1 in Section A, without being separated by the sterile stratum comprising Levels 4C.1-3 and the burnt layer (Level 4B). This illustrates the changeover from a 2-phase occupation (above and below the sterile stratum shown in Section A) in the rear to the single-phase occupation already described for the front of the shelter. It seems that Level 2 in this part of the site corresponds to the shell midden (Level 2) further to the south, but this can only be confirmed by excavating the intervening unit N96/E88,

which was buried under a large boulder that has meanwhile been removed. As Section B shows, the impact of several tons of limestone led to a visible compression and subsidence of the upper half of the deposit and to a reworking of the superficial stratum (Level 1), but in spite of this disturbance the original stratification remains intact.

Towards the end of the second season, the western area produced a third feature (Feature 4) above and behind the 'ash heap' (Feature 1 in Section A). Preliminary investigation suggests a hemispherical concentration of light-gray ash resting on Level 2, yet its size and shape can only be determined once the slab of limestone which also covers Feature 1 (Section A) has been lifted. In the narrow space between this new feature and the back of the shelter (SW Quadrant of N99/E89), there was a concentration of igneous stones and several pieces of chipped stone associated with the top of the artifact-bearing Level 2. The same context also yielded a number of faunal remains. Since Site E has produced very little igneous material, the concentration was unusual in itself. In addition, it included an intact shallow mortar that constitutes the only recognizable groundstone implement so far recovered at the site (see below).

The presence of three superimposed features, a unique concentration of igneous stones, the fact that almost 50% of the chipped stone assemblage retrieved during the first two seasons comes from this area, and the complicated stratification reflect several activities in the western sector of the site that are not yet understood, but which seem to be contemporaneous with the deposition of the megafauna remains and the marine molluscs. Furthermore, they indicate that the cultural residues in back of the shelter are more heterogeneous and spatially structured within the deposits than those associated with the midden area. Judgment on the stratigraphic significance of the sterile layer described above must be reserved until more of it has been uncovered; if it consists of eolianites which accumulated on top of the bone midden, this would suggest partial abandonment at least of the west sector of the shelter before it came into use again as an ash dump. Alternately, unless the subjacent row of blackened stones is coincidental, the sterile stratum may simply represent a bed of sand spread intentionally over the stones to make a level surface on the bone midden for the deposition of hot ashes. In that case, it would signify a functional discontinuity in the use of this part of the site, instead of a chronological break. Dates for the deposit above and below the sterile stratum are unlikely to clarify the matter, for even if two discrete occupational phases are present the break between them was far too short to be detected radiometrically. The chronology of Site E will be discussed separately in **CHAP-**

TER 4, infra, yet thus far the ^{14}C dates obtained show no internal development, and in this the chronological evidence is compatible with the hypothesis of a fairly short-lived occupation.

Despite their concentration in the western area, burning loci or 'casual hearths' have also been found at the center of the bone midden towards the front of the subsurface deposits. The first of these (Feature 2, N94/E90) consists of an oval concentration of fine, charcoal-rich sediments and contains burnt and unburnt faunal remains, including a pelvis fragment of *Phanourios*. The second lies a short distance to the NE—where the midden reappears at the center of the shelter—and has been exposed only partially (Feature 5, N96/E91); it is distinguishable from the surrounding bone midden matrix by its almost black, loose, sandy sediment. It remains to be determined through further excavation whether several pieces of chipped stone and large numbers of bone and shell are directly embedded in this feature or whether they are associated with the midden itself. Proper hearths have not yet been found at Site E, but the pattern of very localized burnt materials in conjunction with the homogeneous mixture of heavily burnt, partially burnt, and completely unburnt bones in the midden area would seem to indicate a combination of small individual fires and the subsequent discarding of burnt matter, and not the kind of unconfined conflagration which accompanies brush fires.

Although the clear stratigraphic association of features, midden deposits, and the artifacts to be described below is no longer in doubt, Site E would rank as one of the Mediterranean's foremost paleontological sites on account of its huge faunal assemblage alone. In excess of 100,000 bones have been recovered from the midden to date, over 95% of which belong to *Phanourios minutus*. Aside from the occurrence of calcification near the truncated edge of the deposits, they are remarkably fresh, unfossilized, and as a rule intact though disarticulated. As might be expected, cranial parts are more fragmented than post-cranial remains, but enough elements have been found to allow the restoration of several skulls. A differential discard pattern is clearly evidenced by the noticeable concentration of crania in the midden area adjacent to the original section (units N93-95/E88), whereas the very dense NW end of the midden (in the western sector described above) has thus far yielded only one complete mandible. Other loci in the midden are marked by very high incidences of vertebrae or ribs. Burning occurs on all body parts, producing staining which ranges from black to white and green, and chemical analyses are planned to determine the various temperatures which effected the differential discoloration.

Preliminary counts have so far reached over 120 individuals and established the presence of all age groups, from fetal to gerontic. Remains of *Elephas cypriotes*, in line with purely paleontological deposits on the island, are scant even in the enormous assemblage of Site E, totaling approximately 40 parts assignable to at least three subadult animals. Like the *Phanourios* crania, most elephant remains were found in the southwestern part of the bone midden near the original section. Notwithstanding the paucity of its remains, this species is represented by both cranial and post-cranial elements. Definite signs of butchery have been noted in a few instances on the acetabulum of the pelvis and on vertebrae of *Phanourios*, but cutmarks are generally rare, even though the exceptional preservation of the bones makes it easy to differentiate between cutmarks and root marks. This might be taken as prima facie evidence *against* the hippo-hunting hypothesis, but even if detailed analysis in future should fail to produce more marks, their rare occurrence does not mean that the animals died naturally. To use cutmarks as the sole criterion is to take a normative view of butchering processes that is at variance with empirical patterns, which suggest an average cutmark frequency ranging from 5% to 15% for archaeo-faunal assemblages (Lyman 1987:319; P. Shipman, pers. comm. 1988). Ethnographically observed carcass-processing techniques vary widely, and the amount of subcutaneous fat and soft tissue can also determine the incidence of marks on the underlying bones (Shipman and Rose 1983:86). In short, the large amount of meat obtainable from a pygmy hippopotamus or dwarf elephant carcass may have resulted in a more wasteful butchering behavior and a better protection of the skeleton than one might expect from smaller and leaner animals such as ovicaprines. Rather than focusing exclusively on the presence/ absence of cutmarks, scrapemarks, and disarticulation marks, further osteological analysis of the Site E assemblage will attempt to determine breakage patterns that are characteristic of butchering techniques such as 'green-fracturing' (Fisher 1984:349-350), and to differentiate them from in vivo and post-depositional (i.e., anthropogenic) fractures.

Despite of the abundance of meat on the hoof—at least temporarily, the occupants of the rock shelter were apparently not above the occasional exploitation of other species present in the island's impoverished endemic fauna. Apart from the short-term importance of marine molluscs which can be inferred from the shell midden, and which signals a shift in subsistence strategy that may have caused the abandonment of the Akrotiri Peninsula, a very small number of crab jaws, sea urchin remains, a single fish vertebra (gray mullet?), and the remains of a turtle indicate

a minor exploitation of marine resources. The small avifaunal component of the assemblage is currently under study and includes birds of several sizes, including a dove, two goose species, and a large bustard the size of *Otis tarda*. The Great Bustard is one of the largest land birds in the Near East, and its association with non-forest habitats indicates that the Early Holocene Akrokiri Peninsula was an open, treeless biotope. Since gigantism in birds is one characteristic of insular body size changes and has been attested in the Pleistocene fauna of Crete and Malta (see next chapter), it will be particularly interesting to determine whether this trend is also present in the Akrotiri species. In addition to the bird bones, remains of a grass snake and a large viper have been recovered, and wet-sieving of soil samples has produced six eggshells. Other samples were taken from various parts of the deposits for botanical analysis, and although the previously mentioned shallow mortar from the back of the western area may have been used for grinding nuts or seeds, direct evidence for food plants and other aspects of the subsistence base besides hunting and shellfish gathering remains to be documented.

The artifact assemblage after two seasons at Site E comprises over 450 objects, the majority of which come from the excavated deposits and consist mainly of chipped stone. Thus far the total from excavated contexts (nearly 90%) and the surface scatter amounts to 364 pieces forming a rather unremarkable assemblage—in common with later EP assemblages on Cyprus. However, the composition of the Site E assemblage differs from those found at other Formative sites. Its most characteristic component is a small thumbnail scraper industry that constitutes 34% of the tools; the remaining implements include burins, scrapers, retouched blades and flakes, a single trapezoid microlith, an axe preform, a backed piece, and several notches. Just over 83% of the *entire* assemblage consists primarily of blade and flake debitage, microflakes, debris, and cores (Simmons 1989:Table 2). Significantly, few cortical flakes are present, which indicates that primary reduction took place elsewhere. Given a distance of several kilometers between the tip of Akrotiri Peninsula and the nearest source of chert (the Kouris River and the nearby bluffs of ancient Kourion), flint-knapping at Site E thus began near a primary or secondary source, foreshadowing a production process that survived into the 20th century AD (Pearlman 1984:86-87).

On current evidence, groundstone played an insignificant role at the site. The imbalance between ground and chipped stone in the assemblage may be representative of the lithic technology of the group occupying the site, in which case the industry would differ in all aspects

from that of the Khirokitia Culture. In light of the apparent age of the Akrotiri focus, this would hardly be surprising. Alternatively, the fact that only the midden area has thus far been excavated may mean that the recovered lithics represent mostly refuse, and that there is a high degree of spatial patterning in the distribution of artifacts between this area and unexcavated activity/ living areas at the back of the collapsed shelter. As discussed earlier, comparatively high densities of lithics occurred in association with an apparent activity area in the western part of the site, suggesting that if more chipped-stone implements and more worked igneous objects are present, they are most likely concentrated in the deposits behind the midden. 18 out of 23 igneous stones from a subsurface context were found clustered in the upper part of Level 2 in N98/E89 (FN 421, 423). Occurring as it did in a sandy matrix deep under the bioclastic overhang near the shelter's back wall, this concentration is hardly fortuitous even though it includes few unquestionable implements. One of these is the small, shallow, discoidal mortar mentioned earlier (FN 421), and a possible grindstone fragment and tool blank are also present. The most remarkable feature of this small assemblage is the frequency of heat or percussion fractures, even though the stones were well protected from fire or roof fall in the position in which they were found. The second intact groundstone artifact came from the surface below the site. It consists of a fist-size (75x55 mm) ground igneous pebble with two carefully ground perpendicular grooves (Simmons 1988b:20, Fig. 6). This object, which has no parallels in Cyprus,[5] was first considered as a possible net weight, yet the almost total absence of fish remains in the excavated deposits now casts doubt on this interpretation. The surface scatter also included several fragments with possible grinding surfaces, but examination with a Scanning Electron Microscope is required in order to determine use-wear on these and several other man-modified igneous pieces. Finally, two chert pounders, a chalcedony pebble, and a serpentinite nodule were also found on the surface.

As at other early prehistoric sites in the East Mediterranean, the ornamental use of marine shells is well attested in the assemblage of Site E. 55 shell beads have been recovered from the midden, fashioned from *Conus mediterraneus*, *Columbella rustica*, and *Dentalium dentalis*. More importantly, in light of the long prehistoric use of native serpentinite on Cyprus, one cylindrical bead (FN 372, replicating the shell beads) and one teardrop-shaped perforated pendant (FN 172) of this material have also been found in a stratified context. By contrast, evidence of boneworking and bone tools is entirely lacking.

In conclusion, two short seasons of systematic investigation have confirmed the test implications enumerated at the outset, leaving little doubt that the deposits are in situ and that the cultural residues are stratigraphically associated, and hence contemporaneous, with the faunal material. A variety of possible taphonomic processes have already been considered, and the problem of site formation will be further addressed in archaeological and geomorphologic terms. Most importantly, the extent and location of reworked deposits is now much better understood than after the first season. As a result, initial reservations about the intact nature of the stratification and suggestions that the artifactual material might be intrusive, having filtered in from above, are now much less justified. As evident from the description of the site's stratigraphy, cultural layers deposited during a reoccupation of the site, from which the chipped stone and other objects could have filtered down, are absent between the topsoil and the midden deposit. Similarly, if such layers had once existed *above* the present topsoil—a scenario which is geomorphically improbable—artifacts should occur in some abundance not only on the surface directly on top of the deposits but particularly in the superficial layers as they are at present. However, this is decidedly not the case. Moreover, in all excavated areas of the site densities clearly increase towards the bottom of the deposits and not vice versa.

Apart from additional excavation aimed at elucidating the nature of deposits in the back of the shelter, a host of analytical studies will undoubtedly provide greater insight into all archaeologically documented aspects of the occupation on Akrotiri Peninsula. Nevertheless, it is already clear that the preliminary results have adequately demonstrated a coexistence of human groups and a Pleistocene relic fauna during the Pleistocene/ Holocene transition. The implications of this conclusion for early Holocene sea-faring and island colonization, paleontology, and the chronology and culture sequence of early prehistoric Cyprus will be discussed further in the following chapters. Meanwhile, it is to be hoped that the excavation of the Eagle Cliff site can be brought to completion with the third, final, and most crucial season.

NOTES ON CHAPTER 1

1. The 'E' designation is almost certainly due to the fact that in both cases the site was the fifth in a series, and does not stand for 'Eagle'. The Greek toponym (which appears on no map except Kitchener's) and its English meaning were probably not known to either discoverer; Nixon reported the site as *Lamnies*, based on a modern topographic map (see **APPENDIX 1**, #Lm.67 [#S/354], Observations, infra).
2. The National Physical Research Laboratory in Pretoria judged the shell dates to be more reliable than those obtained from bone (letter from J. C. Vogel dated February 13, 1984). Although, coming from the same specimen, both samples could have suffered identical contamination, Vogel's opinion has since been vindicated by closely comparable recent shell dates from excavated contexts. See **CHAPTER 4** for a more detailed discussion of the chronometric evidence from Site E.
3. The ceramics can be attributed to the presence of Roman rock-cut tombs which dot the sea cliffs of the peninsula, including several directly above the talus on which Site E is located. A very small quantity of sherds and Roman glass was subsequently excavated in the superficial layers at the site.
4. Principal Investigator of the Akrotiri Excavation Project is Dr. Alan H. Simmons, Desert Research Institute, University of Nevada System, with the present writer acting as Assistant Director in 1988. Ten days were spent in the field during the 1987 season; besides the aforementioned, the team consisted of Gerald Hennings, Lena Kassianides, Rolfe Mandel (project geomorphologist), Deborah Olszewski, and Stuart Swiny. The 1988 season consisted of a total of 37 days in the field and was supported by National Geographic Society Grant No. 3798-88; the core crew consisted of Geoffrey A. Clark (Arizona State), Susan Dolezal (U. Kansas), Alexandra Held, Steve O. Held (Institute of Archaeology, U. London/ CAARI), Gerald Hennings, Rolfe Mandel (U. Kansas, project geomorphologist), David S. Reese (Field Museum of Natural History, project paleontologist), and Alan H. Simmons (DRI). Several experts and volunteers joined the excavation for short periods of time, among them Dr. Catherine Perlès (Université Paris-X, Nanterre) and Prof. William R. Farrand (U. Michigan). CAARI provided logistical support, and permits for the 1987 and 1988 were granted by the Department of Antiquities, Cyprus. The project is indebted to the Base Commanders and personnel of RAF Akrotiri for their hospitality and assistance;

in particular Group Captain Brian Hoskins (1988 season), Flight Lieutenant Stewart Chapman (1987 season), Flight Sergeant Tai Quine (1988 season), and Corporal Gavin Muir (1988 season).

5. For other, dissimilar, grooved stones cf. Le Brun 1974a:14; 15, Fig. 5/14; 1981a:181, Fig. 45/8; 1984b:139, Fig. 75/3; Lehavy 1989:227, Fig. 11/c; 239, Pl. 6/c; Peltenburg 1985a:Pl. 43/3, 47/13.



CHAPTER 2

Insular Configurations: Quaternary Island Ecology and Mainland Biogeography: The Colonization of Cyprus in Light of Recent Evidence

Islands, as the late Fernand Braudel observed in his classic study of the world's largest inland sea, have long formed an integral part of the human environment of the Mediterranean and shared a common fate born out of the particular conditions of their insularity (Braudel 1972). Ever since the emergence of circum- and trans-Mediterranean trade networks and the onset of commercial navigation in the second millennium B.C., this fate has been determined by a conjunction of geographic diversity and historical vicissitudes that has put islands into (or out of) the stream of shipping lanes and the minds of explorers, marauders, entrepreneurs, empire-builders, and other power-brokers leaving a palimpsest of cultural imprints in their wake. If, to use a cliche, the Mediterranean has always been the *crossroads* of Orient and Occident, North and South, Known and Unknown, and other simplistic contrasts in a Eurocentric view of the world, its islands can be said to represent the *crosswalks*. As a result, the archaeological records of all large Mediterranean islands, and many small ones as well, are long, rich, and often complex in a checkered way that alternately encapsulates and diverges from mainland situations. Given the traditional interest of European science and scholarship in what was loftily referred to by the Romans as 'mare nostrum,' it is therefore no coincidence that the concepts of 'island archaeology' and 'islands as cultural laboratories' were formalized by a European prehistorian with extensive experience in that area (Evans 1973, 1977). These notions have since been adopted, expanded, and applied by others (notably Cherry 1979, 1981, 1984, 1985, 1987; but also Lewthwaite 1981, 1985, 1986), yet for significant multidisciplinary advances in island studies one must turn to Southeast Asia and Oceania. In the Mediterranean, islands were historically relegated to the marginal roles of stepping stones, springboards, and continental appendages. The Pacific region, by contrast, is a vast island realm embracing the world's two largest islands, the largest archipelago, and thousands of habitable islands marked by a multitude of geographic, racial, and cultural complexities in an oceanic setting (Bellwood 1978, 1985, 1987) that has long attracted the attention of anthropologists, ecologists, and geographers. Thus, methodologies and theories of island biogeography developed for the Pacific have potential applications to

island studies in other regional contexts such as the Caribbean and the Mediterranean. Two recent congresses, the *International Symposium on Biogeographical Aspects of Insularity* (Rome, 1987) and the *International Conference 'Early Man in Island Environments'* (Oliena [Sardinia], 1988) reflect a new tendency to regard islands as discrete phenomena and a growing interest in studying the effects of insularity on an interdisciplinary, interregional, cross-cultural scale.

Little work in this vein has been carried out in Cyprus, and although there are several valuable studies of the island's Quaternary flora (e.g., Meikle 1977, 1985), fauna (e.g. Boekschoten and Sondaar 1972; Spitzenberger 1978, 1979), and human colonization (e.g., Stanley Price 1977a, 1977b), they represent sporadic and uncoordinated research efforts whose data and conclusions need to be reexamined in light of recent evidence and integrated into a systematic approach to the explanation of culture change in an early island ecosystem. Colonization episodes by "man and beast" (Diamond 1977a) and the late Quaternary ecology of Cyprus remain a fundamental and only partially resolved issue in Cypriot prehistory. This view is not tantamount to an endorsement of diffusionism or environmental determinism but simply acknowledges the geographic peculiarity of small landmasses cut off completely from continents by varying distances of open water. Unless science is turned on its head and someone proves that life on earth evolved on islands, the latter's isolation and confinement will always beg the question of biological and cultural origins and invite *a priori* assumptions of a probabilistic role of insularity in migrational and evolutionary processes (cf. Sauer 1977:322-323; Terrell 1977a:237).

1. Geometric Properties: Remoteness vs. Accessibility

Among the islands scattered over the Mediterranean's 2,500,000 km^2, Cyprus occupies a solitary position in the shadow of southern Anatolia and at the gateway to the Levant—a position placing it well within the biogeographic sphere of Southwest Asia and determining its political fate since antiquity. On a global scale of island size, Cyprus, with an area of 9,251 km^2, is small (New Guinea: 831,400 km^2; Madagascar: 594,180 km^2; Iceland: 193,000 km^2; Sri Lanka: 64,644 km^2; Vancouver Island: 32,137 km^2). In the Mediterranean, however, it is outranked only by Sicily (25,460 km^2) and Sardinia (23,818 km^2) and combines with Corsica (8,681 km^2) and Crete (8,259 km^2) to form an intermediate size-group. Compared to the majority of very much smaller Mediterranean islands, the five largest exhibit a degree of physical and biotic diversity that makes them 'matchbox continents' capable of supporting sizeable populations in a variety of regional habitats, almost certainly causing them to attract permanent human settlement long before any

of the small islands (Cherry 1981:52-58). But at this point the obvious similarities end, and to cite more specific parallels (such as the fact that neither Cyprus nor Corsica nor Crete were continental at times of maximum glacial sea-level depression) would be to draw meaningless comparisons. The recognition of any biogeographic patterns of colonization and evolution first requires a detailed analysis of what Keegan and Diamond (1987:58) have termed the "geometrical properties" of each island, and in this respect Cyprus differs in several crucial aspects. As a glance at the map (Fig. 4, infra) shows, it is the only insular landmass in the East Mediterranean basin, which is rimmed by a uniformly smooth, linear coast lacking (with the exception of the Gulf of Iskenderun) major embayments, peninsulas, and archipelagic environments that would point to a radically different littoral paleogeography and submerged landbridges or stepping-stone islands. The readily apparent physical separation of Cyprus from the surrounding Syro-Turkish coastline finds confirmation in the submarine relief, which shows very narrow continental shelves and steep shelf escarpments dropping to depths of 2,613 m in the Antalya Basin and approximately 1,500 m in the Adana Trough and Latakia Basin, to the northwest, north, and east of the island, respectively. The only drowned landmasses in the vicinity of Cyprus are the igneous Hecataeus Ridge and the Eratosthenes Tablemount; the former would have extended the island's southern seaboard into a long peninsula pointing ESE towards the Lebanese coast, whereas the latter would have formed an oceanic island ca. 80 km south of Cyprus. However, in both cases a sea level depression of at least 800 m is required to effect continental conditions, an event that has not occurred since the late Miocene sabkha desiccation hyped by Hsü and coworkers (Hsü 1972; Hsü et al. 1973). The only critical area for configurational changes between Cyprus and the mainland during the Quaternary comprises the Cilician Basin and the Gulf of Iskenderun, where the widening of the continental shelf and the orientation of the island's panhandle (the Karpas Peninsula) combine to reduce the bathyal gap by a considerable amount. Assuming a stable offshore bathymetry, marine regressions of only 100 m resulted in a considerable seaward displacement of the mainland littoral and the partial exposure of the now-submerged extension of the Karpas Peninsula in the form of a short arc of offshore islands that bridged part of the remaining water gap. This gap would not have been reduced much further by a regression of 200 m, although most of the continental shelf would then be dry and northeastern Cyprus would be visible from anywhere on this paleocoastline.

It could be argued that inferences from late Holocene coastlines are of limited heuristic value in tectonically unstable regions like the Mediterranean and the Pacific Rim, where insular and

continental landmasses bob up and down to the tune of epeirogenic movements, and where in consequence eustatic sea-level changes are frequently obscured by isostatic processes (van Andel and Shackleton 1982; Butzer 1971, 1975; Flemming 1978; Inman 1983; Mörner 1971; Shackleton 1975a). Valid as this caveat may be on a geologic time-scale, it has in the past been used uncritically in defense of land-bridge hypotheses and arguments for a possible continental origin of Cyprus. In fact, it has little import on a discussion of possible migration routes of land mammals (including humans) during the Quaternary, because the comparatively short timespan (ca. 1.6 Ma) of the most recent Period is marked by relative geologic stability following the Alpine Orogeny, and because in the case of Cyprus mammalian colonization cycles appear to be entirely a Late Quaternary phenomenon. Coastal landform changes have resulted mainly from sea-level fluctuations and geomorphic processes, and post-orogenic tectonism occurs only in localized form on a scale rarely exceeding several centimeters/ century. Besides these long-term isostatic adjustments, seismicity and volcanicity also continue to be common tectonic phenomena in the Mediterranean region (Ambrasays 1963, 1978; Christodoulou 1969; Galanopoulos 1965; Melentis 1977). But as well-documented examples of enormous eruptions and paroxysmal ground deformations since antiquity show (e.g., Santorini in ca. 1,600 cal BC and Vesuvius in 79 AD, earthquakes in southern Cyprus ca. 3,900 BC, 365 AD, and 1953), even violent upheavals of this magnitude are mere geologic hiccups—cataclysmic enough to profoundly affect human geography and ecology on a regional scale, yet too insignificant to make or break land bridges and otherwise alter the paleogeography of mainlands and archipelagoes. Furthermore, the geologic origin of Cyprus is itself entirely oceanic. The old view of geologists and geographers since Unger and Kotschy (1865) that the island essentially represents an arcuate extension of the Taurus Range to the north and the Amanus Mountains to the east that became detached from the mainland when the intervening lowlands were submerged to form the Cilician Basin (e.g., Bellamy and Jukes-Browne 1947:56, Fig. 9; Pinar-Erdem and Ilhan 1977:308) is a gross oversimplification. Instead, recent advances in geology conclusively prove a differential evolution for the two mountain ranges of Cyprus. The mostly sedimentary Permian-Middle Miocene rocks of the northern Pentadaktylos Range were deformed into their present position through southward thrusting or strike-slip faulting toward the end of the Alpine Orogeny in the Late Miocene. In this respect the development of the northern relief of the island may be considered part of the Tauro-Dinaric belt formation between the Balkan Peninsula and southern Anatolia along the Tethys Sea, of which Crete forms the southernmost limit (Melentis 1977).[1] By contrast, the

southern Troodos Massif consists of an elongated dome of still uplifting igneous rocks divided into several lithostratigraphic complexes. Together they form the so-called Troodos ophiolite, which is one of the best-preserved and most thoroughly studied ophiolite complexes in the world and exhibits a number of features with close parallels in the active volcanoes of Hawaii. Although the structure and lithology of the Troodos ophiolite are complicated, it can be summarized as a platelet of oceanic crust ca. 70 Ma old that in late Oligocene/ early Miocene times underwent a horizontal displacement and anti-clockwise rotation before assuming its present position. Recent geologic and geochemical analyses of a sectioned volcano in the Akaki Canyon strongly suggest that the ophiolite originated as part of an early island arc development in a subduction zone environment (Rautenschlein 1987) as opposed to a mid-ocean spreading ridge (Moores and Vine 1971; Moores et al. 1984; Robertson and Woodcock 1980), so that the evolution of the Troodos is directly linked to destructive margin processes accompanying the collision of the Afro-Arabian macro-plate and the Turkish micro-plate in the East Mediterranean basin. Subsequently, deposition of a succession of pelagic sediments of mainly Tertiary age around and between the two mountain ranges created the island's third main structural feature, the Central Plain, and filled out its contours. At this stage, a cycle of intermittent submergences—especially during the Pliocene transgression—meant that the two mountain ranges appeared as separate islands or island arcs above the waves. This was followed by a major uplift of the Troodos ophiolite during the transition to the Quaternary and the gradual emergence of the island's present shape as the result of geomorphic processes in the Pleistocene. Hence, the morphogenesis of the principal structural features demonstrates that even though Cyprus itself went through a sequence of drastically changing configurations in Miocene/ Pliocene times—when it had not yet become a single landmass—the configuration between it and the mainland has changed very little since the climax of the Alpine Orogeny. Even the existence of a late Miocene land bridge implicit in the Hsü-Ryan interpretation of deep-sea evaporites has now been cast into doubt by the more recent deep brine basin models of Sonnenfeld and Schmalz (Dietz and Woodhouse 1988).

Besides the absence of intervening islands, a further configurational variable to be considered in modeling colonization episodes is the aspect, i.e., orientation, of Cyprus vis-à-vis those regions of the surrounding continental coasts that are likely staging areas for over-water dispersal (Fig. 4). Since the island's broadside faces the coast of southern Turkey, it forms a large target subtending 105° of the southern horizon for a crossing from Cape Anamur, which is the closest

point on the mainland. In theory, this would yield a 58% probability of landfall, but if the relative positions of Cape Anamur and the island as well as the prevailing surface currents are taken into account, the target for passive dispersals diminishes to the size of western Cyprus and the probability decreases to 18%. This means that four out of five drift voyages and crossings by swimming land mammals along this vector would probably miss the island despite the comparatively short distance involved. On the other hand, crossings undertaken further to the east (from Cape Ovacik) would have a target of 105° and a 58% probability of contact, with the distance being only marginally longer. A third obvious vector is from the Syrian coast to the eastern shores of Cyprus, where the shortest distance is between Cape Ras Ibn Hâni and Cape Andreas. In this case the island presents a much smaller target subtending 32° (18% probability of contact). Now if a pleniglacial marine regression to the 120 m isobath is postulated, resulting in partial continentality of the Cilician Basin and an extension of the Karpas Peninsula, the figures for Cape Anamur remain essentially the same, while improving for Cape Ovacik (125° target, 70% probability) and Cape Ras Ibn Hâni (50° target, 28% probability). Moreover, there would be a fourth vector along the shortest distance between the paleocoastlines (across the ancient 'Klidhes Strait' from Point X to the Karpas Extension), with a target size of 41° and a probability of 23%.

As the case of Cape Anamur has shown, however, the 'target effect' is a purely geometrical quantification that ignores other variables of sea crossings, such as prevailing winds and currents, physiological endurance, and navigational skills. While it is possible to factor in climatic variables on the assumption that the cyclonic weather pattern and ocean currents of the East Mediterranean have remained virtually the same during the last 10,000 years (Bintliff 1977a:51, 66; Butzer 1971:550; Hadjioannou 1987; Raikes 1967:74), physiological and technical constraints can only be inferred by analogy with modern wildlife studies and ethnographic observations.

The most readily determinable variable is distance, the second of the three geometrical properties of islands. It modifies the target effect inasmuch as the chance of a successful crossing depends not only on the relative size of the destination but also on the time, effort, and precision required to reach it. Of two islands presenting equal targets of 60°, one a small island 10 km offshore and the other an oceanic island 100 km distant and proportionately larger, clearly the offshore island is the more likely candidate for contact under almost any conceivable circumstance. Thus, the predictive value of the 'target effect' would be enhanced by expressing

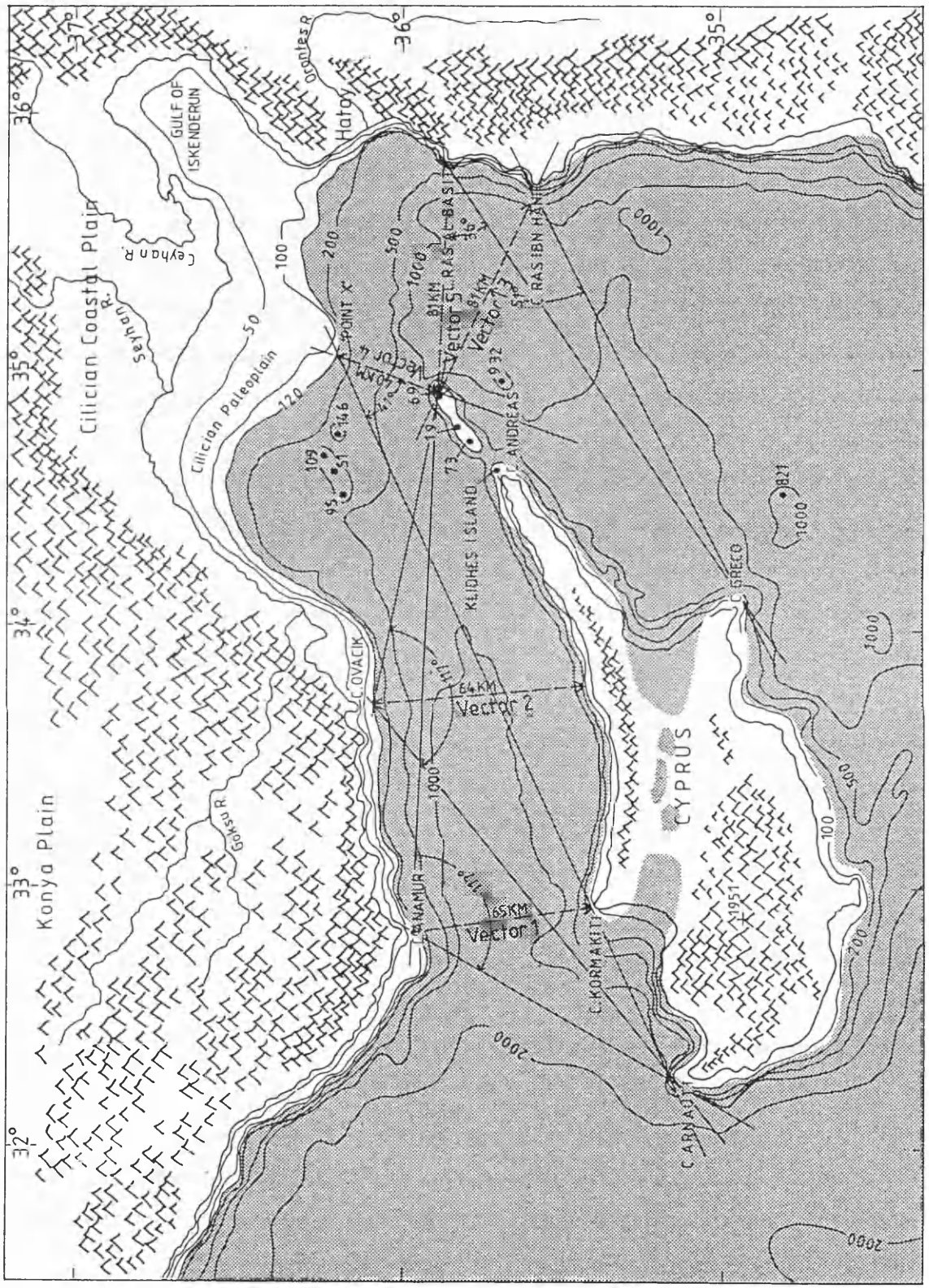


Fig. 4: Geometric Properties, Dispersal Vectors, and Paleocoastlines.

probabilities for contact in terms of target/ distance ratios providing a quantitative value of 'accessibility' (or, in inverse form, of 'remoteness'). In this instance the offshore island rates 6 and the oceanic island 0.6—meaning that far from having an equal probability of 33% the former is ten times more likely to be reached than the latter. Although the target/ distance ratio merely provides a comparative value on a scale whose upper limit can theoretically be stretched *ad absurdum* (e.g., a value 180,000 for a 180° target 1 m distant from the point of embarkation) and whose lower limit would be set by the world's remotest island, it allows a more realistic assessment of the relative difficulty of island colonization than the consideration of only a single configurational parameter. If the Target/ Distance (T/D) Ratio is computed for each of the hypothetical colonization vectors of Cyprus, the following values result: 1.52 (Cape Anamur), 1.29 (Cape Ovacik), 0.32 (Cape Ras Ibn Hâni), and 0.22 (Cape Ras Basit) for the Holocene; and 1.80 (Cape Anamur), 1.82 (Cape Ovacik), 1.02 (Point X), 0.63 (Cape Ras Ibn Hâni), and 0.44 (Cape Ras al Basit) for the Pleistocene. They demonstrate the island to be four to five times more accessible from southern Anatolia than from the northern Levant with the sea at its present level but only three times more so during glacial maxima, indicating an eastward configurational gain at times of depressed sea levels. The values further show that although its aspect always favored colonizations from the north, Pleistocene Cyprus was 20%-50% more accessible than at present depending on which vector is considered. Even though these figures may seem highly theoretical, they evidence temporal and spatial changes in the 'target effect' that will assume significance in the following discussion of passive and active water crossings by animals and man.

Distance, then, is the other variable besides target size that determines the accessibility of islands, and since Cyprus cannot be reached by means of island hopping, its shortest distance from the mainland is tantamount to the widest water gap that must be breached by a colonizing species. In this respect alone, it differs from all large Mediterranean islands except Sicily (whose distance, however, is only a fraction of that of Cyprus) and most of the smaller ones. Among the latter, Ibiza in the West and Pantelleria in the Central Mediterranean are the only oceanic islands in similarly remote positions; reaching the first involves a 92-km crossing from the Iberian Peninsula and the second a 72-km crossing from North Africa. Significantly, both islands lack Pleistocene paleofaunas despite substantially reduced distances at times of maximum sea-level regression, and both fit the pattern of accessibility fall-off recognized by Cherry (1981, 1984, 1985) which predicts late Holocene human contact/ colonization for small and remote Mediterranean islands. Crete, Malta, Sardinia, Corsica, as well as Majorca and Minorca, by contrast, can

all be reached via stepping-stones, which mitigates the effect of their greater distances from the mainland on faunal dispersals—particularly where autocatalytic expansion (Keegan and Diamond 1987:67-68) and 'supertramp' behavior (Diamond 1977b:298-302; Diamond and Keegan 1984) come into play. Conversely, the configuration of Cyprus implies that its colonizations depended less on autocatalysis than on stochastic processes involving one giant leap as opposed to a succession of small steps. Under late Holocene conditions, the smallest water gaps surrounding the island measure 69 km between Cape Anamur and Cape Kormakiti, 81 km between Cape Ovacik and the northern seaboard, 101 km between Cape Ras Ibn Hâni and Cape Andreas on the tip of the panhandle, and 108 km between Cape Ras al Basit and Cape Andreas. During glacial maxima, these distances would have been shortened to 65 km, 64 km, 81km, and 81 km, respectively, demonstrating—as previously noted for the T/D ratios—a shift in optimal crossing points as well as a net gain in the island's accessibility from the northern Levant. By far the smallest gap to traverse would then have been the 'Klidhes Strait,' where the distance shrank to approximately 40 km;[2] however, as the corresponding T/D ratio proves, this vector ranks only third in terms of accessibility and—all other things being equal—would therefore have selected against drift voyages, 'joyride' crossings, and similar aimless sea travel leading to castaway, or accidental, colonizations. Moreover, the favorably short distance across the Pleistocene 'Klidhes Strait' would be offset by the fact that despite a relief accentuated by the 120-m drop in sea level Cyprus would not have been visible from the paleocoastline at Point X, hence requiring a 'blind' crossing. Evidently, crossings of this sort present particular difficulties affecting colonization processes, and this leads to the consideration of one further insular parameter of aquatic dispersals: target acquisition.[3]

It stands to reason that regardless of size and distance visible targets not only have a better chance of being reached but also are more likely to encourage active crossings among populations occupying the staging areas for potential colonizations, such as Pleistocene shelf plains and Holocene littorals. An island appearing above the sea horizon, even if only as a speck of land under optimal atmospheric conditions, is a known island whose distance and accessibility can be estimated *before* putting to sea. In addition, increasing visibility during a crossing allows course corrections and a constant assessment of how much effort is still required to complete it successfully or whether it should be aborted. Therefore, intervisibility serves to mitigate the 'target effect' substantially by reducing the hazards of aquatic dispersal, acting as an immediate booster

of accessibility values. It has been observed that even if islands lie below the horizon their presence can be inferred from stationary clouds shrouding island mountains ('whaleback clouds'), flocks of birds, and other telltale signs; and that the existence of such screens probably facilitated the long-distance colonization of Polynesian outliers (Keegan and Diamond 1987:61) and inter-island contacts in Micronesia (Bellwood 1978:303). But as the recognition of such landmarks presupposes empirical knowledge, they can safely be discounted as factors favoring one-way voyages by inexperienced mariners such as terrestrial mammals and landbound humans. At this point it is worth recalling the quintessential geographic difference between the Pacific and the Mediterranean, where in evolutionary terms the combination of relatively short distances (measured in tens rather than hundreds of km) and frequent intervisibility of source and target (see Höckmann 1987:62-63, Figs. 9a-b; Schüle 1970) may have selected the development of boat-building techniques at the expense of navigational skills, while the simultaneous development of both was necessary for aquatic dispersal throughout Oceania. As might be expected, such adaptive variation seems to have generated pronounced differences in colonization patterns between the two regions. For the Mediterranean, Cherry has drawn long-overdue attention to a time lag of several millennia between the inception of seafaring (first attested archaeologically by the presence of Melian obsidian in a stratified Upper Paleolithic context at Franchthi Cave ca. 13,000 BP or shortly thereafter [Perlès 1979]) and *widespread* insular settlement in the late 4th and 3rd millennia BC, concluding that:

> It therefore seems likely that, while primitive maritime transport permitted sporadic trips to the islands resulting in resource acquisition and in a few cases actual settlement at an early stage, *systematic* regional exchange and interaction emerged only with larger, navigable boats, as well as with resident insular populations [Cherry 1985:22].

The Austronesian pattern, on the other hand, evidences no such contact-colonization differential, with the large body of archaeological data indicating that maritime contacts and colonization went hand in hand. In Cherry's model of Mediterranean island settlement, while a lack of adequate boat technology prevented the intensification of maritime interaction, limited size and concomitant ecological constraints constitute the prime mover argument in explaining the delay of widespread colonization until the late 'Neolithic'/ 'Chalcolithic' periods. This automatically implies an initial phase of occasional yet fairly extensive exploratory contacts, even if nebulous in terms of archaeological evidence, for the limitations of small island environments obviously first had to be seen to be appreciated. In view of the above, rudimentary navigational skills and comparatively

primitive watercraft were no doubt sufficient for sporadic contacts to take place as long as visual target acquisition was possible for the majority of Mediterranean islands.

In clear weather, the north coast of Cyprus and the south coast of Anatolia between Tasucu Bay and the eastern end of the Gulf of Antalya are intervisible due to the mountains rising behind them, but the Karpas Peninsula and the Cilician coastal plain are not. Less favorable conditions obtain between the island's low eastern coastline and the northern Levant. Here the distance is so great (see above) that there is no intervisibility at sea level. However, under optimal atmospheric conditions (i.e., on the evenings of clear winter days) the panhandle between Cape Andreas and Dhavlos can be seen from the highest peaks in the Alaouite Range of maritime Syria—ca. 45 km inland from Cape Ras Ibn Hâni—and from the highest peak of the Amanus Range in the Hatay, 145 km ENE of the Cape.[4] Dip range calculations (see below) indicate that from the same peak it is theoretically possible to see as far as Cape Greco at the southeastern extremity of Cyprus, 205 km distant, but in practice the unlimited visibility required for such a sighting rarely occurs in a mediterranean climatic regime and has in fact never been reported. The best vantage point for human colonists occupying the eastern staging area is found in the higher coastal topography at Cape Ras al Basit (ca. 30 km NNE of Cape Ras Ibn Hâni and currently 108 km ENE of Klidhes Island), which is intervisible with Cape Andreas, although, as noted earlier, distance-wise Cape Ras Ibn Hâni is the better embarkation point for eastern crossings to Cyprus. At times of low Pleistocene sea levels and the resulting relief exaggeration by approximately 120 m the intervisibility of northern Cyprus and southern Anatolia increased, but even then visual target acquisition from the Cilician paleo-plain, the northern Levantine shore *and from Point X* was rarely possible.

Yet not all mammals acquire targets in the same manner as humans. Assuming that the most commonly utilized mode of acquisition is determined by the keenest sense, physiological differences in sensory perception can be expected to produce different acquisitional modes among species, amplified by a wide spectrum of intra-specific variation in sensory aptitude. Animals whose preferred mode of target acquisition prevents them from detecting the presence of an island cannot become active colonists, so that environmental parameters ensure the natural selection of colonizing populations before they even leave the shore. Man's keenest sense is sight; therefore, no matter what processes were directly or indirectly responsible for causing prehistoric island colonizations, the final trigger must in many cases have been the visibility of the target (with Oceania and Sahul once again providing exceptive evidence). Put somewhat

differently, in view of the innate shyness of most land mammals towards open water, active crossings ultimately involve not push but pull. No amount of pressure will cause a stressed mainland population to abandon its coastal niche by swimming into the sunset rather than migrating inland or along the seaboard, but if islands are within perceptible range aquatic dispersal may become an attractive alternative to other mainland regions. This suggestion should not be misconstrued as a claim that visible islands were invariably colonized by mainland populations; the failure of the Tasmanian Aborigines to re-inhabit the Furneaux Group and other islands in the Bass Strait in late prehistoric time (Bowdler 1989; Jones 1976, 1977) is but one instance of proof to the contrary:

> For those societies which possessed watercraft, distances of a mile or two were no real problem in normal travels, even including family groups and entire bands. Distances of three and even up to five miles [4.8 km to 8 km] were covered regularly when rewards such as seasonal delicacies were available, and possibly slightly longer voyages might have been attempted by the foolhardy or the brave for a special reason. On the other hand this was the *limiting distance*, for the field evidence suggests that open-sea distances somewhere between 6 and 14 miles [9.6 km and 22.5 km] were beyond the capabilities of Tasmanian and south-eastern [Australian] Aboriginal man even over a period of thousands of years [Jones 1976:256, brackets added].

As the record of Pleistocene fauna and Holocene man bears out, even at the best of times Mediterranean island occupations involved successful crossings that often equaled and sometimes exceeded those that thwarted the Aborigines. Terrestrial paleofaunas of Pleistocene age have been found on 17 islands, in 14 or even 15 cases in endemic form (Sondaar 1977:678-679, Table 1; see below), and the fact that among themselves these islands differ considerably in terms of geology, area, distance, configuration, and ecology is indicative of the extent and relative success of early Quaternary non-human adaptive radiation in the Mediterranean basin. Since few of the islands in question were fused to the mainland during the Pleniglacials, it follows that aquatic dispersal was the normal mechanism and—at least as regards herbivorous megafauna such as deer, elephants, and hippopotami—that *active* sea-crossings to previously acquired target islands were probably much more instrumental in the establishment of island propagules than accidental drift voyages. This hypothesis draws at least partial support from indications that the accessibility fall-off mentioned earlier also affects the pattern of faunal colonization, only that now it is reflected in progressively unbalanced endemic faunas instead of progressively later human occupations. The reason for this difference lies probably not so much in the fact that the target effect operates differently on early human and megafauna colonizations than in the

unequal time scales involved, which produces primarily radiometric and typological data for humans and biometric and phylogenetic data for megafauna. Moreover, when looking at animal dispersals accessibility fall-off manifests itself differently because more than one species or taxa are being considered and thus the mechanism of Simpson's (1940, 1965) so-called "sweepstake dispersal" can be used to measure fall-off as a function of species lag instead of time lag.

The sensory powers of the terrestrial mammals that seem to be most adept at colonizing oceanic islands in the Mediterranean as well as elsewhere (i.e., deer, elephants, and hippopotami) are geared to olfaction at the expense of long-range vision, so that they are more likely to acquire targets by smell than by sight. To sight-dependent humans this may appear to put these species at a distinct disadvantage, but one only needs to remember that the limbic systems of animals are much more developed than those of humans, meaning that their social, territorial, defensive and dietary behavior is profoundly influenced—even controlled— by pheromones and other olfactory signals (e.g., Gibbons 1986; Wilson 1975), to realize that a 'smelly' island can make just as obtrusive a target as one that is visible only to man. In addition, odors contain detailed molecular information about the composition of their source, so that mainland animals downwind of an island receive trophic messages that may cause or prevent attempts to colonize it in search of food. Long-term meteorological data for Cyprus and the East Mediterranean reveal that the prevailing surface winds around the island are chiefly westerlies; seasonal shifts mean that SW and W to NW winds commonly occur from December to February, W and NW to N and NE winds from March to May, W and NW to N winds from June to August, and NW and N to NE winds from September to November (Meteorological Service 1976). Therefore, the direction of wind fetch places the Syro-Turkish littoral downwind of the island except in fall, a circumstance which would have facilitated olfactory target acquisition by mammals on the mainland during most of the year. Whether such detection was in fact possible over the distances envisaged for times of lower sea levels cannot be ascertained, but as will be shown in the next section, a host of modern observations of deer, elephants, and hippopotami suggest that, at least under exceptionally favorable conditions, it was.

Finally, auditory detection—though evidently part of animal communication by sound—is the least likely mode of target acquisition in aquatic dispersal. Not only are most islands out of earshot unless they lie in littoral positions and are thus irrelevant to the present discussion, but uninhabited islands are by definition silent, and islands already colonized by certain species will at best produce sounds unintelligible to other species that have yet to cross over. Moose have

been known to swim across rivers and to lake islands in answer to mating calls, and there are old reports by villagers in the panhandle of hearing "dogs bark in Syria" (S. and H. Swiny, pers. comm. 1988), yet in this case neither fact nor fiction proves helpful in determining what ultimately made early colonists take the plunge.

2. Comparative Insularity: Global Patterns

Before proceeding to the Pleistocene fauna of Cyprus, the island's place in a global context of accessibility must briefly be considered. Table 2 lists 40 islands or island groups in various parts of the world, selected for their Pleistocene endemic faunas and/or prehistoric/ pre-contact archaeological records, along with a number of stepping-stone islands/ archipelagoes that could be used to reach them. Distances and configurations represent Holocene sea levels as they are today. The same islands are listed again in Table 3, but this time distances and configurations reflect the exposure and fusion of many shorelines during glacial maxima, when Pleistocene colonizations would have been easiest. Typically for holistic views of late Quaternary shorelines (cf. CLIMAP 1976), the data contained in Table 3 to some extent ignore details of local littoral and shelf geography. Furthermore, the information necessarily glosses over regional differences in relative sea-level fluctuations that have led to the use of various critical isobaths in reconstructing ice age coastlines; for example, 18,000 BP regressions of 120-130 m are normally used by archaeologists and geomorphologists in the Mediterranean (e.g., van Andel and Shackleton 1982; Shackleton et al. 1984; and this volume), whereas authors in the Pacific region tend to work with the 150-m isobath (e.g., Bellwood 1987; Birdsell 1977; Bowdler 1989; Chappell and Shackleton 1986; Chappell and Thom 1977). For the purpose of broad, interregional comparison, however, best approximations may be regarded as sufficiently accurate to allow the detection of general patterns of island colonization. In both tables, shortest distance(s), target size, accessibility value (T/D Ratio), and dip range are the geometric parameters given for each island. The target heights on which dip range calculations are based are included in Table 2, while information on the presence/ absence of Pleistocene endemics and the chronology of human colonization is provided in Table 3.[5]

Analysis of the data embodied in the two tables leads to a number of revealing conclusions, not only as regards the comparative position of Cyprus but—more significant for developing a nomothetic approach to island archaeology—about worldwide occurrences of island colonization. To begin with, it is worth reiterating two very broad generalizations concerning maritime

HOLOCENE ISLANDS

Island(s)[1]	From	Distance[2]	Target	T/D Ratio[3]	Height[4]	Range[5]
EAST MEDITERRANEAN:						
Cyprus	C. Anamur	69 km	105°	1.52	1020 m	**127 km**
	C. Ovacik	81 km	105°	1.29	800 m	**113 km**
	C.R.Basit	108 km	24°	0.22	160 m	53 km
	C.R.I.Hâni	101 km	32°	0.32	160 m	53 km
Crete	Kasos[6]	49 km	40°	0.82	820 m	**114 km**
	Thira[6]	89 km	101°	1.13	2400 m	**193 km**
	Antikithira	30 km	62°	2.06	1400 m	**148 km**
	Kithira[6]	72 km	50°	0.69	1400 m	**148 km**
Antikithira[6]	Kithira[6]	32 km	6°	0.19	380 m	**79 km**
Euboia	Attica	0.5 km	180°	360.00	1200 m	**137 km**
Rhodes	SW Anatolia	18 km	90°	5.00	1200 m	**137 km**
CENTRAL MEDITERRANEAN:						
Malta+Gozo*	Sicily[6]*	80 km	28°	0.35	250 m	65 km
	Pantellaria	207 km	5°	0.02	250 m	65 km
Pantelleria	N Africa	72 km	12°	0.16	840 m	**115 km**
	Sicily	99 km	8°	0.08	840 m	**115 km**
WEST MEDITERRANEAN:						
Corsica	Elba[6]*	51 km	90°	1.76	2700 m	**204 km**
Sardinia	Corsica	12 km	119°	9.92	760 m	**110 km**
Minorca	Majorca	40 km	40°	1.00	360 m	**77 km**
Majorca	Ibiza[6]	87 km	31°	0.35	1450 m	**150 km**
Ibiza[6]	Valencia	92 km	15°	0.16	410 m	82 km
INDIAN OCEAN:						
Madagascar	E Africa	420 km	98°	0.23	830 m	115 km
	Mayotte[6]	280 km	125°	0.45	2880 m	210 km
Grande Comore[6]	E. Africa	280 km	11°	0.04	2360 m	191 km
Sri Lanka*	SE India	54 km	59°	1.09	150 m	51 km
	Pamban[6]*	24 km	135°	5.62	150 m	**51 km**
SE ASIA+OCEANIA:						
Sumatra*	Malay Pen.	42 km	170°	4.05	60 m	34 km
	Riau[6]*	12 km	176°	14.66	60 m	**34 km**
Sulawesi	E Borneo*	111 km	105°	0.94	1830 m	**169 km**
Philippines	NE Borneo[7]*	60 km	31°	0.52	190 m	**57 km**
Australia	Timor	445 km	122°	0.27	310 m	72 km
Timor	Alor[6]	29 km	140°	4.83	2920 m	**212 km**
Tasmania*	Victoria	240 km	83°	0.34	820 m	114 km
	Furneaux[6]*	23 km	105°	4.56	760 m	**110 km**
Flinders[6]*	**Kent**[6]*	53 km	26°	0.49	340 m	**75 km**
King*	Hunter[6]*	65 km	35°	0.54	200 m	58 km
Kangaroo*	S Australia	15 km	98°	6.53	110 m	**44 km**
New Zealand	Norfolk[6]	750 km	49°	0.06	680 m	104 km
	Cook	3000 km	16°	0.005	1750 m	165 km
Norfolk[6]	N. Caled'a	750 km	0.5°	0.0006	320 m	73 km
New Britain	New Guinea	90 km	58°	0.64	930 m	**121 km**
	Umboi[6]	24 km	62°	2.58	930 m	**121 km**
Umboi[6]	New Guinea	48 km	85°	1.77	1100 m	**132 km**
Fiji	**Vanuatu**	900 km	12°	0.01	1320 m	144 km
Easter	Ducie[6]	1750 km	0.1°	0.00006	600 m	98 km
Ducie[6]	Henderson	400 km	0.2°	0.0005	350 m	76 km
Henderson	Pitcairn	200 km	0.5°	0.002	300 m	70 km
Pitcairn	Oeno[6]	200 km	0.5°	0.002	340 m	75km

Island(s)[1]	From	Distance[2]	Target	T/D Ratio[3]	Height[4]	Range[5]
Oeno[6]	**Tuamotu**	400 km	0.2°	0.0005	250 m	65km
Hawaii	**Christmas**	1600 km	37°	0.02	4170 m	252 km
	Marquesas	3600 km	2°	0.0005	4170 m	252 km
EAST ASIA:						
Japan*	Sakhalin*	42 km	91°	2.16	200 m	**58 km**
	Genkai-nada*	15 km	169°	11.26	770 m	**111 km**
Genkai-nada[6]*	Tsushima[6]*	38 km	31°	0.81	120 m	**46 km**
Tsushima[6]*	S Korea	54 km	54°	1.00	350 m	**76 km**
Okinawa	S Japan[8]	81 km	42°	0.52	700 m	**106 km**
Taiwan*	SE China	120 km	83°	0.69	500 m	90 km
BERING SEA:						
Fox*	Unimak*	42 km	21°	0.50	2040 m	**177 km**
PACIFIC NORTHWEST:						
Qu. Charlotte*	Stephens[6]*	54 km	90°	1.66	120 m	46 km
Stephens[6]*	B.C.[9]	21 km	45°	2.14	80 m	**38 km**
Vancouver*	B.C.	0.5 km	180°	360.00	2200 m	**184 km**
WEST COAST:						
N Channel	California	21 km	8°	0.38	150 m	**51 km**
SOUTHEAST PACIFIC:						
Galápagos	Ecuador	960 km	15°	0.01	1690	162 km
CARIBBEAN:						
Cuba	Hispaniola	86 km	39°	0.45	1180 m	**136 km**
	Jamaica	144 km	127°	0.88	1980 m	**175 km**
Jamaica	C. America	660 km	13°	0.02	2260 m	187 km
	Navassa[6]	138 km	27°	0.19	2260 m	**187 km**
Navassa[6]	Hispaniola	54 km	1°	0.02	200 m	**58 km**
Hispaniola	Isla Mona[6]	60 km	63°	1.05	910 m	**120 km**
Isla Mona[6]	Puerto Rico	66 km	8°	0.12	320 m	**73 km**
Puerto Rico	**Leeward**[10]	114 km	31°	0.27	190 m	57 km
Windward	S America[11]	144 km	10°	0.07	840 m	115 km

[1] Boldface indicates island groups/archipelagoes.
[2] Narrowest water gap.
[3] Numerical expression of accessibility.
[4] Target height asl opposite staging area.
[5] Maximum distance at which target island is visible from 1.5 m asl. under optimal atmospheric conditions. Bolded ranges indicate that target islands are visible from staging areas. Intervisibility increases the more range exceeds distance.
[6] Stepping-stone island or stepping-stone archipelago.
[7] Via Sulu Archipelago.
[8] Figures are for widest gap among Ryukyu Islands.
[9] British Columbia.
[10] Via Virgin Islands; figures are for crossing of Anegada Passage.
[11] Between Grenada and Paria Peninsula.
* Landbridge island.

Table 2: Worldwide Holocene Island Configurations. Selective list shows geometrical properties determining accessibility of islands with archaeological records and/or Pleistocene endemics.

PLEISTOCENE ISLANDS

Island(s)[a]	From	Dist.[b] km	Target	Ratio[c]	Range[d] km	Earliest Occupation	PE[e]
EAST MEDITERRANEAN:							
Cyprus	C. Anamur	65	117°	1.80	134	8,600 BC[1]	Y
	C. Ovacik	64	117°	1.82	**121**		
	Point X	40	41°	1.02	31		
	C.R.Basit	81	36°	0.44	31		
	C.R.I.Hâni	81	51°	0.63	31		
Crete	Kasos[6]	35	46°	1.31	**122**	7,100 BC[2]	Y
	Thira[6]	87	103°	1.18	**197**		
	Antikithira	12	64°	5.33	**154**		
Antikithira[f]	Kithira[f]	Connected					
Euboia*	Attica	Connected				Pleistocene[3]	
Rhodes	SW Anatolia	15	92°	6.13	**144**	4th/3rd mbc[4]	Y
CENTRAL MEDITERRANEAN:							
Malta+Gozo*	Sicily*	Connected				5,100 BC[5]	Y
Pantelleria	Sicily*	30+	22°	0.73	**123**	1,500 BC[6]	
WEST MEDITERRANEAN:							
Corsica	Capraia*	15	145°	9.66	**208**	7,600 BC[7]	Y
Sardinia	Corsica	Connected				Pleistocene?[8]	Y
						7.800 BC[9]	
Minorca	Majorca	Connected				Late 3rd mBC[10]	Y
Majorca	Ibiza[fg]	39	70°	1.79	**156**	4,700 BC[11]	Y
Ibiza[fg]	Valencia	51	51°	1.00	**92**	Late 3rd mBC[12]	
INDIAN OCEAN:							
Madagascar	E. Africa	240+	104°	0.43	70	700 AD[13]	Y
Sri Lanka*	SE India	Connected				?	
SE ASIA+OCEANIA:							
Sumatra*	Malay Pen.	Connected				9,000 BC[14]	
Sulawesi	Sunda Shelf	42	135°	3.21	**221**	Pleistocene[15]	Y
Philippines	NE Borneo[h]*	18	130°	7.22	**200**	8,550 bc[16]	Y
	NE Borneo[i]*	15	85°	5.66	**71**		
Australia[j]	Timor-Roti	87	180°	2.06	51	Pleistocene[17]	
Timor-Roti	Alor[f]	29	140°	4.83	**212**	Pleistocene[18]	Y
Tasmania*	Victoria	Connected				Pleistocene[19]	
	Furneaux*	Connected					
Furneaux*	Victoria	Connected				Pleistocene?[20]	
						5,000 bc[21]	
King*	Tasmania*	Connected				Pleistocene?[22]	
						5,700 bc[23]	
Kangaroo*	S Australia	Connected				Pleistocene[24]	
New Zealand	Norfolk[f]	700+	50°	0.07	113	1,100 AD[25]	
	Cook	3000+	16°	0.005	170		
Norfolk[f]	N. Caledonia	650+	0.5°	0.0007	85	1,200 AD?[26]	
Bismarck	Sahul[k]	30	115°	3.87	**129**	Pleistocene[27]	
Fiji	**Vanuatu**	888+	14°	0.1	150	1,300 bc[28]	
Easter	Ducie[f]	1750+	0.1°	0.00006	107	310 AD[29]	
Henderson	Pitcairn	200	0.5°	0.002	83	1,250 AD[30]	
Pitcairn	Oeno[f]	200	0.5°	0.002	86	1,350 AD[31]	
Hawaii	**Christmas**	1600+	37°	0.02	256	600 AD[32]	
	Marquesas	3600+	2°	0.0005	256		
EAST ASIA:							
Japan*	Sakhalin*	Connected				Pleistocene[33]	Y
	S Korea	Connected					
Okinawa	S Japan[l]	54	85°	1.57	**110**	Pleistocene[34]	Y
	E China[m]	78+	44°	0.56	**100**		
Taiwan*	SE China	Connected				9,000 bc?[35]	

Island(s)[a]	From	Dist.[b] km	Target	Ratio[c]	Range[d] km	Earliest Occupation	PE[e]
BERING SEA:							
Fox*	Unimak*	Connected				6,500 bc[36]	
PACIFIC NORTHWEST:							
Qu. Charlotte*	B.C.[n]	Connected[o]				6-7,000 bc?[37]	Y
Vancouver*	B.C.[n]	Connected[o]				4-7,000 bc?[38]	
WEST COAST:							
N Channel	California	7	90°	12.85	**67**	Pleistocene?[39] 5,000 bc[39]	Y
SOUTHEAST PACIFIC:							
Galápagos	Ecuador	940	15°	0.01	168	post-500 AD[40]	Y
CARIBBEAN:							
Cuba	Hispaniola	86	39°	0.45	**142**	2,000 bc[41]	Y
	Jamaica	144	127°	0.88	**180**		
Jamaica	C. America[p]	75+	55°	0.73	51	650 AD[42]	Y
	Navassa[f]	138	27°	0.19	**192**		
Navassa[f]	Hispaniola	36	1.5°	0.04	**73**		
Hispaniola	Isla Mona[f]	36	90°	2.50	**127**	5,000 bc?[43] 2,600 bc[43]	Y
Islan Mona[f]	Puerto Rico	42	10°	0.23	**83**		
Puerto Rico	**LAntilles[q]**	90	40°	0.44	72	1,000 bc[44]	Y
Windward	**S America[r]**	40+	40°	1.00	123	2,100 bc[45]	Y?

[a] Boldface indicates island groups/archipelagoes.
[b] Narrowest water gap during Pleniglacials, based on the 120-m isobath.
[c] Numerical expression of accessibility.
[d] Based on present target heights asl + 120 m opposite staging areas. Bolded ranges indicate that target islands were visible from mainland paleocoastlines in staging areas.
[e] Pleistocene endemics (fauna). Y(es).
[f] Stepping-stone island or stepping-stone archipelago.
[g] Incl. Formentera.
[h] Via continental Palawan and Sunda Shelf at Mindoro Strait to Mindoro.
[i] Across Sibutu Passage and via continental Sulu Archipelago to Mindanao.
[j] Sahul Shelf off Cape Talbot.
[k] New Guinea off Huon Peninsula.
[l] Figures are for widest gap among Ryukyu Islands.
[m] From E China shelf off Wenzhou via Kume-Shima.
[n] British Columbia.
[o] Periglacial environment, with parts of Vancouver Island and the emergent inner coastal lowlands covered by the Vashon glacier.
[p] Figures are for widest gap among formerly continental mid-Caribbean islands.
[q] 'Greater Puerto Rico,' incl. Virgin Islands; figures are for crossing of Anegada Passage from Anguilla via Dog Island.
[r] Between 'Greater Grenada' and the continental shelf N of Paria Peninsula.
* Landbridge island (fused to present mainland either directly or via island chain).
+ Best estimate; affects accuracy of target and T/D ratio also.

References:

1 'Proto-Neolithic' at Akrotiri *Aetokremnos* (Simmons 1988a, 1988b; Simmons et al. 1989).
2 Basal 'Neolithic' (Stratum X) at Knossos (Evans 1968).
3 Cherry 1981
4 Cherry 1981
5 'Neolithic' Ghar Dalam (Evans 1971).
6 'Bronze Age' at La Mursia (Trump 1980).
7 'Mesolithic' at five sites. Based on mean of 4 available ^{14}C dates (Lanfranchi, pers. comm. 1988; Vigne n.d.).
8 Pending confirmation of the Lower Paleolithic age claimed for the Riu Altana and Pantallinu lithic assemblages and of the Upper Paleolithic age of the earlier 'pre-neolithic' levels in Corbeddu Cave (Klein Hofmeijer, Martini et al.1987).
9 Human remains in upper Stratum 2 (Hall 2), Corbeddu Cave (Klein Hofmeijer, Sondaar et al. 1987; Klein Hofmeijer, Martini et al. 1987).
10 'Late Chalcolithic,' pre-talayotic sites (Cherry 1981).

[11] ^{14}C dates from Cueva de Son Matge and Cueva de Muleta (Camps 1976; Cherry 1981).
[12] At Ca na Costa (Cherry 1981).
[13] Level V at Lakaton'i Anja (Dewar 1984; Dewar and Rakotovololona 1989).
[14] Hoabinhian obsidian flake industry at Tianko Panjang Cave and other cave and open-air sites in the south, paleocoastal shell midden sites in the north (Bellwood 1978, 1987; Bronson and Asmar 1975; Glover 1973).
[15] Upper Paleolithic flake tool industry at Leang Burung 2 and other caves (Bellwood 1978, 1987; Glover 1973, 1977, 1989).
[16] Pleistocene/Holocene flake-blade industries at Sohoton, Samar, and Musang Cave, Luzon; Upper Paleolithic Tabonian flake industry at Tabon Cave in Palawan (Bellwood 1978, 1987; Glover 1973).
[17] 38,000 BP at Upper Swan site, Western Australia (Bowdler 1989; White and O'Connell 1982).
[18] Upper Paleolithic flake tool industry at Wai Bobo 2 and other limestone caves (Glover 1973, 1989).
[19] Ca. 28,900 bc and 28,500 bc at ORS 7 and Bluff Cave rockshelters (Cosgrove 1989).
[20] Jones 1977; White and O'Connell 1982 (cf. Bowdler 1977).
[21] ^{14}C-dated shell-midden site on Flinders (Bowdler 1989).
[22] Jones 1977; White and O'Connell (cf. Bowdler 1977).
[23] ^{14}C-dated dune site (Bowdler 1989).
[24] Ca. 14,000 bc at the Seton rock shelter and further sites with Kartan pebble choppers and other heavy quartzite core tools (Bowdler 1989; Jones 1977; White and O'Connell 1982).
[25] At Tairua, Mount Camel, Wairau Bar, and other Early Archaic sites on the North and South Island with close artifactual parallels to Eastern Polynesian culture in the Society Islands and the Marquesas (Bellwood 1978; Clark 1977).
[26] Possible Maori settlement from New Zealand (Bellwood 1978; Specht 1984).
[27] Ca. 30,500 bc from a coastal shell-midden site at Matenkupkum, New Ireland (Allen et al. 1988; Groube 1989; Wickler and Spriggs 1988).
[28] Lapita Culture at Natunuku, Viti Levu (Bellwood 1978).
[29] Early Period *ahu*, Ahu Tepeu (Bellwood 1978; Clark 1977).
[30] Rock-shelter sites with basalt adzes and oyster shell fishhooks (Bellwood 1978; Kirch 1988a).
[31] Stone platforms and adz-workshop (?) sites (Bellwood 1978; Kirch 1988a).
[32] Settlements with Early Eastern Polynesian assemblages at Bellows Beach, Oahu, and in the Halawa Valley, Molokai (Bellwood 1978).
[33] Ca. 30,000+ bc in Level XV at Fukui Cave on Kyushu, 55,000+ bc in basal levels at Hoshino, 28,000+ in basal Iwajuku and other lithic assemblages in the Tachikawa Loam formation on Honshu, up to 200,000 BP at stratified sites in Miyagi Prefecture (Chard 1974, Clark 1977, Akazawa 1989).
[34] *H. sapiens sapiens* remains at Yamashita-cho Cave and the Minatogawa limestone quarry, dated to 30,000+ bc and 16,250 bc, respectively (Akazawa 1989, Chard 1974).
[35] Tentative palynological evidence of forest clearance in center of island has been related to Corded Ware Culture at Ta-p'en-k'eng and Feng-pi-t'ou, though both sites date themselves probably only from the 5th/4th mbc (Bellwood 1978; 1987).
[36] 'Aleutian Core and Blade Industry' at Anangula settlement site, Umnak Island (Anderson 1978; Willey 1966).
[37] Redeposited assemblage of unifacial pebble cores, pebble tools, and large flakes at Skoglund's Landing, with general affinities in the Diuktai tradition of NW Siberia (Fladmark 1979).
[38] Southern extension of early Northwest Coast microblade tradition represented by several sites on the east and west coasts of Vancouver Island (Fladmark 1979; Willey 1966).
[39] Claim of 28,000+ bc for 'hearths' and mammoth bones on Santa Rosa Island, at variance with a more recent collagen date of 6,000 bc. Human contact is well documented starting ca. 5,000 bc and permanent occupation ca. 250 AD by sites of the Canaliño Culture (Glassow 1985 in Keegan and Diamond 1987; Willey 1966, Meighan 1978).
[40] Finds of pre-Columbian pottery, indicating contacts during the Manteño Culture of coastal Ecuador (Willey 1971).
[41] At the Residuario Fuenche site, belonging to the (preceramic) Archaic Guayabo Blanco Complex (Rouse and Allaire 1978).
[42] At the Bottom Bay site, belonging to the (ceramic) Ostionoid Little River Complex (Rouse and Allaire 1978).
[43] 'Lithic-Age' industry of massive chunks and flakes, classified as Casimiroid Series, at several sites, succeeded by large lamellar flakes of the Mordán Complex which has ^{14}C dates starting at 2,610 bc (Rouse and Allaire 1978).
[44] At the Caño Hondo site of the (preceramic) Archaic Cayo Cofresí Complex, featuring stone pestles and edge grinders (Rouse and Allaire 1978).
[45] Sugar Factory 1, St. Kitts, an Archaic assemblage with chipped and ground stone implements (Rouse and Allaire 1978).

Table 3: Worldwide Pleistocene Island Configurations. Selective list shows geometrical properties determining accessibility of islands as they would have been at times of pleniglacial shorelines.

aquatic dispersals that are not always fully appreciated. The first, increasingly accepted among paleontologists yet still occasionally disputed, is that in ecologically, geographically, and climatically diverse regions of the world a small array of fossil and subfossil herbivores swam in breeding-group strength to Pleistocene islands situated around continental margins.[6] In doing so, they breached 'best-case 'water gaps ranging from 7 km to approximately 60 km and thus popularly believed to exceed the swimming powers of such animals; in at least one instance (Madagascar) they proved themselves capable of completing a crossing of at least 240 km in sufficient strengths for the establishment of a viable founder population. The second generalization, obvious from both biological and ecological viewpoints, is that although the sample used here is intentionally skewed towards islands with Pleistocene endemics, *Homo sapiens sapiens* is shown by implication to colonize farther, faster, and more adaptively on a global scale than any other faunal taxon save certain insects. However, human aquatic dispersal is almost entirely a Recent phenomenon, and scores of future discoveries of Pleistocene island occupations would be required in order to invalidate this observation. The principal question for island archaeology is whether the dispersal, once its rate had begun to increase exponentially, was the general outcome of population growth on the world's mainlands but otherwise entirely stochastic, or whether it was partially or wholly determined by certain factors that can be elucidated archaeologically, biogeographically, or ecologically. Since geography and technology have no doubt exerted considerable influence on the course of hominid diffusion, one could justifiably join Keegan and Diamond (1987:52) in the expectation that technologically advanced groups colonized earlier and/or farther, that islands were most likely to be reached first by groups to whom they were most accessible, and that large islands and close islands were colonized earlier than small islands and remote islands; the last assumption conforms to a pattern "with considerable 'noise'" which Cherry recognized for East (but not West) Mediterranean colonizations (Cherry 1981:50-58, 1985:17). Naturally, the diversity of man and his environment, coupled with disparate rates of technological evolution among peoples, is bound to generate more 'noise' as the study area is expanded. As a result, not only can the technology-dispersal correlation lead to the fallacy of affirming the consequent (although the Lapita people, for example, colonized earlier, faster, and farther than the Myceneans and Phoenicians, the Melanesian culture area was no more technologically advanced than the Mediterranean in the late 2nd millennium BC),[7] but narrow parametric extrapolations from other species to man tend to ignore the contribution of cultural factors to the dispersal behavior of humans. Archaeologists who model migrational

processes for a single pandemic species like man on patterns shared by many different species in a multitude of restricted habitats are guilty of misusing the biogeographic analogy, for their approach replaces behavioral determinism ('Man is unique') with biological determinism ('man is just another animal'), besides ignoring the fact that many models in biogeography have been developed to explain passive dispersal and are thus rather less suitable for man. If there are any patterns underlying human island colonizations and the turnover and extinction rates of island cultures, they are more likely to be recognized through the judicious use of general principles of *human* biogeography, which is more than simply biogeography applied to humans; an approach of this kind accords equal importance to Cherry's (1981:49) aphoristic postulate that "insularity presents special problems and opportunities which all species, including man, must face" and to Terrell's (1976:2) view that "the history, distribution, characteristics, and interrelationships of human groups on a regional and global scale" must be considered alongside purely ecological aspects of human biogeography. Predictably, then, the expectations introducing Keegan and Diamond's (1987) paper cannot be fulfilled in the form in which they are stated; and as a matter of fact, they are only used by the two authors as a heuristic device to stress that the history of human island colonizations abounds in mysteries. Whether these are the proverbial exceptions proving biogeographic rules, or whether they shroud a pattern dissimilar to that of other species—but nevertheless a pattern—is for island archaeology and human biogeography to find out.

If the T/D ratios for the islands in the present sample are compared, it can be seen that the long-term global trend of human water-crossings indeed shows a progression from close islands to distant islands, not only in the sense that absolute distance increases steadily over time but also in that remote islands were reached more frequently as time went by. Although a qualitative assessment of T/D ratios requires that a much larger sample be studied in much greater detail than is possible in this context, a value of or approximating 1.0 seems to form a dividing line; islands whose geometric properties yield higher values may tentatively be assumed to be more or less accessible, while those with lower values are characterized by varying degrees of remoteness. The array of the sample used here is illustrated by means of bar graphs in Fig. 5 (for the Holocene) and Fig. 6 (for the Pleistocene), with extremely accessible and extremely remote islands occupying the upper and lower ends of the scale, respectively. Large continental islands like Euboia and Vancouver (both of which involve minimum water-crossings of less than 1 km and fill the horizon when viewed from the mainland) are highly accessible, with values of

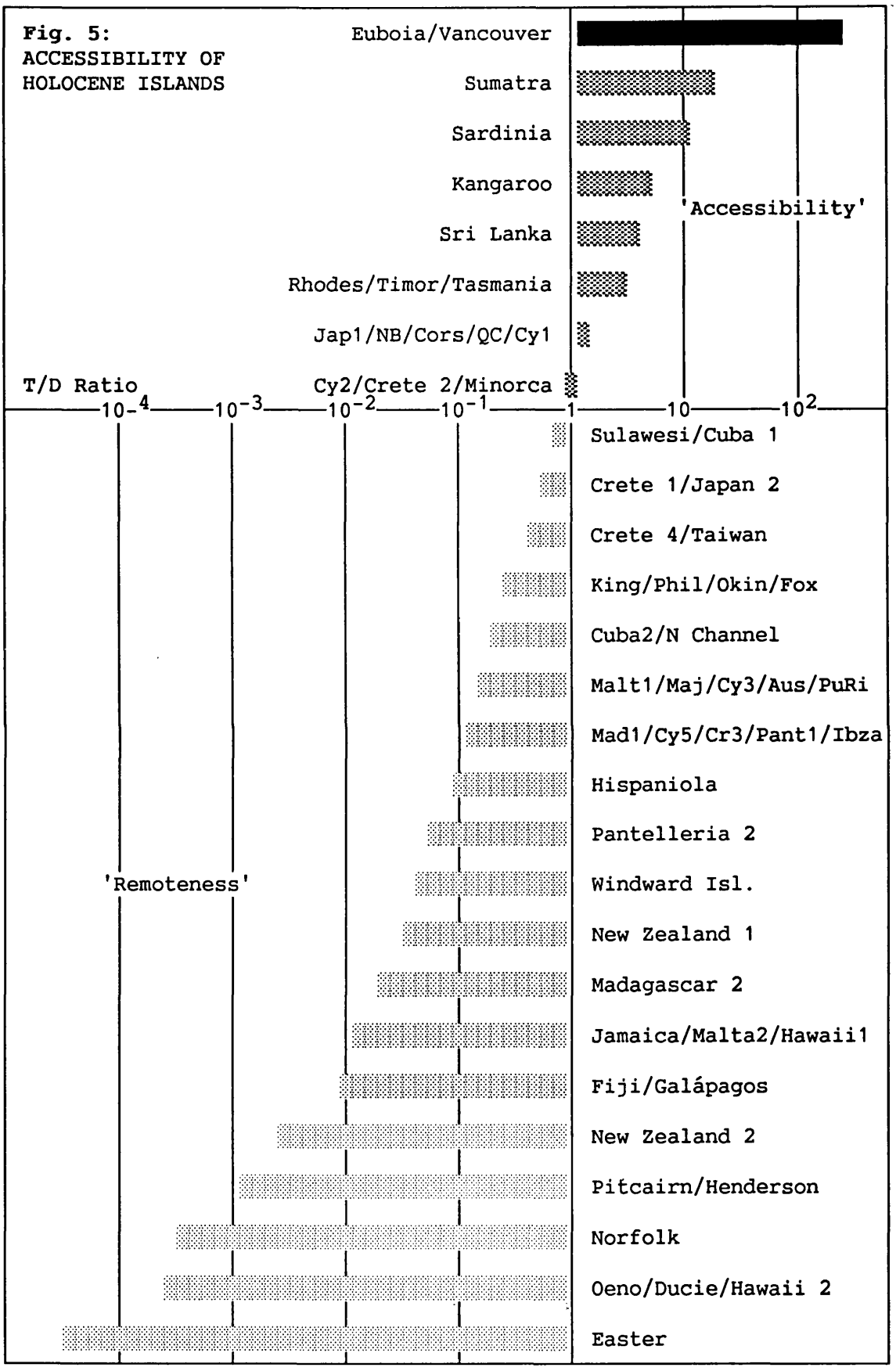
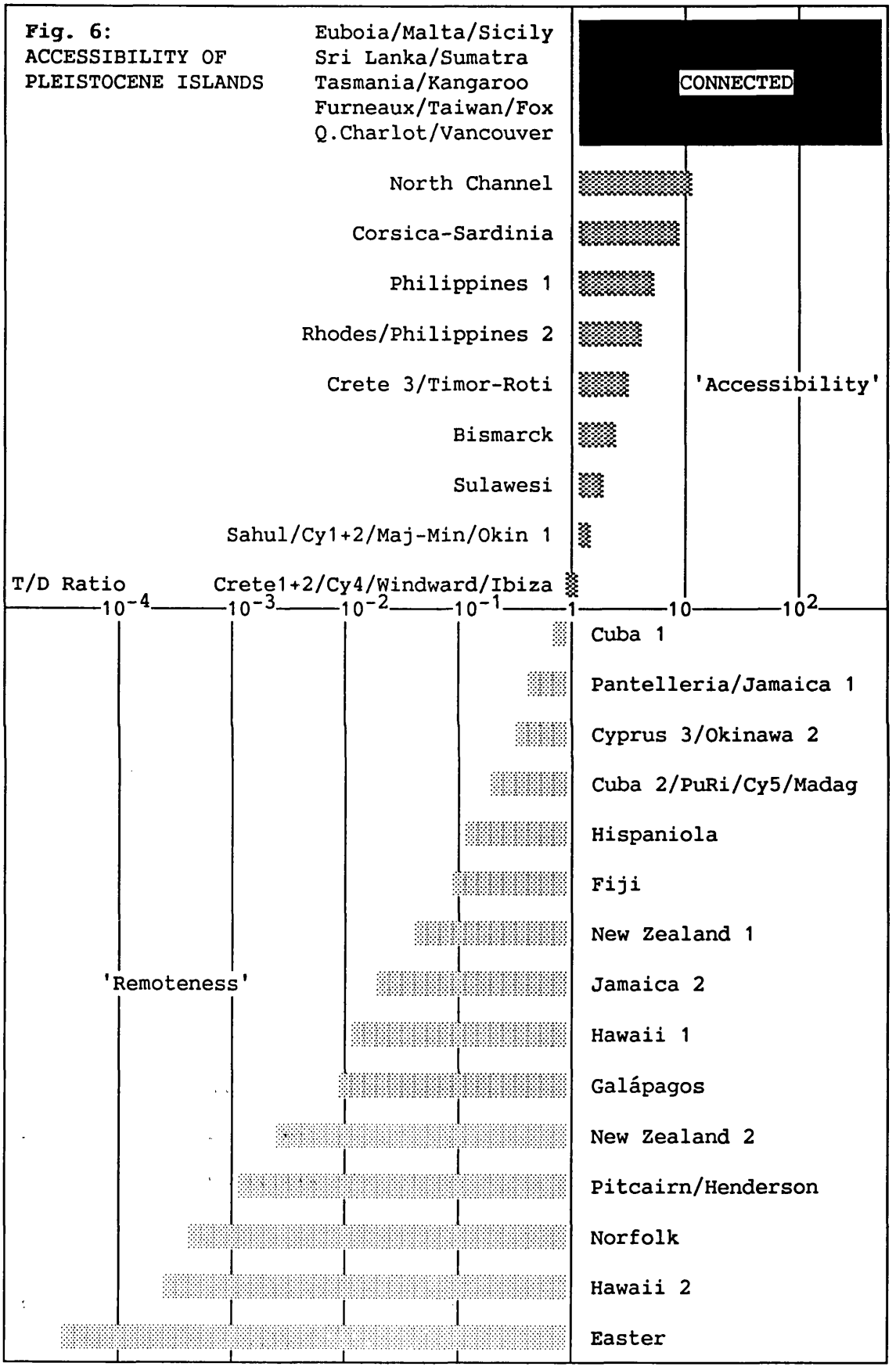


Fig. 5: ACCESSIBILITY OF HOLOCENE ISLANDS


Fig. 6:
ACCESSIBILITY OF
PLEISTOCENE ISLANDS
Euboia/Malta/Sicily
Sri Lanka/Sumatra
Tasmania/Kangaroo
Furneaux/Taiwan/Fox
Q.Charlot/Vancouver
CONNECTED
North Channel
Corsica-Sardinia
Philippines 1
Rhodes/Philippines 2
Crete 3/Timor-Roti
Bismarck
Sulawesi
Sahul/Cy1+2/Maj-Min/Okin 1
'Accessibility'
T/D Ratio
Crete1+2/Cy4/Windward/Ibiza
10-4
10-3
10-2
10-1
1
10
102
Cuba 1
Pantelleria/Jamaica 1
Cyprus 3/Okinawa 2
Cuba 2/PuRi/Cy5/Madag
Hispaniola
Fiji
New Zealand 1
'Remoteness'
Jamaica 2
Hawaii 1
Galápagos
New Zealand 2
Pitcairn/Henderson
Norfolk
Hawaii 2
Easter

360. Can it therefore be deduced that they were early stations in the evolution of human aquatic dispersal and reached before more remote islands? The answer is both a qualified yes and a qualified no. As evidenced by Cherry's survey, Euboia—even though Paleolithic settlement has meanwhile been attested—was not colonized *as an island* until well into the neolithic period (Cherry 1981:55, n.c); i.e., at a much later date than more remote Mediterranean islands such as Cyprus, Sardinia, and Crete. Area and ecology are unlikely to have acted as inhibitors of permanent settlement in this case, for Euboia's relatively large size (3,654 km^2, plus vertical zones) and similarity to the fertile environment of central Greece and Attica would have mitigated the 'area effect' on the rate of species extinction (see Case and Cody 1987; Cox et al. 1973:94-100; MacArthur 1971:97-104; MacArthur and Wilson 1967; Simberloff 1974, for discussions of equilibrium theory). Therefore, on current archaeological evidence the failure of early Holocene agriculturalists on the mainland to expand into Euboia cannot be readily explained in biogeographic terms, and other inhibiting factors seem to have been the cause. Similarly, man did not join a multitude of other species in colonizing Vancouver Island until sometime between 9,000 and 6,000 BP, even though it presents a 450-km-long, visible target (from Allison Harbour, B.C., in the North to Mt. Vernon, WA, in the South) and its great biodiversity indicates that the joint role of the target, distance, and area effects was negligible. Why then, the skeptic uniformitarian might ask, was it not colonized by humans before, say, the Huon Peninsula on the far side of Sahul (Papua New Guinea), Buka (North Solomons), or even the larger Mediterranean islands? In contrast to Euboia, the delay in settling Vancouver Island has a simple explanation: there is no firm archaeological evidence for the presence of prehistoric peoples in the entire Pacific Northwest prior to the early Holocene (cf. Willey 1966:380-387). Though the exact time remains a moot point, the island is thought to have been settled when carriers of the early Northwest Coast Microblade Tradition began moving into the ice-free coastal corridor of British Columbia (Borden 1979; Fladmark 1979), after a long push across Beringia and Alaska during the late Pleistocene whose artifactual origins seem to lie in the Diuktai culture of northeastern Siberia (Chard 1974:33; 36, Fig.1.23). By contrast, the hominid finds on Java and various radiometrically or inferentially dated early flake-tool assemblages on Borneo, Palawan, Sulawesi, Flores, and Timor testify to the presence of Paleolithic populations in Sunda over 1 Ma BP and to their radiation into Wallacea during mid-late Pleistocene times, so that man was poised to colonize Sahul and the closest Pacific islands beyond it long before the settlement of the Americas.[8] It can be seen now that Vancouver Island *does* fit the biogeographic pattern in having been

reached soon after the peopling of the staging area, and the same applies to the Bismarck Archipelago and the North Solomons even though they are much less accessible, yet in each case events took place at different times. Moreover, both Euboia and Vancouver island confirm the general regression from early high to late low accessibility values inasmuch as they were reached earlier than, for instance, the Galápagos Islands—with a value of 0.01 roughly 36,000 times more difficult to reach—and Easter, which scores only 0.00006 (=6 million times less accessible) and represents the remotest island in the sample. In summary, the foregoing makes it clear that colonization episodes are determined by regional opportunities, constraints and other conditions, that schedules of human dispersal must hence be examined in specific rather than universal contexts, and that worldwide patterns are at best very general.

Another interesting aspect besides the colonization of extremely distant and very close islands is the shift from remoteness to accessibility that can be observed when islands with values near the 1.0 borderline are projected backwards from the Holocene to the Pleistocene. This increase in the number of accessible *oceanic* islands is readily apparent when Fig. 5 is compared with Fig. 6. Sulawesi, Okinawa, Australia, the Windward Islands, the North Channel Islands, the Baleares, Crete 2 (from Kasos) and 3 (from Kithira), and Cyprus 3 (from Ras Ibn Hâni) evidence this shift. What they have in common is positions close to continental margins and, excepting Australia and Ibiza, Pleistocene endemics. Probably as a direct outcome of the change in target size, human dispersal to these islands occurred either very early (Sulawesi, Australia, Okinawa) or, once the Würm 'entry window' had been missed, not until relatively late in the Holocene (Baleares, Windward and North Channel Islands). The exceptions are Crete and especially Cyprus, which, if first reached from the Levant, only had an accessibility value of somewhere between 0.32 and depending on how much the sea had risen from its pleniglacial low by ca. 10,600 BP. As noted already, the island's remoteness in relation to the Levantine staging area was aggravated then, as it is now, by the absence of intervisibility between the respective coastlines. Of course, since on recent archaeological evidence from the Akrotiri rock shelter site the initial colonization of Cyprus coincided with the Pleistocene-Holocene transition, the timing of the Flandrian transgression and an approximate measurement of the amplitude of its oscillations are crucial to an accurate determination of the island's accessibility/ remoteness at the time; neither pleniglacial nor modern sea levels have *a priori* validity in such a boundary situation. The closest available data on Late Quaternary coastal stratigraphy in the East Mediterranean have been furnished for the southern Levantine seaboard by work in Israel. The presence off the

northern Carmel coast of a series of submerged settlements of late PPNB and late neolithic date, such as Newe-Yam (Prausnitz and Wreschner 1971; Wreschner 1977a, 1983), Atlit-Yam, and Megadim (Galili 1987; Galili, Kaufman and Weinstein-Evron 1988; Galili, Weinstein-Evron and Ronen 1988; Raban 1983) at depths ranging from 0 to -12 m proves—given the absence of Recent isostatic movement in the area—that by ca. 8,000 BP, the sea had already rebounded to approximately -14/-15 m below its present level. Based on these data, Wreschner (1977b) proposed a date of 10,000-8,000 BP for the peak of the Flandrian transgression, but his sea-level curve has since been contested by Ronen (1983). After examining dune-ridge profiles containing evidence of ten cycles of sedimentation and cultural remains and yielding a series of chronometric dates, Ronen proposed a model of coastal deposition whose inferred sea-level fluctuations suggest a steady progression of the Flandrian starting soon after the late Würm Pleniglacial, ca. 18,000 BP. Despite the author's conclusion that the "Middle and Epi-Palaeolithic near-shore settlements are to be sought far west of present shoreline, perhaps between -60 and -120 m," interpretation of the stratigraphy in conjunction with a matching oxygen-isotope curve and a less expansive view of the term 'Epi-Paleolithic' shows the sea level to have stood at no less than -30 m, and possibly higher, by the 11th millennium BP (Ronen 1983:128-131, Fig. 3). This means that as far as the initial human colonization of Cyprus is concerned, Vector 4 (across the Pleistocene 'Klidhes Strait') may safely be excluded from the list of hypothetical routes, and furthermore that the island's accessibility from an eastern embarkation point was closer to a value of 0.32 than to 0.63 (Vector 3).

Even if the earliest colonists arrived over the shortest routes, along Vectors 1 and 2 (Cape Anamur and Cape Ovacik, respectively), Cyprus would have been more difficult to reach than any of the other large Mediterranean islands and most smaller ones as well. From the direction of southern Anatolia, it is less remote but almost half again as far as Crete is from Kasos. For active crossings, when visibility mitigates the effect of a small target size, Crete would also have been easier to reach via Kithira and Antikithira. During the Würm glaciation, Crete was also somewhat less accessible from, but twice as close to, Kasos (Route 1) than northern Cyprus was from southern Anatolia, and considerably more accessible via fused Kithira-Antikithira (Route 3). Significantly, the use of both routes to Crete is attested by Pleistocene fauna on the stepping-stone islands Kithira, Rhodes, Karpathos, and Kasos (e.g., Sondaar 1986, and following section). Furthermore, Crete still lacks incontrovertible evidence of human settlement prior to ca. 9,000 BP (Cherry 1981; Evans 1968) and thus seems to have been reached over one millennium after

Cyprus. Sicily, which was intermittently connected to the Italian peninsula during the Pleistocene, is now only separated from it by the 3-km-wide Strait of Messina. Corsica and Sardinia can be regarded as one biogeographic unit as far as dispersals are concerned, for the Strait of Bonifacio between them is only 12 km wide at present sea levels and was continental during much of the glacial period. If it were not for Corsica, Sardinia would not only be one of the largest but also one of the most remote oceanic islands in the Mediterranean, but in their Quaternary configuration Corsica acts as a stepping stone for Sardinia, with a filter effect more likely to operate across the northern Tyrrhenian Sea than between the two large islands. This sea is bridged by a small archipelago comprising—in order of increasing distance from Tuscany—Palmaiola, Elba, Pianosa, and Capraia, which reduces the widest water gap for Holocene crossings (Elba-Corsica) to 51 km and yields an accessibility value of 1.76. During maximal regressions most of the stepping-stone islands were continental; Corsica could then be reached without major difficulty across a deep, 15-km-wide channel via Capraia and had a value of 9.66. Therefore, dispersals to Corsica—and, by implication, Sardinia—were facilitated during the Holocene by better overall accessibility and visibility than obtain for the northern seaboard of Cyprus, and they would have been so to an even greater degree in a Pleistocene environment, when a favorable configuration boosted the islands' accessibility to more than five times that of northern Cyprus. In view of the relative ease of access, there are no conceptual difficulties in biogeographic terms with the recent claims of Lower Paleolithic settlement in the Riu Altana and Pantallinu areas and Upper Paleolithic human remains at Corbeddu Cave, all on Sardinia (Klein Hofmeijer, Martini et al. 1987; Klein Hofmeijer, Sondaar et al. 1987). However, on examination by the author much of the Pantallinu and Corbeddu assemblages appeared to consist of secondary flakes with few signs of deliberate retouch, and until corroborative typological evidence for the 'Clactonian' affiliation of the Riu Altana/ Pantallinu complex, more ^{14}C-dated human remains from Corbeddu, or older dates for Corsica become available, the case for a pre-Holocene human colonization of the two islands remains weak (see Vigne and Alcover 1985, and Vigne n.d. for up-to-date discussions of this topic). The issue of the initial settlement of Corsica-Sardinia raises an interesting question about the boundary conditions of early human aquatic dispersal in the Mediterranean, for all other islands with confirmed Paleolithic occupations in that region could have been settled under continental conditions (cf. Cherry 1981:43-45).[9] Global comparison strongly suggests that Pleistocene water crossings were confined to islands with accessibility values greater than 1.0, which is as likely a measure of the limits of Paleolithic maritime skills as of the increase in fatalities

that probably terminated passive dispersals over longer distances. Table 3 shows that Pleistocene Okinawa had an accessibility of 1.57 from Kyushu (Route 1), slightly less than northern Cyprus; Sahul from Timor-Roti had a value of 2.06, slightly more than Cyprus; while Sulawesi, Timor-Roti, and New Britain in the Bismarck Archipelago, with values ranging from 3.21 to 4.83, were even more accessible. The inevitable exception is encountered in remote Buka-Bougainville (North Solomons, ex-sample), whose minimum distance from New Ireland in the Bismarcks is 168 km and whose accessibility value is therefore only 0.2. Unless the small Green Island atolls had already emerged as stepping stones, Buka represents by far the most daring—or the luckiest—crossing man survived as he began to make inroads into the island world during the Late Pleistocene; whereas the journey to Australia, usually perceived as difficult and hazardous (e.g., White and O'Connell 1982:46) yet involving just over half the distance and an accessibility value 100 times that of the North Solomons, would have been child's play by comparison. Island hopping across the Feni Group and Green Islands, on the other hand, reduces water gaps to 50-60 km, in which case the Pleistocene settlement of the North Solomons would fit the pattern remarkably well. Either way, the dispersal process was arrested in the archipelago. Beyond it, sea barriers increase to 200 km and more, species diversity decreases rapidly, and as a result of this biogeographic discontinuity human groups did not expand further into the Pacific until the Late Holocene (Groube and Pernetta 1989; Wickler and Spriggs 1988). To return to Sardinia and Corsica, if, provided that the staging area on the Italian mainland itself was not devoid of any Paleolithic settlement, the islands failed to be colonized at times of low sea level despite their eminent accessibility (9.66), this may point to a pronounced regional variability of aquatic dispersal behavior among Late Pleistocene human populations—at least between the Mediterranean and Island Southeast Asia. Although Cherry's research bears out the possibility of dichotomous developments even on an intra-regional scale, it can be postulated that if Corsica-Sardinia was inaccessible or unattractive to Pleistocene hunter-gatherer groups, the same factors would most likely have prevented the colonization of less accessible and ecologically more equable islands. The fact that the date of the initial colonization of Cyprus, where claims of 'paleolithic material' have been repeatedly put forward and rejected, has now been shown by the new discoveries at Akrotiri *Aetokremnos* to edge towards the Pleistocene/ Holocene boundary but not beyond it, seems to support this hypothesis.

After the Flandrian transgression had restored sea levels more or less to their present height, Malta and the Baleares became the least accessible of the larger Mediterranean islands. Malta

and Gozo are separated from Sicily—the nearest landfall—by a sea barrier of 80 km, and their small target size and low relief mean that blind crossings were required during the Holocene. With a value of 0.35, the two islands are about four times less accessible than the north coast of Cyprus, and it is therefore not surprising that archaeological evidence puts the date of their initial colonization only in the late 6th m.BC. During the Pleistocene, however, Malta was at least occasionally connected to Sicily by a wide coastal plain; that conditions of continentality were nonetheless ephemeral can be inferred from its unbalanced and highly endemic fauna (e.g., Boekschoten 1986) and the apparent failure of Paleolithic settlers on Sicily to traverse the land bridge and colonize the islands.

The closest parallel to the position of Cyprus can be found in the Baleares, aside from the obvious configurational difference between a single large island and a group of smaller islands. Assuming that dispersals can usually be gauged by minimum water gaps, the islands' accessibility is largely determined by the distance of Ibiza from the Iberian coast. With a Holocene accessibility of the latter amounting only to 0.16, the Baleares are very remote by Mediterranean standards—closely comparable to less distant but considerably smaller Pantelleria, between Sicily and North Africa. Nor did the Pleistocene expansion of coastal plains do much to mitigate the distance effect, even though the islands were then relatively accessible by Southeast Asian standards (a value of 1.0, and visibility, from the mainland to Ibiza and 1.79 for the next gap between Ibiza and Majorca-Minorca). In perspective of what was earlier suggested for the Mediterranean, the combination of great distance (51 km) and small target size (51°) must have put them beyond the reach of most land animals and humans. Predictably, then, the Balearic paleofauna is extremely unbalanced (e.g., Sondaar 1986)—in common, as will be seen shortly, with that of Cyprus—and the first signs of human occupation are comparatively late, dating approximately to the first half of the 5th m.BC on Majorca (Camps 1976; Cherry 1981).

If Cyprus was difficult to colonize from the north, it position with regard to the Levantine coast is decidedly remote. Taking Vector 3 (Cape Ras Ibn Hâni-Karpas Extension) as the shortest route, the corresponding accessibility value of 0.64 means that the island was considerably more remote during the pleniglacials than any other Mediterranean island in the sample, including all the larger islands mentioned earlier. In addition, pre-Holocene Cyprus was far less accessible to Paleolithic populations from the East than Sahul and any of the Southeast Asian and Melanesian islands included in the sample. Looking to other regions of the world, only Madagascar, the Greater Antilles, the Galápagos Islands, and Oceania were more remote. However, with the

exception of Madagascar none of these examples have yielded fossil or subfossil evidence of large placental mammals that swam to them, and none seem to have been colonized by humans before the Late Holocene. With the gradual ablation of the ice sheets in the Northern Hemisphere following the last glacial maximum, the remoteness of Cyprus from the Levant intensified; its present accessibility value of 0.32 from C.Ras Ibn Hâni implies that prehistoric dispersals along that vector were more hazardous than to any of the other medium-size to large Mediterranean islands except Ibiza and Majorca (0.16 and 0.35, respectively). On a global scale, Australia, Madagascar, and Puerto Rico have comparable accessibility values (yet in the case of the first two, excessive target size almost certainly effects a distortion of their *real* accessibility which, due to the great distances involved, must be substantially lower), while numerous Caribbean and the majority of Pacific islands are more remote.

In summary, islands come in such a bewildering variety of sizes, shapes, distances and configurations that visual pattern recognition is inadequate as a comparative technique for illuminating all but the starkest contrasts. As for many geographic problems, accurate analysis is therefore only possible through the quantification of a previously specified set of parameters; in this case the parametric data consist of the geometric properties of islands and the archaeologically determinable dates of their initial colonizations. Based on a worldwide sample of approximately 40 islands, it was concluded that human aquatic dispersal during the Pleistocene was almost as a rule limited to islands with accessibility values greater than 1.0, leaving the vast majority to be colonized during the Recent period. This disparity is shown clearly by the cumulative frequency curve in Fig. 7, which illustrates the dramatic jump in the rate of dispersal following the transition to the Holocene, in other words precisely at time when rising sea levels put greater distances between man and the islands. Such a glaring example of 'bad timing' is difficult to reconcile with the view that human aquatic dispersal was governed by natural selection; instead it implies that cultural evolution was the determinant and ecological circumstance the modifier of a process that usually involved prehistoric agriculturalists and horticulturalists, and only rarely hunter-gatherer groups. What is concealed by the scale of the graph is a further time lag of several millennia between the end of Pleistocene and the rapid increase in the number of initial colonizations. Barring circumstantial evidence for Early Holocene cultivators on Taiwan, as well as the tantalizing but still tenuous evidence from Sardinia which was earlier referred to, so far only the Philippines *and Cyprus* have produced reliable data for initial colonizations at the

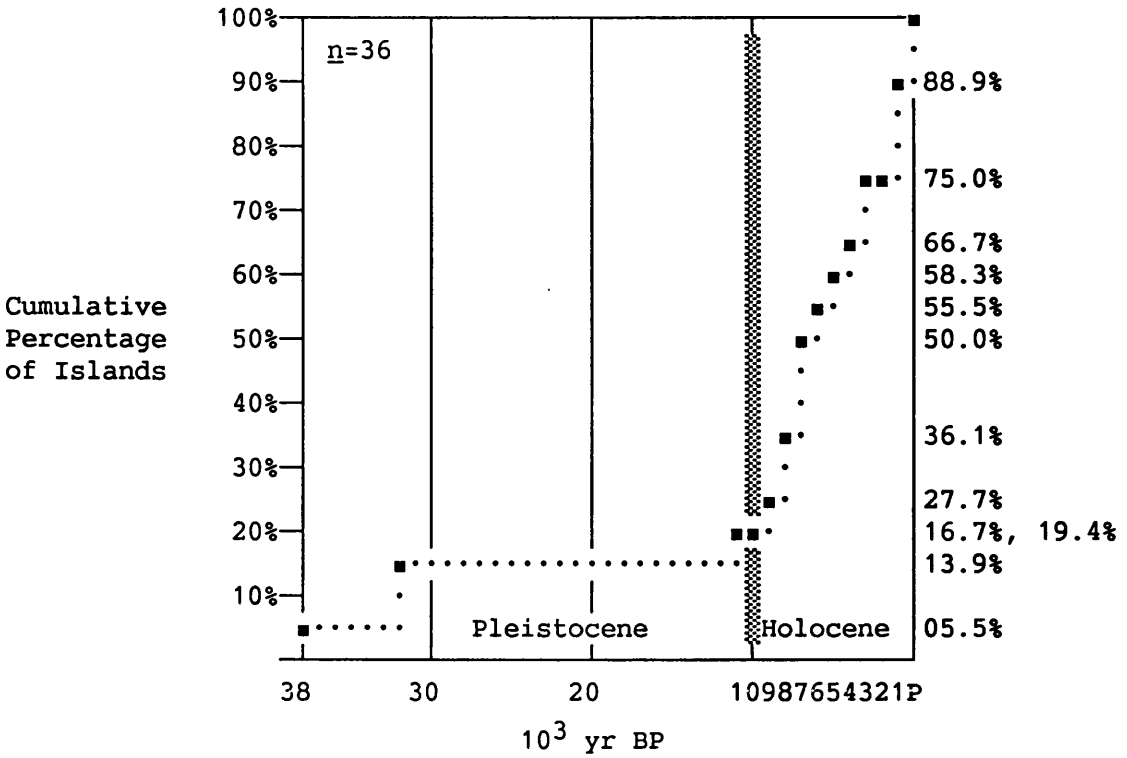


Fig. 7: Cumulative Percentage Curve of Global Island Occupations. Simplified curve shows increase in initial colonizations from 38,000 BP to 1350 AD. Only islands colonized as islands are shown.

Pleistocene/ Holocene boundary.[10] As a comparison of the relevant parameters demonstrates, however, migration to the Philippines—though necessitating several steps and hence a longer process—would always have involved less taxing water crossings than dispersal to Cyprus from the northern Levant (Heaney 1985). But, as will be argued in the last section of this chapter, this, not southern Anatolia, is the most likely source area for prehistoric settlement of the island until the end of the Formative period.

Thus, the colonization of Cyprus in the 11th millennium BP not only represents one of the earliest aquatic dispersals in post-glacial times but involved simultaneously a longer crossing and a more remote destination than any documented sea voyage until man reached either Hispaniola in the early 8th millennium BP or Majorca in the early 7th millennium BP.[11]

In order to gain a quantitative impression of the patterning of worldwide island colonizations, an attempt was made to measure the strength of correlation among the parameters which have been discussed so far. Specifically, the purpose of the analysis was to test the following pair of hypotheses:

H_1: Because island colonizations generally represent the final push in the global

radiation of *Homo sapiens*, human aquatic dispersal was primarily linked to cultural evolution, with stochastic processes impinging on its development in a secondary role.

I_1: Thus, there should *on the whole* be a temporal progression in the number and remoteness of islands reached for the first time, and the strength of the association between time and space can be expected to provide a measure of the stochastic element involved in the worldwide dispersal process. (Cf. Keegan and Diamond's [1987] normative scenario, supra.)

Furthermore,

H_2: Because longer sea crossings are evidently more hazardous, beyond a certain point distance can be expected to become the sole determinant variable of aquatic dispersal, to the virtual exclusion of target size. When this happens, T/D ratios are no longer useful as indicators of accessibility or remoteness.

I_2: This alone should cause colonization dates to covary more strongly with distance than with accessibility/ remoteness, with the distance effect observable either in the form of a concave curve when distance is plotted against time, or in a flattened curve when time is plotted against both distance and accessibility/ remoteness.

Stipulating that each of the two hypotheses cannot be confirmed by any other test implication, the truth of the first is established by the expectedly favorable outcome of testing whether accessibility decreases with time. It has already been noted that with one possible exception islands with accessibility values below 1.00 do not appear to have been colonized prior to the final phase of the Pleistocene. This is certainly true for all five Paleolithic colonizations included in the present sample. From the Pleistocene/ Holocene boundary onwards, a dramatic increase in the pace as well as the range of humankind's maritime radiation is apparent no matter which variable is plotted against time (Figs. 9-10), although the pattern deviates markedly from a linear progression. Again, in light of what was said earlier, considerable background noise in a global sample must be expected; the interest of it lies not so much in its presence *per se* as in analyzing its structure. In other words, while the fact that noise is present says little about the pattern except that there is a certain degree of variability involved in human aquatic dispersals, explaining its greatest deviations (i.e., the points with the largest residuals) may potentially provide insights into the pattern itself.

However, detailed interpretation becomes difficult when the use of a small sample and large

array sizes produces dispersion, and for this reason the results of the present analysis are somewhat equivocal. Fig. 8, which provides a composite picture of the next two graphs, displays a fairly strong cluster of colonizations from the Pleistocene (p) down to the 4th millennium BP. That this cluster, which involves mainly accessible and moderately inaccessible islands at distances ranging from 0.5 km to ca. 150 km, is itself split chronologically into two clusters can be seen in Figs. 9 and 10. Following the colonization of Sahul and, as implied by Birdsell's Route 2B (Birdsell 1977:126-128), Timor-Roti (unrelated to the possible presence there of *H. erectus* in the Middle Pleistocene), three more episodes took place almost simultaneously around 32,000 BP; then there was a noticeable hiatus until ca. 11,000 BP, when the spate of Recent colonizations began. A third discontinuity can be recognized at ca. 3,000 BP or slightly earlier, when the sudden dispersion of the scatter in Fig. 8 indicates a quantum leap in distance and remoteness. This sudden push towards small and distant islands is exemplified by the colonization of Fiji ca. 3,300 BP and probably related to the diffusion of the Lapita Cultural Complex in Melanesia and western Polynesia (Kirch 1988b). Outside the South Pacific, islands at distances of several hundred kilometers do not seem to have been reached until even later; both the Galápagos Islands, with geometric properties very similar to those of Fiji, and Madagascar, which is hard to miss provided the Mozambique Channel can be negotiated, remained empty until the Christian era. The presence of discontinuity in the observed pattern, twice in the temporal and once in the spatial sense, can be interpreted either as resulting from sample bias or as indicating that the global process of island colonization was periodic rather than gradual—akin, in terms of evolutionary biology, to the concept of punctuated equilibrium. The regression curve in Fig. 8 shows that T/D ratio decreases by a factor of 6.5 per 1,000 km and hence that the association between accessibility and distance is not very strong; this is because distance is only one of the two parameters determining accessibility, the other being target size. The same figure also provides a measure of the stochastic element inherent in the sample in the form of an insignificant negative correlation between accessibility and distance (r=-0.091). Judged in conjunction with the time factor, this merely serves as a statistical confirmation of the commonsensical prediction that humans did not *invariably* colonize large and close islands before small and distant ones. The potential for variability is borne out not only by the role of regional variation—as discussed earlier using the examples of Euboia, Vancouver Island, and the West Mediterranean—but generally by the fact that if every colonization episode is defined in terms of three variables possessing two

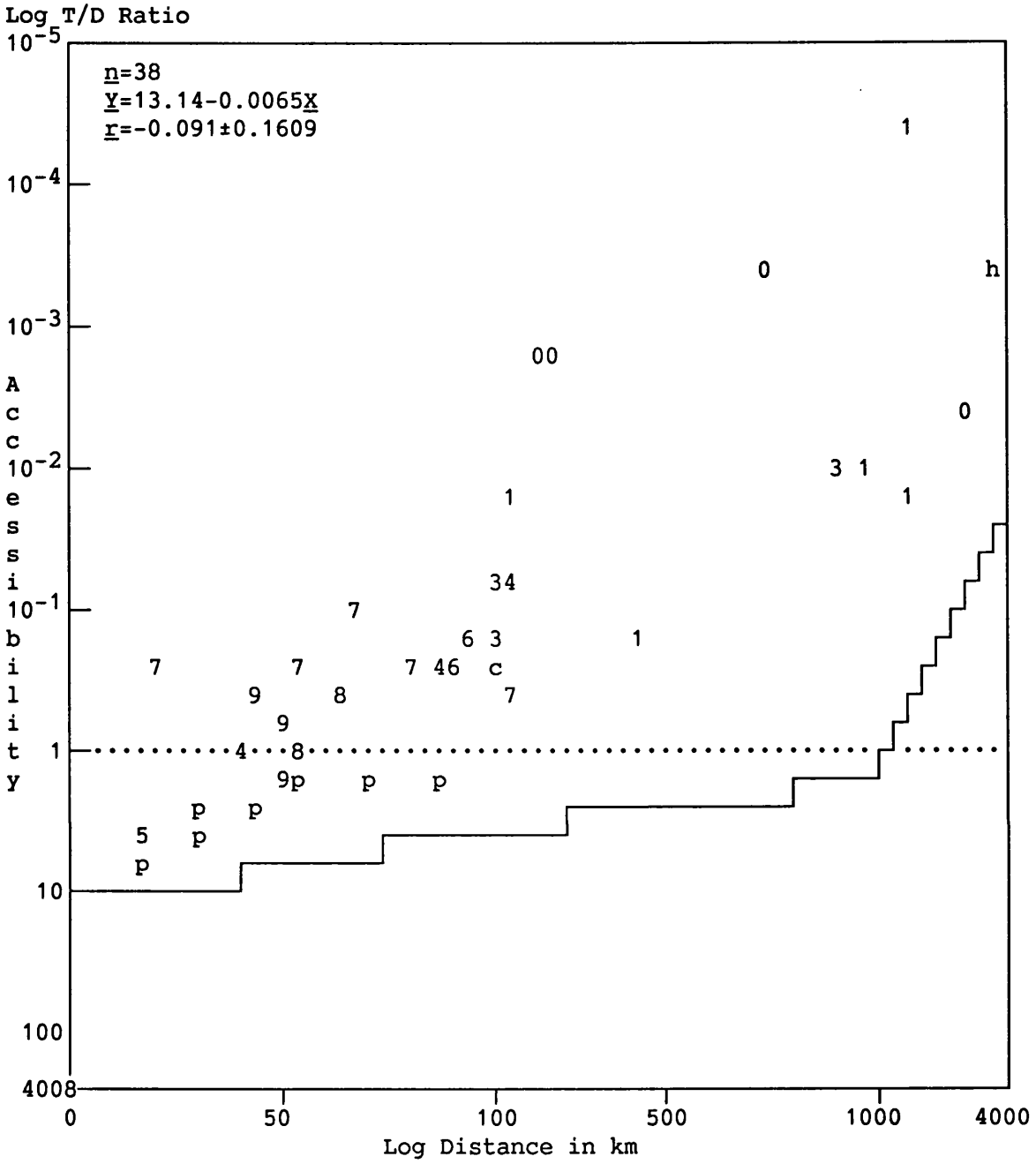


Fig. 8: Scatter Diagram of Initial Island Colonizations. *N* observations are plotted against Distance and Accessibility. Alternative vectors resulting in significantly different scores are shown for Cyprus (c) and Hawaii (h). Symbols indicate time code as follows: p=Pleistocene (38,000 BP-10,000 BP), incl. (c); 9=10,000-9,000 BP; 8=9,000-8,000 BP; 7=8,000-7,000 BP; 6=7,000-6,000 BP; 5=6,000-5,000 BP; 4=5,000-4,000 BP; 3=4,000-3,000 BP; 2=3,000-2,000 BP (no observations); 1=2,000-1,000 BP, incl. (h); 0=1,000-0 BP. Dotted horizontal line at 1.0 shows division between accessibility and remoteness. N.B.: One symbol 8 coincides with lower left-hand corner of graph.

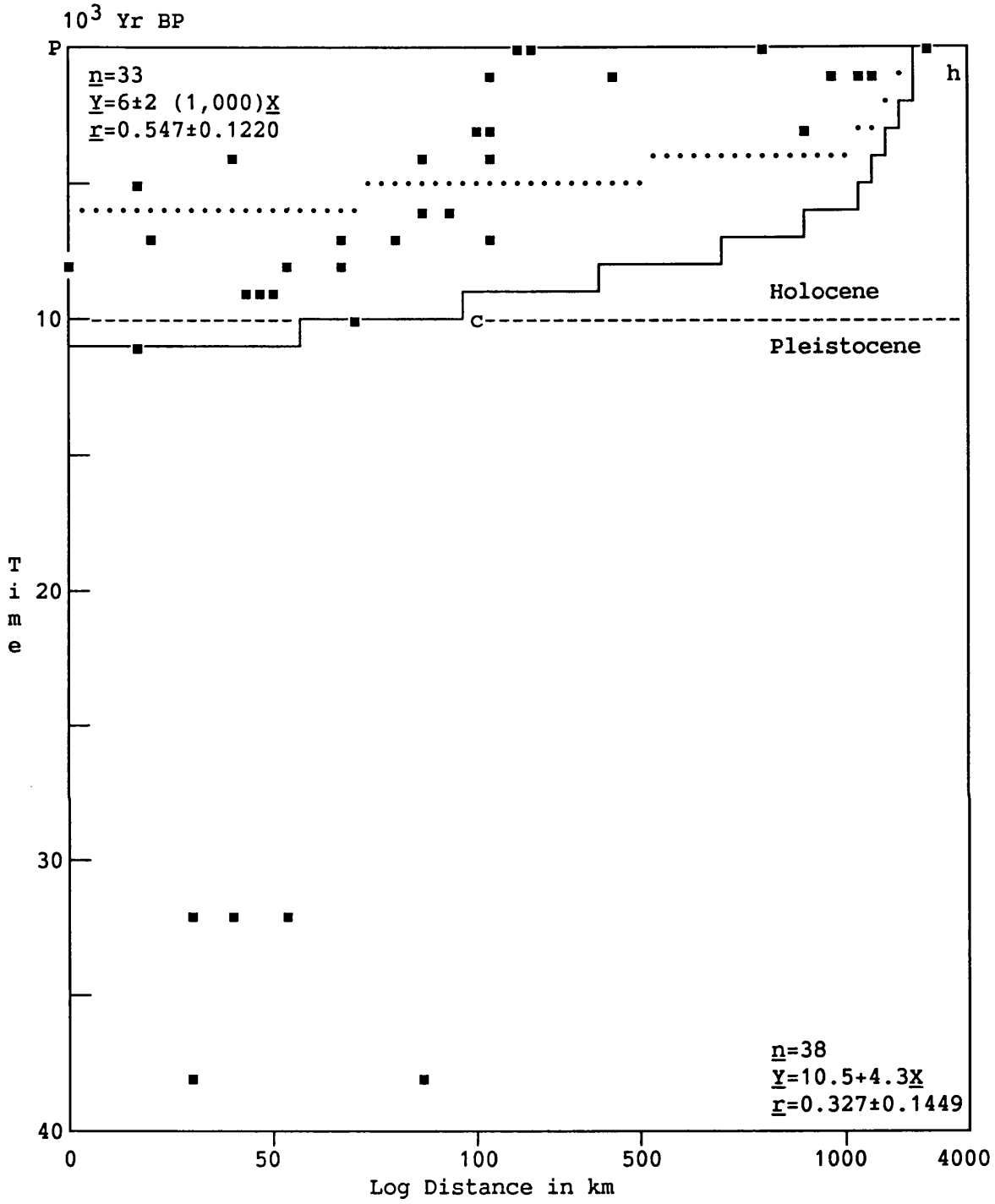


Fig. 9: Plot of Initial Colonizations: Distance and Time. Regression curves and correlation coefficients are shown for entire sample (n=38, solid curve) as well as for the last 11,000 years only (n=33, dotted curve). Alternative vectors resulting in significantly different scores were plotted for Cyprus (c) and Hawaii (h). *Y*-axis was scaled to increase during computations in order to obtain positive values. Stepped curves are due to software output.

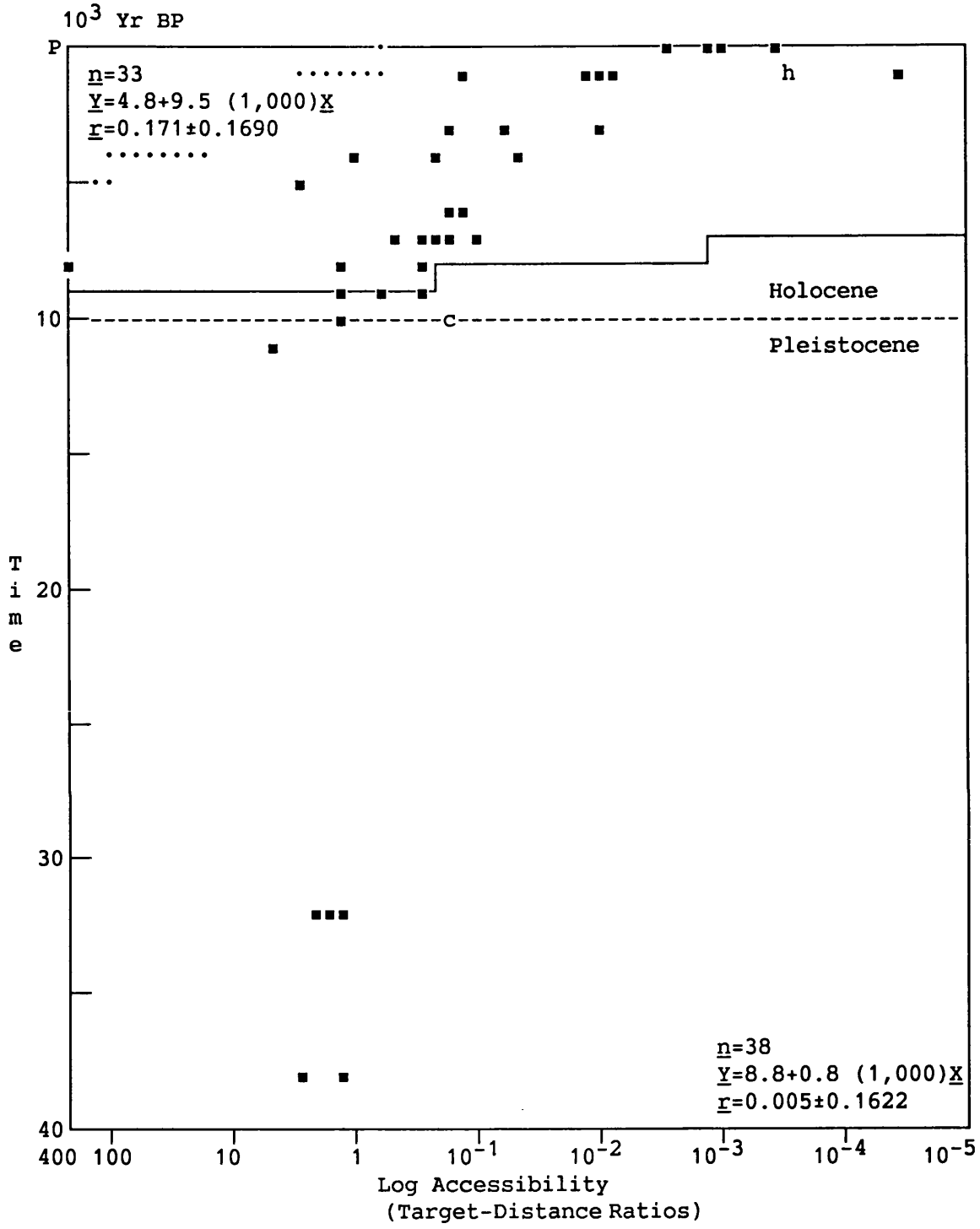


Fig. 10: Plot of Initial Colonizations: Accessibility and Time. Regression curves and correlation coefficients are shown for entire sample (n=38, solid curve) as well as for the last 11,000 years only (n=33, dotted curve). Alternative vectors resulting in significantly different scores were plotted for Cyprus (c) and Hawaii (h). *Y*-axis was scaled to increase during computations in order to obtain positive values. Stepped curves are due to software output.

attributes each (time: early, late; distance: close, far; island size: large, small), there are eight possible combinations of attributes that can accompany a given episode.

Another interesting observation arising from a close inspection of the plots is that there is a stronger positive correlation between time and distance than between time and accessibility. When regressions and correlation coefficients are computed for the entire sample, the temporal disparity between the five earlier Pleistocene episodes and the bulk of measurements in the Holocene distorts the results; thus in Figs. 9 and 10 they are shown twice: once for the entire sample and once more for the Holocene cluster only. The values for Recent dispersals demonstrate a moderately strong correlation between date of colonization and island distance (r=0.547) and a much weaker one between date and island accessibility (r=0.171). From this might be inferred that the time at which islands were reached depended primarily on the widths of water gaps en route, regardless of whether they made large or small targets. However, such a conclusion is contradicted by the outcome of plotting target size against distance (not illustrated). This test showed the two variables to be only weakly correlated (r=-0.334), suggesting that as distances increased so did the widths of targets because either larger islands or entire archipelagoes were increasingly colonized. Examination of the plots furthermore reveals that the strengths of these relationships vary temporally as well as spatially, with a consistent change occurring at approximately 3,500-3,000 BP and ca. 100-150 km no matter which variables are plotted against each other. When colonization dates are plotted against accessibility and distance (Fig. 8), a comparison between scatter and regression curve shows that the former diverges from the latter in the direction of the y-axis before beginning to converge on it at the time and distance mentioned (due to the use of log scales, the curve shows up in the regression line whereas the scatter appears to be linear), meaning that accessibility began to decrease more slowly beyond distances of 100-150 km. When time is plotted against distance alone (Fig. 9), the latter is seen to increase rapidly beyond the same juncture, whereas the time-accessibility plot (Fig. 10) does not show a significant change until ca. 1,000 BP. Although it is difficult to discern clear patterns on the graphs, the following trend is faintly recognizable: up to ca. 3,500-3,000 BP and 100-150 km, a fairly strong linear relationship exists between distance and accessibility as well as between either of these and time, pointing to the colonization of progressively smaller and/or more distant islands. Since there is almost no relationship between target size and distance at this stage, the more distant islands that were reached also tended to be larger, and it follows that accessibility decreased mainly due to distance. When water gaps become too great

to be breached and dispersal remains confined to islands within a certain radius, a decrease in T/D ratios is attributable to the fact that colonization episodes involve increasingly smaller islands, in which case accessibility decreases due to a reduction in target size. However, the opposite was found to be true for the present sample, indicating that up to 100-150 km the role of distance as a determinant of aquatic dispersal was perhaps inhibitive but not *prohibitive* in a global perspective. A corollary of this observation is that greater distances *were* prohibitive regardless of target sizes, and this finding would appear to confirm the second hypothesis (H_2), even though a clearly concave curve as specified in the test implication (I_2) could not be recognized. Next, a perceptible change in plot patterns signifies the breaking of this distance barrier sometime around 3,500-3,000 BP. A comparison of the distance-accessibility and distance-time plots (Figs. 8 and 9) with the accessibility-time plot (Fig. 10) shows that while distances increase dramatically at this point, accessibility not only continues to decrease in more or less linear fashion but even increases temporarily before starting to diminish rapidly in the 2nd millennium BP. This means that for some time the distance effect on accessibility was offset by increasing target width; i.e., more distant but larger islands or archipelagoes were selected. Late Holocene colonizations thus seem to have passed through an intermediate stage before expanding to islands that were simultaneously very distant and very small, a development which makes sense in terms of the hazards involved in long-distance seafaring. In conclusion, the emergence of Late Quaternary human aquatic dispersal can tentatively be divided into the following stages:

Period	Stage	Colonization of	Examples
LATE PLEISTOCENE	I	Oceanic islands near continental margins with accessibility values ≥1.00	Bismarcks, Okinawa, Sulawesi
Quantum leap in number of dispersals			
FINAL PLEISTOCENE/ EARLY HOLOCENE	II	Smaller islands and larger, more distant islands involving water gaps of up to 100-150 km	Cyprus, Philippines, most Medit. islands
Quantum leap in size of water gaps			
LATE HOLOCENE	III	Very distant islands and archipelagoes presenting relatively large targets	Fiji, Galápagos, Madagascar
Quantum leap in overall remoteness			
LATE HOLOCENE	IV	Very distant, small islands and distant islands presenting very small targets	Easter, Norfolk, Henderson

On a cautionary note, because island colonization is a process with deterministic as well as stochastic components, the use of a relatively small grab sample is bound to compound the difficulty of separating the former from the latter by imposing severe limitations on the detection of nonrandom patterns for individual parameters. The risk of spurious correlations is particularly great when, as in this case, non-trivial generalizations about *dynamic* processes require the recognition of associational patterns for two or more parameters, because each variable may be influenced by unknown factors. For this reason the conclusions reached can only be of a preliminary nature and need to be subjected to further, more detailed tests. In order to stand a chance of obtaining clear-cut results, a similar analysis would require a much-enlarged database, involving perhaps 80-100 islands, the meticulous compilation of a catalog of geometric properties, and an exhaustive search of the latest archaeological literature with the purpose of determining the dates of initial contacts/ colonizations. Since the subject of comparative insularity is merely an adjunct to the discussion of the circumstances that accompanied the Late Quaternary colonizations of Cyprus, an analysis of this magnitude is, however, clearly beyond the scope of the present chapter.

Furthermore, the attempt to define a number of normative factors of human aquatic dispersal should not make one lose sight of the caveat posed in the beginning; namely, that geometric properties alone must be evaluated in conjunction with other environmental parameters which presuppose familiarity with local conditions, such as tides, currents, prevailing winds, surface ice, salinity levels, water temperatures, and so on. Beyond these, there are physiological and cultural factors that may a) trigger or prevent water crossings, b) contribute to their success or failure, and c) reduce or decrease the chances of propagules to found archaeologically detectable populations. Even if it were possible to take all these factors into account, determining which one, or what combination, promoted or inhibited colonization in a specific case is likely to remain an unattainable goal where prehistoric and pre-contact situations are concerned. On the other hand, meteorological and oceanographic conditions are easier to factor into a predictive model, as exemplified by a highly interesting computer simulation of Polynesian colonization (Levison et al. 1973). The effect of failing to do so can be illustrated by the way in which the intriguing trans-pacific contact hypothesis put forward by Meggers, Evans, and Estrada (1965) to explain ceramic parallels between the Jomon culture of Japan and the Valdivia Complex of coastal Ecuador, ca. 3,000 BC, was recently demolished by Gordon McEwan and Bruce Dickson. These authors first pointed out that none of the proponents and opponents of the issue had ever

examined the physical obstacles to such a voyage and then proceeded to adduce a host of environmental and physiological factors which demonstrated the chances of success to be virtually nil (McEwan and Dickson 1978).

In the Mediterranean, of course, boat voyages—even where primitive water craft are involved—are unlikely to exact endurance records from the occupants, and oceanographic conditions around Cyprus are generally favorable. Oceanic currents circle the island in counterclockwise direction, although local reversals and vortices commonly occur in the nearshore zone, particularly in the lee of peninsulas and capes (A. Dimitropoulos, pers. comm. 1988). Current speeds are uniformly low: along the island's southern seaboard, currents move east at ca. 1.8 km/h in calm weather and at up to 2.7 km/h during storms; north of Cape Greco they veer to the northeast at a speed of 0.9 km/h; along the northern seaboard they can be east or west near the shore, with speeds of less than 1.8 km/h; and off the south coast of Anatolia between Cape Ovacik and Cape Anamur currents flow east to west also at less than 1.8 km/h (Houp and Horn 1985). By comparison, the speed of the current between Corsica and the Tuscan Archipelago reaches 3.6 km/h (Vigne n.d.). Buoyancy is increased by the fact that east Mediterranean salinity levels are among the highest in the world, amounting to approximately 32 parts per thousand off Cape Andreas, Cape Lissan in Cilicia, and Cape Ras el Basit on the North Syrian coast, and surface water temperatures reach 25° during the summer months (Guibout 1987). All in all, the prevailing atmospheric and oceanographic conditions around Cyprus are therefore unlikely to have foiled attempts to reach the island from the surrounding coast.

3. Biogeography and Faunal Dispersals

So far, islands have been treated as essentially two-dimensional geographic entities whose size as targets for human and non-human water crossings is determined by extrinsic properties, such as distance, width, and height as perceived from a staging area. Island 'size' was used mostly to refer to relative target width in this sense rather than as a synonym for area, the third geometric property of islands. It is now time for the discussion to shift focus on size as *area* and as a circumscription of ecological diversity, and to turn to the biogeographic background of colonization episodes by plants and animals which involved Cyprus. If, as was suggested in the preceding section, the island was more difficult to reach than many others, at least given the capabilities of the colonists in question, what were the mechanics of their dispersal, what environmental conditions did they find on arrival, and to what extent is the island's remoteness

reflected in the phytogeography of the East Mediterranean region? All these questions relate to the problem of Quaternary extinctions and the chance of survival for the first humans to set foot on Cyprus, and in turn the viability of its initial settlement has implications for the origins of the aceramic Khirokitia Culture and the possibility of Holocene extinctions involving the early prehistoric settlers themselves.

General up-to-date descriptions in varying detail of the island's physical geography introduce several recent archaeological studies (e.g., Baurain 1984; Courtois 1971; Knapp, n.d.; Stanley Price 1976b, 1976c), and an in-depth discussion of present and past environments can be found in Held (1983, 1989a). For the purpose of this study it is thus sufficient to provide a rough physiographic framework for addressing the problem of plant biogeography as a potential indicator of mainland connections. Under the current Late Holocene regime, Cyprus is a semi-arid country with a typically Mediterranean climate that is classified as *attenuated thermo-mediterranean* in the mountainous environment of the higher Troodos and as *xerothermo-mediterranean* in the remainder of the island (BMMZ 1963). Therefore, upland conditions resemble those of the adjacent mainland coast and maritime regions as far south as Tartus, and lowland conditions those found in interior Anatolia and the interior of the northwestern Levant. The more attenuated *sub-mediterranean* and *meso-mediterranean* conditions encountered in the Taurus Range and the Hatay do not influence the climate of the island. December is the coldest month with average minimum temperature readings of 9 °C and August the hottest with an average maximum of 35 °C. Precipitation is mainly cyclonic and orographic, meaning that it is unreliable and unevenly distributed between seasons and regions. Mean annual rainfall amounts to approximately 533 mm, more than 80% of which usually occurs from November to April. The summer season from late May to mid-October is almost completely dry, mitigated only by occasional thunderstorms in June and August. Past experience indicates a pattern of one year marked by moderate drought conditions occurring every three years and one year marked by severe drought conditions occurring once every decade. Freshwater, therefore, is at a prime, and there is persuasive albeit circumstantial evidence that this has been so since the Early Formative (see **CHAPTER 3**, infra). New palynological data from Khirokitia *Vouni* under study by Josette Renault-Miskovsky also seem to point to xeric conditions during the Early Holocene, according to the excavators (A. Le Brun and O. Daune-Le Brun, pers. comm. 1988). Ironically, however, almost 80% of the island's annual 4.6 million m^3 of precipitation are lost through evapotranspiration, so that the hypothetical existence of a more mesic regime during the Late Pleistocene/ Early Holocene implies a much

larger water crop prior to the start of widespread forest clearance. In terms of mean annual amount, marked seasonal variability, and annual oscillations of precipitation, the hydrology of the island is thus similar to that of the 300-500 isohyetal zone which has been singled out as the primary habitat of wild cereals in the Near East and the core area of incipient cultivation (Raikes 1967:135-137). In the absence of large perennial rivers feeding flood-plain ecosystems, Cyprus not only lacks an environment conducive to the emergence in antiquity of hydraulic civilizations like those of Mesopotamia and Egypt (Butzer 1976) but has always had to bear the cumulative effects of deforestation, erosion, and soil depletion on a water-starved dry-farming economy. The island's soils are generally poor in organic matter content (>1%) and neutral to slightly alkaline in reaction (PH of 7-8.5); they are relatively rich in potassium yet contain only small quantities of nitrogen, phosphorous, and trace elements. The most important soil categories for cultivation are rendzinas, luvisols, vertisols, regosols, and cambisols. The first occur on the very calcareous *Pakhna* and *Lefkara* geologic formations, while the second are chiefly red soils distributed along the seaboards and on low plateaus and associated with calcium carbonate hardpan, called *kafkalla*. Vertisols occur primarily in the *Mesaoria* on old alluvial deposits. Regosols and cambisols are less developed soils found on various geologic formations throughout the island. In addition, extensive areas are covered with shallow soils and bedrock outcrops, designated as either calcaric or eutric lithosols, which have no agricultural value.

Climatic uniformity coupled with regional differences in precipitation is a sign of the opposing effects that size limitation and pronounced relief are likely to have on the spatial structure of island ecosystems. By increasing not only land area but also biodiversity through vertical zonation, the combination of mountains and lowlands which is common to all of the larger Mediterranean islands, including Cyprus, can be expected to reduce the negative impact of environmental constraints that are traditionally identified with insularity:

> Some of the more significant characteristics of island ecosystems are relative isolation; limitation in size (spatial resource); limitation in, or even absence of certain other resources; *limitation in organic diversity*; reduced inter-species competition; protection from outside competition and consequent preservation of archaic, bizarre, or possibly ill-adapted forms; *tendency toward climatic equability*; extreme vulnerability, or tendency toward great instability when isolation is broken down; and tendency toward rapid increase in entropy when change has set in [Fosberg 1963:5, emphases added].

In parallel to the four main geologic formations of the island (the Troodos ophiolite, the Pentadaktylos Range, the central lowlands, the western Mamonia Complex), its three principal landform features are the Troodos massif, the *Mesaoria*, and the Pentadaktylos. An analysis of

terrain types concludes that it "...exhibits great contrasts in its relief features...[and is]...about equally divided between mountain and plain," with 45% of the total land area covered by mountains, 10% by hills, 36% by rolling and irregular plains, and 9% by nearly level plains (LFMC 1960). Due to the mountains of Cyprus, which attain a maximum height of 1951 m in the central Troodos, aspect and altitude partially compensate for the limitation of size by creating numerous mesoclimates and regional habitats that increase ecological diversity on a small scale. The role of relief and aspect in the phytogeographic composition of relatively small regional environments is exemplified by the stark contrast between the woody north slope and the barren south slope of the Pentadaktylos Range on the island's North Coast.

The Late Holocene vegetation of the island, which Meikle (1977:4-8) divided into eight phytogeographic regions, has been subsumed under the same broad category of *Mediterranean Evergreen Oak Belt Formation* that characterizes the coastal regions of southern Anatolia and the northeastern Levant, with most of the more humid Troodos ecozone belonging to the *Sub-Humid Mediterranean Belt Formation* that is also found in the Lebanon and Anti-Lebanon, the Jebel Alaouite, and in the lower parts of the Amanus and Taurus mountains (VMMZ 1969). On the other hand, the *Submediterranean Oak and Pine Forest Belt Formations* associated with the more temperate climatic zone of the higher Taurus and Amanus mountains do not occur on the island. In general terms, the present-day ecosystem of Cyprus falls squarely within the same mediterranean/ chaparral-type biome that is associated with the maritime environment of southern Anatolia and the northwestern Levant. The prehuman vegetation of the island and the surrounding coastal regions is traditionally identified with an oak-pine Mediterranean woodland climax (GBOMME 1973), which in the case of Cyprus is divided into 13 separate consociations according to a widely-adopted scheme proposed by Jones, Merton, Poore and Harris in the late 1950s (Jones et al. [1958], see **Map G**, infra). The JMPH scheme, for short, has so far not been consistently confirmed by archaeologically retrieved palynological data and has remained largely untested by means of explicitly ecological methods involving, for example, diachronic pollen analyses from stratified sediment cores (see Held 1983:116-161, 1989a: Chpt. 1). The notion of an extensive sclerophyllous woodland climax is based mainly on an inferential interpretation of the island's four main ecosystems (i.e., secondary woodland, maquis, garigue, and batha) as stages of anthropogenic degradation, with Cyprus envisaged as a forest-clad island at least until the advent of large-scale clearance in classical antiquity (Meiggs 1982:134-137, 397-399;

Thirgood 1981:124-125). Besides direct historical attestations to the prominence of timber as a natural resource, particularly with regard to shipbuilding, it has often been observed that the island's famed copper production could not have developed without a readily available supply of wood fuel (e.g., Weisgerber 1983:28; Wertime 1983). The enormous demands which ancient mining industries made on forests as the only accessible energy source is illustrated by the recent estimate that a total output of approximately 200,000 tons of metallic copper over three millennia, starting in the Bronze Age, required 1.2 billion cubic meters of pine wood, which—based on an average yield of local pine species of ca. 80 m^3/ha and a current forest regeneration rate of 50-80 years—implies the occurrence of 16 allogenic woodland successions requiring a cumulative nonproductive period of at least 800 years (Constantinou 1983:22-23). In reality, the forest area added to flat area by relief and a maximum regeneration rate of 80 years may mean that somewhat fewer wholesale deforestation episodes required a cumulative regeneration period of almost 1.3 millennia, suggesting that energy resources were theoretically depleted during more than one-third of the history of copper production. However, such highly general estimates are no substitute for ecological reconstructions of seres that would provide direct evidence for or against the postulated existence, composition, and geographic extent of Early-Middle Holocene climax communities. An illustrative test case of the woodland-climax hypothesis is furnished by Madagascar, another island for which a continuous, pristine forest cover and its subsequent catastrophic degradation through pyrotechnological interference constitutes the most frequently-invoked Holocene scenario. On the other hand, recent paleoecological, biogeographic, and paleontological work by Burney, Dewar, Koechlin, McPhee, Tattersall and others has produced strong evidence of natural fire ecology and climatic changes as likely agents of the prehuman environmental transformation of woodlands and bushlands into more open, savanna-type habitats, suggesting that natural habitat modifications played a more important role in the Late Holocene extinction of the Malagasy subfossil fauna than had previously been assumed (Burney 1987a, 1987b; Burney and MacPhee 1988; Burney et al. 1988; Burney et al. 1989; MacPhee 1986; MacPhee et al. 1985; Tattersall 1989). Thus, although Madagascar and Cyprus lie in dissimilar biomes and have different ecological and historical records, when it comes to the uniformitarian retrofit of a prehuman climax vegetation there are potential methodological and interpretive lessons to be learned from the Malagasy case.

The origins of the modern flora of Cyprus are only partially evidenced by its composition, and the balance of endemic and exemic elements is such that a relative long isolation and coloniza-

tions of indeterminate date can be inferred with equally good reasons. Zohary, in a comprehensive study of Near Eastern phytogeography, first notes that the Cypriot flora is "comparatively rich in endemics" (1973:71) but later, when discussing island endemism in general, remarks that "neither Cyprus nor any of the numerous larger or smaller Aegean islands are as outstanding in the number of endemic species as might be expected of island floras..." (1973:318). Barring contradiction, the gist of Zohary's argument thus seems to be that the *percentage* of endemics in the Cypriot flora is high in relation to the Aegean islands. Crete, of comparable size and relief, has approximately 7.5% endemic species of a total of ca. 1,800, whereas Cyprus scores slightly over 6% out of ca. 1,300 species (Zohary 1973:71-72, 309). The same author emphasizes several interesting features of the exemic component of the island's flora, which he states as belonging to that of Syria. Over 50% of the exemics are classified as *Mediterranean* and ca. 25% as *Mediterrano-Irano-Turanian*—the latter an uncommon component of Mediterranean island floras. Even more foreign are *Irano-Turanian* and *Saharo-Arabian* elements, which at present are found neither in Syria nor Turkey and hence imply previous contact with more distant, southern desert or semi-desert vegetation types. These allochthonous xerothermic features, according to Zohary (1973:71, 151-152), point to a long period during which Cyprus was connected with the Syro-Turkish mainland, especially the Amanus Mountains in the Hatay, and was invaded by some species evidently indigenous to those regions. On the other hand, the relative abundance of endemics speaks for an early, not late, separation of the island from the continent, even though the degree of endemism is not regarded as being so high that insular conditions were a prerequisite for its development. The floristic evidence, therefore, while allowing no accurate chronological inferences, lends some general support to the Oceanic Scheme, which discounts the existence of post-Tertiary land-bridge connections. Moreover, if it is recalled that maritime aerial dispersal is the prevalent mechanism of island colonizations by plant species (Section 1, n.3), advective transport provides an alternative explanation of the presence of a relatively large number of foreign floristic elements on the island that obviates the need to invoke former land connections. The fact that present-day meteorological data evidence seasonal shifts in surface wind directions between Cyprus and the mainland indicates the possible nature of the filter effect that allowed endemicity to develop.

In a recent zoological analysis, Spitzenberger (1979) asserts that the Holocene flora and mammalian fauna of Cyprus share a surprising number of common elements. Following Zohary,

this author recognizes not only *Mediterranean*, *Mediterrano-Turkestanian*, and *Irano-Turenian* faunistic affiliations (the last category including hedgehog, moufflon, and Persian fallow deer), but also *Saharo-Arabian*, *Tropical-Ethiopian*, *Southern Palearctic*, *Palearctic* (fox) and *European* (hare) elements (1979:459). The entire assemblage is characterized as being predominantly *Paleo-Mediterranean/ Irano-Turanian* given its lack of true forest species and the high proportion of xerothermic forms. In order to explain the noticeably low species diversity on an island the size of Cyprus (comprising only 23 different kinds of terrestrial and winged mammals, see **APPENDIX 2**, infra), on the one hand, and the "mannigfaltigen Beziehungen zu Festlandspopulationen," on the other, Spitzenberger then concludes with the somewhat elliptical argument that because of the close links to the mainland the present paucity of non-domesticated species must be due to human-induced extinctions, and that a wider range of animals inhabiting the island in prehistoric times therefore must have colonized it via a land bridge prior to man's arrival, possibly during the Upper Pleistocene (1979:439, 461). Only one new example of this purported extinct island fauna is cited, the carapace of *Testudo* sp. (a reptile!) from Late Cypriot Enkomi, but if that is thought to represent a formerly indigenous turtle, then the same could be said for the much more frequent ostrich-egg canteens and the teeth of *Hippopotamus amphibius* and elephant found at Kition, Hala Sultan Tekké, Toumba tou Skourou, and other contemporary sites and universally accepted as imports (Conwell 1987; Reese 1985, n.d.a). Nor is the hypothesis of Holocene extinctions supported by faunal evidence from prehistoric sites—with the well-known exception of *Dama mesopotamica*, which was perhaps not extirpated from the island until the 16th or 18th century AD.[12] At least down to the genus level, archaeological assemblages of early or late prehistoric date have so far failed to yield remains of wild animals that are not also part of the modern fauna (Davis 1984a:148, Table 1, 1987:123, Table 5.2; Le Brun et al. 1987:308, Table 1). Apart from these factual inaccuracies, Spitzenberger's biogeographic conclusions betray the traditional conceptual bias—mentioned at the beginning of this chapter—towards land bridges as the geographic prerequisite of over-water dispersals by mammals. Oddly, this notion is embraced despite a preponderance of bat species in the inventory of Late Holocene mammals (13 out of 23), all of which could have flown to Cyprus without great difficulty. How some of the larger flightless mammals like fox and hare colonized the island without the help of man is harder to explain, but hedgehogs, shrews, mice, and other micromammals may well have reached it as involuntary passengers on natural rafts. The same bipolarization of views between the 'walkers' and the 'swimmers' fuels an ongoing debate among paleontologists, and thus the discussion

has come full circle to the issue of Pleistocene dispersal mechanisms which was alluded to at the end of Section 1.[13]

As elsewhere, the fossil record of pre-Quaternary Cyprus is fragmentary; indeed, unlike some other Mediterranean paleofaunas (e.g. in Crete, the larger Dodecanese islands, Sicily, Sardinia, Monte Gargano, and Tuscany, and the Baleares), the island's early Cenozoic assemblage lacks terrestrial mammals altogether. This provides an excuse for moving directly to an examination of the Pleistocene foundations of human settlement, with only a brief mention of finds dating from the Neogene. The overwhelming majority of these consists of fossil invertebrates occurring in sedimentary formations deposited under marine conditions during the Miocene and Pliocene (Reed 1932, 1935, 1940). Foraminifera and radiolaria retrieved by coring are common and have long been recorded by the Geological Survey Department (see **APPENDIX 2**, infra). Of particular biogeographic interest is Reed's (1932:517) report of a freshwater turtle, probably *Tryonix* (*Aspideretes*) sp., in a sandy bed of Miocene age approximately 45 m below surface near Peristerona (central Mesaoria) and of close faunistic relations between Cyprus and the Syro-Turkish coast in the Miocene. The invertebrate links are hardly surprising, given the widespread intra-regional deposition of marine faunas during a succession of Neogene transgressions, yet the presence of a Tryonichid turtle needs to be explained against the background of the 'Oceanic Model.' Passive marine dispersal by swimming or rafting is one possibility, as suggested earlier for other reptiles and amphibians; another is that of terrestrial dispersal from southern Turkey in the Late Oligocene/ Early Miocene when paleo-Cyprus was situated in the Bay of Antalya before undergoing the horizontal displacement mentioned at the beginning of the chapter and therefore would have been more accessible than it has been since. This hypothesis, however, begs the question why the island's entire Neogene fauna is so severely unbalanced, for greater faunistic affinities with the mainland, including the presence of a mammalian component, might be expected if a land connection existed prior to the Messinian Event. Miocene-Pliocene formations on Crete, Karpathos, and Rhodes contain a balanced mainland fauna which points to continental conditions in the South Aegean island arc (Sondaar, de Vos, and Dermitzakis 1986), Sicily was connected to North Africa in the Late Miocene, whereas Sardinia and the Baleares have unbalanced island faunas extending back to the Eocene and indicating uninterrupted isolation (Sondaar 1986:52). This indicates that Sardinia acquired its fauna before rotating away from the Provençal Basin some time during the Late Oligocene/ Early Miocene (Hsü 1977:44-46; Lort

1977:166-169). The fact that no similar faunistic scenario can be invoked for Cyprus suggests that the island was physically extremely difficult to colonize before and even during the Messinian desiccation. This may have been due either to conditions of prolonged Tertiary oceanicity or to radical changes in physical appearance linked to its heterogeneous morphogenesis, and possibly to a combination of both factors. The presence of freshwater turtle poses no greater puzzle for the zoogeography of Cyprus than it does for that of the Galápagos Islands, whose colonization in the Pleistocene by its eponymous tortoises, as well as by five other species of reptiles (one snake and four lizards, including two giant iguanas) and two species of mammals (a bat and an extinct rice rat) involved sea crossings of approximately 950 km. Unless the idea of an episode of autocatalytic dispersal across a chain of now-submerged volcanic islands is accepted, the Galápagos fauna exemplifies the maritime aquatic dispersal ability of small land vertebrates and thus highlights the problem of their absence from Cyprus, where the sea barrier was incomparably smaller even if a very different Tertiary paleogeography is postulated.

So far, the limited fossil record indicates that the first land mammals arrived on Cyprus at some undetermined time during the Pleistocene, establishing successful breeding populations. In the case of the megafauna component, these consisted of a very small number of sympatric species that remained sufficiently isolated from their founder populations on the surrounding mainland to evolve into dwarfs and finally became extinct during or shortly after the Pleistocene-Holocene transition. All elements of this highly unbalanced Quaternary island fauna are known from fossils sites; as was pointed out in the preceding chapter, subfossil material is unknown except at Akrotiri *Aetokremnos*, whose cultural association makes it at any rate a special case, but it may exist. At present the number of confirmed and recorded fossil deposits throughout the island reaches 32, with an additional 12 sites indicated by isolated finds or unverified reports of fossil material (Fig. 11, infra).[14] A detailed description of all fossiliferous localities and their distribution, as well as a summary history of paleontological research since the late 17th century are contained in **APPENDIX 2**, and a list of sites with their associated species is provided in Table 4, infra. As the latter shows, the Pleistocene mammal assemblage consists of only eight species, including two megaherbivores, the larger of which were first reported and studied by Bate 1903a, 1903c, 1904a, 1904b, 1905a, 1905b, 1906). They are the Cypriot Dwarf Elephant (*Elephas cypriotes*), the Cypriot Pygmy Hippopotamus (*Phanourios minutus*), and Genet (*Genetta plesictoides*) and were initially known only from cave deposits. The micromammals were reported by Boekschoten and Sondaar (1972:332) and comprise two species of bat found in a fossiliferous sea cave at Cape Pyla, two

murid mice from the same area (one species akin to *Mus musculus*, and the other somewhat larger, also found in an ancient lake bed near Kythrea), and a soricid from the Kythrea lake bed and another northern site whose genus could not be identified. The presence of a civet-like cat poses certain problems, for carnivores are seldom part of island ecosystems in the Pleistocene, but the age of Bate's genet remains questionable. Apart from these mammals, the excavations at the Akrotiri rockshelter have now added a large bustard and a turtle, both currently under study, to the Pleistocene fauna of the island. A comparison of the Cypriot inventory with those of other Mediterranean islands, particularly the ones of similar size, and with the surrounding mainland, bears out the island's relative remoteness in faunistic terms (Fig. 12, infra). This fact was recognized by Sondaar, who characterized the island's Early Quaternary fauna as a truly oceanic type with regard to the extreme paucity of larger land mammals, on par with the Ryukyu Islands of Japan (1977:677) and with Majorca and Minorca. The Balearic fauna consists of only three genera: a large murid, a large soricid, and the distinct *Myotragus balearicus*, an endemic goat-like ruminant artiodactyl with two continuously-growing lower incisors whose remains have yielded a series of ^{14}C dates ranging from 32,000 BP down to ca. 6,000±120 BP (OL-29) in association with human bones in the cave of Son Muleta, proving that this small Pleistocene bovid overlapped with the mid-Holocene human colonization of Majorca (Burleigh and Clutton-Brock 1980). The post-Pleistocene survival of *Myotragus* was no doubt due to a prolonged state of ecological equilibrium in the Baleares which was only disturbed when a new species, man, colonized the islands, and the new evidence from Akrotiri indicates a similar situation—though terminated earlier—for Cyprus. Another common feature of the Baleares and Cyprus apart from a pronounced lack of species diversity (*species* is used here in the colloquial sense of *kinds* of animals) is the absence of cervids from their fossil records. Endemic deer—an important component of Quaternary island faunas not only in the Mediterranean but also in the Japanese archipelago and elsewhere—is present in half of the sixteen fossil island faunas in the Mediterranean (Sondaar 1977:678-679, Table 1).[15] Contrary to what might be expected, cervids are found on the larger and more distant islands, such as Crete, Sardinia and Malta, but are absent from some of the more accessible continental islands like Kefalonia, Rhodes, Dilos, and Naxos, suggesting that the range of dispersal of deer was not restricted to islands within easy reach of the mainland. On Kithira, which, as was pointed out in the preceding section, was fused to Antikithira but remained separated from the southern Peloponnese at times of lowered sea levels, both cervids and proboscideans occur as mainland forms, indicating that contacts between the

Site #:	Site Name:	El.	Hi.	Ge.	Mu.	So.	Ba.	Bu.	Tu.
FOS-01N	Kythrea *Kephalovrysi*	X	.	.	X	X	.	.	.
FOS-02N	Kato Dheftera *Khrysosp.*	?	.	.	.	.	.	.	.
FOS-03K	Kato Dhikomo *Vokolossp.*	X	X	X	.	.	.	.	.
FOS-04K	Pano Dhikomo *Onisha PC*	.	X	.	.	.	.	.	.
FOS-05K	Pano Dhikomo *Proph. El.*	.	X	.	.	.	.	.	.
FOS-06K	Pano Dhikomo *Imbohary*	X	X	.	.	.	.	.	.
FOS-07K	Dhikomo *Anoyero*	.	X	.	.	.	.	.	.
FOS-08K	Koutsovendis *Ay. Phan.*	.	X	.	.	.	.	.	.
FOS-09K	Koutsovendis *Asproyi*	.	X	.	.	.	.	.	.
FOS-10K	Koutsovendis *Ay. Khrys.*	.	X	.	.	.	.	.	.
FOS-11K	Ayia Irini *Pervolia* N	X	X	.	.	.	.	.	.
FOS-12K	Ayia Irini *Dragontovou.*	X	X	.	.	.	.	.	.
FOS-13K	Kormakiti *Krommyon*	.	?	.	.	.	.	.	.
FOS-14K	Liveras *Mandres Virilas*	X	X	.	.	X	.	.	.
FOS-15K	Liveras *Mandres Istavri*	.	X	.	.	.	.	.	.
FOS-16K	Ay. Yeoryios *Ay.Phanou.*	X	X	.	.	.	.	.	.
FOS-17K	Ay. Yeoryios *Trashas*	X	.	.	.	.	.	.	.
FOS-18K	Kyrenia *Athkiaephendis*	X	.	.	.	.	.	.	.
FOS-19K	Trapeza	.	X	.	.	.	.	.	.
FOS-20F	Akanthou *Stalou Creek*	X	X	.	.	.	.	.	.
FOS-21F	Akanthou *Vourna*	X	X	.	.	.	.	.	.
FOS-22F	Athna (Achna)	X	.	.	.	.	.	.	.
FOS-23R	Xylophagou *Sp. Kokkino.*	X	.	.	.	.	X	.	.
FOS-24R	Xylophagou *Mavrospilia*	.	?	.	.	.	.	.	.
FOS-25R	Xylophagou *Sp. Englezou*	.	X.	.	.	.	.	.	.
FOS-26R	Xylophagou *Sp. Nikolad.*	.	X	.	.	.	.	.	.
FOS-27R	Xylophagou *Ayii Saranda*	.	X	.	X	.	.	.	.
FOS-28S	Akrotiri *Aetokremnos* ≡	X	X	.	.	.	.	X	X
FOS-29P	Kissonerga *Kleiotoudhes*	X	X	.	.	.	.	.	.
FOS-30P	Kato Arodhes *Ayii Phan.*	.	X	.	.	.	.	.	.
FOS-31P	Emba *Ayios Yeoryios*	X	X	.	.	.	.	.	.
FOS-32P	Emba *Ayia Phaneromeni*	.	X	.	.	.	.	.	.
1	Akanthou *Arkosyko* ≡	?	?	.	.	.	.	.	.
2	Ayia Irini	.	x	.	.	.	.	.	.
3	Famagusta/Ay. Napa area	.	x	.	.	.	.	.	.
4	Kapouti *Kephalovrysos*	.	x	.	.	.	.	.	.
5	Krini	.	x	.	.	.	.	.	.
6	'Lichades'	see APPENDIX 2, *Section B*					.	.	.
7	Liveras *Kolymbi Mandres*	no info	.	.	.	.	.	.	.
8	Pera	no info	.	.	.	.	.	.	.
9	Rizokarpaso *C. A. K.* ≡	.	x	.	.	.	.	.	.
10	Trimithi	.	x	.	.	.	.	.	.
11	Vouno	?	?	.	.	.	.	.	.
12	Vourna	.	x	.	.	.	.	.	.
13	Xylophagou *Ay. Yeoryios*	no info	.	.	.	.	.	.	.
14	Xylophagou	x	.	.	.	.	.	.	.
15	Yeri *Dhrakontia*	no info	.	.	.	.	.	.	.
Total Number of sites/species:		**16**	**32**	**1**	**2**	**2**	**1**	**1**	**1**

Table 4: Occurrence of Pleistocene Vertebrate Fauna in Fossiliferous Deposits and on Human Occupation Sites (≡).

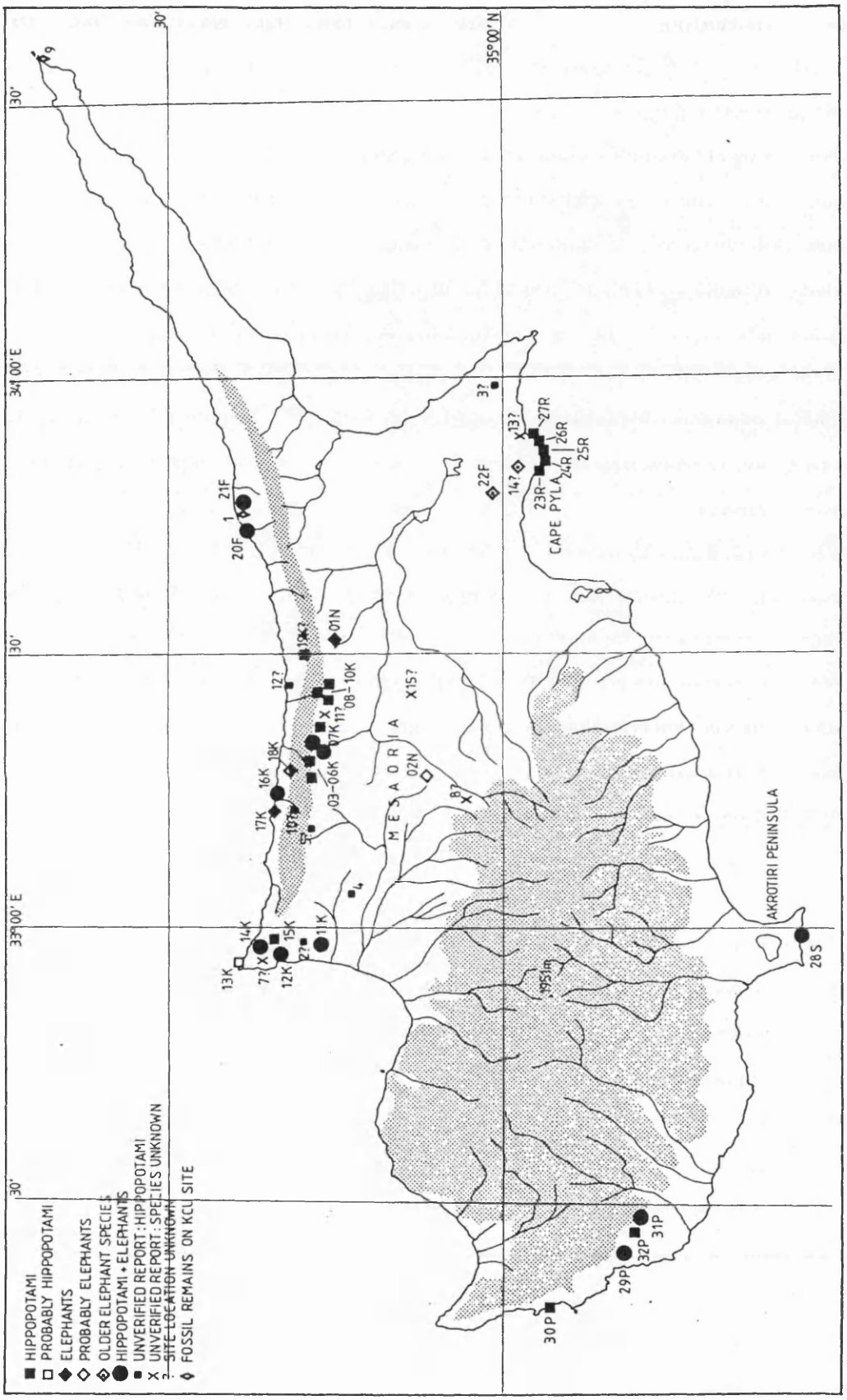


Fig. 11: Distribution of Fossil Sites on Cyprus.

mainland and island populations were frequent enough to maintain genetic links. This apparently random dispersal of Pleistocene deer bears on the introduction of cervids to Cyprus and will be referred to again later.

A wide survey of the literature demonstrates a general acceptance of dwarfism and gigantism as evolutionary peculiarities of island faunas, and the Mediterranean is no exception. Based on a worldwide survey of insular mammals, reptiles and birds, Foster (1964) came to the conclusion that insular rodents and lizards tend to be larger but have reduced tail-lengths—with a clear correlation between the extent of isolation and the degree of gigantism, birds are uniformly larger and sometimes flightless (particularly extinct genera), whereas lagomorphs, carnivores, and artiodactyls commonly experience a reduction in body-size. A more recent study, though confirming most of Foster's results, has pointed out that body-size change trends in contemporary insular carnivores are more equivocal, with large forms also occurring, particularly among bears (Case 1978:2). The widespread occurrence of pygmy elephants in Pleistocene faunas ranging from the Mediterranean to SE Asia shows that dwarfism also affected proboscideans. As noted before, the Quaternary fauna of the Baleares includes a small bovid and two large rodents, a dormouse and a shrew. The Tertiary faunas of Tuscany and Monte Gargano—both islands during the Miocene—includes giant dormice, mice, hamster, hedgehog, and a giant flightless owl. The Quaternary faunas of Corsica and Sardinia feature dwarf elephant, pygmy hippo, giant otter, a dwarf suid, a small macaque, a small antelope, a dwarf hare, a large shrew, and large murid and microtid rodents. Capri had a small deer, Pianosa (in the Tuscan archipelago) had a small bovid and cervid. Malta had a giant swan and vulture, a giant turtle and three different species of giant dormouse, and Malta/ Sicily shared dwarf elephant, pygmy hippo, and dwarf deer during the Pleistocene. Still in the earlier Quaternary, Crete had dwarf elephant, pygmy hippo, and dwarf deer, but also large deer, rodents, insectivores, and a flightless owl. Kasos, Karpathos and possibly Amorgos possessed only dwarf deer; while on Rhodes, Tilos, Naxos, Serifos, Milos, and Dilos dwarf elephant was the only bizarre form. Cyprus had dwarf elephant, pygmy hippo, and large bustard (Azzaroli 1971, 1978, 1981; Bachmayer et al. 1976, 1984; Caloi and Palombo 1983; Davis 1985, 1987:118-125; Dermitzakis and Sondaar 1978; Palombo 1986; Sondaar 1986; Sondaar and Boekschoten 1967; Symeonidis et al. 1973, 1974; Thaler 1973; Weesie 1989). Outside the Mediterranean, dwarfs and giants are found in the Quaternary faunas of Madagascar (giant lemur, pygmy hippo, large fossa, and the elephant bird *Aepyornis*), Sulawesi (dwarf elephant and buffalo), Flores (dwarf *Stegodon*, giant rat and tortoise), Timor

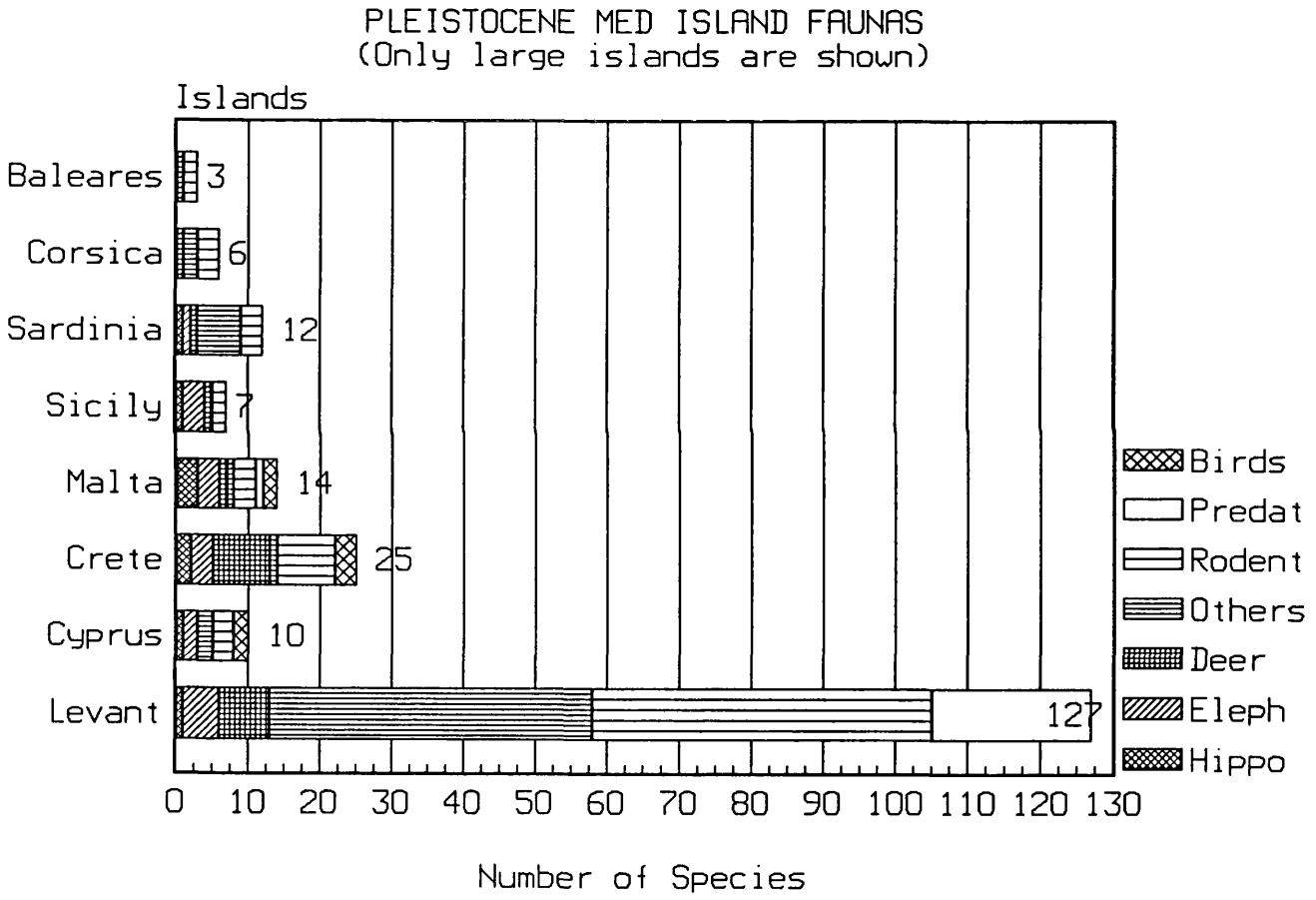


Fig. 12: Composition of Pleistocene Faunas on the Larger Mediterranean Islands and in the Levant

(dwarf *Stegodon*, giant rat), the North Channel Islands (dwarf mammoth), the West Indies (dwarf megalonychid ground sloth and giant hystricomorph rodents), the Comores and Aldabra (giant land tortoise), and New Zealand (moa), where they had become extinct by the terminal Pleistocene or early Holocene (Kurtén 1972: MacPhee et al. 1989; Mahé 1972; Martin 1984; Sondaar 1987). Neontological evidence shows that insular size change as an evolutionary, adaptive phenomenon is not confined to paleofaunas but also occurs among modern island populations that are either relicts of Pleistocene faunas or the products of relatively rapid divergent speciation. Some better-known examples are the giant land tortoises of the Galápagos Islands, the giant rats of the Philippines, the giant fruit bats of the Comores, the Kodiak Bear of southwestern Alaska, and the giant black bear, deer mouse, and dwarfed saw-whet owl of the Queen Charlotte Islands (see Case [1978] for additional species).

The well-established principles of evolutionary biology specify the conditions under which genetic mutations can occur, such as behavioral, mechanical and gametic isolation, hybrid invariability and sterility, and so on. Extrinsic conditions comprise various forms of geographic isolation like ecogeographic isolation, habitat isolation and seasonal isolation, and these are most relevant to island biogeography because only the absolute secular isolation imposed on island ecosystems by water barriers can apparently sustain the process of divergent speciation to the degree of producing bizarre forms such as giants and dwarfs. On the other hand, it is the task of zoologists and biogeographers to establish the conditions for the conditions, as it were, by defining what types of faunal interchange between mainland founder populations and their insular derivatives had to result from certain known or inferred paleogeographic configurations in order to cause faunal successions, low species diversity, endemism, and extreme genotypic changes in island populations.

Different attitudes towards the problem of defining these interchanges and their underlying dispersal mechanisms account for the present rift between the 'walkers' and the 'swimmers' among paleontologists. The former, represented *inter alii* by Azzaroli and Kuss, consider the existence of land bridges a necessary condition for island colonizations by mammals large or small. Where the present submarine relief evidently contradicts its hypothesis of continental colonization routes, this group invokes the likelihood of violent downfaulting of oceanic crust and submergence of entire chains of volcanoes in Recent times as an ad hoc argument in defense of a scheme that essentially denies the ability of land mammals to swim more than a few kilometers or the possibility of passive dispersal on 'vegetation islands' and natural rafts (e.g. Audley-Charles

and Hooijer 1973; Azzaroli 1980, 1982; Azzaroli and Guazzone 1979; McFadden 1980). The arguments of the 'swimmers' suffer from several weaknesses. First, the central assumption of a radically different paleogeography and the existence of former land bridges is often unsupported or outright contradicted by recent geologic and geophysical data. Second, in playing down the role of aquatic dispersal, this view ignores a large body of data on the physiology, migratory behavior, and sightings of terrestrial mammals of varying size and environments that documents their swimming powers. Last, the belief in land bridges as prerequisite colonization corridors does not offer a satisfactory explanation of the fact that most island faunas are unbalanced and impoverished, since it is difficult to see how even temporary land connections could have acted as filters for mainland communities, particularly to the extent of denying passage to predators. By contrast, the 'swimmers' subscribe to the view that a significant percentage of Pleistocene island colonists happen to be animals with proven swimming powers and could therefore have reached islands that were demonstrably oceanic at the time to which their faunas are dated. Unlike the 'walkers,' this group, represented by Sondaar, Dermitzakis, de Vos, Johnson, and others, places considerable emphasis on the causative relationship between dispersal mechanism, dispersal route, and faunal composition, employing the concepts of corridors, filters, sweepstake dispersal, and commuting—most of which were developed by Simpson (1940, 1962, 1965).[16] These offer simple and elegant explanations for the disparate composition of mainland and island faunas, thus strengthening the case of this school of thought. A further plus is that the thrust of its argument consists of empirical zoological knowledge instead of geologic speculations, yet here, too, there are some weak points, though not quite as serious as the opposing group's. For instance, maritime aquatic dispersal, either actively by swimming or passively by rafting, cannot be invoked for some animals present in island faunas, such as bovids—a fact that the 'walkers' have been quick to point out (e.g. Azzaroli 1980). Furthermore, while modern wildlife analogies are generally persuasive enough to accept the *possibility* of swimming land mammals, statistically meaningful samples of quantitative data about the limits of such skills are not yet available, so that successful crossings to less accessible islands with extinct Quaternary faunas are not automatically implied by historical observations. Thus, reports of modern hippopotami repeatedly crossing the 35-km wide Zanzibar Channel (Joleaud 1920; Frädrich 1968) and being carried a long way out to sea by the current of the Zambezi River (D. Burney, pers. comm. 1988)—although no doubt illustrative—do not constitute hard and fast proof that the ancestors of *H. lemerlei* and other Malagasy pygmy hippos reached Madagascar at times

of sea-level regressions in the early Quaternary by swimming 240 km or more across the Mozambique Channel. However, since hippopotami are much more recent than the island's Gondwanic fauna, unless island-hopping across a chain of underwater volcanoes is conjured up, circumstantial evidence leads inevitably to the conclusion that this is precisely what happened (cf. Rabinowitz et al. 1983).

It should be clear by now that Cyprus, for one, provides a strong case for refuting land-bridge models, and that its insular configuration and the composition of its flora and fauna—particularly the Pleistocene fauna—exemplify the effects of a sweepstake route *sensu* Simpson. Like Madagascar, Sulawesi, and other islands with Quaternary paleofaunas mentioned already, its proboscideans and artiodactyls, possibly including deer, must have reached it by means of active or passive maritime aquatic dispersal on occasions so rare that genetic links to their founder populations were severed and evolutionary nanism could develop to the extreme degree which marks *Phanourios minutus* in comparison to other Mediterranean pygmy hippos. The two Pleistocene bat species of Cyprus probably flew to the island, and once the results of biometric studies are available, it should be possible to assess whether they represent commuter species or became confined to their new insular habitat. The same applies to the bustard, dove, and geese found at Akrotiri Site E. The other micromammals; i.e., the murids and the soricid, along with land snails, lizards, and small amphibians, may be assumed to have colonized by means of natural rafts. This hypothesis finds no favor with Azzaroli, who, speaking in a general context, maintains that

> The very idea of natural rafts as a means of transport for small mammals is highly questionable. Clusters of floating vegetation may form in large streams draining pluvial forests, like the Congo or the Amazon, but this is not the case in the Mediterranean, nor, for that matter, along the coast of California [Azzaroli 1980:424, and almost verbatim in 1982:206].

The notion that only a rain forest biome can produce driftwood and other floating organic matter that may double as rafts is ludicrous. While it is obviously true that heavily vegetated ecosystems are more likely to do so than degraded or poorly drained systems, most types of forest biotope shed dead vegetation into streams and rivers that may end up floating off shore. Driftwood is not uncommon along the mid-coast of California, though admittedly not as ubiquitous as in the heavily wooded Pacific Northwest, and is likely to have been more frequent than at present prior to the degradation of Mediterranean forests from mid-Holocene times onwards. A classic

example of how small mammals and sedentary birds may cross sea barriers was cited by MacArthur (1972:84-85), who described a large floating island, ca. 13 m in diameter and 10-12 m high, complete with vegetation, which had broken loose from eastern Cuba in 1969 and was observed drifting towards Jamaica—144 km to the south (cf. Gorman 1979:14). The modern environment of eastern Cuba, it should be noted, though mountainous and originally in the rain-forest belt, has suffered extensive denudation in recent history. In the vicinity of Cyprus, the southern Taurus Range is drained by three large rivers, the Göksu, the Seyhan, and the Ceyhan, all of which empty in to the Bay of Cilicia opposite the island. Particularly at times of a Mediterranean woodland climax, the conditions for floating vegetation therefore existed. In this connection it is worthwhile mentioning that Cutler, in his analysis of the charred and silicified wood remains from Ayios Epiktitos *Vrysi*, on the north coast of Cyprus, suggested that some of the arboreal species could have been collected as driftwood originating in the Taurus (1982:453).[17]

Accounts of swimming elephants[18] have been summarized by Johnson, who, echoing Sondaar (1971) and Sondaar and Boekschoten (1967), argues that the ancestors of the fossil dwarf mammoths found on the North Channel Islands most likely colonized them by crossing the Santa Barbara Channel, involving a distance of at least 7 km at times of depressed sea levels (Johnson 1980, 1983; Wenner and Johnson 1980). This is considerably less than the minimum of 40 km to Pleistocene Cyprus along Vector 4 or the 35 km from Kasos to Pleistocene Crete, and comparable to the crossing from greater Kithira to Crete (see preceding section), but Johnson marshals an impressive array of data to show not only that the trunks, cranial air-cavities, and abundant digestive gases of proboscideans make them physiologically excellent swimmers, but also that in order to forage, mate, or simply survive, they have been observed to swim distances of up to 48 km in the open sea. After reaching an island, elephants could not make the return trip if the mainland was downwind from the island because they could no longer smell the target, and once morphological changes had taken place, their dwarfed descendants were incapable of repeating the crossing or surviving on the mainland, where they would have been disadvantaged and vulnerable (Johnson 1980:390). Johnson's data indicate swimming speeds ranging from 0.96 km/h to 2.7 km/h, which led Swiny (1988:8) to suggest that a crossing to Cyprus could have taken as much as 20 hours. Assuming a distance of approximately 40 km between Point X and the Karpas extension and an east-west current speed of 1.5 km/h (see preceding section),

the colonization of the island by Pleistocene elephants maintaining an average speed of 2.0 km/h in calm water would have required little more than 11 hours at sea.

Evidence that modern hippopotami[19] are equally good distance swimmers is largely circumstantial, although they are the only truly aquatic genus of artiodactyls and, with their round shape, are physiologically adapted to water. Their digestive tracts, like those of elephants and ruminant herbivores, produce large amounts of gas, and hippos have been compared to "freshwater buoys" (Frädrich 1968:122, quoting Hediger) that are not particularly agile swimmers and prefer shallow river banks to deeper and fast-flowing water, in which they are easily swept away. As their migration to Zanzibar and Mafia indicates, however, they are not restricted to rivers and lakes but will venture out to sea when they want or need to. Apart from the already mentioned account by Joleaud (1920), observations of hippopotami swimming in rivers, lakes, and along the African coast were also recounted by Lyell (1863:179-181), who had visions of entire herds of ancient hippos migrating across the Mediterranean from the Nile delta, and further references can be found in *Grzimeks Tierleben* (Frädrich 1968). In summary, numerous non-scientific reports attests to hippopotami swimming in both freshwater and saltwater, but it is difficult to determine how their swimming powers compare to those of elephants.

Cervids,[20] although not aquatic animals, have long been known for their migratory water crossings. Like all ruminants, they possess four-chambered stomachs that are veritable fermentation vats and greatly increase their buoyancy. Once in the water, their streamlined shape makes them potentially more agile swimmers than either elephants or hippopotami. Although the picture of swimming cervids usually evokes associations with reindeer, moose, and caribou, Arctic and sub-Arctic cervids are by no means the only genera that regularly ford rivers, and lakes, as well as sea inlets, bays, and channels. Most species belonging to the large southeast Asian sambar (*Rus* sp.) are water-loving deer and swim frequently, at which time their bodies are completely submerged and only the heads and antlers protrude from the water, and the same applies to the smaller gray brockets (*Mazama guazoubira*) of South America (Heck 1968:187, 251). The mule deer of western North America (*Odocoileus hemionus*) are very good swimmers, and a subspecies, blacktails (*Odocoileus columbianus*), regularly swim to the San Juan Islands and other islands in Georgia Strait and Puget Sound as well as on the west coast of Vancouver Island across gaps of up to ten kilometers (personal observation). Whitetail deer (*Odocoileus virginianus*) swim in the Great Lakes, and European red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*) among islands in the North Sea and the Baltic. Deer have been spotted swimming in

the sea off the northern Netherlands (Dermitzakis and Sondaar 1978:813-814). In the Mediterranean, herds of red deer currently cross between the Peloponnese and several small islands, sometimes daily, over distances reaching up to 35 km (A. Bubenik and P. Y. Sondaar, pers. comm. 1988). Unfortunately, similar data on the swimming powers of fallow deer are not available; however, on anatomical and physiological grounds they are likely to be even better than those of other cervids. Fallows not only have a more balanced gravity due to their unusually large reserves of subcutaneous, abdominal, and intramuscular fat, but in addition to a stomach volume which is similar to that of red deer (ca. 40% of body weight) they also possess the longest intestines of all cervids. This provides them with a very large digestive tract containing about 30% methane and other gases, and as a result their bodies are naturally buoyant in salt water (A. Bubenik, pers. comm. 1988). As was pointed out in the foregoing section, salinity levels in the East Mediterranean are unusually high, which would have increased the physiological edge of gas-producing herbivores over other swimming land mammals.

The question whether deer could and would have swum to Cyprus from the mainland assumes a heightened significance in light of the controversy which surrounds the early prehistoric arrival of *Dama mesopotamica* on the island. King, in her study of the faunal assemblage from Khirokitia *Vouni* and Erimi *Pamboula*, suggested either an Early Pleistocene land-bridge colonization or a human introduction during the 'Neolithic' (Dikaios 1953:436). Zeuner (1958) was in favor of semi-domesticated deer introduced by prehistoric settlers, whereas Ducos (1965) came to the tentative conclusion that the species was indigenous but was eventually tamed in the Sotira Culture. Halstead (1977:267, n.1-5) cited the absence of dwarfing as evidence against a Pleistocene age. In discussing this issue, Watson and Stanley Price argued for its introduction by settlers of the aceramic Khirokitia culture and interpreted the zoogeographic limit between southwest Asian *D. mesopotamica* and Anatolian *D. dama* as circumstantial evidence for a Levantine origin of the initial colonists (Watson et al. 1977:246-248). While the distributional implications of Anatolian and Persian Fallow Deer are undoubtedly of interest in tracing the origins of human settlement on the island, postulating human intervention is essentially an argument by association in which deer is considered part of an entourage of early domesticates, including pig and sheep/goat, that accompanied the first colonists (this view is also expressed by Croft [1989a, 1989b], and implicitly accepted by Carter [1989]). As the frontispiece for this chapter illustrates with some degree of artistic license, horned animals and presumably other livestock were ferried around the 3rd-millennium Aegean in Early Cycladic longships, craft believed to

have measured up to 20 m in length (Renfrew 1972:357). The proportions of the depicted vessel and its occupants are clearly symbolic, and the animal itself can unfortunately not be identified. Cherry's comment that the scene "must have taken place in the Aegean on many occasions during the previous four millennia (Cherry 1985:22) should therefore be given a liberal interpretation in the sense that neither the animal's size nor the type of vessel can be projected backwards to the 6th, 7th, or 8th millennia BC. Early Holocene colonizations of Cyprus from the Levant are more likely to have involved reed boats or rafts, and the much greater distance involved would have made the transport of fully grown animals a hazardous undertaking. There is an undeniable elegance to the argument that Early Holocene man deliberately introduced fallow deer as a substitute for the widely hunted but high-strung Persian Gazelle (*Gazella subgutturosa*, see Legge and Rowley-Conwy [1987]). Alternatively, it might be argued that gazelle, which is adapted to the arid environment of the interior Levant, was not found in the more humid maritime biotope of the eastern staging area during the Pleistocene/ Holocene transition and was therefore no longer part of the economically important wildlife. However, in place of concrete evidence to substantiate Watson and Stanley Price's thesis and Croft's (1989a:261) 'feralization' model there are lingering conceptual difficulties with the idea that cervids of any kind were transferred in primitive watercraft and used to stock the island with a wild population for the express purpose of hunting.[21] Modern deer, though gracing European parks for a thousand years or more, are much more difficult to manipulate than cattle, pigs, and ovicaprids. Fallow (chiefly *D. dama*) may be the most popular species of park deer, but like all park deer they are confined to their ranges by means of strong fencing and are noted for their timidity, unruliness, and tendency to escape at the first chance (Tomlinson 1988). Persian fallow and gazelle, both of which must have been familiar hunt animals to the early Holocene immigrants to Cyprus, are not known to have ever been domesticated (Davis 1987:141), and even if it was possible for fallow fawns to be caught and transported to the island, it is therefore unlikely that they would have bred in captivity so successfully as to provide the propagules of a large feral population. Also, there is so far no evidence for age group selection in the faunal record of Early Formative sites that would point to the culling of herded deer. The available relative bone frequencies in KCU assemblages from Rizokarpaso *Cape Andreas Kastros*, Dhali *Agridhi*, Khirokitia *Vouni*, and Kalavasos *Tenta* are too variable to settle the argument one way or the other (Carter 1989:247, Table 4; Croft 1982:61, Table 2; 1989a:259, Table 1; Davis 1984a:149, Table 2; Le Brun et al. 1987:305-306), insofar as a decline in the percentage of deer might be taken to indicate initial reliance on a native population

and the reverse a gradual shift towards the hunting of an increasing feral population. Apart from the possibility that inter-site variability in the form of slightly different subsistence strategies may confuse the statistics, an initial reliance on introduced and herded deer should not only have produced more consistent frequencies (at least in the early phases of sites that overlap or seem to be very close together chronologically), but due to a combination of the founder effect and inbreeding it should also have effected morphological differences to Early Holocene *D. mesopotamica* in the Levant. Carter (1989:249-250) has argued for clear signs of size decrease in the species between samples from Ain Mallaha and Dhali *Agridhi* (I?), but Croft (1989a:267-268) concluded that the size differences were due to normal metric variability rather than evolutionary dimorphism. The Khirokitia material, too, is biometrically identical with material from Upper Paleolithic and Epipaleolithic sites in Israel and furthermore exhibits a bone density that is characteristic of wild species (Davis 1984a:152-155). Therefore, the osteological evidence is not clearly compatible with the concept of human introduction and initial manipulation of deer.

Probably the single most forceful argument against an indigenous deer population is provided by the complete absence of cervids from known Pleistocene fossil deposits. In this respect, the situation on Cyprus is different from that on Crete, where deer occurs in stratigraphic association with other Pleistocene mammals including elephant and hippopotamus. Interestingly, however, this is true only for some of the Cretan localities (i.e., Kalo Khoraphi, Kharoumbes, Mavro Mouri, Milatos, Rethymnon Fissure, Simonelli Cave, Stavros, and Zourida) but not for others (e.g., Ayios Antonios, Bali, Bate Cave, Cape Meleka, Gerani, Grida Avlaki, the Katharo plain, Kato Zakros, Koulouridi, Liko, Sitia, and Xeros) (Dermitzakis and Sondaar 1978:820, Table III; Dermitzakis and de Vos 1986, 1987). Deer are therefore not invariably associated with other mammals in fossiliferous deposits, even though they must have been very abundant on the island, as implied by the presence of no fewer than eight species of the endemic genus *Candiacervus*. This diversity, which a recent phylogenetic model attributes to two separate episodes of colonization and adaptive radiation (de Vos and Dermitzakis 1986), on an island the size of Crete almost certainly means that the habitats of Pleistocene deer, elephants, and hippopotami overlapped. Hence the Cretan analogy practically rules out an allopatric distribution of deer and the other two species or taphonomic factors as possible causes of the failure of cervids to appear in the Cypriot record. With more than 32 localities investigated systematically, such remains would certainly have occurred at least once if present on the island. At present, there is no obvious reason why mainland cervids should have failed to follow elephants and hippopotami in coloniz-

ing the island, especially since the 40-km water gap which existed during the Pleniglacials is unlikely to have acted as a filter for this species. Apart from occurrences of other species of deer, *D. mesopotamica* is securely dated back to the Riss-Würm in the biostratigraphy of Israel (Tchernov 1981), so that fallow had certainly evolved in its Middle Eastern homeland long before the terminal Pleistocene. A ritual Middle Paleolithic deer burial on the coast of northern Lebanon (Solecki 1982) attests the importance of Persian fallow deer at an early time and its widespread distribution, yet it is possible that on a regional level the zoogeography of this species was somewhat different from that of elephants and hippopotami and that initially it was absent from the coastal areas directly opposite Cyprus. Aside from this possibility, the stochastic element in faunal dispersal must not be overlooked: not all potentially able colonizers inhabiting a staging area can be expected to follow the same pattern and timetable of dispersal. It has already been pointed out that chance plays a large role in sweepstake dispersals, so that even the hippos and elephants can only have breached the water gap on rare occasions. Deer may never have done so, or at such a late stage—perhaps during the Pleistocene/ Holocene transition or the initial Holocene—that its remains have not entered the fossil record. Here lies the crux of the hypothesis of non-human introduction: scientific recovery methods currently are such that only fossilized and archaeological faunal assemblages stand a chance of being retrieved; non-cultural subfossil deposits have never been searched for. While such a subfossil record may have suffered serious damage through extensive environmental degradation in Middle-Late Holocene times, its former existence is implied by the widely accepted theory that a large population of wild (presumably feral) deer existed on Cyprus during many millennia. Clearly, the deer bones recovered in archaeological contexts can only represent a fraction of this population, and the rest of its remains are, or were, therefore part of an unknown subfossil record. The prospects for retrieving subfossil remains in sinkholes, colluvial deposits, and similar sedimentary contexts without paleoecological research are dim, which is probably also why no such material has ever been recorded in the past. In light of the foregoing, it is thus suggested that *D. mesopotamica* could have colonized the island on its own sometime in the terminal Pleistocene or the initial Holocene, establishing an indigenous population that was later exploited by the aceramic Khirokitia Culture. This event could have occurred at any time during several thousand years prior to the appearance of the first KCU settlements without permineralization affecting the bones of deceased animals. But if this hypothesis were true, shouldn't deer remains occur at Akrotiri Site E? Not necessarily, for nothing is known about the hunting strategy and range of its occupants, which may have

excluded deer for a variety of reasons that could be technical, seasonal, or zoogeographic in nature. Even if future fieldwork confirms the absence of *D. mesopotamica* at Akrotiri, Site E is at present one of a kind and therefore not representative of anything—including the faunal inventory and subsistence base of the island's first human colonists. Another potential criticism is that if deer colonized after the Würm Pleniglacial, the advancing Flandrian transgression would have made crossings progressively longer and more difficult, with distances approaching present values of 69-101 km during the Pleistocene/ Holocene transition. This is longer than any cervid has ever been known to swim, yet if ancient sources are to be believed, such crossings occurred repeatedly in the past. A description given by Aelianus (170-235 AD) is so detailed that it seems to be based on an eye-witness account:

> The Syrian deer live on the highest mountains, the Amanus, Lebanon, and Carmel. However, when they want to cross the sea, the herd gathers on the shore and waits for the wind to die down; when they perceive it to be gentle and calm, then they entrust themselves to the sea. Yet they swim in single file, whereby the ones behind put their heads on the rears of the ones in front, and when the first one tires it seeks rest by lining up as the last one and brings up the rear. Yet they move to Cyprus out of desire for the local grass [*De Natura Animalium* V:56, translated from a quotation in Oberhummer 1903:373].

The same author further refers to deer swimming from Epirus to Corfu, a crossing of a mere five kilometers, and Pliny briefly mentions that deer reached Cyprus from Cilicia. The report by Aelianus sounds credible enough if juxtaposed with the foregoing observations concerning the swimming powers of modern deer, but in light of the tendency of ancient authors to base their accounts on yet older sources and to embellish the facts it must be taken with a grain of salt (Pliny, for example, also claims that elk had to browse backwards because of their fat upper lip!). Nevertheless, the passage throws an interesting sidelight on the issue of how *Dama* might have reached the island without human help. It also suggests that the geographic range of Persian fallow extended right up to the Gulf of Iskenderun, and therefore conceivably into the lowlands of Cilicia. Now, zoogeographic boundaries rarely correspond to political frontiers unless the latter coincide with ecological boundaries, and diachronic expansions and contractions of ranges are known to have accompanied the climatic changes of the Quaternary. Since the border between Turkey and Syria bisects the barren, rolling hills and alluvial plains of the upper Euphrates and Tigris, with the same semi-desert biotope on either side, on ecological grounds it is difficult to see why it should also mark the northern limits of Persian fallow (Chapman and Chapman 1975; Harrison 1968:365-368). This conclusion could only be based on historical and archaeological evidence, for the species teetered on the brink of extinction in recent history. When Lee Merriam

Talbot succeeded in locating a surviving herd in 1955, its distribution had shrunk from a coverage in antiquity of the entire Fertile Crescent as far south as Egypt to a small relic population in Khuzistan. Persian fallow, therefore, has not occurred naturally in the Djezireh of northern Syria in a long time, and the same may pertain to fallow (Anatolian or Persian) in the Malatya region of southeastern Turkey. As a result of the Euphrates Dam Project, however, this area is now emerging as a previously unknown focus of Early Holocene settlement, and faunal analysis has already confirmed the presence of Persian fallow alongside *Cervus elaphus* and *Capreolus capreolus* at aceramic Cafer Höyük (Helmer 1985). Only *Cervus* seems to be present at Çayönü (Lawrence 1982) and the faunal reports for Gritille and Nevalla Çori could unfortunately not be consulted. Yet Cafer alone demonstrates the occurrence of *D. mesopotamica* north of the border in the 7th m.BC, thus supporting Uerpmann's view that the southern flank of the Taurus provided the biogeographic boundary between Anatolian and Persian Fallow Deer during most of the Quaternary (Uerpmann 1981:101; 105, Fig. 1.6). Hence it is quite unjustified to assume that *by definition* this species could only have reached Cyprus from the Eastern Staging Area. Even if the ancient reports are wrong and fallow never bridged the 101-km gap between Ras Ibn Hâni and Cape Andreas, it could still have colonized the island by crossing the much narrower Cilician Channel from the Northern Staging Area. Enclosed by the Taurus to the north and west and hemmed in by the Mediterranean to the south, the Cilician lowlands form a well-defined geographic unit that is more accessible from the Levant than from the Anatolian plateau. Just as this coastal corridor facilitated contacts between the Epipaleolithic cultures of the Antalya region of Turkey (Belbasi-Beldibi) and the Levant (Kebaran A-Natufian) (Mellaart 1975:28, 42), so it may have determined the zoogeography of the East Mediterranean rim during the Pleistocene and Early Holocene.

The origins of the Cypriot *Dama* population is not the only unsolved problem in the island's Quaternary fauna. Two further issues concerning the endemic dwarf elephant and pygmy hippopotamus merit brief examination before concluding the section with a general assessment of their paleoecology.

In contrast to Crete, Sardinia, and other Mediterranean islands with well-studied faunal records, it has so far not been possible to work out a biostratigraphy for Cyprus. Paleontological, archaeological, and neontological data outline a very general succession of Quaternary faunas from the Pleistocene to the Late Holocene, comprising the stages Pleistocene-Early/ Middle

Holocene-Late Holocene, yet the faunal succession of the Pleistocene is almost completely unknown. Despite the fact that most of the available fossil material comes from Bate's early investigations, and although no cave deposit has ever been excavated scientifically the osteological evidence is consistent for all fossil localities known on the island and hence makes it unlikely that biostratification has been missed. The new subfossil material from Site E at Akrotiri serves to reinforce this conclusion, because preliminary analysis by David S. Reese shows it to be biometrically identical with elephant and hippo remains at other, non-cultural, sites, despite the fact that Site E must be much more recent on account of its post-Pleistocene ^{14}C dates as well as the non-fossilized state of its bones. As it is, the absence of morphological changes suggests that the timespan represented by the Site E subfossil assemblage and the (presumably older) fossil deposits falls within a single evolutionary stage for both animals which is clearly the last one in their endemic development. This stage is represented by *Elephas cypriotes* and *Phanourios minutus* (see **APPENDIX 2**, infra, for characteristics). The osteology of the Cypriot pygmy hippo demonstrates that nanification had proceeded further than in the case of other Mediterranean dwarf hippos, implying a greater degree of isolation that also manifests itself in an unusual dentition (the absence of a permanent upper fourth premolar). *Phanourios* was smaller than either of the two (possibly three) subspecies of the Cretan pygmy hippopotamus, *H. creutzburgi creutzburgi* and *H. creutzburgi parvus* (Boekschoten and Sondaar 1966; Dermitzakis and de Vos 1986:111, 1987:385). These were in turn smaller than *H. melitensis* and *H. pentlandi* of Malta and *H. pentlandi* and *H. cf. major* of Sicily (the last is a full-size species). Besides intermediate hippopotami, these islands have also yielded morphologically differentiated elephant remains. Crete has the continental *E. antiquus*, the slightly smaller *E. creutzburgi*, and the dwarfed *E. creticus*, but opinions are divided as to whether these three species represent a single lineage and whether they are descended specifically from *E. antiquus* (=*Palaeoloxodon*) as Bate postulated or, more generally, from *E. namadicus* which includes the former (Dermitzakis and de Vos 1986:115-117, 1987:388-390; cf. Symeonidis and Theodorou 1982; Theodorou 1986). In descending order of size, Sicily has produced *E. antiquus*, *E. mnaidriensis*, and *E. falconeri*, and Malta *E. mnaidriensis*, *E. melitensis*, and *E. falconeri* (Adams 1870:216-232; Azzaroli 1971:90-91, 1982:200, Fig. 4; Vaufrey 1929; Woodward 1930). Sardinia, by contrast, has yielded only one dwarf elephant (*Mammuthus lamarmorai*) descended not from *E. antiquus* but most probably from *M. armeniacus* (Azzaroli 1981:110). On odontological grounds, the size of the Cypriot dwarf elephant has been placed between *E. meletensis* and *E. falconeri* (Bate 1905b:358; Woodward

1903:245). Furthermore, Bate interpreted the somewhat simpler molar construction in her Cypriot specimen as evidence that the endemic evolution of *E. cypriotes* began before the separation of the Sicilian and Maltese lineages from their continental ancestors (Bate 1905b:358), so that signs of severe isolation of the Cypriot paleofauna are present in the elephant as well as the hippopotamus. The dwarfed faunas from these Mediterranean islands are generally dated to the Middle-Late Pleistocene, and the emergence of the Cypriot species probably also took place with this range since absolute isolation would have accelerated the rate of evolution, producing extreme morphological changes more rapidly than on islands where initial or occasional faunal interchanges occurred.

Because of the abundant cranial and post-cranial remains of *Ph. minutus*, its phylogeny has been examined in numerous recent studies despite the absence of intermediate forms (Boekschoten and Sondaar 1972:326-331; Faure et al. 1983; Houtekamer and Sondaar 1979:443-447; Reese n.d.b). Interestingly, however, it is the scant elephant material that contains signs of evolutionary dimorphism, pointing to the presence of an ancestor of *E. cypriotes*. So far, there is only dental evidence for this hypothesis, yet the results of new research support Boekschoten and Sondaar's (1972:331-332) conclusion that a number of elephant teeth in the BMNH, known to come from Athna (**APPENDIX 2**, infra, #FOS-22F), are too large to belong to *E. cypriotes*. In the summer of 1988, the author, in collaboration with David S. Reese, succeeded in tracing a short reference to the find of an elephant tooth in a deep well near Kyrenia (Bear 1962:8). The deep and therefore unusual geologic context of this find had chronostratigraphic implications that suggested a possibly greater age than Bate's dwarf, and although all efforts to locate the specimen in Nicosia failed, a description provided by its discoverer proved it to have been a molar ca. 18 cm long and 14 cm high, i.e., too large for *E. cypriotes* (**APPENDIX 2**, infra, #FOS-18K). Only a few weeks later, a tusk was discovered in a private collection that had reportedly been found years before in a deep gravel deposit on or near the southeast coast of Cyprus; when measurements were taken, it was realized that this specimen, too, was biometrically distinct from *E. cypriotes* tusks (**APPENDIX 2**, infra, *SECTION B*, #14). Although the degree of divergence can only be determined through further study, with regard to *E. cypriotes* this tusk and the teeth from Athna and Kyrenia collectively attest the existence of material that is attributable to an older and thus probably ancestral form of elephant. It is possible to advance this argument on grounds of the following compatible strands of evidence: first, the three sites in question have all yielded osteologically distinct material that is consistently larger than the

expected range of intra-specific variation; and, second, as sites buried under several meters of Recent and possibly also Late Pleistocene deposits they have in common a geochronological context that differs markedly from the cave, rockshelter, surface and near-surface sites with which *E. cypriotes* is invariably associated.

Paradoxically, the finds which have just been described are likely to remain tantalizing scraps of evidence for a potential biostratigraphy that cannot be investigated further. Two of the sites, Kyrenia and Athna, are inaccessible and possibly reburied, and the location of the third seems to have passed from memory. This is doubly unfortunate, for not only might at least one of them be expected to contain additional faunal remains, but even in the absence thereof it should be possible to date the find matrices using the associated sediment profiles. The presence of large amounts of (presumably) stratified overburden makes for a potential correlation with the known Quaternary sedimentary succession of the island that is impossible for the cave and rockshelter localities.

The failure to elucidate the relative or absolute chronology of the majority of fossiliferous deposits represents the second unsolved issue in the macropaleontology of Cyprus. As stated above, by analogy with data from other Mediterranean islands and due to the advanced state of the dwarfing which is evident in the endemic species, it can be inferred that the remains belong to the Middle and Upper Pleistocene. The timespan required to produce the extreme size reduction of *E. cypriotes* and *Ph. minutus* cannot be reliably determined without radiometrically dated intermediate species, but insular evolution is generally believed to have been comparatively rapid, particularly in the initial adaptive stages (Azzaroli 1982:205-206; Sondaar 1977:696). Because *K*-selected placental mammals and marsupials generally evolve more slowly and become extinct more rapidly than *r*-selected species such as reptiles, amphibians, and birds (see **GLOSSARY**, supra), the elephant, by dint of a reproductive rate that is even lower than that of hippopotami (see above, n.18), must have taken more time to speciate than other members of the island's Quaternary fauna and may in fact have colonized earlier than the hippos. In either case, however, the rate of evolution was more likely controlled by the pronounced isolation of Cyprus than by time (see Case and Cody 1987:409), so that close temporal comparisons with less remote Mediterranean islands may not be valid. In light of recent paleontological investigations, attempts to date fossil material from island sites radiometrically are surprisingly few. A ^{14}C date of 12,135±485 BP was obtained a few years ago by Bachmayer and Zapfe on hippopotamus material from the Katharo plain in Crete (Dermitzakis and de Vos 1986:114, 1987:387, n.1).

Although a single date is statistically insignificant, if correct it would provide additional evidence for the hypothesis that Pleistocene island mammals in the Mediterranean did not become extinct until the Early Holocene (see Martin 1984:389-391). A bone of the small "*Cervus cretensis*" (=*Candiacervus cretensis*, de Vos and Dermitzakis [1985]) from Gerani Cave IV yielded a date of 43,600+6,000/-3,400 BP (the error amplitude reflecting the limits of the ^{14}C technique), and charcoal reportedly associated with remains of the same species and of a rodent (*Mus minotaurus*) in a fissure near Gumbes was dated to 5,320±100 BP (Kuss 1973:58, n.4). Two ^{14}C dates for the dwarf elephant from Tilos, 7,090±680 BP and 4,390±600 BP, are more difficult to accept (Bachmayer et al. 1976; Dermitzakis and Sondaar 1978:825; Symeonidis et al. 1973); their unexpectedly recent age and large standard deviations suggest the possibility of contamination.[22] Because this risk is demonstrably smaller in tooth enamel, Giorgio Belluomini of Rome University and Jeffrey Bada of the Scripps Institution of Oceanography have begun dating dwarf elephant teeth from the Sicilian caves of Puntali and Spinagallo by means of amino acid racemization (Bada 1985; Belluomini and Bacchin 1980; Belluomini and Bada 1985; Belluomini and Delitalia 1983). Preliminary results, with dates of 60,000 BP, 180,000 BP and 550,000 BP (±25-30%), contradict the established Sicilian evolutionary sequence from *E. antiquus* to *E. falconeri* and thus require corroboration, but the method has been tried and tested on East African fossil material and has potential for dating teeth from the Cape Pyla caves and in Bate's BMNH collection from the now-inaccessible Pentadaktylos fossil sites on Cyprus. Another technique, ESR (Electron Spin Resonance) is currently being utilized as a control method of verifying the ^{14}C assays for Akrotiri Site E (see **CHAPTER 1**, supra), yet owing to its reliance on charred substances, this is not an optimal dating method for non-cultural fossil deposits unless they are stratigraphically associated with natural charcoal horizons (such as some of the Malagasy subfossil sites). So far, the only evidence for the age of the latter is geochronological. The data incorporated in the *Gazetteer of Pleistocene Fossil Sites* (**APPENDIX 2**, infra) bears out the frequent association of fossiliferous exposures with Pleistocene marine terraces, which therefore can at least provide termini post quo for the deposition of the faunal remains *if their ages are known*. As shown on **Map A**, infra, the majority of Cypriot fossil sites are distributed along the island's coasts at heights correlating with marine terraces. Since the Mesaoria did not become fully continental until the Quaternary—a process that may have overlapped with the arrival of the Pleistocene fauna, corresponding terraces are also present along the south slope of the Pentadaktylos (where another cluster of sites is located), though the heavy erosion which

has turned this ecozone into a landscape of barren foothills and karstic outcrops has also erased most of the terrace features. Those fossil sites that can be tied into the northern terrace sequence (Ducloz 1964, 1965, 1968, 1972, see also Dreghorn 1978:210-214) are consistently associated with the three most recent terraces. These are the Ayios Epiktitos, Kyrenia, and Koupia terraces,

Climatic Regime	Italian Beach Sequence	Cypriot Coastal Sequence	Glaciations	Age	System
Warm	Versilian		Recent Alluvium + Modern Beaches		HOLOCENE
				10,000 BP	
Cold	(Pontinian)	Submerged Shoreline	Würm Glacial (Weichsel) |——|	75,000 BP	
Warm	Tyrrhenian III	Koupia Terrace	Late Riss-Würm Interglacial		LATE PLEISTOCENE
Cool	(——)	Submerged Shoreline	(Eem)		
Warm	Tyrrhenian II	Kyrenia Terrace	Early Riss-Würm Interglacial		
				125,000 BP	
Cold	(Nomentanan)	Submerged Shoreline	Riss Glacial (Saale) |——|	265,000 BP	
Cool	(——)		Late Mindel-Riss Interglacial (Holstein)		
Warm	Tyrrhenian I	Ayios Epiktitos Terrace	Early Mindel-Riss Interglacial |——|	300,000 BP	
Cold	(Flaminian)	Submerged Shoreline	Mindel Glacial (Elster) |——|	430,000 BP	MIDDLE PLEISTOCENE
	Milazzian II	Toumba Terrace	Günz-Mindel Interglacial (Cromerian)		
Warm		Milazzian I			
				700,000 BP	
Cold	(Cassian)	Submerged Shoreline			
Mainly Cold	Sicilian	Trapeza Terrace	Günz Glacial		
Warm	Emilian	Klepini Terrace			
				1,000,000 BP	
Cold	Calabrian				EARLY PLEISTOCENE
				1,800,000 BP	

Table 5: Coastal-Stratigraphic Correlations Between Cyprus, the Central Mediterranean, and Pleistocene Glaciations (Simplified Scheme).

which have been dated to the early Mindel-Riss Interpluvial (Middle Pleistocene, ca. 300,000 BP), the early Riss-Würm Interpluvial (early Late Pleistocene, ca. 120,000 BP), and the late Riss-Würm Interpluvial (middle Late Pleistocene, ca. 80,000 BP), respectively (Table 5, infra). This chronology is based exclusively on the intercalation of associated marine malacofauna and absolute heights with the Sicilian sequence, and no absolute radiometric dates are available yet. This should be contrasted with Dreghorn's (1978:212) erroneous report of a ^{14}C date of ca. 52,000 BP (!) for the continental deposits of the youngest of these terraces, the Koupia Terrace, which is a misquote of the following observation by Ducloz:

> La formation de Koupia...peut être mise en parallèle avec les dépôts de la terrasse marine de 6 m du littoral syro-libanais. Ces dépôts ont livrés de nombreux Strombes et sont assez bien datés car ils sont surmontés d'atterrissements continentaux ou l'on a trouvé des éclats levalloiso-moustériens et moustériens ainsi que des dents de *Rhinoceros merckii* et d'Hippopotames. Des fragments d'os calcinés associés à un matériel levalloiso-moustérien ont donné un âge absolu (^{14}C) plus ancien de 52,000 ans. D'après KAISER, VAN LIERE, WRIGHT, et GARROD, le niveau de 6 m représenterait une phase tardive de l'interglaciaire Riss-Würm; la grande régression würmienne se placerait après la fixation du rivage de 6 m [Ducloz 1968:187].

Of relevance here is the stratification of the 6-m Syrian terrace below the fossiliferous, artifact-bearing alluvium and its correlation with the Koupia Terrace. Any determination "older than 52,000 years" stretches the limits of conventional, unenriched, ^{14}C dating, but in approximate terms the absolute age of the alluvium is not incompatible with the assumed age of the lowest marine terrace on the mainland and Cyprus. The problem in attempting to date fossil assemblages in superficial and cave contexts is that they are not actually stratified within the terrace formations, so that theoretically they could all post-date the emergence of the youngest terrace and thus belong exclusively to the Late or even Final Pleistocene (the latter, however, is unlikely on evolutionary grounds). Conversely, as stated above, the sites for which geologic intercorrelation is possible cannot be older than the late Middle Pleistocene Ayios Epiktitos Terrace. Clearly, these correlations can only be evaluated through a refinement of the coastal stratigraphic sequence and its application to the southern seaboard of the island, a region where the occurrence of Quaternary fossil sites is increasing.[23] More precise dating would be possible for buried fossil sites, and mention has already been made of the importance of the Kyrenia and Athna sites in this respect. On stratigraphic grounds, for example, the elephant represented by the molar from Kyrenia *Athkiaephendis* (#FOS-18K) can be tentatively dated to the early stages of a marine regression that accompanied the cool climatic interlude between the Tyrrhenian II (Kyrenia Terrace) and the Tyrrhenian III (Koupia Terrace), i.e., to ca. 100,000-110,000 BP.

Whatever its true age, it is certain to be significantly earlier than the nearby pygmy hippopotamus exposure at the type site of *Phanourios*, Ayios Yeoryios *Ayios Phanourios* (#FOS-17K), which is associated with the Koupia Terrace. Although the dwarf elephant and pygmy hippopotamus of Cyprus have always been mentioned together in this discussion, this does not imply that the ancestors of both colonized the island at the same time. The context of the Kyrenia molar suggests that the elephants arrived no later than the end of the Middle Pleistocene, presumably at times of low sea levels during the penultimate glaciation (Riss). The hippopotamus, by contrast, may not have breached the widening water gap during Riss-Würm Interpluvial and possibly did not colonize the island until sea levels dropped again during the Würm.

As in the case of *D. mesopotamica*, the age of mainland megafauna like the full-size elephant and hippo during the Pleistocene is too great to narrow down the time depth of potential colonization episodes. Furthermore, the phylogeny of the continental species is still under debate, so that the ancestors of insular species are also subject to different opinions. The history of research on the mainland hippopotamus of Europe has recently been summarized by Kahlke (1987b), who also reports that the only occurrence of hippopotamus (probably *H. antiquus*) in Anatolia is at the Karain cave complex in Antalya (1987a), where it was found by Bostanci and Kökten in an Upper Paleolithic level together with a Mousterian industry. Recent excavations at this site attest the association of hippopotamus and elephant (*E. antiquus*), with Acheulian bifaces in Level IV (Yalçinkaya 1981:215), so that the hunting of these large mammals is shown to go back to the Lower Paleolithic in southwestern Anatolia, while the first instance of giraffe in Anatolia was recorded in a Middle Paleolithic context (Yalçinkaya 1987:198). *Elephas antiquus* and *H. amphibius* (or the Pleistocene subspecies *H. amphibius antiquus*) are the most likely mainland ancestors of the Cypriot dwarf species, and although remains are not known from Cilicia, reflecting the absence of Paleolithic sites from the Northern Staging Area, they are well documented in the Near East (Fig. 13, infra). In proximity of the Eastern Staging Area, Middle Pleistocene levels at Latamne in the Orontes Valley and at Naamé in Lebanon have yielded *H. amphibius* remains (Fleisch 1970; Hooijer 1962, 1965), and in the staging area itself Fleisch (1965) reported hippopotamus in the Würmian terrace mentioned by Ducloz (see above). The same species also occurs abundantly in the Early Pleistocene at 'Ubeidhiyah in the Jordan Valley, alongside *H. behemoth*, a new species proposed recently by Faure (1986), and—identified only to the genus level—in Middle Pleistocene contexts at Evron near Haifa and in the Gesher Benot Ya'akov Formation (Jisr Banat Yaqub) in the upper Jordan Valley. It has also been recorded in

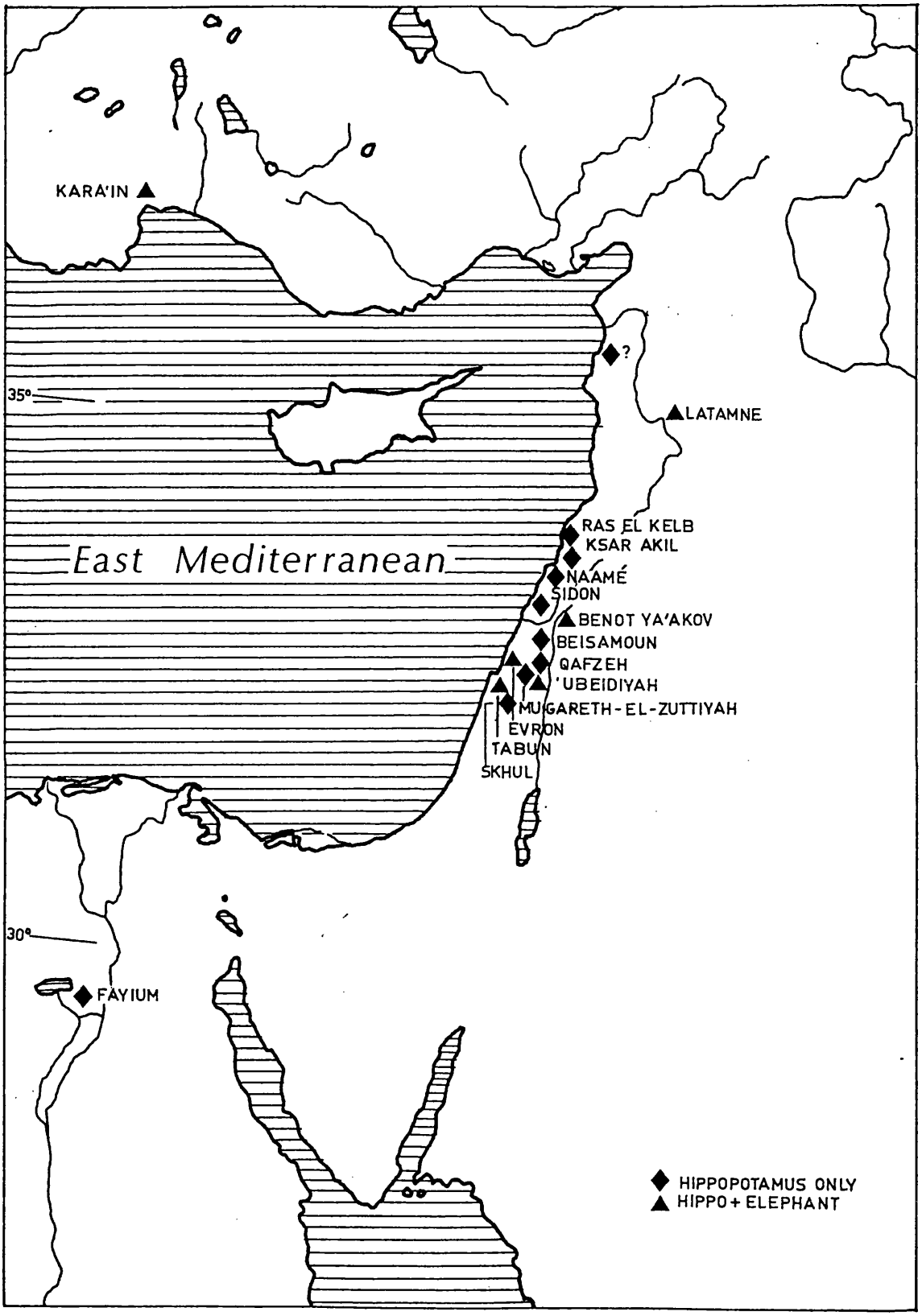


Fig. 13: Distribution of Elephant (*Elephas* sp.) and Hippopotamus (*Hippopotamus* sp.) Remains in Early Pleistocene-Early Holocene Deposits in the Near East.

Early Pleistocene levels at Skhul and Tabun (Wadi el-Mughara, Mt. Carmel), and in Middle Pleistocene levels at Qafzeh and Mugareth-el-Zuttiyah. In her study of the Tabun material, Bate revised her original thesis that *H. amphibius* probably survived into the historical period in the Middle East, stating instead that the available data contradicted such a continuity (Garrod and Bate 1937:201; see also Uerpmann 1981:101, contra Tchernov 1981:95, Fig. 11); however, her earlier assumption has been proved correct by more recent finds of this species in Upper Pleistocene and Holocene contexts at Ksar Akil, Ras el Kelb and Sidon on the Lebanese coast, at the 7th m.BC (PPNB) settlement at Beisamoun in Israel, in 'neolithic' levels in the Fayum basin in Egypt (where a projectile point was found lodged in a hippopotamus skeleton), and in 'Bronze Age' levels at Arat, Ras Shamra, Tell Sukas, and other sites. Consequently, Faure (1986:129) concluded that "absent de nos jours au Proche-Orient, *Hippopotamus* est demeuré dans cette region...jusqu'à une date très tardive." Thus the rare hippopotamus teeth found in LCII-III deposits at Enkomi, Kition, and Hala Sultan Tekké (Reese 1985, n.d.a) may well have come from live animals in the Levant, rather than representing old curios that eventually found their way to Cyprus. Egyptian, Greek, and Roman references document the populous survival in antiquity of hippopotami in the Nile Delta, a region where it was only exterminated by hunting and ecological pressure at the beginning of the 19th century (Frädrich 1968:121). The record shows a similar distribution and longevity of the Asian elephant in the Near East. *Elephas trogontherii* (=*namadicus*) is known from Middle Pleistocene deposits at Latamne, Evron, Benot Ya'akov, and 'Ubeidiyah (Hooijer 1962, 1965; Tchernov 1981); *Elephas* sp. from an Early Pleistocene level (E) at Tabun (Garrod and Bate 1937:222). Despite a lack of osteological evidence, the ancestors of the Asian elephant (*E. maximus*) are believed to have been present in southwestern Asia during the Late Pleistocene (Maglio 1975:467, Fig. 2), and pictorial and literary evidence suggests that wild herds of this species still ranged widely throughout the region in antiquity (Barnett 1982; Miller 1986). Osteological data consisting of unworked elephant remains in Recent archaeological deposits extend back to a late 4th m.BC ivory workshop at Bir es-Safadi, near Beersheba, and range from Çatal Hüyük in central Anatolia to Ras Shamra/ Minet el-Beidha (EB-LB), Haft Tepe, Elam, Iran (ca. 1,500 BC), Babylon (ca. 1,800 BC), and Quantir in the eastern Nile Delta (ca. 1,300-1,200 BC) (Reese 1985:399-400, 1988a). However, the majority of these occurrences involve single specimens or small quantities of molars and tusks, and seen in conjunction with finds in the Kas shipwreck and at the ancient port of Ras Shamra, Minet el-Beidha, their

distribution can be correlated with the far-flung ivory trade in the ancient Near East rather than with the actual Mid-Late Holocene zoogeography of the Asian elephant.

A final point concerns the ecology and ethology of the dwarf elephant and pygmy hippopotamus. This issue is pertinent to understanding the population dynamics, distribution, and extinction process of the two species of 'mini-megaherbivores' in an insular environment that could not have supported them in its present, semi-arid state. Unfortunately, the current dearth of direct biological and ecological data means that conclusions must be based mainly on comparative evidence from other paleofaunas and on modern wildlife analogies and can only be drawn from a small number of osteological symptoms found chiefly in *Phanourios minutus*. As noted earlier, the most conspicuous morphological changes observable in island populations are changes in body size that are amplified by genetic isolation to the degree of dwarfism and gigantism. An important aspect of these evolutionary developments is that they consist not merely of unchecked growth or diminution until speciation takes place but are marked by allometric changes that are generally seen as signs of an adaptive response to island environments. Thus island dwarfs and giants are not simply scale models or oversize versions of their continental ancestors resulting from pathological or degenerative aberrations, for if this were the case evolution would not have produced such a consistent pattern of body size change trends in island faunas (Sondaar 1977:681). One interpretation of reduction in body size is that it represents an adaption to warmer climates (Bergmann's rule), but this view not only conflicts with the drop in ambient temperatures during the Pleistocene but also fails to explain why directional selection of this kind would have led to evolutionary nanism only on islands and not on mainlands. Furthermore, it cannot account for the opposite trend toward gigantism, often in the same insular environment, which would have to be interpreted as an adaptive response to cooler climates and is therefore clearly contradictory. More convincing is the alternative explanation that extreme body size changes in either direction reflect the absence of predators on islands and that size reduction in large mammals moreover facilitated movement in rugged terrain such as characterizes many islands. As the largest living land mammals, full-size hippopotami and elephants have few enemies owing to their bulk, which can be seen as an anatomical adjustment to predation pressure that—given their current distribution in hot tropical forest and savanna biomes—seems to override Bergman's rule. Removal of this pressure on predator-free islands can therefore be expected to obviate the need for large size and allow the development of natural selection that favors smaller size in order to

optimize the different resource potential of island habitats. Optimization may have involved the ability to compensate for the physical limitation and lower biodiversity of such habitats through more frequent niche shifts than on the mainland and by means of a higher reproductive rate that offset the effects of morbidity and mortality caused by food shortages on population survivorship and permitted group fissioning as a regulatory mechanism for maintaining demographic stability. Pointing out that heavy predation pressure may confine small prey species to restricted feeding areas near potential refuges whereas large species tend to form protective herds, Case (1978, 1979) has proposed a model relating body size trends to territoriality, which predicts that animals with little or no territorial behavior and communal feeding habits (like proboscideans and artiodactyls) experience a shift to smaller size due to higher consumer densities when the external threat of predation is removed, whereas species which defend individual feeding territories and are less tolerant of intraspecific resource competition will become larger. Although Case cites numerous exceptions to this rule and notes that the loss of predators can initially be expected to reduce consumer densities and aggressive behavior by allowing the expansion of feeding areas (1978:10-11), his model is more empirical and ecologically sophisticated than some alternate explanations proposed by Boekschoten and Sondaar (1966:37-38), namely, that dwarfing could represent an adaption to small shelters (the caves in which many hippopotamus remains are found on Mediterranean islands) or reduce the size of territories. The former is an untestable and unlikely proposition given the lack of evidence that hippopotami are compulsive cave-dwellers, and the latter is contradicted by the admixture of other fossil mammals in many hippo deposits on island fossil sites, including Cyprus, which suggests that other large herbivores like dwarf elephants were not excluded from the niche occupied by pygmy hippopotami. In contemporary *H. amphibius*, territoriality is frequently inferred from the animals' habit of marking their well-trodden inland paths by means of splattering feces with rapid tail movements on either side of the trail (e.g. Grandall 1964:532), yet such behavior is associated almost exclusively with adult males and thus is probably an expression of sexual dominance by bulls rather than the claim to a feeding territory by the entire species (Frädrich 1968:126-127).

The hypothesis that size reduction in hippopotami and elephants represents at least in part a response to the need for greater mobility is supported by direct evidence. The living West African forest hippo, *Hexaprotodon liberiensis*, although strictly speaking not a dwarfed form of *Hippopotamus amphibius*, is native and confined to a forest biotope that would be impenetrable to its bulkier relative. Likewise, the correlation between woody habitat and smaller body size would

seem to find confirmation in the African forest elephant (*Loxodonta africana cyclotis*), which normally reaches a height of 2.2-2.5 m as compared to 3.2-3.7 m for the African savanna elephant (*Loxodonta africana oxyotis*). On the other hand, there is no clear anatomical and ecological dichotomy in elephants as there is in hippopotami, because the Asian elephant (*Elephas maximus*), whose average size of 2.5-3.0 m is intermediate between the two other species, is indigenous to jungle biotopes on Sri Lanka as well as in Southeast Asia, and because even the giant African elephant is often found in savanna woodlands that approach the density of typical mediterranean maquis vegetation. Therefore, unless the sclerophyllous woodland climax envisaged for pre-Holocene Cyprus (see above) was considerably denser in all regions of the island, its role as a source of selective pressure on body size among the founder population of *Elephas cypriotes* remains questionable. However, while the existence of an island-wide climax forest may not have triggered body size changes as the dwarf elephant and pygmy hippopotamus of Cyprus began to evolve, the variety of landforms and lack of large floodplain or savanna environments means that the animals had to negotiate rough terrain in order to radiate across the island, as the distribution of currently known fossil deposits indicates they did. This led to locomotory adaptions that are characteristic of island dwarf species and have been studied in detail. They consist of syndactyly (fusion) and shortening of phalanges and metapodials (hippopotamus, deer, and *Myotragus balearicus*), the loss of the foot pad observed in the dwarf hippopotami of Cyprus and Crete, and a distinct functional forelimb morphology facilitating anterior-posterior movement but restricting lateral movement of the legs that makes the Cretan and Cypriot hippopotami resemble *Hexaprotodon liberiensis* more than *Hippopotamus amphibius* (Boekschoten and Sondaar 1966, 1972:331; Houtekamer and Sondaar 1979). In short, *Phanourios minutus*, as well as other dwarf artiodactyls in other extinct Mediterranean island faunas, had shorter, sturdier legs that increased agility at the expense of speed, resulting in a mode of locomotion which was evidently of advantage in mountainous island ecosystems without large ground-living carnivores.

Osteological evidence also shows peculiarities in the masticatory apparatus of the Cypriot pygmy hippopotamus pointing to feeding habits radically different from those of the extant species. Chewing in a transverse, grinding motion is indicated by wear patterns on the jaw bone, a different occlusion of the teeth resulting from an absence of the upper fourth premolar (P^4), and a combination of brachyodonty and extreme lophodonty (Boekschoten and Sondaar 1972:327-331). The lack of P^4 and the extremely lophodont molars set *Phanourios* apart from all

other *Hippopotamidae*, whereas brachyodont teeth occur to a lesser degree in the pygmy hippopotami of Sicily/ Malta (*H. pentlandi*), Crete (*H. creutzburgi*) and Madagascar (*H. lemerlei*) (Reese n.d.b:26). The mode of mastication indicated by these characteristics in general, and specifically the presence of lophodonty, have been interpreted as signs of a diet consisting mainly of leaves and twigs (Boekschoten and Sondaar 1972:336; Sondaar 1977:689). Unlike other Pleistocene pygmy hippopotami, and unlike *Hippopotamus amphibius*, which is a grazing animal that eats aquatic plants and on land mows wild grass to a short stubble (see above, n.19), *Phanourios* hence seems to have been uniquely adapted to browsing sclerophyllous shrubs. Its diet, low-gear locomotion, and the lower position of its eyes and nose in comparison with the amphibious modern hippopotamus are consistent with a way of life involving reduced dependence on aquatic habitats and successful adjustment to a heavily vegetated and topographically heterogeneous home range. As has been emphasized throughout, such a biotope corresponds closely to assumed paleoenvironmental conditions on Cyprus during the presegetal era.

In a study of Miocene dwarf rhinos from the Texas Gulf coastal plain, Prothero and Sereno 1982) recently drew attention to the strong positive correlation between decreasing body size and increasing dietary selectivity in many animal groups. Small-bodied animals like the small African antelope utilize food items such as seed pods, twig tips, flowers, buds, and fresh foliage that are typically high in nutritive content, whereas large animals, including larger antelope species and *H. amphibius*, are confined to the unselective grazing of a wide variety of fibrous grasses whose lower nutritive value is only partially offset by their more continuous spatial distribution and the digestive efficiency of some of these animals, particularly the modern hippopotamus (see above, n.19). In light of these observations, it is thus possible to advance the argument that dwarfism among insular herbivores was not so much a self-regulatory demographic response to the boundedness of an island ecosystem as a direct physiological adaption to a shift in feeding strategy from grassland grazing to forest browsing. If this concept is applied to the context of the hypothetical spatial structure of resource on Pleistocene Cyprus, it implies a gradual niche shift from low, open coastal paleo-plains exposed during the glacial periods to higher and more woody inland regions along the Pentadaktylos range, on the elevated and geologically older parts of the Mesaoria, and in the coastal hinterland of the southern seaboard. Given the habit of *Hippopotamus amphibius* as well as *Hexaprotodon liberiensis* to beat extensive paths into savannas and forests bordering their river habitats, this migration process may have started as a largely stochastic range expansion. On the other hand, if the behavior of the founder

groups (presumably *H. amphibius antiquus*) was as sedentary as that of surviving hippopotami, it is plausible that a major niche shift only occurred when marine transgressions—either prior to or during the Flandrian—began to dislodge the ancestors of *Phanourios* from their coastal habitats. With rising sea levels, successive generations would have been forced to resort increasingly to the utilization of a woody biotope in the rear of the shrinking plains, where herbaceous plants were replaced by arboreal and subarboreal communities including lentisk (*Pistacia lentiscus*), juniper (*Juniperus phoenicia*), green-brier (*Smylax aspera*), storax (*Styrax officinalis*), hawthorn (*Crataegus aronia*) and strawberry trees (*Arbutus andrachne*) interspersed with pine (*Pinus brutia*), cypress (*Cupressus sempervirens*), and wild olive (*Olea europaea oleaster*) (see **Map G**, infra). The attraction of this model lies in its ability to explain at once the absence of sites containing ancestral stages of *Phanourios* (they would have been submerged along with the coastal paleo-plains or buried under later fanglomerates and alluvial deposits), as well as the occurrence of extreme evolutionary size diminution, locomotory adaption, and changes in the mode of chewing (gradual transformation of an amphibious lowland grazer into a more mobile forest browser by dint of niche constriction). The adaptive shift from coast to interior was probably not absolute and does not imply that the pygmy hippopotamus acquired the kinetics and feeding strategy of sheep or goat, yet it was no doubt instrumental in allowing the species better access to the island's regional habitats, thereby increasing its chance of survival.

The role of the elephant in this process can only be surmised. A similar change in habitat may be inferred from parallel adaptive changes in the osteology of the limb bones of dwarf elephants (Ambrosetti 1968), but there is no clear odontological evidence for altered feeding habits among island dwarf proboscideans, including *Elephas cypriotes*. The reason for this may be that elephant naturally is a mixed feeder adapted to the consumption of plants ranging from roots and grasses to foliage, fruit, buds, and even tree bark (Altvogt et al. 1972:491), and therefore a major niche shift by the forebears of *E. cypriotes* does not necessarily signify a change in feeding strategy that would be reflected in the dentition. Differential feeding patterns of elephants and hippopotami and their impact on the prehuman environment of Cyprus possibly hold the answer to a demographic enigma in the fossil record. Always keeping in mind that on the whole only the last evolutionary stage is represented by the osteological material, there is a striking numerical imbalance between the remains of *E. cypriotes* and *Phanourios minutus* that is not only characteristic of all fossiliferous localities but also exists in the subfossil deposit at Akrotiri *Aetokremnos*. Not only have elephant remains so far been recorded at fewer than half of the confirmed sites

with Pleistocene fauna (Table 4, supra), but they are always vastly outnumbered by those of the pygmy hippopotamus. This situation applies even to Bate's "Elephant Deposit" (Pano Dhikomo *Imbohary*, #FOS-06K), which produced all the elephant remains studied by her (e.g. Bate 1905b). Furthermore, elephant remains have never been found without attendant hippopotamus. Exceptions are the elephant remains from Kyrenia *Athkiaephendis* (#FOS-18K), Athna (#FOS-22F), and Kythrea *Kephalovrysi* (#FOS-01N). Yet without thorough investigations the presence of hippopotamus at these scarcely-known sites remains a possibility, and—as was earlier suggested—the first two at any rate pose special problems that set them apart from all other deposits. This preponderance of hippopotamus remains can only be interpreted in three ways: either an unknown taphonomic factor is involved, which is unlikely given the consistent underrepresentation of elephant; or the admixture of elephant in hippo deposits represents merely a few stray animals, which begs the question why major elephant deposits should have eluded discovery; or the uneven distribution reflects a real demographic imbalance between two apparently sympatric populations of Late Pleistocene 'mini-megaherbivores' on the island, in which case the cause of the disparity calls for an explanation. While the first two scenarios, though unlikely, cannot be ruled out entirely, the last lends itself to the conjectural argument that the elephant population was headed for extinction at an earlier time than the hippopotamus population. If the relative bone frequencies of the Akrotiri assemblage are anywhere near the absolute numerical proportion of the two populations at the end of the Pleistocene, they would mean that dwarf elephants were outnumbered by pygmy hippopotami approximately 40:1. Of course it is impossible to determine whether the rockshelter assemblage is representative of the herd(s) from which it is derived, or whether the composition of that herd was in turn representative of other mixed herds throughout the island. Nevertheless, the uniform scarcity of elephant in fossil deposits could well indicate the fate of a species that literally ate itself to death. In a stimulating contribution to the debate on Quaternary faunal extinctions, Owen-Smith (1987) stresses the environmental impact of herbivorous megafauna such as elephant, rhinoceros, and hippopotamus, using it as the prime mover argument in a 'keystone herbivore' hypothesis that predicts a knock-on extinction effect on smaller herbivores depending on the ecological mosaic created by megaherbivore feeding strategies that was triggered by the removal of the larger mammals through hunting. Although the commensalism of different herbivore species which constitutes the linchpin of this argument is not directly relevant to a fauna as small as that of Cyprus during the Pleistocene, the evidence for niche transformation caused particularly by elephants and its

detrimental effect on their own populations might hold the answer to what caused the paucity of *Elephas cypriotes*. Studies of modern elephant populations, primarily *Loxodonta africana*, give eloquent testimony of the destructive behavior of herds. Trees are stripped of their bark or uprooted, bushes, ground-covering plants and tall mature grasses are trampled, and foliage is plucked from the tree canopy up to a height of 5-6 meters. The resulting patchwork of climax woodland and secondary shrub coppice often results in the elimination tall grasses and certain sensitive plants and an invasion of gap-colonists such as tragacanthic vegetation and short grass of low nutritive value to indiscriminate feeders with inefficient digestive systems like elephants (see above, n.18). The environmental impact is so severe that it can result in complete range destruction over little more than a decade, leading occasionally to mass starvation of other megaherbivore species like that of the black rhino in the Tsavo National Park (Kenya), whose riparian woodland range had been completely denuded by elephants when two consecutive drought years in 1960-1961 brought on a population crash (Altvogt et al. 1972:504-505). The more nomadic elephants are buffered from the nutritional effects of reduced biomass and environmental degradation by a combination of generalized feeding and trophic tolerance, low metabolism, reduced birth rates, and emigration to intact niches but are prone to demographic stress when compressed into marginal ranges with a mean annual precipitation below 400 mm from which they cannot escape (Owen-Smith 1987:355). It is therefore possible that the small number of *Elephas cypriotes* is in some way related to intraspecific demographic stress and reflects a density-dependent limitation imposed by its niche in the island ecosystem. This limitation may have been aggravated by negative habitat impact of the kind just outlined, in which case the fossils most likely represent a remnant elephant population that survived a long-term decline, or it could have been present in the form of a permanently low carrying capacity which effected a leveling off of the growth curve of the elephant population early in its evolution from the founder group. In this case the dwarf elephant population would have been small but stable within a relatively narrow range of short-term fluctuations. However, there are conceptual problems with both scenarios. The idea of a natural decline, corresponding to an unstable population, presupposes that *E. cypriotes* was capable of depriving itself of food resources to the same extent as the extant African elephant, yet in light of the considerable size difference the environmental impact of dwarf elephants may not have been analogous. Furthermore, on an Island with the size and landform diversity of Cyprus, there would have been no obvious factor to prevent herds from continually emigrating to pristine habitats after destroying their current

~~to prevent herds from continually emigrating to pristine habitats after destroying their current~~ range—unless their population ultimately exceeded the carrying capacity of the entire island or niche overlap with the pygmy hippopotamus led to competitive exclusion of the elephants. On the other hand, the idea of population stability below saturation levels implies densities of 0.1-0.2 animals per km^2 or less, and if the Troodos massif is excluded this yields an estimated maximum population of only about 700-1,400 individuals for the island during the Pleistocene. Although data on the population dynamics of extinct species are not available, these figures seem rather low for a population to survive for the length of time implied by the evolutionary history of *E. cypriotes* if the susceptibility of small populations to crashes is considered. For example, the previously mentioned mass starvation episode involving the black rhino in the Tsavo National Park decimated a herd of 780 by approximately 40% within two years; the chances of an elephant population only twice that size of absorbing episodic stress over many thousands of years thus would have been virtually nil.

Two possible ways of determining whether the dwarf elephant population of Cyprus was stressed would be to search for signs of group morbidity and abnormal mortality rates in the fossil material. However, although a claim for mass starvation of pygmy hippopotamus and (wrongly) deer has been advanced in connection with Ayia Irini *Dragontovounari* (#FOS-K12K) (Sondaar 1986:54), pathological evidence for malnutrition similar to that observed in a Cretan cave deposit of the dog-size *Candiacervus ropolaphorus* (Sondaar 1977:694-696) has so far not been noted in the Cypriot material of either *Elephas* or *Phanourios*. Group mortality patterns would be reflected in hypothetical survivorship curves whose reconstruction requires adequate information on age distribution in the elephant sample. A systematic re-examination of all known remains of this species would certainly be helpful in this respect, particularly in light of preliminary evidence from Bate's collection for the frequent occurrence of subadult individuals (Reese 1988b:6; Woodward 1903:245).[24] Because the survivorship patterns of most wild-animal populations commonly are intermediate between a mortality rate that is constant at all ages and one that is high for young individuals, it would be premature to infer the existence of population stress among *E. cypriotes* as long as more complete data are not available. Only if future research confirmed an exceedingly high mortality rate among young individuals that could not be explained in terms of differential taphonomy, leading to a separation of subadult from adult remains, would it be possible to draw conclusions about the dynamics of the elephant population. By contrast, the lack of a similar age group differential in the incomparably larger *Phanourios* sample gives cause to suspect that the hippopotamus population was not under stress, so that

the role of the first human colonists as a prime mover in its extinction remains a strong possibility. The extent to which Holocene island extinction in the Mediterranean involved direct predatory overkill on the one hand and indirect extermination through niche compression on the other will only be elucidated by excavating further 'human-impact sites' like Corbeddu Cave and Akrotiri *Aetokremnos* in the years to come (see Martin 1984:389-394).

4. Aspects of Initial Human Colonization

A discussion of the insular properties and paleobiogeography of Cyprus would be incomplete without reference to its initial colonization by human groups. Thus it remains to end the present chapter with a brief recapitulation of the problems pertaining to this issue (see also concluding remarks in Held 1989a).

Because prehistoric island colonizations and the question of the origins of island cultures are obviously intertwined, the latter issue used to be addressed in terms of 'external relations' before the emergence of a processual outlook brought colonization itself into focus (e.g. Dikaios 1953:316, 328-341 passim; 1962:193-194). An explicit approach to the colonization issue was not taken until Stanley Price explored both possible mainland origins *and* the processes which could have led to the emigration of early human groups to Cyprus (Stanley Price 1976b:274-301). His findings were subsequently published in two seminal papers (Stanley Price 1977a, 1977b). These set out the cultural similarities and dissimilarities and the synchronisms between the Khirokitia Culture and the Levant in light of new excavations and advances in ^{14}C chronologies, but epistemologically their significance lies in a model of settlement regression on the adjacent mainland from interior to maritime regions which postulates a causative role of human biogeography in the colonization process, and in the use of the founder principle—another biogeographic concept—to account for loss in transmission and transformation of traits, two factors which distort and erase crosscultural parallels. If the founder effect is considered in conjunction with another transferential concept, which shall be termed the Hypothesis of Intermediacy since it stipulates that the derivation of an island founder culture from a founding culture in the interior of a continent had to pass through intermediate stages, it can almost be predicted that original traits will be diluted during diffusion and that specific parallels will necessarily be few and far between. This caveat obtains particularly when neither the founder culture on an island nor its *immediate* predecessor (the 'parent culture') on the mainland coast presumed to have functioned as the staging area of an initial colonization have been identified, in which case the two most

~~*immediate* predecessor (the 'parent culture') on the mainland coast presumed to have functioned as the staging area of an initial colonization have been identified, in which case the two most~~ crucial links are missing in a chain of events that is not recognizable as such. Sadly, twelve years of archaeological research on Cyprus and the mainland (and the lack thereof) have not provided the two links. The fact that there is hardly anything of substance to add to the discussion of possible origins is as much a reflection of this state of affairs as of the perspicacity of Stanley Price's treatment of the subject. In any event, the continued absence of clear evidence for cultural development within the Khirokitia Culture as well as for specific links with the mainland means that the only hope for a breakthrough lies in further fieldwork on Cyprus and the adjacent mainland coasts. If and when concrete comparative data become available, their analysis may provide a worthwile dissertation topic. Until then, the new evidence from Akrotiri has provides an opportunity for expanding the colonization issue to related questions rather than deepening our understanding of it in a purely archaeological sense.

At the moment, the early occupation focus on the Akrotiri Peninsula poses more archaeological questions than it answers. The summary of currently available evidence in the preceding chapter makes it clear that Site E and its cultural assemblage are radically different from typical Khirokitia Culture settlements and survey sites. Obvious distinctions can be drawn as concerns site type (rockshelter occupation), site function (specialized activity evidently related to the killing/ butchering/ processing of a non-domesticated Pleistocene relic fauna), degree of sedentism (inferred short-term—perhaps seasonal—occupation), subsistence base (hunting and gathering, with primary reliance on a single source of red meat and supplementary exploitation of marine resources), demography (inferred limitation of group size to the physical constraints of the site, which under current conditions make the presence of more than 15-20 individuals impractical as well as hazardous), and lastly artifacts (an assemblage of portable character devoid of KCU diagnostics such as igneous vessels and idols, penannular pendants, and obsidian). The small groundstone mortar found at the end of the second excavation season in Level 2 in the rear NW part of the shelter (FN 421, N98/E89) gives cause to believe that further implements indicating domestic activities could exist behind the exposed midden area, in which case the last statement may have to be revised.

The unusual features of Site E are matched by an unusual set of ^{14}C determinations (which will be examined in more detail in **CHAPTER 4**, infra). The dates that have so far been obtained are not only remarkably consistent but also remarkably early compared to the remainder of radiometric assays for the early prehistory of the island. Though this circumstance lends welcome

chronological credibility to the material and functional distinctness of the assemblage, it also increases the site's isolation in the Cypriot culture sequence. Far from furnishing the sequence with a recognizably less developed, initial stage of the aceramic Khirokitia Culture, Site E has opened another gap, even bigger than the hiatus that has long foiled attempts at defining the nature of the KCU-SCU transition during the 6th millennium cal BC. Strictly speaking, even the use of the term 'culture sequence' in connection with Site E may be inappropriate, for there is currently nothing to justify the assumption that a) it belongs to a culture in the archaeological sense and b) there is a sequential development from it to the Early Formative cultures beginning with Khirokitia. After all, with Akrotiri separated from the KCU *floruit* by 2,000-2,500 years if calibrated averages are compared—a lacuna longer than the apparent duration of the Khirokitia Culture itself (see **CHAPTER 4**, Table 6 and Fig. 19), there is clearly room for a lengthy developmental stage which may not be consequent to the occupation of Site E at all. Understanding that the latter is previous but not necessarily antecedent to the Khirokitia Culture leads to the realization that either there are more than two missing links between early prehistoric Cyprus and the mainland (and Site E is somewhere in the middle), or there are only two links missing, in which case Site E cannot be one of them (and hence represents a failed colonization episode). The rationale behind this evolutionary arithmetic is that some degree of internal development is plausible for a culture of the spatial and temporal uniformity manifest in most of the KCU sites—corresponding to the link missing on the island—and that there must have been a 'parent culture' in one of the staging areas—corresponding to the missing link on the continent. Now if the position of Akrotiri is considered alongside the likelihood that neither Khirokitia *Vouni* nor the adjacent Kalavasos *Tenta* nor the new western KCU sites contain early components (on grounds of recent excavation results and an assumed E-W expansion of aceramic settlement), the need for investigating more ephemeral aceramic occupations in central and eastern regions becomes evident. To cite two examples (already noted by Stanley Price [1977a, 1977b]), Kataliondas *Kourvellos* (#N/005) may possibly represent an earlier stage unless it is a task site belonging to some unknown mainphase Khirokitia Culture settlement, and Dhali *Agridhi* (#N/002) has produced a small ^{14}C set with the highest average of any KCU site yet.[25] The crux of this linkage is that if a yet-to-be-discovered Early Khirokitia Culture constituted the founder culture, it might be expected to display at least some traits of the coastal parent culture that were not altered beyond recognition by a hypothetical founder effect. The site distribution of such an initial phase would coincide with the 'primary settlement' of the island, whereas the main phase as it

~~altered beyond recognition by a hypothetical founder effect. The site distribution of such an initial phase would coincide with the 'primary settlement' of the island, whereas the main phase as it~~ is currently known mirrors the subsequent expansion leading to 'secondary' or even 'tertiary settlement' (Held 1979:60-63). Alternatively, if this early phase of the Khirokitia Culture did not exibit any close parallels with the mainland coast, it could be inferred that it was in turn preceded by another stage which may link it either to whatever future research will show Akrotiri to be representative of, or to the mainland parent culture. Either way, there would then be two missing links on Cyprus and one on the continent, where further links between the coast and the interior may also be missing. Given the lengthy interval between the KCU *floruit* (ca. 5,700 BC) and the emergence of the Natufian (ca. 10,000 BC), which may be the ultimate ancestor of the Aceramic of Cyprus, there is clearly room for several intermediate stages that are not yet documented in the archaeological record. In schematic form, however, two simple linkeages are adequate for conveying the principle of intermediacy:

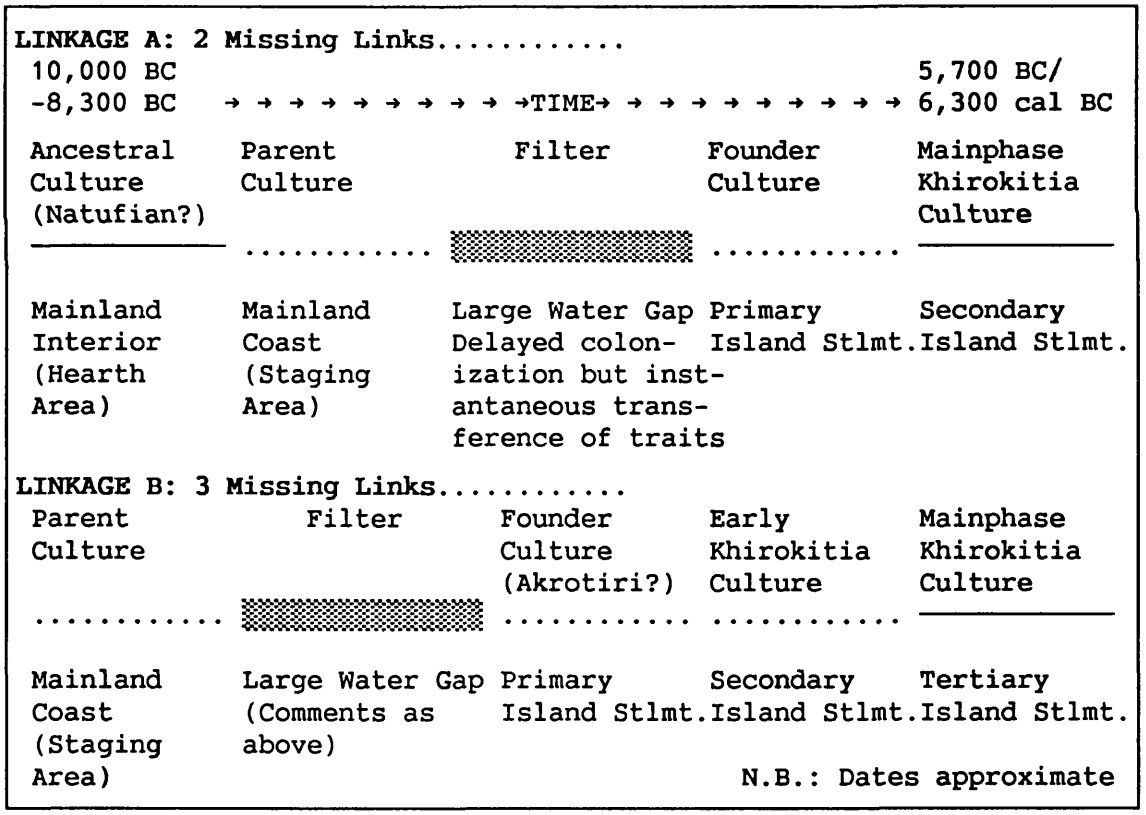


Fig. 14: Hypothesis of Intermediacy in the Derivation of Island Cultures; 2 Linkeage Models Showing Process of Trait Transformation.

The linkeages shown in Fig. 14 make it clear that knowledge of the parent culture is as vital to establishing the origins of the Khirokitia Culture as the identification of the founder culture on the island itself. A resolution of the colonization issue is therefore impossible before the staging areas have been thoroughly investigated, and in this respect prehistorians working on Cyprus are

hindered by the lack of progress in archaeological fieldwork in the crucial regions, i.e. Cilicia (the Northern Staging Area), and Antakya (Hatay) and the coastal plain of northwestern Syria down to the Lebanese border. In Cilicia, the presence, geographic extent, and time depth of a possible Early Holocene occupation besides Maltepe, Sakçagözü, and the well-known sites of Tarsus and Mersin are unknown. This may indicate a real gap in occupation between Antalya to the west and Antakya to the east before the spread of the ceramic neolithic south of the Konya Plain, or it may simply be a reflection of the dearth of systematic fieldwork since Mellaart's survey in the early 1960s. In light of the cultural affinities between the Beldibi in Antalya and the Natufian in the Levant, including lithic and boneworking parallels in the form of geometric microliths and carvings (Mellaart 1975:42, 92-93), it is reasonable to assume that some form of epipaleolithic settlement of the coastal corridor which made the contacts possible did in fact occur. However, the unobtrusive base camps which by analogy with the Natufian are most likely to have been associated with such an occupation may lie buried under massive amounts of Holocene alluvium and below the water table (see n.2, supra). It need only be recalled that the early neolithic levels at Mersin (XXVII-XXXIII) continue through the water table below the present surface of the plain, with pre-pottery levels possibly present further down (Garstang 1953:11) to appreciate the problems that bedevil the search for epipaleolithic sites in the lowlands of the Northern Staging Area. In spite of being known only from a 2x2 m sounding, the early ceramic neolithic occupation at this site has conveniently yielded a ^{14}C date of 6,238±250 BC (LHL) for Level XXXIII (W-617) which would fit neatly into a northern colonization sequence. Yet the presence of rectangular architecture and a distinctive chocolate-colored, burnished ware as well as a shell-impressed and notched facies in a region from which—as the preceding discussion has shown—northern Cyprus was relatively accessible practically rules out Mersin as the possible source of an aceramic island occupation with the attributes of the Khirokitia Culture.

Although it was earlier argued that the question whether Cyprus was colonized from the North or from the East should be disconnected from assumptions about the former distribution of fallow deer, the balance of evidence still points to an origin in the round-house tradition of the Natufian/ early PPNA on the Levantine mainland. This statement reflects the present writer's agreement with the hypothesis of eastern origins put forward by Stanley Price (1976b:274-301, 1977a, 1977b) as well as the continued absence of evidence to contradict it. Conversely, it must be freely admitted that there is still none to confirm it. Recent research has not drastically altered the fabric of early prehistoric cultures in the Fertile Crescent as it was known a decade ago, with the

~~admitted that there is still none to confirm it. Recent research has not drastically altered the fabric of early prehistoric cultures in the Fertile Crescent as it was known a decade ago, with the~~ exception of the cluster of sites that has sprung up around Çayönü, in southeastern Anatolia. Here, Çayönü itself as well as Cafer Höyük, Gritille, and Nevalla Çori have produced aceramic occupations spanning the 8th millennium BC. Although a residual round-house stage probably datable to the preceding late Natufian and to the PPNA has been noted at some sites (e.g. Çayönü and Mureybet IB-III), the architecture of these settlements and nearby Sheikh Hassan is predominantly rectilinear and cellular (the 'cell' and 'grill' plans characteristic of the Upper Euphrates region). Aurenche believes that the transition from curvilinear to rectilinear buildings occurred early in the 8th m.BC in the northern Levant (Aurenche 1981a, 1981b, 1982), which would have to be regarded as a terminus ante quem for the population movements leading to the colonization of Cyprus if architecture constituted the hallmark of cultural identity. Recent survey work along the Sajour and Oueiq rivers (Matthers 1981; Sanlaville 1985) have demonstrated the existence of a cultural continuum in northern Syria from the Pleistocene/ Holocene boundary down to the 6th m.BC, making the region between the Euphrates River and the Amuq Plain an obvious candidate for a putative 'hearth area' as far as the colonization of Cyprus is concerned. On the other hand, maritime Lebanon forms a coastal corridor that could have served as a migration route to the eastern staging area from the southern Levant, and anatomical comparisons of the skeletal material from Khirokitia with that of the submerged PPNB settlement at Atlit-Yam (Galili 1987; Galili and Weinstein-Evron 1985; Galili, Kaufman, and Weinstein-Evron 1988; Galili, Weinstein-Evron, and Ronen 1988) have reportedly evidenced close similarities in cranial morphology between the two populations (Galili et al. 1989; I. Hershkovitz, pers. comm. 1988). However, the hypothesis of genetic origins of the Khirokitia stock in the southern Levant requires further testing; two ^{14}C determinations for Atlit-Yam are sufficiently early to support the contention of a southern derivation (6,434±120 BC [LHL, RT-707] and 6,290±90 BC [LHL, Pta-3972]), yet the transition to rectangular house-form had already been made. As elsewhere in the Levant, clear technological, ritual, and artistic parallels are lacking in the assemblages of Atlit-Yam and other submerged sites off the Carmel coast. To cite two additional examples in the interior, excavations at 'Ain Ghazal (Rollefson 1984; Rollefson and Simmons 1984; Simmons and Rollefson 1984; Simmons et al. 1988) have revealed cellular rectangular architecture, a chipped-stone industry in which points and burins form major components, a rich tradition of plastic art, and a mortuary ritual involving skull-caching which was also practiced at Çayönü (Çambel 1985:187). Further, investigations at PPNB Wadi el-Jilat 7 in the Azraq Basin (Garrard et al. 1986:17-23) have yielded fresh evidence for the widespread distribution of diagnostic grooved stones in the late 8th-early 7th

m.BC. These flat, elongated objects, which are also present at northern sites such as Çayönü (Braidwood and Braidwood 1982:144-145, Figs. 3.12-3.13) are marked by straight grooves with angular as well as round cross sections so that their function is debatable. If they represent shaft-straighteners, their absence from KCU lithic industry must be viewed as an adjunct to the almost total lack of projectile points on Cyprus (see below). It is important to note that some of the salient Levantine traits absent from Cyprus, such as rectangular building plans, arrowheads, and the ritual of posthumous skull embellishment and caching, did not emerge until the PPNA (Mellaart 1975:37-55; Moore 1982:2-9) so that their failure to reach the island could be taken to indicate an early (i.e., Natufian/ early PPNA) separation of the Khirokitia Culture's 'parent' from its hearth area. In this case, post-Pleistocene settlement of the Eastern Staging Area could be expected to date back to the earlier part of the 8th millennium BC. For the time being, preceramic occupation of the coastal lowlands between the Jebel Alaouite and the Mediterranean Sea is attested only for the 7th m.BC: at Ras Shamra, where basal levels with rectilinear architecture belong to the PPNB (6,665±100 [LHL, P-460, Level Vc:1] and 6,436±100 [LHL, P-459, Level Vc:2]), and at PPNB Yanoudhieh and Slenfé in the piedmont of the coastal range, whose architecture is not known.

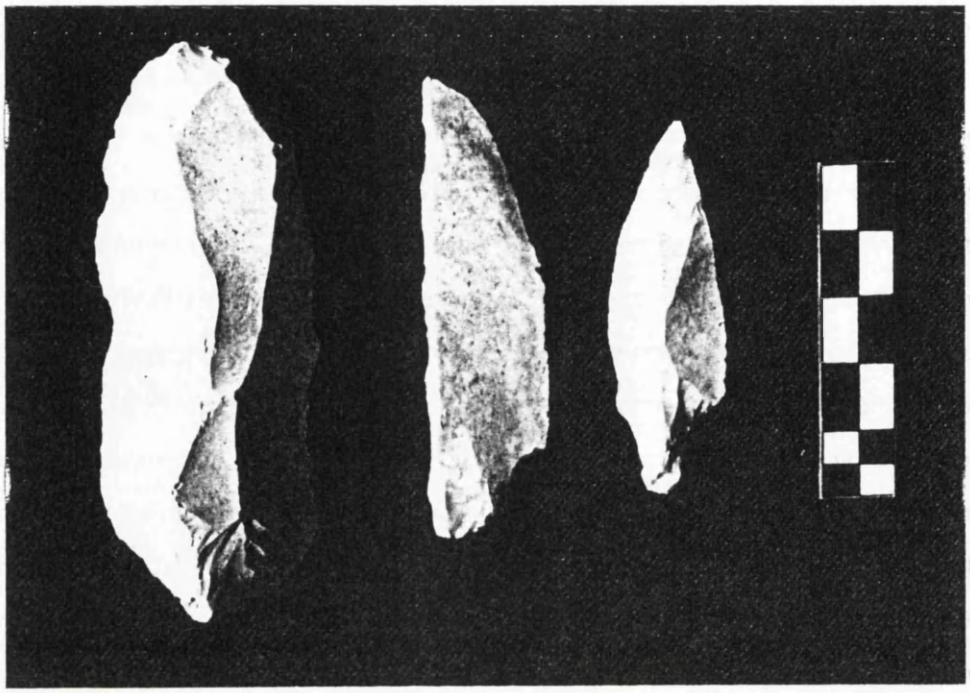
As long as there is no reliable information from systematic surveys, the absence of 9th and 8th m.BC sites in the Eastern Staging Area may simply reflect a sample bias towards a few large late prehistoric sites opposite Cyprus whose deep stratigraphy has led to the accidental discovery of early neolithic occupations in basal levels (e.g. Ras Shamra, Byblos, and Mersin). If this is the case, the following colonization hypothesis can be formulated:

H$_1$: The 'parent culture' of the founder population on Cyprus migrated from interior North Syria to the coast during the Natufian or early PPNA (late 9th-early 8th m.BC), establishing sites in the Eastern Staging Area which remain to be discovered. Following colonization of the island, this culture ultimately evolved into the mainphase Khirokitia Culture, a process involving one or more transitional stages on Cyprus and possibly including an 'Akrotiri Phase.'

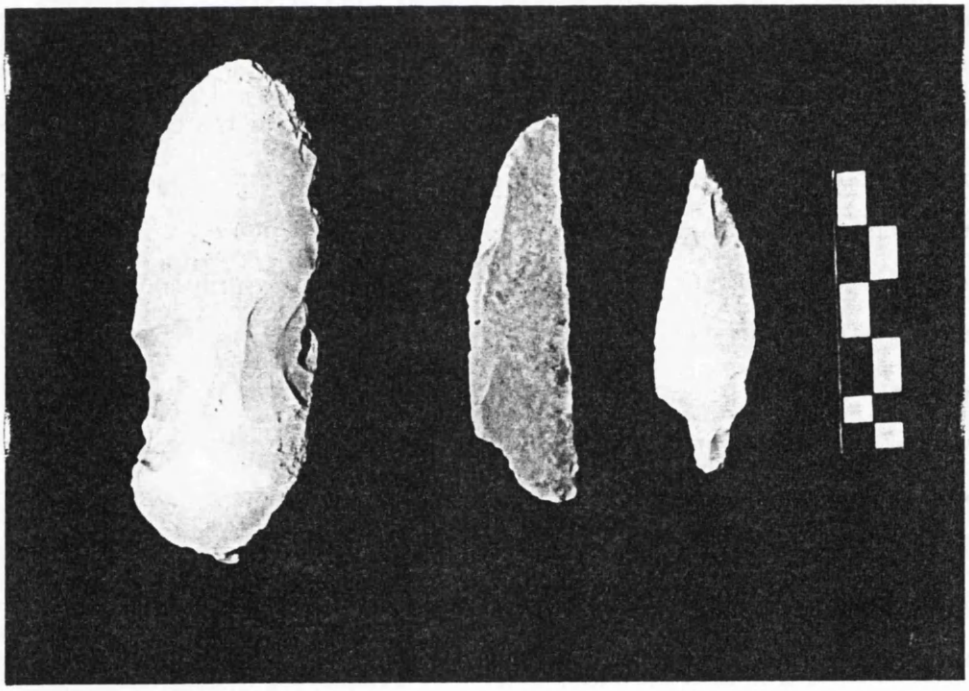
The implications of this scenario are as follows: Certain traits of the Natufian/ early PPNA ancestral culture were lost in transmission (microliths, fine bonework, red-ocher burials) either prior or subsequent to the colonization episode; others were transferred and elaborated on the island (curvilinear building tradition and groundstone vessel industry), or transferred and transformed (burial rites surrounding the heads of the deceased, with skull detachment not yet widespread

~~(curvilinear building tradition and groundstone vessel industry), or tranferred and transformed (burial rites surrounding the heads of the deceased, with skull detachment not yet widespread~~ on the mainland and practiced only once at Khirokitia *Vouni* [Dikaios 1953:96, 214-222, 228-231]). The spread of plant domestication and subsistence agriculture late in the PPNA period reached the Eastern Staging and led to the introduction of cultivars to Cyprus, either during the initial colonization or by means of subsequent contacts, reducing the dependence on hunting (deer, dwarf elephant and pygmy hippo?) and gathering. At that time the technique of building with mudbricks and pisé may also have been transmitted. A further expansion of the subsistence base occurred during the 7th m.BC with the introduction of domesticated animals (sheep/ goat and pig, but not the larger cattle present at aceramic Ras Shamra). The presence of a few recognizable late 7th/early 6th-m.BC Levantine traits and raw materials (attempts at ceramic manufacture at aceramic Khirokitia *Vouni* [Dikaios 1953:265-266, and Fig. 105], incised stones, the 'butterfly bead' from Khirokitia *Vouni* [Dikaios 1953:306], and very limited amounts of carnelian [from the southern Levant?] and Çiftlik obsidian [from south-central Anatolia]) would have arisen from increasing contacts between Cyprus and the mainland coast during the PPNB.

By far the most diagnostic Levantine artifact is a projectile point from Akrotiri *Vounarouthkia ton Lamnion* East (**APPENDIX 1**, #S/355, infra; see also Swiny 1988:10-11). Located in 1980, this site consists of a small surface scatter of *Monodonta turbinata* Born; a small number of unmodified limestone pebbles; several weathered and sometimes heat-fractured igneous pebbles without signs of grinding, polishing, pecking, or pounding; two igneous pounders; an admixture of Byzantine sherds; and a small quantity of chipped stone. In the last category, recognizable implements are represented by several scrapers, a tanged knife on a backed blade, and the point (Fig. 15, infra). Projectile points are rare but not completely lacking in the EP period: a tanged and 'fluted' example with coarse edge retouch is known from Khirokitia (Dikaios 1953:LXXXVI/908); a smaller, symetrical point with a stubby tang, obverse flat invasive retouch and continuous inverse edge retouch was found at Karavas *Vounarin tous Loies* (*BCH* 84:298, Fig. 77; 299; for both specimen see also Buchholz and Karageorghis 1973:169, 497, #1830 and #1831); a tanged point with coarse bifacial edge retouch on the left side and another point with obverse edge retouch come from Rizokarpaso *Cape Andreas Kastros* (Le Brun 1981a:141, Fig. 25/5-6); and a small but very interesting group of snapped, notched flakes with discontinuous obverse edge retouch from a hill between Amathus and the village of Parekklisha may represent former points (*BCH* 102:973, Fig. 45/2007.2,3,4,6,8,9), whereas a 'point' found on the north side



DORSAL



VENTRAL

Fig. 15: Chipped-Stone Implements from Akrotiri *Vounarouthkia ton Lamnion* E (Photographs by S. Swiny).

of the northern necropolis of Amathus looks more like an axe (ibid, #2018.1).[26] This small Cypriot assemblage can be distinguished from the common arrowhead types of Syria and Palestine by a number of negative attributes; namely, a general lack of blade symmetry, the absence of long blades struck from naviform/ bipolar cores (which are unknown on the island), the absence of symmetrical notches, well-shaped tangs, and barbs, as well as the absence of squamous pressure flaking and lack of well-controlled, fine, flat retouch and stepped edge retouch, and not least the lack of heat treatment—all of which add up to a rather careless or unsophisticated manufacturing technique. Here the Akrotiri point stands out. The raw material is a glossy, mottled Lefkara chert of grayish orange-buff color which was also used to fashion the knife and a possible second point of the same type found ca. 70 m seawards of the main concentration. The blade was pointed through bifacial retouch on the distal end and tanged in the same way on the proximal end. The laurel-leaf shaped blade is ca. 5 cm long and slightly asymmetrical on the right distal end. On the same side of the proximal end, the tang flares into a rounded shoulder. Although the point was originally compared to a Jericho type by Ronen, on subsequent examination the present writer came to the conclusion that these attributes were more characteristic of Byblos points, primarily on the basis of the shape of the tang and shoulder (Held 1983:232). Although the Akrotiri specimen is reminiscent rather than characteristic of this type, it certainly does not feature the elongated tang and straight-sided or barbed shoulders of Jericho points (e.g. Bar-Yosef 1981b:560, Fig. 2). Byblos points occur in recognizable form as early as ca. 7,600 BC at Mureybet IVA and were widely distributed in the early-middle PPNB in Syria and Palestine (e.g. Çayönü, Mollah Assaad, Tell Aswad IB and II, Munhata, Jericho, Beidha, Nahal Divshon) and continued through late PPNB (e.g. Bouqras, El Kowm sites, and Abu Hureyra) into the Early and Middle Neolithic of Byblos on the Lebanese coast (Bar-Yosef 1981b; Braidwood and Braidwood 1982; Cauvin, J. 1968, 1979, 1981a; Cauvin, M.-C. 1974b; Sanlaville 1985), and perhaps the closest parallels are found at Late Neolithic Jericho and Munhata (ca. 4,500-3,750 BC., Moore 1973:49, Fig. 4/7-9; 63-64), so that a precise chronological and regional correlation between the Akrotiri find and the mainland is not possible. However, the typological parallel proposed here would place the site well after Akrotiri *Aetokremnos*, and since there is currently no reason to suspect a connection between the two sites despite their proximity (1.4 km), the intriguing finds at *Vounarouthkia ton Lamnion* East must, for the moment, be regarded as a coincidence. In order to clarify the chonological relationship of the two sites, efforts are underway to obtain a shell date on a *Monodonta* sample from the surface site.

In contrast to the first hypothesis, Stanley Price's model attempts to explain the similarities and

dissimilarities between the mainphase Khirokitia Culture and the Levant entirely within the framework of late 7th/early 6th-m.BC developments:

H$_2$: The initial colonization of Cyprus occurred during the 7th millennium BC and the founder population (presumably represented by an early stage of the Khirokitia Culture) is therefore derived from the PPNB. Population movements leading to the settlement of the Eastern Staging Area conceivably proceeded northwards along the Levantine coast, a diffusion which is reflected in a string of coastal settlements extending from Atlit-Yam in the south to Tell Sukas and Ras Shamra in the north.

The implications of the second hypothesis are relatively straightforward. Less allowance is made for transitional phases leading up to and following the colonization episode, with the consequence that greater emphasis must be placed on the operativeness of the founder effect in order to account for cultural divergence on Cyprus. Accordingly, the architectural tradition of the island is seen as representing an involution from a more complex rectilinear to a simpler curvilinear settlement morphology, unless it was linked directly to a survival of the more archaic round-house tradition in the southern Levant during PPNB (still one of the most specific parallels exists between the compartmentalized buildings in the Jordan Valley at Munhata 3 and Cyprus, primarily the Structure 14 complex at Kalavasos *Tenta* 2 [see **Map K**, infra], but also Structures 537 and 578 at Rizokarpaso *Cape Andreas Kastros* [Levels VI and V] and Structure 111 at Khirokitia *Vouni* [Level IA]).[27] Cultivars, an entourage of domesticated animals, and all artifactual and mortuary parallels cited above were introduced simultaneously, rather than successively as envisaged by the preceding hypothesis.

While the two models just outlined are differentiated by their respective processual and chronological characteristics, and possibly also by their assumptions of a northern vs. a southern origin of the first colonists, they share two paramount aspects of the colonization issue in general. One—as already mentioned—is the postulation of Levantine as opposed to Anatolian origins. If Cyprus was colonized from the much less distant Northern Staging Area it would mean that Cilicia, as has often been suggested, was an integral part of the Levantine interaction sphere during the Early Holocene, for there are presently no signs of an initial link between Cyprus and the Anatolian plateau north of the Taurus Range.[28] The second aspect is that in either case the process of colonization, including the prerequisite settlement of the Eastern Staging Area, can be correlated with an episode of climatic deterioration, during which desiccation entailed a contraction of the Near Eastern woodlands towards the humid maritime regions of the northern

contraction of the Near Eastern woodlands towards the humid maritime regions of the northern Levant as well as concomitant faunal changes and a shift in settlement patterns (Bottema and van Zeist 1981; Davis 1981, 1982, 1983; Henry 1981, 1982, 1986; Henry and Turnbull 1985; Stanley Price 1977a, 1977b; van Zeist and Bottema 1982; van Zeist and Woldring 1950). Although largely conjectural, this correlation provides a credible cause for the beginning of sea-faring in the East Mediterranean because it posits that instead of being an inexplicable chance event, the decision to venture across 100 km of open water was the inevitable outcome of changing biogeographic conditions and a wider pattern of post-Pleistocene adaptions.

Finally, if Pleistocene herbivores arrived by swimming, micromammals on vegetation islands and natural rafts, and bats by flying, what means of transport did Early Holocene humans use to reach the island? This may seem an idle question given the obviously limited variety of watercraft which can be produced at a low level of technology and the undeniable fact that by hook or by crook the first colonists made the crossing (see Cherry 1985:21-23 for a summary discussion). In theory, a successful colonization episode only required one fertile couple to assemble some primitive aquatic machine on which to drift across to Cyprus; a computer simulation of Pacific founder populations has demonstrated a 75% chance of survival and population growth for a colonizing group consisting of one male and two females (McArthur 1976; McArthur et al. 1976; cf. Black 1978). However, in light of the introduction of animals and a relatively diversified tool kit including mainland raw materials, it is plausible that larger groups, several craft, and a number of crossings were involved. Knowing the type of craft would permit inferences about the degree of maritime adaption by the colonists, the frequency of contacts, and the feasibility of transporting larger animals such as deer and cattle (if the craft were robust enough to carry deer, why were cattle—which are present at aceramic Ras Shamra—not also imported?). Unfortunately, there is no direct evidence for boat-building in the Mediterranean prior to the 3rd millennium BC, either in the form of actual remains such as the two royal ships of Cheops, models and pictorial representations such as the Cycladic longships, or in hieroglyphic writing such as that inscribed on the later Phaestos Disc (MM III, late 17th c.BC) and found in Egypt from the Old Kingdom onwards. By that time metallurgy provided a means of producing efficient woodworking tools for the complicated joinery necessary to build plank hulls. By contrast, in the stone age technology of the previous millennia, ground and polished igneous adzes and bone needles could have been used to make dugouts and skin-boats, such as are known from many pre-contact societies, e.g. the Inuit *umiak* and the outrigger canoes of the Pacific islanders. Both types exemplify the refinement of a particular technique over many centuries if not millennia, and the watercraft used

in the Pleistocene colonization of Sahul and western Micronesia and in the terminal Pleistocene/ Early Holocene exploitation of Mediterranean obsidian sources (Camps 1976; Perlès 1979) may well have been so primitive as to restrict maritime dispersal to the modest scale outlined in Section 2. In one of several recent studies of prehistoric watercraft in the Mediterranean, Johnstone (1980:55-84) considers boats or rafts constructed of reed bundles more likely than other primitive types such as dugouts, basket boats and skin boats, and clay-pot rafts, citing the ease of construction, the ready availability of raw materials, relative stability, and the existence of an indigenous reed-boat tradition in the central and western Mediterranean (Johnstone 1980:58-60). Such a tradition also existed in Mesopotamia, where it has survived into the present century. The reed-bundle boats used until recently by the oyster fishermen of Corfu are said to be surprisingly seaworthy and capable of carrying considerable loads (C. Perlès, pers. comm. 1988). Reed-bundle craft are heavier than skin boats, which would have reduced the risk of being blown off course by the prevailing westerlies and southwesterlies during a crossing from the Levant to Cyprus. As was pointed out while discussing the island's configuration, a certain degree of navigability was required for watercraft to reach the relatively small target which the island forms towards the east. Reeds are a typical component of riparian, lacustrine, and lagoonal hydrophile plant societies on Cyprus and the adjacent continent, occurring, often abundantly, in an azonal distribution pattern along streams and in supralittoral locations. Fragments of burnt roofing material with plant impressions at Khirokitia *Vouni* (Le Brun 1983:67, Pl. II/2-3; 1984b:70, Pl. IV/1-2; Le Brun et al. 1987:292, Fig. 9) testify to the use of reeds (*Phragmites australis*?) in early prehistoric settlements on the island, and bundles could have been tied together with ropes of bog rush (*Schoenus nigricans*) and flax (*Linum bienne/ Linum usitatissimum*), the remains of which have been found at aceramic Kalavasos *Tenta* (bog rush, see Hansen in Todd 1978b:184), aceramic Rizokarpaso *Cape Andreas Kastros* (flax, van Zeist 1981:98-99), and ceramic Ayios Epiktitos *Vrysi* (flax, Kyllo 1982:92, Table 10). In the Eastern Staging Area, flax is attested in aceramic and later 'neolithic' levels at Ras Shamra (van Zeist and Bakker-Heeres 1986:160). Another possible sign of the early use of watercraft on Cyprus is an unusual aceramic example of the widespread 'Bronze Age' stone anchors, which formed part of a grinding installation at Khirokitia *Vouni* (Frost in Le Brun 1984b:125-126, and Fig.77, Pls. XIII/3, XXX). Although it cannot be said with certainty that the object was used for this purpose, if it were indeed an anchor it would furnish the most tangible evidence yet for Early Holocene seafaring in the East Mediterranean basin.

NOTES ON CHAPTER 2

1. For detailed recent summaries of the tectonics and geophysics of the Mediterranean basin, see Hsü (1977) and Lort (1977).
2. This is almost certainly an optimistic estimate based on present-day shelf topography. Continental-shelf sedimentation is a dynamic process involving the continuous deposition of terrigenous sediment, mud dispersal by ocean currents over considerable distances, and constant reworking by oceanographic processes (Evans 1981:339-341). The presence of several large rivers draining the heavily eroded Amanus and Taurus ranges and emptying into the northeastern Mediterranean basin (e.g., the Orontes, Ceyhan, and Seyhan) is responsible for adding substantial amounts of unconsolidated sediment to the shelf and sea floor opposite Cyprus (Stanley 1977:80-81, Fig. 1; Wong and Zarudski 1969, Wong et al. 1971), and Erinç has concluded that rapid development of deltas and deltaic fills has caused a dramatic transformation of the Cilician coast during post-glacial times (1978:99-101). Since tidal forces in the Mediterranean are weak and the Syro-Turkish shelf lies in the wave shadow of Cyprus, it is likely that neritic progradation is checked only partially by tidal and storm currents and that added mass has resulted in a thickening and perhaps also widening of the shelf in Recent times. If true, this in turn leads to the conclusion that the 120-m isobath used in determining coastlines during the Würm pleniglacial may have been a little closer to the present shoreline that it is now.
3. Active and passive (as opposed to parasitic) dispersal mechanisms can be divided into four broad categories: 'Aquatic dispersal' denotes expansion on the surface of water bodies and normally applies to terrestrial vertebrates and the buoyant fruit and seeds of certain plants, such as the successful Hawaiian colonists *Scaevola sericea* and *Erythrina* (Cox et al. 1973:104); it contrasts with 'terrestrial dispersal,' 'marine dispersal' (involving all forms of marine life), and 'aerial dispersal' (winged mammals, birds, insects, and most plant seeds). The terms 'continental dispersal' and 'maritime dispersal,' on the other hand, are used in reference to the environments in which dispersals take place. Thus avifaunal island colonizations involve maritime aerial dispersal.
4. The view of Cyprus which Schaeffer (1936:2, n.1) reported from the coast at Ras Shamra at sunset must have been the backlighted peaks of eastern Pentadaktylos, since most of the panhandle and the shore of Famagusta Bay would have been well below the horizon.

5. The 'dip range' of an island is the distance at which its highest point dips below the sea horizon, or, conversely, the range at which an object at sea becomes visible. Dip ranges are based on target heights facing the approach of potential colonists and can be calculated using the following formula: $R = 1.852(2.08h)+4.5$, where R is the range in kilometers and h is the target height in meters. Eye level of the observer is assumed to be 1.5 m above sea level. Since dip ranges also assume unrestricted visibility, the greater their overlap with the observer's position, the more likely he is to see the target under adverse atmospheric conditions. See Schüle (1970:458) for a slightly different formula that yields dip ranges from the water level rather than eye level.

   Information in Tables 2 and 3 is based on topographic data from *Rand McNally, The International Atlas* (Rand McNally, Chicago, 1969), various National Geographic Society regional maps, the *Operational Navigation Chart* (1:1,000,000, Defense Mapping Agency, Aerospace Center, St. Louis AFS, MO 63118, rev. 1979), and IBCM 1981 (see **MAP REFERENCES CITED**, infra).

6. The animals in question are mainly proboscideans (*Elephas*, *Palaeoloxodon*, *Stegodon*, *Mastodon*), and ruminant (*Cervidae*) and non-ruminant (*Hippopotamus*, *Hexaprotodon*, *Phanourios*) artiodactyls.

7. The fallacy, if committed, would take the form:

   H: More technologically advanced groups colonize earlier and/or farther than less advanced groups.

   I: If a certain group *X* is observed to colonize earlier and/or farther than another group *Y*, then *X* is more technologically advanced than *Y*.

   Hence,

   If *H* is true, then so is *I*.

   (As the evidence shows) *I* is true.

   H is true.

   Even if specific conditions are imposed on the test implication *I*, e.g., that only contemporaneous populations in the same region and inhabiting similar coastal environments may be compared, hypothesis *H* in its present form is likely to be wrong, due to numerous contributing factors of dispersal rates that have nothing to do with technology.

8. That Melanesia represents an early focus of *H. sapiens sapiens* is beginning to emerge

through recent ^{14}C-dated occupations (Allen et al. 1988; Gowlett 1987; Wickler and Spriggs 1988), and archaeologists working in the region consequently point out that the evidence for Pleistocene settlement there stands up to scrutiny much better than for man's early entry into the Americas (e.g., Groube and Pernetta 1989), where recent claims for late Pleistocene occupations at Pikimachay in Peru (ca. 22,000 BP), Boqueirao da Pedra Furada in central Brazil (ca. 32,000 BP) and Monte Verde in Chile (ca. 33,000 BP) need to be backed up with corroborative dates.

9. For a critical discussion of Honea's controversial Kithnos material, see Cherry (1979:28-32, also briefly in 1981:44).

10. The prehistoric sequence at Tabon Cave on west-central Palawan is not considered here, since the island is geographically closer to northern Borneo than to the central Philippines, to which it forms a natural migration corridor.

11. The coastal colonization of the Aleutian chain, which recent archaeological research shows to have started at about the same time (Aigner and Del Bene [1982] in Keegan and Diamond 1987), involves shorter distances and more accessible targets except to get to the outer Aleutians (from Kiska to Shemya via Buldir). Similarly, neither the diffusion of the Hoabinhian and flake-blade complexes throughout island Southeast Asia nor the possible introduction of ceramics to Japan in the Initial Jomon, both developments occurring sometime in the Final Pleistocene/Early Holocene, would have required the crossing of equally forbidding water barriers. Evidence that man reached the Greater Antilles as early as the 6th millennium BC so far consists only of typological comparisons involving a Casimiroid series of Lithic Age complexes on Hispaniola; the first ^{14}C-dated assemblage on the island belongs to the late 4th/early 3rd millennium BC (Rouse and Allaire 1978:465).

12. Since the paucity of the Late Quaternary terrestrial fauna of Cyprus provides one of the best biogeographic indicators of its long isolation, any observable diachronic increase in species diversity might be expected to occur during the course of human settlement as the result of intentional or unintentional import. This model would be severely weakened by the identification of three additional ungulates in early prehistoric deposits such as was claimed by Schwartz (1973, 1974a, 1974b), who not only asserted that Red Deer (*Cervus elaphus*), Roe Deer (*Capreolus capreolus*), Gazelle (*Gazella gazella*), and even *Equus* sp. were present from the Early-Middle Holocene onwards (and that *Cervus* was found along with *Dama* at Dhali *Agridhi* [#N/002], Khirokitia *Vouni* [#R/063], and in a surface collection

made at Kataliondas *Kourvellos* [#N/005] by Stanley Price [1972a]), but also suggested that the putative *Cervus* and *Dama* remains he had studied showed evidence of dwarfism and that the former species colonized the island during Hsü's Miocene desiccation. However, none of these claims have been confirmed by subsequent faunal analyses (see Watson et al. [1977:246] for a rebuttal). Schwartz's report of a size decrease from the mainland to the Cypriot *Dama* populations is unfounded and arose from a mistranslation of Ducos's observation that diachronic changes in the frequency of *Dama* remains in archaeological assemblages "semblent indiquer que *le statut* du Daim s'est trouvé modifié à partir du 4° millénaire, c'est-à-dire en même temps qu'apparaissait la céramique" (Ducos 1965:5, emphasis added). As a matter of fact, the study by Ducos did reveal osteological signs of possibly evolutionary dimorphism in which he saw evidence for a population isolate, but these consisted of a greater uniformity of the proximal antler morphology in his Cypriot sample compared to an Iranian sample and did not extend to the post-cranial skeleton (Ducos 1965:4). The Persian Fallow Deer of Cyprus is not dwarfed, and its status as the sole deer species represented in early prehistoric assemblages on the island is being strengthened by recent faunal studies (see Carter 1989; Croft 1982:61, 1989a, 1989b). Red Deer has so far been reliably reported only from Kalopsidha *Tsaoudhi Chiftlik* (Gjevall, N.-G., 1966, "Osteological Investigations of Human and Animal Bone Fragments from Kalopsidha," in Åström 1966:128-132) and Kition (Nobis, G., and E. von Lehmann, 1979, "Ein Geweihstück vom Rothirsch, *Cervus elaphus* Linné, 1758, aus Kition, Zypern," *Säugetierkundliche Mitteilungen* 27(2):158-160), which supports the argument that if these remains represent live animals, cervids other than *Dama* were probably introduced by man along with large domesticates like cattle and horse from the 'prehistoric Bronze Age' onwards.

Another, non-biogeographic, aspect of the species-diversity issue is the marked dearth of representational references to either domesticated or wild animals in the EP cultures of the island, even though artistic expression in the form of vessel decoration, murals and especially statuary attests to a steady expansion of the ideational system and the use of symbols from the aceramic Khirokitia Culture onwards. In contrast to the available subsistence data, neither wild nor domesticated animals seem to have loomed as large in the imagery of early settlers as the human form. Only four zoomorphic figurines have been recorded in contexts earlier than the 'Bronze Age'; all consist of the familiar local igneous

ground stone, and none resembles a deer. The first was excavated at Khirokitia and represents the protome of a long-necked nondescript animal which Dikaios interpreted as a lioness or tiger but which, in light of the presence of *Felis silvestris/lybica* in the faunal inventory of the site, could be a crude representation of a domestic cat (Buchholz and Karageorghis 1973:464, #1692; Dikaios 1953:365, #561, Pl. XCVII, CXLIII, 1962:48, Fig. 25/561, Pl. 14/3). The second, from Tholos LXVII at the same site, is also a protome of what bears a faint resemblance to a woolly sheep's head (Buchholz and Karageorghis 1973:464, #1691; Dikaios 1953:186, #1252, Pl. XCVII, CXLIII, 1962:48, Fig. 25/1252). Since ovicaprids are well represented in the faunal assemblages of Early Formative settlement sites, it is not surprising that two recently published figurines—probably but not certainly of aceramic date—also and less doubtfully seem to depict sheep, particularly the fat-tailed variety that remains ubiquitous on the island today. One comes from Mari *Mesovouni* (#R/065), a surface-collected hilltop site located by the VVP in 1978, with KCU and SCU components (#CM.1978/XII-19/1; *ARDA 1978*:Fig. 27), and consists of the entire body of a quadruped with stubby legs, a flattened back, and pecked sides. The head is missing. The other is a much smaller but noticeably finer specimen of the same type (#CM.W.19; Flourentzos 1988:Pl. D/5; see frontispiece, **APPENDIX 1**, infra). This unprovenanced figurine, which is intact except for a few recent scratches and nicks and was probably accessioned by the Cyprus Museum some time before 1920 (P. Flourentzos, pers. comm. 1989), shows an animal much like the previous object, yet in this case with lowered neck and intact head featuring an incised mouth in the unmistakable posture of a grazing animal. The exceptional quality of this piece, which rivals that of Early Cypriot clay zoomorphs, underlines the elusiveness of animal images that would flesh out the bones so abundant in the early prehistoric record.

13. Other components of the Holocene fauna of Cyprus, such as the amphibians, reptiles, and terrestrial gastropods, require further study before a composite zoogeographical profile can be drawn. A large viper and a grass snake have been identified at Akrotiri Site E. Remains of Green Toad (*Bufo viridis*), a colubrid (*C. jugularis*?, Large Whip Snake), Schneider's Skink (*Eumeces schneideri*), and Agama Lizard (*Agama stellio*) were found in the aceramic levels of the 1972 sounding at Khirokitia *Vouni*, and Arnold, who analyzed the assemblage, emphasizes the complete absence of endemicity in the island's modern inventory of ca. 21 reptilian and three amphibious species, a situation matching the

generally low level of endemicity which characterizes these types of fauna on all Mediterranean islands except Corsica and Sardinia (Watson et al. 1977:236-238). This author plays down the role of humans in the introduction to Cyprus of the reptilian species represented at Khirokitia, arguing instead for an independent colonization by swimming or rafting. The ecology and biogeography of the malacofauna of Cyprus and the neighboring mainland are the subject of a current project by a group of Dutch biologists (Ze'ev Bar, pers. comm. 1989).

14. A claim for the discovery of new sites in northern Cyprus was recently made in a poster presentation by Bromage, Dreghorn, and Erojoment at the International Conference 'Early Man in Island Environments' (Oliena, Sardinia, September 25-October 2, 1988). Regrettably, the authors were unavailable for comment, and an earlier personal communication with the writer by W. Dreghorn omitted any reference to such sites, so that the nature of these explorations, said to have begun in 1987, cannot at present be ascertained.

15. Contra Kuss (1973), who cites further occurrences of Pleistocene cervids on Rhodes, Amorgos, and Kos, considers the cervids of Karpathos, Kasos, and possibly Amorgos as being autochthonous, and generally disagrees with Sondaar, Dermitzakis, and others on the mechanism of faunal dispersal in the Aegean during the early Quaternary.

16. A **land bridge route** without physical or ecological obstacles eventually results in the transference of the mainland fauna in a staging area to a continental island. In this way the island acquires a balanced mainland fauna, including terrestrial carnivores, whose continued genetic links with the mainland prevent the development of endemic forms. After the island becomes detached, clines or a low degree of endemism may develop but species diversity parallels that of the parent community. A **filter bridge** or **filter route** is a land bridge, a chain of stepping-stone islands, tidal flats, or any other continuous or discontinuous physical link that can be passed by some mainland species but not by others. Species unfit, for a variety of reasons, to take advantage of the existence of this type of route are therefore 'filtered out' from the dispersal process and will not be represented in the island fauna. In this case, the latter is impoverished but balanced, with a greater likelihood of limited endemism at the specific level. A **sweepstake route** involves larger water barriers that effectively prevent most species present in a staging area from colonizing an oceanic island. Species for which crossings are probable may colonize the island through active dispersal and maintain tenuous links with their founder populations

by means of later arrivals, in which case endemic evolution may be very slow or impossible. Species for which crossings are only just possible may colonize through passive dispersal on rare occasions and are therefore more likely to become completely isolated and evolve into endemic forms. Consequently, the island fauna is impoverished, unbalanced, and endemic in direct proportion to its isolation from the mainland. In this case, endemism often extends to the generic level. A **commuter route**, as the name connotes, exists when a fairly regular interchange between mainland and island populations is possible for some components of the fauna but not for others. The commuter species easily crosses the water barrier and in doing so maintains genetic links with the mainland, yet the same crossing is improbable for other species. This situation leads to mixed impoverished island faunas comprising both exemic and endemic elements.

17. For evidence that Cilicia and the Hatay were not stripped of their extensive evergreen forests until the Industrial Revolution, see Meiggs (1982:394-395).

18. Order *Proboscidea*, family *Elephantidae*. The most developed branch of a group of mammals that can be traced back to the Eocene *Moeritherium* of Egypt. Widespread and diversified during the Pleistocene, but in the Holocene represented by only two geographically restricted relic genera with one species each, *Loxodonta africana* (African form) and *Elephas maximus* (Indian form). Largest living terrestrial mammals, with weight ranging from 5 tons (Indian) to 5-7.5 tons (African) and heights from 230-300 cm (Indian) to 300-400 cm (African). Sympatric herd animal with a well-developed social structure and communication. Wide ecological range up to altitudes of 5,000 m asl. Herbivorous, with relatively inefficient digestive system. Slow metabolism; good sensory perception, particularly sense of smell and sense of hearing. Slow reproductive rate; cows reach sexual maturity between 9-12 years and have a gestation period of 20-22 months, but remain fertile until death. Single births. Average life expectancy for wild specimens ca. 35 years. References: Altevogt et al. 1972; Clutton-Brock 1981; Kurtén 1968; Maglio 1975.

19. Order *Artiodactyla*, family *Hippopotamidae*. Like the elephants, a typically Quaternary mammal probably descended from the Pliocene anthracotheres. Two surviving genera in Africa with one species each: *Hippopotamus amphibius* and *Hexaprotodon liberiensis*. Pleistocene distribution covered most of Europe and extended to island SE Asia. The only aquatic genus among artiodactyls, the large hippopotamus is one of the largest living terrestrial mammals. Weight up to 3.2 tons and height reaching 165 cm; the West African

forest hippopotamus weighs in at 180-260 kg and stands between 77-83 cm tall. The large hippo is a sympatric herd animal that shares habitats with rhinos, elephants, and other non-amphibious mammals, whereas the elusive forest hippo seems much more solitary. Of particular interest to the present study are observations of captive hippos and elephants interacting with each other. Both hippo species are strongly territorial and markedly sedentary. *H. liberiensis* has a very limited ecological range in a jungle biotope, *H. amphibius* has a wider range up to 2,000 m asl that is now confined mainly to equatorial regions. Herbivorous (incl. hygrophytes, grass, and low-growing foliage), with a very efficient digestive system based on a multi-chambered stomach and intestines longer than those of elephants. Good olfactory and optical perception, with sensory organs adapted to aquatic way of life. Four-toed foot structure, unique among artiodactyls, results in surprisingly good land locomotion, including running and climbing. Cows reach sexual maturity after 4-5 years (small hippo) and ca. 9 years (large hippo) and remain fertile until old age. Average gestation periods of ca. 6-7 months (small hippo) and 8 months (large hippo) have been recorded. Single births (twin births on rare occasions), either on dry land (small hippo) or in shallow water (large hippo). Average life expectancy 35 years for small and over 40 years for large hippo. Analyses of butchered animals prove *H. amphibius* to be a valuable source of protein-rich meat. Meat weight reaches ca. 68% of gross body weight, which is exceptionally high for wild animals. Adults yield up to 90 kg of mostly subcutaneous fat. In terms of texture and taste, hippo meat resembles lean beef rather than pork. References: Frädrich 1968; Grandall 1964; Kurtén 1968; Lang 1968.

20. Order *Artiodactyla*, suborder *Ruminantia*, family *Cervidae*. Descended from the Miocene *Palaeomerycidae*, real cervids had already evolved by the Pliocene, including the modern forms *Cervus*, *Capreolus*, and *Alcer*. The early Tertiary deer, however, either had no antlers at all or a simple, bifurcated type. Nowadays, evolved antlers are characteristic of the males of all but two forms of cervid, and among reindeer of females as well. Currently seven subfamilies with many species; indigenous distribution in Eurasia, Africa, the Americas, and introduced in Australia and New Zealand. Body weight ranges from 7-800 kg and height from 35-255 cm among species. Generally herd animal, but social structure varies. Some species are very gregarious and others solitary. Very wide ecological range. Herbivorous, with efficient digestive system centered on four-chambered stomach. Very good sensory perception, including exceptional olfactory sense and good eyesight.

Gestation period 5-8 months. Single and sometimes multiple births. Average life expectancy 15-30 years. References Clutton-Brock 1981; Heck 1968; Kurtén 1968.

21. In a paper which was unfortunately not available to the writer, Jarman (n.d.) reportedly advanced an analogous argument for Crete, suggesting that deer, cattle, sheep/goat, pigs, dogs, and even badger were introduced to that island by 'neolithic' colonists in the 7th millennium BC. This in turn has led Halstead and Jones to suggest the same possibility for the European fallow and/or red deer found at the ceramic 'neolithic' site of Kalythies on Rhodes (1987:137). The Holocene deer on Crete is presumably *D. dama* and can thus not be an autochthonous descendant of its Pleistocene dwarf deer, but it could nevertheless have colonized the island via Rhodes, Karpathos and Kasos during the Early Holocene. See also Groves (1989) on this issue.

22. Although more recently obtained ^{14}C and U/Th dates are considerable higher and more in line with a Pleistocene fauna, ranging from 140,000 BP to 17,140 BP in stratigraphic order, the excavators continue to uphold the validity of the two Holocene dates and the likelihood of a late survival of the elephants of Tilos (Bachmayer et al. 1984).

23. Current dissertation research by Andrew Poole of the Grant Institute of Geology, University of Edinburgh, will hopefully elucidate the southern sequence in relation to the work of Ducloz (ibid.) in the north and Turner (1971) in the west, providing a grasp on the geochronology of such sites as Kissonerga *Kleiotoudhes/Ayios Phanentos* (#FOS-29P), Emba *Ayios Yeoryios* and *Phaneromeni* (#FOS-31P, FOS-32P), and Kato Arodhes *Ayii Phanendes* (#FOS-30P).

24. The same pattern is in evidence at Site E (see **CHAPTER 1**, supra, and **APPENDIX 1**, #S/354, and **APPENDIX 2**, #FOS-28S, infra). However, since the assemblage of this site almost certainly represents a kill rather than an episode of natural deaths, age distribution is more likely to reflect culling practices than group survivorship.

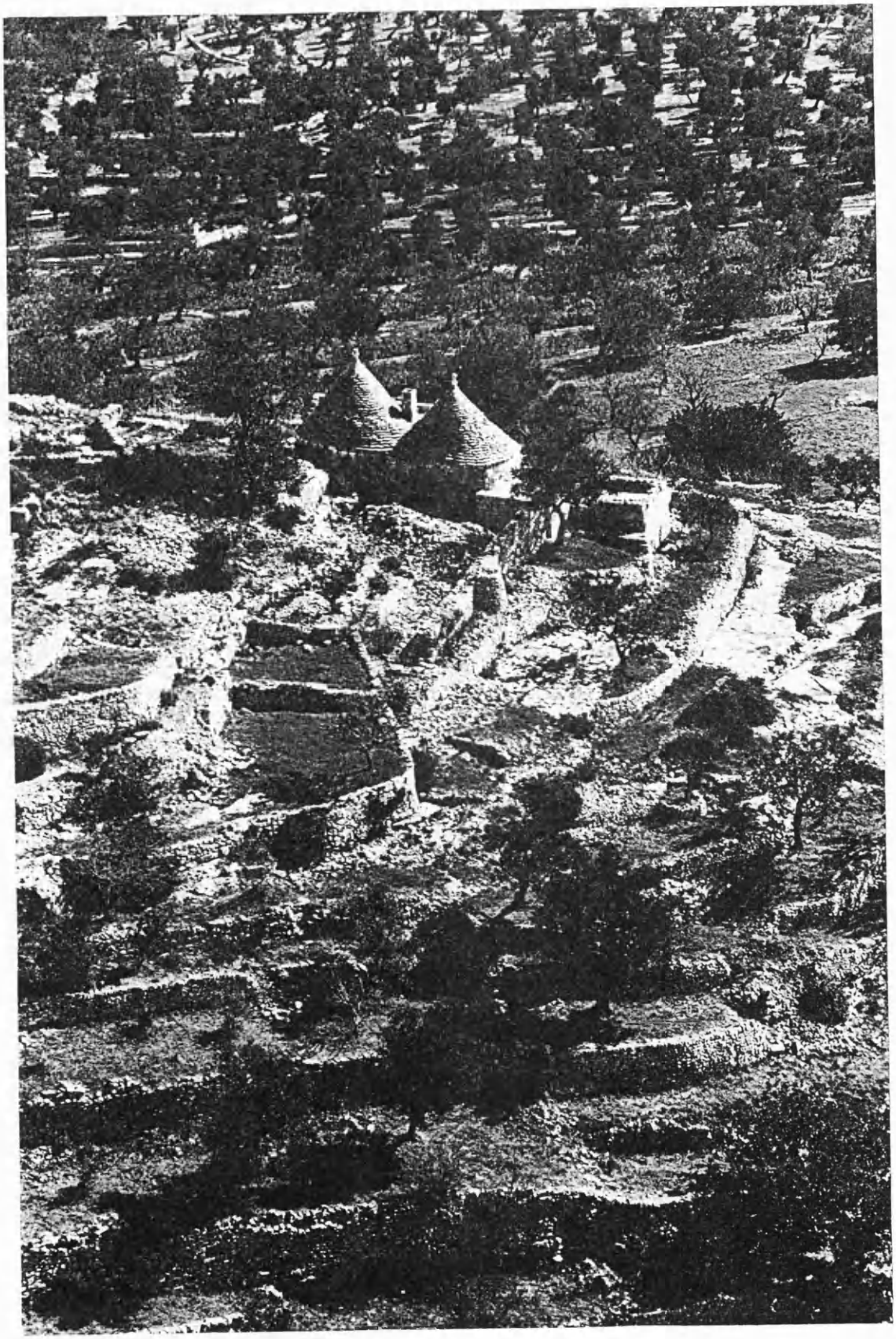
25. Perhaps the absence of identifiable cereals other than hulled barley at this site (Stewart 1974:124; cf. Lehavy [1989:206], who reports wild einkorn [*Triticum boeoticum* var. *aeglopoides*] but makes no mention of barley), which is very unusual for a recently excavated KCU settlement, and the preponderance of *Dama mesopotamica* (Schwartz 1974a; Carter 1989, Croft 1989a) may have something to do with *Agridhi*'s early position in the radiocarbon chronology.

26. Furthermore, two fragmented, well-worked, bifacial projectile points have recently been

reported from a Period-3 context at the LF settlement of Kissonerga *Mosphilia*. Both are regarded as probable foreign imports (Peltenburg et al. 1987:13, Peltenburg 1988c:231).

27. To restate the role of architectural evolution, on an interregional scale the transition from curvilinear to rectilinear plan shows a pronounced time lag between northern Syria/SE Anatolia and the southern Levant, where the round-house tradition lingered on until the second half of the 7th m.BC (late PPNB). The late transition south of the Dead Sea is best documented in Beidha V and at 'Ain Abu Nekheileh, where the juxtaposition of archaic curvilinear, transitional polygonal, and novel rectilinear structures in the same phase of occupation provide textbook examples of evolutionary change in settlement morphology (Aurenche 1981a:Pl. 17b; Kirkbride 1978:2, Fig. 1). Thus if the origins of the Khirokitia Culture were in a curvilinear tradition of the 7th m.BC a southern ancestor would be likely. Conversely, the alternative hypothesis of a northern origin implies an early separation from the 'hearth area,' before the transition to rectilinear buildings took place.

28. In light of the relative abundance of obsidian at Klepini *Troulli* I, it has been suggested that this site served as a gateway community for the trade of Çiftlik obsidian from Anatolia to Cyprus (Peltenburg 1979b:24-26). As far as Early Formative sites on Cyprus are concerned, this model accords well with the quantitative interregional distribution of the material (see **Map F**, Figs. a-c), as does the sharp fall-off in quantity between equidistant mainland sites and Troulli with the 'filter effect' of a water barrier. However, the possibility that Troulli was plugged into the supply line of Cappadocian obsidian along the southern coast of Anatolia (Mellaart 1975:40-41, Fig. 11) does not constitute circumstantial evidence of a northern derivation of the Khirokitia Culture. Aceramic sites north of the Taurus all belong to a rectilinear building tradition (Asikli Hüyük, near the obsidian sources, as well as Can Hasan III, Suberde, and Hacilar I-VII) which seems to have been in existence by the beginning of the 7th m.BC. Naked six-row barley and cattle indicate incipient domestication but failed to turn up on Cyprus until the early 4th and mid-3rd millennium, respectively. After the appearance of ceramics halfway through the 7th m.BC, contrasts between the vibrant culture of the Anatolian plateau and the comparatively lackluster Khirokitia Culture militate even more strongly against anything but the most infrequent and indirect form of interaction (cf. Todd 1986b:15-19).



CHAPTER 3
Spatial Configurations: Intra-Island Dispersal and Demographic Evolution: A Locational Analysis

Reaching and colonizing islands presents most species with problems they do not ordinarily face on mainlands (cf., however, the concept of habitat islands). The real test of adaptability comes later, when natural selection starts to operate and founder populations need to demonstrate their evolutionary fitness. Since evolution is a long-term if not secular process, the diachronic approach which is intrinsic to archaeology is well-suited for studying the way in which cultural evolution on islands reflects the adaptability of human colonists. How long a colonization must last before it may be regarded as successful is a moot point, but where uninterrupted culture process and indigenous evolutionary transformation can be demonstrated over several millennia it is safe to infer success. The aim of this chapter is to provide a link between the problems of colonization discussed in the foregoing chapter and the chronometric interpretation of continuity which will be attempted in the one to follow. In order to avoid lengthy theoretical digressions when discussing the results of the locational analysis, the first section deals briefly with general adaptational aspects of island settlement.

1. Colonization to Continuity: Some Theoretical Considerations

Immigration, equilibrium, and extinction are the three broad segments of island life, be it human or nonhuman, and the success of a species in the first two stages largely determines the time it takes to reach the third. Based on the notion that all island populations are susceptible to extinction, ecologists have formulated the concept of taxon cycle, according to which entire conspecific groups of insular organisms pass through a collective life cycle that sooner or later ends in the death of the species (Gorman 1979:48-52; Williamson 1981:163-166). Pitcairners reached the brink of extinction only 18 years after the mutiny of the *Bounty*, at which time John Adams was the sole survivor of the original nine sailors. In this case, though, it was not ecological factors but warfare between the mutineers and the Polynesians they brought with them that decimated the small founder population of 29. Although intercommunal strife often arises from resource competition (see below) and can thus ultimately be traced to ecological constraints, the original population of Pitcairn did not begin to approach the island's carrying capacity until

1856, when the Crown encouraged resettlement on distant Norfolk in an attempt to relieve the pressure. Only three years previously, a severe drought had almost wiped out the population once more. Thus, outside intervention made possible by the long arm of the British Empire extended the life cycle of the Pitcairners, but no such help was available to the Polynesians who occupied the island perhaps 500 years earlier (Kirch 1988a:31). Failed colonization episodes are archaeologically attested on other Pacific islands, as well as on islands in the Bass Strait in the final Pleistocene/ Early Holocene (Jones 1977), in the case of the Norse settlement of Newfoundland and Greenland in the 10th century AD and the settlement of the Lesser Antilles in the 1st millennium BC (Keegan and Diamond 1987:63-64, 70-71), and on Early Holocene Cyprus probably in the case of the Akrotiri Focus and possibly also in the case of the Khirokitia Culture (see below and **CHAPTER 2**, supra). Indeed, it could be argued that every Pleistocene and many Holocene island occupations for which settlement continuity into the historical period cannot be documented are likely to represent instances of extinction, and that island cultures of the past therefore passed through similar cycles as extinct animals and plants. But the taxon cycle analogy is difficult to defend, first because archaeological fieldwork can rarely furnish positive proof of real settlement discontinuity over long periods of time (the old absence of evidence vs. evidence for absence dilemma), second because humans are seldom edged out of a habitat by a species other than their own and hence human island populations become extinct only as groups but not as a taxon, and third because humans are the only species to develop a technology allowing them to overcome the limitations that islands impose on all other living organisms. Even if the analogy is made in a more particularistic manner to island societies at a low level of technology, the prehistoric record boasts more successful and enduring island populations than failed ones, so that, although cultures succeeded one another on islands just as they did on continents, their insular evolution cannot be said to follow the same underlying ecological principles as that of the Fijian warbler or the Melanesian ant. Put simply, in the words of Terrell (1976:4): "If human societies are truly different from ant societies, for example, the difference is not complexity so much as the latitude of cleverness which we all know is part of being human."

It took some time, however, until humans became clever enough to invent canned food, Kool-Aid, and container ships with which to sustain themselves on even the most barren and inhospitable islands. During the roughly 40,000 years preceding these momentous advances, human island populations had to be self-sufficient. Overseas barter and systematic trade eventually came to provide a mechanism of shortage compensation, yet to work it not only

required certain propitious geographic and social conditions but also an economic surplus of some sort which could be traded. Foodstuffs were rarely commodities in inter-island exchange networks and were usually eclipsed by highly-prized raw materials and utilitarian or ornamental prestige products such as the copper of Cyprus, Aeolian and Aegean obsidian, and the obsidian, lithics, and ceramics imported by Lapita communities in Melanesia (e.g. Davidson 1977). Far from importing essential foodstuffs, a number of islands in fact exported produce to the mainland (e.g., wheat, barley, wine, and sugar from Cyprus; wine and olives from Crete). Minoan Crete is said to have been entirely self-sufficient except for metal (Renfrew 1972:473), and Kirch (1988b:336-338) has emphasized the sophisticated broad-spectrum exploitation of terrestrial and marine resources that provided the Lapita Complex with a stable subsistence base. Once it emerged, overseas exchange therefore provided access to certain desirable or even essential goods, but it never became an instrument of famine relief, so that prehistoric island populations had to maintain an ecological equilibrium just like other species if they were to survive. One of the two principal components of equilibrium theory is the 'area effect', already referred to in the preceding chapter, which can be summarized as the correlation between the extinction rate of a colonizing species and the *K*/cc differential, with *K* representing the critical carrying capacity of the colonists and cc the overall carrying capacity of an island. Since the latter is usually (though not invariably) a function of island size, cc is more likely to exceed *K* for a given species on a large island, and the resulting positive differential reduces the risk of extinction (cf. Simberloff 1974:168).[1] There is no archaeological evidence to suggest that prehistoric populations on the large Mediterranean islands reached saturation levels (*K*), which is why the concept of a mid-Holocene extinction on Cyprus is difficult to accept, but for some of the smaller islands the notion of population crashes is not only historically sustainable but ecologically plausible.

The most striking example of the kind of sudden, short-term cultural discontinuity that may signify the internal collapse of an early island society in this region is provided by the Maltese temple culture, which bespeaks a considerable degree of socio-political complexity and communal effort invested in activities other than food procurement during the late 4th and early 3rd millennia cal BC (Evans 1971, 1977; Trump 1980). Coupled with the dearth of foreign imports during the Ggantija and Tarxien phases, the obvious preoccupation with monumental ceremonial architecture leaves little doubt that for as much as a millennium the community thrived in isolation. On islands so poor in natural resources that even fertile soils have to be redistributed for farming, this self-sufficiency implies the presence of some unknown regulatory mechanism that kept the

population at or just slightly below *K*; conceivably the temples and the extraordinary Hypogeum of Hal Saflieni themselves played a role in this process. However, like every species in the food chain, humans must consume to be consumed, and an island society using its principal resource—people—to nonproductive ends cannot crop the food supply efficiently enough to sustain itself at saturation level indefinitely. As much as events can be judged from a record without attendant settlement sites, the transition to the Tarxien Cemetery culture that succeeded the temple period at ca. 2,500 cal BC was not accompanied by destruction and subjugation (as was the collapse of Minoan civilization ca. 1,000 years later), particularly as there are no signs of desecration of the temples. Instead, the record points to a period when the latter fell into disuse as sanctuaries and were occupied by squatters, before newcomers with different physical traits and different ceramics arrived. To quote Trump (1980:144): "The newcomers show no trace of continuity with their predecessors; it was as if the islands had been completely depopulated in the interim, whether by war, disease, famine or even religious hysteria." All of these are ultimately destabilizing factors, and a serious and irreversible population-food resource imbalance could have been the root cause in each case, but without clear evidence for group morbidity or violence (Evans 1977:24) the true cause cannot be determined. One intriguing line of argument can be pursued on the basis of Renfrew's (1973:154) suggestion that the temples represent the centers of territorially discrete chiefdoms—a model subsequently supported by a computer-programmed locational analysis (Renfrew and Level 1979:152-158), by drawing an analogy to the hierarchical social system of the Palau Islands in western Micronesia. The Palau archipelago consists of a main island, Babeldaub, approximately the size of Malta (excl. Gozo) and about 250 lesser islands of volcanic rock and coralline limestone that supported a contact-population estimated to range between 20,000 and 50,000. The four larger volcanic islands are environmentally more diverse than the Maltese islands but still severely limited ecologically, and Gumerman (1986), using a simple game theory model, has postulated that a formalized system of socially stratified competition among and within clans acted as the operative mechanism of maintaining equilibrium between a chronically resource-stressed population and its spatially and trophically severely circumscribed habitat. It could be speculated that the same regulatory mechanism was operative on prehistoric Malta, yet if it was, the archaeological data show clearly that it did not work indefinitely. This highlights two intrinsic weaknesses of Gumerman's model: first, the fact that game theory deals with conflict situations in which symbiotic relationships are perceived essentially as antagonistic interactions—in short, situations that can be regarded as being innately

unstable. In this case, the alternation of cooperative and competitive behavior is part of a self-serving strategy designed to gain maximum control over resources while keeping disruptive friction to a minimum. As the Palauan example shows, such a system can ensure temporary balance between competing social groups, but because it is so obviously based on tension its function as a homeostatic device is questionable. Second, Gumerman's observations pertain exclusively to the ethnographic present, and although he postulates that the system of competitive hierarchy extends back to ca. 1200 AD (Gumerman 1986:47), there is no evidence other than 'defensive' site locations that this is so. As the sites of the Khirokitia Culture and the Sotira Culture illustrate, however, defensive positions, and even the presence of perimeter walls and ditches, cannot automatically be assumed to indicate intercommunal strife. Despite archaeological remains of intensive prehistoric agriculture, it can therefore not be inferred that aggressive resource competition was used successfully to maintain population stability in the Palau archipelago over hundreds of years. Instead of concluding, as Gumerman does, that such a strategy represents the most effective adaption to a limited island ecosystem, the Palauan and Maltese cases could also be interpreted as examples of the social response to chronic resource stress. In this view, and in very general terms, Palau possibly represents the first stage of Seyle's general adaption syndrome (the 'alarm stage'), when the threat of food shortage tends to lead to increased social interaction and ritualistic behavior; whereas the demise of the Maltese temple culture corresponds to the following stage of starvation and widespread famine (the 'resistance stage'), which is characterized by an erosion of social ties and eventual group fissioning, as well as by the replacement of communal storage and food sharing systems with economic involution and hoarding at the household level (Dirks 1980:26-30). Both viewpoints suffer from inadequate evidence: Gumerman's because it is unable to demonstrate the existence of competitive chiefdoms in Palauan prehistory, and the alternative because the signs of famine in the islands' recent history are ambiguous (Gumerman 1986:47). Apart from these deficiencies, however, the fundamental difference between the two views is that the former considers aggressive competition as a stabilizing and the latter as a destabilizing strategy. It is suggested that in the case of small islands with severe resource limitations territorial competition may ensure short-term stability by acting as a density-dependent brake on population growth, but that the underlying state is disequilibrial because aggressively competing polities are captives of their own territories unless one of them assumes a dominant position and creates a centralized redistributive economy for the benefit of all. The reason for this antithetical view is that the partitioning of a

severely limited island ecosystem into mutually exclusive subsistence territories drastically reduces the biomass available to each group, aggravating rather than alleviating the effects of environmental constraints on the population as a whole. In other words, it is doubtful whether an island society of warring chiefdoms which box themselves in and fritter away their energy on continual skirmishes is capable of optimizing its resource base.

While Malta thus epitomizes the proneness of small and introverted island cultures to endogenous collapse, a fate that may also have overtaken the prehistoric agriculturalists of Palau and Easter, food crises attributable to external factors became an endemic feature of island life in the Mediterranean during the late historical period. The imposition of foreign authority and exploitation of local resources not only for export but also for the sustenance of garrisons and merchant communities drained even the larger islands, creating severe food shortages even though the native populations remained well below the carrying capacity of the land. For the Venetian period, Braudel observed:

> All the islands with a few exceptions (Sicily in particular) were lands of hunger. The extreme cases were the Venetian islands in the Levant: Corfu, Crete, or Cyprus, which were constantly threatened by famine in the second half of the [16th] century. It was a catastrophe when the *caramusalis* did not arrive on time, with their providential cargoes of grain from Thrace, when the stocks of wheat and millet in the stores of the citadels had been exhausted [Braudel 1972:152].[2]

Cyprus, about which Strabo (14:6.5) had written: "...in fertility it is second to none of the other islands; for it produces in abundance both good wine and oil, and is also self-sufficient in wheat," experienced a dramatic fall in cereal production and a concomitant population decline between the 16th and 18th centuries (Christodoulou 1959:51, 123). Census and production figures compiled by a succession of foreign administrations, along with early travelogues, provide a composite picture of historical land use and population densities, yet already in the 1st millennium BC the written record becomes extremely reticent. Attempts to identify adaptive strategies and land use patterns for the 2nd millennium BC and beyond depend on archaeological and paleoenvironmental data, and since there are wide gaps in both areas (especially, as noted already in **CHAPTER 2**, supra, with regard to the paleoenvironment), inferring—and perhaps even measuring—economic and sociopolitical responses to the prehistoric ecosystem of Cyprus is a frustratingly selective task. Ancient terracing systems such as those on Palau, which provide clear evidence not merely for cultivation but more significantly for the intensification of subsistence strategies, have so far not been identified on Cyprus (cf. remarks on field survey in Held 1989a, Chpt. 6). Likewise, archaeological data attesting the emergence of social hierarchy during

the early prehistoric period are few and far between: the presence of the compartmentalized buildings at Rizokarpaso *Cape Andreas Kastros*, Khirokitia *Vouni*, and Kalavasos *Tenta* already mentioned at the end of previous chapter may indicate a beginning 'Big-Man' (cf. Van der Leeuw [1986] and other papers in Bakel et al. [1986]) or other form of nascent central authority and a redistributive economy at the village level during the Khirokitia Culture; signs of wealth polarization in the North Sector at Ayios Epiktitos *Vrysi* (Peltenburg 1985c:62-64, but cf. 1982c:105-106) possibly bear witness to incipient social ranking among kinship groups during the Sotira Culture; and the existence of hypothetical special-purpose buildings during Period 3 (Units 206 and 994) and Period 4 (Unit 3) at Kissonerga *Mosphilia* (Peltenburg 1985b:55-56, 1987b:221, 1988a-d; Peltenburg et al. 1986:33-34, 1987:3, 1988) points to a system of cooperative storage as well as to communal worship at least from the late mainphase Erimi Culture onward.[3] Although these examples provide tantalizing glimpses of the evolution of early prehistoric social systems on the island, the multidisciplinary database required for an eclectic study of environmental adaption and population dynamics in early-mid Holocene Cyprus is still at an embryonic stage. For this reason, the remainder of this chapter focuses on only two narrow aspects of human biogeography and ecology during the early prehistoric period: the correlation between population and the spatial structure of resources as defined by a set of readily observable environmental parameters, and the nature of demographic change on an interregional and diachronic scale. In doing so, the discussion builds on and complements the study of settlement patterns undertaken by Stanley Price (1976b:225-273, 1979c:59-81), which emphasized methodological problems such as the discovery rate and dating of surface sites, as well as types of site location, site clusters (or 'foci'), and modern land use analogies. Due to the deficiencies of the archaeological record and the absence of paleoecological work on the island, both studies are necessarily limited in the extent to which patterns can be detected and interpreted. Quantification and non-intuitive generalizations about the distribution of populations are central to both inquiries, yet the methods of approach differ. The typing of individual site locations, the determination of possible inter-site ranking, central places, and territoriality, the study of mineral resource acquisition and distribution which excavations at Ayios Epiktitos *Vrysi* and the Lemba Cluster sites have made a worthwhile subject, or the analysis of site catchments as attempted with only limited success in the past (e.g., Tomber 1977) will not be considered here. In view of the possibility that future fieldwork will eventually produce enough bioarchaeological and other evidence to put such research on a

firmer footing, the work of Stanley Price and the analysis described below must be regarded as a first and second approximation of EP settlement pattern studies.

2. Environmental Patterns: Variability of Zonal Distribution

The locational analysis of sites spanning the early prehistoric period described in this and the following section employs simple, non-probabilistic statistics. Variables consist of environmental attributes (Section 2) and site densities (Section 3), and are measured at the nominal scale. The database used for the various analyses comprises excavated, tested, or surveyed EP sites and seven classes of environmental attributes allocated on the basis of cartographic information. This information was extracted from the following maps: AAPMC 1972, 1983; CMCVZ 1958; GSGS 1973; HGMC 1970; LFMC 1960; LSMC 1961; RSMC 1961; and SCARM 1978 (see **MAP REFERENCES CITED**, infra). The results are embodied in **APPENDIX 3** (infra), and for the prehistoric site distribution and chronological attribution of sites the reader should turn to **Maps A-H** at the end of this dissertation.

Because the ultimate aim of the analysis is to provide information about prehistoric *settlement* sites, and faced with a situation where current survey data permit positive identification of such sites in probably less than one third of the cases, the concept of 'settlement site' first has to be defined. This is done in the form of a 'reduction sequence' of the total sample of 313 EP sites (Table 12).[4] In the first instance, the total sample (Sample A) is divided into Major Sites and Minor Sites (capitals will be used to indicate generic meaning). The former represent sites with artifact assemblages >5 separate objects and/or architectural remains or cultural deposits and are defined as potential or confirmed settlement sites; whereas the latter represent sites with assemblages ≤5 separate objects and no visible signs of perennial or seasonal occupation. Based on this definition, Sample A is found to consist of 95 Major Sites and 218 Minor Sites. The next step is to eliminate isolated Minor Sites; i.e., Minor Sites that can not be attributed to a site cluster and are considered to represent discards relating to human movement among settlements. The remaining 232 sites are subdivided into clustered Minor Sites (137), clustered Major Sites (70), and isolated Major Sites (25), whereby a site cluster may contain both Major and Minor Sites.[5] This second reduction yields a sample of 232 sites, comprising 207 sites in clusters and 25 Major Sites in isolation (Sample B). The third reduction splits off the 95 Major Sites into a separate sample of highly probable settlement sites (Sample C). Lastly, since all sites in a cluster share the same environmental attributes, undatable clustered Major and Minor Sites are reduced

to one site per cluster, called—without sociopolitical connotations—the Hypothetical Center (HC) Site. Because the majority of site clusters have at least one Major Site, the 4th reduction eliminates most clustered Minor Sites as well as some suspect clustered Major Sites, leaving a combined sample of 90 HC Sites and isolated Major Sites (Sample D). This 'end sample' can be regarded as the closest approximation of actual settlement pattern if the pattern sought is not one of diachronic site densities but one of ecological preference, for the inclusion of doubtful clustered settlement sites risks distorting the outcome of the analysis. Nevertheless, owing to the uncertainty regarding the precise number of settlements represented by all sites in the archaeological record, each of the four samples was analyzed. It was hoped that the latitude of results which such a comparative analysis was likely to produce would provide an indication of possible functional differences between Major Sites and Minor Sites. Thus, if the distinction between the two types did not reflect the real proportion of settlement sites and non-settlement sites with a certain degree of accuracy, the latitude of results between Sample A and the other three samples should be relatively narrow because many of the so-called Minor Sites would then conform to the predictable patterning of settlements. The converse test implication was that if most of the isolated Minor Sites represented desultory activities, they could be expected to have a more stochastic distribution than Major Sites and site clusters, and therefore the latitude of results should be relatively wide. Similarly, the latitude of results between Samples B and D on the one hand and Sample C on the other might indicate whether it was correct to assume the existence of a settlement in clusters consisting exclusively of minor sites.

While the operational definition of the environmental variables used in the analysis is a fairly straightforward matter, that of the archaeological concepts is not. The criteria for defining units such as Major Site, Minor Site, and types of site clusters (see n. 5, supra) arose from a composite judgment of a variety of attributes of surface assemblages. The difficulties involved in classifying surface assemblages are numerous and cannot be examined in this context; however, the detailed discussion of the subject provided by Stanley Price (1976b:124-138, 1979c:48-58) leaves little doubt that subjective decisions are inevitable as long as the sample on which they are based is inadequate. This caveat applies in particular to the chronological ordering of survey sites. Because of the impossible task of reliably classifying non-ceramic assemblages without KCU diagnostics, or ceramic assemblages lacking sufficient numbers of clearly diagnostic sherds, the former often cannot be dated at all and the latter at best on an 'either-or' basis (i.e., either SCU or ECU). Undatable sites have to be omitted from a diachronic analysis, and either-or

cases represent ambiguous binary data that can only be dealt with by treating them as two separate sets of observations: one containing the minimum and the other the maximum number of possible observations in a certain category.[6] Because it doubles the number of observations for a given set of variables, the 'minimax' approach renders the interpretation of multivariate analyses more difficult, and for this reason it is used only in the analysis of site densities (Section 3, infra), where variables are few and the recognition of diachronic change is crucial. In the environmental analysis, EF and LF sites are lumped together, so that the inferences which are made pertain to the early prehistoric period *in toto*. Distinguishing diachronic changes in zonal distribution that suggest secular trends in human biogeography clearly is a desirable goal, but the procedural complexity involved puts such an analysis far beyond the scope of a single chapter.

The first variable to be analyzed is elevation above sea level (cf. Stanley Price 1979c:65-67). In **CHAPTER 2** (Section 3) attention was drawn to the role vertical zoning plays as a co-determinant of biodiversity, ameliorating the ecological conditions imposed on islands by their areal limitations, and it was noted that the varied relief of Cyprus creates two distinct macroclimatic zones. Elevation thus serves as a useful general indicator of biotopes, and the correlation between altitudinal zones and prehistoric settlement patterns can be used to make preliminary inferences about adaptive strategies even if the paleoecological makeup of vertical zones is not known in detail. For this purpose, the total elevational range of 1951 m (sea level to summit of Mt. Olympus) has been divided into eight altitudinal zones which are also used in the *GEPS SUPP.* (**APPENDIX 1**, infra). For each of the four samples, the data are first tabulated and then summarized in the form of a graph. The altimetric distribution of all major and minor sites (Sample A, n=313) shows Zone 1 (0-99 m) to be the single most important zone for prehistoric settlement, comprising 43.13% of all sites. Considerably less populated but still important are Zone 2 (100-199 m) and Zone 3 (200-299 m) with 18.21% and 15.34% of all sites, respectively. Above 300 m, the number of sites per zone decreases rapidly as altitude increases, with only one site (0.32%) present above 1000 m (Table 13). This progressive reduction is shown clearly in Fig. 23, both in the form of decrements (scaled at 10%-intervals on the righthand side) and by the cumulative frequency curve (scaled at 10%-intervals on the lefthand side). The curve flattens out markedly between after Zone 5, corresponding to the second largest decrement (drop in frequency) between zones (66.67%), which bears out the dearth of sites above 600 m. The most

even interzonal distribution of sites is represented by the range of least variability, called the 'plateau'. In this case, the plateau comprises 52.72% of all sites in the 100-600-m range, meaning that the majority of sites are located between these contours. However, because this distribution could simply be the result of prevailing land forms, a better test of non-random distribution is to determine the frequency of sites relative to the percentage of area in a given altitudinal zone. This method also throws light on the amount of regional variability among site selection strategies. Thus, a comparison of the site frequencies per administrative district provided in Table 13 with the percentages of land area below 600 m in Table 45 shows that proportionately more sites in the 0-600 m range occur in the Nicosia, Limassol, and Paphos districts than in the Kyrenia, Famagusta, and Larnaca districts. The imbalance is very pronounced in the Nicosia District, where 97.78% of the sites are concentrated in land from sea level to 600 m that makes up only 75.87% of the total region, and to a lesser degree in the Limassol District, where 81.82% of the sites are concentrated in only 66% of the entire region. Islandwide, 95.84% of all sites occur in the 83.66% of total land area below 600 m. For a sample consisting not only of settlements but also of isolated minor sites, these results indicate that prehistoric settlement and movement was concentrated in regions lying between the 100-m and 500-m contours, probably because this altitudinal range covers several contiguous ecozones that are transitional between coastal and highland biotopes and thus represents the optimal habitat for a broad-spectrum subsistence base. Highlands above 600 m seem to have been avoided, and although survey bias may have acted against the discovery of sites in the mountains, the data for the Nicosia and Limassol districts lend some support to this hypothesis.

The distribution of Major Sites and Site Clusters (Sample B, n=232) follows the same pattern with only minor differences. Sites belonging to these categories are absent above Zone 7 (800-999 m), and if anything there is now an even greater concentration below 600 m in the same districts as in the previous sample and on the island as a whole (Table 14 and Fig. 24).

An obvious change of pattern occurs when the samples comprising known and hypothetical settlement sites are examined. The distributions of Major Sites (Sample C, n=95) and Major Sites and HC Sites (Sample D, n=90) evidence a clear cutoff at 400 m; i.e., between Zone 4 (300-399 m) and Zone 5 (400-599 m), with only ca. 5% of sites occurring above 400 m, including one HC site located at high altitude (Zone 7, Limassol District).[7] As might be expected in the case of farming villages, both samples indicate a general tendency of settlement sites to be confined to lower altitudes; however, there are telling disparities between the findings for each sample, as

well as among regions when relative frequencies are obtained. Just under half of the Major Sites (47.37%) are located in Zone 1 (0-99 m), which can be taken as a measure of the importance of fertile bottom lands (Table 15). On the other hand, the fact that the distributional plateau consists of Zones 2-4 (100-399 m), where it comprises 48.42% of all Major Sites (Fig. 25), suggests that the bottom lands chosen were fluvial terraces in the middle and lower reaches of rivers and not prograding deltaic fills. The virtual absence of EP sites on coastal alluvium (Held 1989a, Chpt. 1) would seem to confirm this finding, whose implication is that settlements were located at intermediate elevations because easy access to the upland biotope was more important economically than easy access to the coastal biotope. Although marine molluscs are commonly found at EP settlements, whether they are in littoral (e.g., Ayios Epiktitos *Vrysi* [Rideout in Peltenburg 1982c:93-95, 437-452]), coastal (e.g., Lemba *Lakkous* [Rideout Sharpe in Peltenburg 1985a:212-216]), maritime (e.g., Khirokitia *Vouni* [Wilkins in Dikaios 1953:438-440; Stanley Price 1976a]), or inland zones (e.g., Kannaviou *Kochina* and Kritou Marottou *Ais Yiorkis* [Reese 1987]), their small numbers prove that marine resources played a minor if not marginal role during the early prehistoric period.[8] The relative frequencies of sites below 400 m for each district also differ from those of the previous samples. While the pattern of site elevations in the Kyrenia, Famagusta, Larnaca districts continues to reflect the predominant land forms, the other three districts now demonstrate a shift of the pattern below the 400-m limit, with a disproportionately large number of sites occurring in Zones 1-4. This imbalance is especially pronounced in the Limassol District, where 100% of the sites are located below 400 m even though the area defined by this contour amounts to only 47.88% of the total region. The same phenomenon is now apparent in the Paphos District for the first time, where 93.33% of the Major Sites occur in the 54.96% of the total area that lies below 400 m. This strongly bimodal distribution of Major Sites and Minor Sites in the last-mentioned districts can be interpreted as evidence that regional uplands in Zone 5 (400-599 m) were exploited on a regular basis (most likely for the purpose of hunting *Dama mesopotamica*, gathering wild plants, nuts, and berries, and acquiring chert and other raw materials), even though settlement itself was restricted to the lower zones (0-399 m).

When the distribution of Major Sites and HC Sites is measured (Sample D, n=90), the results show that although the proportion of sites in the lowest zone, 1 (0-99 m) is almost unchanged from the previous sample (47.78%, Table 16) this zone is now the plateau containing the highest frequency of sites (Fig. 26). However, since the frequency is only marginally higher than the 46.66% of sites in Zones 2-4 (which formed the plateau in Sample C), this shift does not signify

a dichotomous pattern between Major Sites and HC sites within the 0-399-m range that would cast doubt on the interpretation offered above. Of more interest is the decrease in the relative frequency of sites below 400 m in the Limassol District (88.89% in Sample D vs. 100% in Sample C), but this change results from the existence in this district of a single cluster in Zone 7 (800-999 m). This single observation diverges strongly from the patterns recognized thus far. Therefore, instead of regarding it as a reliable indicator of variability in zonal distribution, it is suggested that this high-altitude cluster does not contain a hypothetical center as defined in the beginning.

Due to the obvious link between altitudinal zones and physical relief, the second parameter to be analyzed is landform. For this purpose, the terrain types chosen are those proposed by Thrower (LFMC 1960); i.e., Mountains (45% of island area), Hills (10% of island area), Rolling and Irregular Plains (36% of island area), and Nearly Level Plains (9% of island area) (Table 18). The most distinctive characteristic of the absolute frequencies (Table 17, Figs. 27-30) is the virtual absence of sites in the Nearly Level Plains category (with a mean frequency of only 0.96% for all four samples). Since there are no upland plains on Cyprus (such as the Katharo Basin on Crete which was mentioned in **CHAPTER 2**, supra), this land form is associated with altitudes below 50 m except in the Mesaoria west of Nicosia Airport, so that the dearth of sites allows a refinement of the altimetric distribution in Zone 1 (0-99) in that the majority of sites in that zone can now be seen to occur not near sea level but in the higher coastal topography. This reinforces the view that coastal lowlands in general and alluvial fans in particular were not customarily selected for settlement during the Early and Late Formative—possibly because deltaic plains were still actively prograding and partially waterlogged in early/ mid-Holocene times. The tendency of Minor Sites and clustered sites to occur more frequently in the mountains is borne out by their greater proportions in this terrain type (Sample A:42.95%, Sample B:42.67%); in contradistinction to Major Sites (Sample C), which seem evenly distributed among Mountains, Hills, and Rolling and Irregular Plains (33.68%, 31.58%, 33.68%, respectively), and to Major Site and HC Sites (Sample D), which occur in almost equal parts in the Mountains and Irregular and Rolling Plains (36.67% and 35.56%, respectively) and less frequently in Hills (26.67%). In demonstrating a preponderance of sites in the mountains, this analysis is clearly at variance with the altimetric distribution. The reason lies in the fact that terrain classified as 'mountainous' takes up the lion's share of the total island area (see above), so that once again relative frequencies must be used to obtain a realistic pattern. Not surprisingly, the site densities per area of terrain type embodied

in Table 19 show the majority of sites in each sample to lie in hilly terrain (mean density = 0.0540 sites/km^2), with uniformly low densities in Nearly Level Plains (mean density = 0.0021 sites/km^2) and less consistently low densities in Mountains (mean density = 0.0179 sites/km^2). Significantly, densities in the last category fall into two neat groups which consist of Samples A and B on the one hand and Samples C and D on the other. The low densities of sites belonging to the last two samples attest the confinement of settlements to mid-and low-altitude zones, where Mountains give way to Hills and Rolling and Irregular Plains.

The third environmental variable used in the analysis is rainfall. In a climatic regime determined by cyclones and anticyclones such as that of the East Mediterranean, precipitation is predominantly seasonal, and although by all acceptable standards the biological evidence from the Levant is still fragmentary, the consensus opinion is that neither seasonality nor absolute rainfall have undergone ecologically significant, secular alterations in postglacial times, and that moister climatic regimes indicated by palynological and paleontological evidence from lake sediments and ossiferous deposits have been largely episodic (e.g., Butzer 1978:9; Henry 1986:11-12; Horowitz 1971, 1974, 1976, 1977; Leroi-Gourhan 1974, 1981; Tchernov 1981; Bottema and van Zeist 1981; Raikes 1967:74; van Zeist and Woldring 1950, Van Zeist and Bottema 1982). This is not to say that ecosystems were similar to today's, for greater moisture and less arid regional climates can be inferred from the reduced evaporation which accompanied the expansion of postglacial woodlands above 32° latitude. In addition, the relief of Cyprus means that rainfall was always orographic, and on this combined evidence modern precipitation zones can reasonably be employed to determine hyetographic site distributions in the Recent past. Seven zones of mean annual precipitation ranging from 200-1,200 mm are used not only in this analysis but also in the *GEPS SUPP.* (**APPENDIX 1**, infra). The information in Tables 20-23 and Figs. 31-34 substantiates the assumption of a relationship between early prehistoric settlement and zonal rainfall variability. The single most important precipitation zone in this respect is Zone 3, defined by the 400-mm and 500-mm isohyets. It contains the overall majority of sites in all samples, and frequencies increase markedly from 39.62% and 40.52% in Samples A and B, respectively, to 44.44% and 47.37% in Samples D and C, respectively, meaning that it contains a greater proportion of settlement sites than Minor Sites. Almost as prominent in the distribution of Minor Sites and clustered sites is Zone 4 (500-600 mm), with 36.10% (Sample A) and 40.09% (Sample B) of all sites, yet in the distribution of settlement sites it shares the second place with Zone 2

(300-400 mm). The 300-mm isohyet has been identified as the limit for cereal dry-farming (Raikes 1967:123, 134) and, as the district percentages show, Zone 3 was economically important only in the Nicosia District, most of which is in the rain shadow of the Troodos Massif. Other regional variations are also instructive. Concerning Major Sites and HC Sites, in the Kyrenia District the most important precipitation zone was the one bounded by the 500-mm and 600-mm isohyets (Zone 4). In the Limassol and Paphos districts, by contrast, this zone was of lesser or even minor importance. In the Paphos District, ca. 21-27% of all settlement sites received 600-700 mm of mean annual rainfall, and almost two-thirds of all such sites still received a mean annual minimum of 400 mm—figures which reflect the location of this region on the windward side of the Troodos. The amplitude of zonal variability is greater in the Nicosia, Famagusta, and Paphos districts (3 zones) than in the other three (2 zones),[9] but it must be emphasized that an amplitude of 300 mm in the range of 200-500 mm per annum in the Nicosia District implies more ecological heterogeneity than the same amplitude in the range of 400-700 mm per annum found in the Paphos District, with the result that some of the settlements in the Nicosia District would have been at a clear competitive disadvantage in terms of the biomass of their niche compared to other settlements in the same district. This observation applies in particular to Dhenia *Kafkalla* 1 (#N.8 [N/003]), the only Major Site in the island to receive less than 300 mm of rainfall.

The fourth aspect of prehistoric ecology is the correlation between cultivation and soil distribution. Given the complexity of local processes of sedimentation, pedogenesis, and erosion, the association of sites with broadly mapped soil zones can do no more than convey a very general idea of the predominant soil types in the vicinity of sites (**MAP H**, infra). The high resolution required to bring micro-regional soil distribution into focus, thereby permitting a more accurate determination of the qualitative and quantitative options available to early cultivators, can only be achieved through site catchment analysis. None of the few studies undertaken with this aim has been fully published (see Gomez et al. 1987:6; Held 1988; Legge 1982a; Rupp et al. 1984:143-148), nor are there detailed reconnaissance soil maps for the whole of Cyprus, so that a detailed database for an islandwide locational analysis of the kind attempted here simply does not exist. Therefore, the distributional pattern suggested below should not be regarded as definitive, but rather as a general hypothesis to be tested by a succession of detailed regional and local surveys.

Based on this approach, the data contained in Tables 24-31 show that the sites in all four samples occur most frequently on (or, more realistically, in the vicinity of) three types of soil. In descending order of frequency, these are terra rossa, xerorendzinas, and calcarious raw soils of varying depth. The proportions of sites associated with these soils remain fairly constant when Sample A is compared with Sample B (32.59%-31.47% for terra rossa, 22.04%-23.28% for xerorendzinas, and 16.61%-16.81% for calcareous raw soils), yet there are differences between these two samples and Samples C and D. The latter show frequencies of 27.37%-30.00% for terra rossa, 28.42%-24.44% for xerorendzinas, and 11.58%-15.56% for calcareous raw soils, so that the predominance of terra rossa over xerorendzinas can be seen to have diminished slightly. Of potential significance is the noticeable rise in frequency of Major Sites and HC Sites on or near non-saline alluvial soils (14.74%-11.11%). The relative importance of these fluvisols in Sample C and Sample D reflects the role which river terraces must have played in the land use patterns of many, though by no means most, prehistoric settlements. As King observes for the Voni-series fluvisols in the Ezousas, Xeros Potamos, and Dhiarizos river valleys in the southern Paphos District (Rupp et al. 1984:145): "...these soils would be suitable for all crops, although the relatively high clay content (30%) may cause a relatively low permeability which could adversely affect the growth of certain crops. Nevertheless, the proximity to a major source of water supply would be an obvious advantage." A further point concerns the evidence for regional variation in the utilization of good, mediocre, and poor soils which emerges from the analysis, although once again inferences in this regard are hindered by the limited applicability of a modern soil-grading system to primitive agriculture lacking the plow. In all four samples, more sites are associated with Grade-B soils than with Grade-A soils, while only a negligible proportion occurs on or near Grade-C soils. The respective frequencies fluctuate around 43%, 51%, 4%; however, it is noteworthy that the frequencies of Major Sites and HC Sites for the poor soils are even lower than those observed for Minor Sites and clustered sites, reaching only 2.11% and 2.22%, respectively. Whether the higher frequencies for Grade-B soils result from a prevalence of such soils on the island or from the influence of non-edaphic factors on locational strategies cannot be determined without knowing the total area of each type of soil; however, the very low site frequencies in the Grade-C category certainly suggests that the biotopes in which such soils predominate, if not the soils themselves, were deliberately avoided. If the data are tabulated on a regional scale (Tables 25, 27, 29, 31), it can be seen that only in the Kyrenia District were Grade-A soils associated with the majority of settlement sites (Samples C and D). In the Nicosia

District, these soil types occur more frequently than Grade-B soils with Major Sites but less frequently with Major Sites and HC Sites, whereas the inverse is true for the Famagusta District. By contrast, in the Limassol District far more sites are associated with Grade-B soils than with Grade-A soils. To a lesser degree this is also true for the Paphos District, where site frequencies for Grade-B soils are roughly twice as high as those for Grade-A soils in all four samples. A summary of frequencies and rank-ordered soil types for all samples is provided in Table 32.[10]

Because soils are not the only determinant of land use in the vicinity of a settlement site, the next step involves classifying sites according to the overall suitability of land for cultivation. Although the definition of land suitability zones given in Tables 33-36 is couched in historical land use patterns, some of the parameters employed (i.e., topographic, hydrographic, edaphic, and geomorphic conditions) are less susceptible to drastic alteration through environmental degradation than vegetation, so that they still provide a useful test of prehistoric site ecology. The validity of this assumption is confirmed by the general fall-off of site frequencies from the most desirable zone (Zone 1) to the least desirable Zone (Zone V) that characterizes distribution in all four samples (see histograms in Figs. 39-42). The statistical dichotomy between Minor Sites and Major and HC Sites which has been emerging in the previous analyses is seen to continue, with Zones I and II showing higher proportions of Major Sites and HC Sites (I: 35.79%/35.56%, II: 25.26%/24.44%, respectively) than Minor Sites and site clusters (I: 28.43%/33.19%, II: 23.96%/21.12% respectively). However, apart from this general trend site distribution does not reflect a dramatic deterioration of conditions for farming from one suitability zone to the next. A clear sign of this is the fact that relatively more sites of all types are associated with Zone IV than with Zone III, even though the agricultural potential of the former is presently lower than that of the latter. This apparent inconsistency and the weak gradient from Zone-I to Zone-IV frequencies can probably be interpreted as signs indicating that a) the prehistoric concept of land suitability differed somewhat from the modern definition, b) far-reaching ecosystemic changes wrought during the last 2,000 years make a close correlation between modern land suitability and EP locational strategies impossible, and c) areas nowadays considered unsuitable for irrigated agriculture and classified as Zone IV may not have put a handicap on the cultivation of rainfed crops in the Early-Middle Holocene. The last observation is particularly relevant to past conditions in the Paphos District, where 60% of all Major Sites (Sample C) and a still-respectable 47.37% of all Major Sites and HC Sites (Sample D) are located in Zone IV (Tables 35-36). The opposite

extreme is found in the Kyrenia District, where 59.26% of all Major Sites and 60.87% of all Major Sites and HC Sites occur in Zone I, underlining the fertility of the narrow coastal plain on Pleistocene marine terrace deposits and the attraction it held for prehistoric settlement well into the 2nd millennium cal BC.

With the next variable to be considered, climax vegetation, the analysis proceeds to a higher level of biogeographic integration. Due to the complex interrelationship between vegetation cover, landform, precipitation, soil distribution, hydrology, and the distribution of animal species, climax vegetation zones can be roughly equated with ecozones, and the distribution of sites among them provides a multifaceted picture of human biogeography during the early prehistoric period. The ten ecozones used in the present analysis correspond to the major climax vegetation zones postulated by Jones et al. (1958) and discussed by the present writer elsewhere (Held 1983:122-161, 1989a: Chpt. 1). The distribution and composition of woodland climax zones on the island is shown on **MAP G**, infra.[11]

In all four samples, the zones with the highest site frequencies are Zone 7 (a mixed cypress-pine forest with localized Golden Oak above 450 m covering most of the Pentadaktylos and the Kyrenia District), Zone 8 (a composite forest/ dense maquis zone including lentisk, wild olive, Aleppo Pine, and Hermes Oak, but almost certainly not carob, stretching along most of the Southern Seaboard), and Zone 9 (a coastal/ maritime scrub forest of lentisk, juniper, and wild olive under a localized Aleppo Pine canopy). Frequencies for each of these zones fluctuate between 20-27% of all sites depending on the sample (Tables 37-40, Figs. 43-46). The consistency of these figures regardless of the type of site involved, and the large areas covered by each zone strongly suggest that the observed association is simply a function of assumed phytogeographic conditions during the Early-Middle Holocene and not the outcome of deliberate adaptive strategies pursued by the prehistoric population. Proof of this conclusion is found in the close correlation between regional variability and the distribution of the three zones, with approx. 70-79% of sites in all samples in the Kyrenia District located in Zone 7, approx. 91-100% in the Famagusta District in Zone 9, and approx. 66-85% in the Larnaca and Limassol districts in Zone 8. In the Nicosia District, not surprisingly given the extent of the hypothetical 'Mesaoria Forest', ca. 64-72% of sites in all samples are found in corresponding Zone 10. By contrast, the heterogeneous biogeography of the Paphos District is reflected in a greater variability of zonal distribution that is evident in all

samples, with frequencies fluctuating between ca. 15-47% among Zones 5 (an extensive western oak forest), 8, and 9 across the spectrum of site types.[12]

The seventh variable and, in the mediterranean biome, unquestionably one of the most determinative parameters of EP settlement is distance to the nearest perennial source of fresh water. Describing the hydrology of the Near East, Sanlaville observes:

> Dans une ambiance générale d'aridité, agriculture et vie humaine sont donc étroitement conditionnées par les ressources en eau, pour les sociétés rurales primitives ou traditionnelles aussi bien que dans le cadre de la vie moderne. La quête et la maîtrise de l'eau constituent l'un des problèmes majeurs du Proche Orient pour les villes comme pour la campagne ou le désert. L'eau y a toujours été, avec la sécurité, la préoccupation principale des hommes [Sanlaville 1981:11].

It was earlier argued that present-day semi-arid conditions in many parts of the island are the result of environmental degradation during the Late Holocene and can therefore not be projected into the early prehistoric period. Reduced rates of evapotranspiration and a steadier run-off during a woodland climax would have increased the supply of localized surface and ground water for human consumption as well as for agriculture and horticulture on well-watered soils (cf. Sherratt 1980). Nevertheless, the proximity of drinking water is always a parameter of site location due to the labor input required to obtain it, unless the groundwater table is so high or precipitation so constant that wells can be dug and rainwater collected. In light of the general preference during the EP period for well-drained and often elevated site locations, and given the cyclonic and orographic pattern of precipitation on the island (see above), neither option was available to the early farming communities. Because scarcity of water is a recurrent theme of modern land use studies (e.g., Christodoulou 1959:36-41) that is sometimes uncritically transferred to the past (e.g., Catling 1970:6), attempting to quantify the notional importance of this resource is a legitimate concern of locational analysis, despite the scantness of reliable data. With the exception of geology, hydrology is said to constitute the most stable set of all ecological parameters (Raikes 1967:4), so that past stream flows, groundwater distribution, and spring locations can be inferred from present drainage morphology and aquifers with some degree of confidence even though streams may no longer be perennial, the groundwater table may be lower, and springs may be dry. Fig. 47 represents an attempt at summarizing the available hydrological information; because of the complexity of this undertaking and the fragmentary database, only confirmed or potential settlement sites are considered, i.e., isolated and clustered Major Sites and clustered Minor Sites tentatively identified as HC Sites. The information on which

the diagram is based was pieced together from hydrological maps, excavation and survey reports as well as personal field observations, without trying to gloss over the fact that intimate knowledge of the environs of each site would be required (incl. ethnographic information) to be able to claim complete accuracy in identifying the nearest source of water.[13] Allowance is made for this uncertainty by using bars to indicate distances—the longer a bar (or dotted line), the greater the uncertainty about the distance involved. Fig. 47a shows the distances to nearest surface water on a scale of 10-10,000 m with the best possible degree of accuracy. Solid lines represent distance to streams, dotted lines distance to springs. Immediately apparent is the dearth of sites with distances greater than 1,000 m. In Fig. 47b these measurements have been amalgamated to obtain the frequency of a given distance interval. The stepped curves show that 66.67% of sites occur in the 200-m interval, 27.35% in the 200-1,000-m interval, and only 5.98% in the 1,000-5,000-m interval. Clearly, therefore, the 200-m interval is statistically the most significant. Further refinement shows that 35.90% of sites occur in the 100-m interval, but only 30.77% in the 100-200-m interval. Further subdivision results in frequencies of 19.66% in the 50-m interval and 16.34% in the 50-100-m interval. Next, when sites are plotted as a function of distance to nearest source, a classic distance fall-off curve is obtained (Fig. 47c), which confirms the logical assumption that settlement sites tend to be as close to water sources as they possibly can. However, the frequency curves provide more detailed information. First, the sharp drop in the middle of the fall-off curve demonstrates the 100-m limit to have been important and the 200-m limit critical, leading to the conclusion that places which were not within 200 meters of a perennial source were not considered optimal site locations.[14] Second, the distribution of sites within this apparently acceptable range is also instructive. If effortless access to water had been the primary concern of prehistoric communities, one would expect settlement sites to occur directly by a spring or on the banks of rivers, resulting in a steady increase in frequencies towards 'zero distance' (i.e., 10 m in this instance). The fact that this is not the case, with a much greater number of sites located in the 100-200-m interval than in the 50-m interval (30.77% vs. 19.66%, respectively), suggests that some other parameter overrode ease of access to water as a determinant of site location within the 200-m interval. In a classic essay on rural settlement location, Michael Chisholm (1979) defined five essential parameters for the location of a farmstead, hamlet, village, or town: Water, arable land, grazing land, fuel, and building materials. Each of these was ranked according to a perceived value expressed in hypothetical units of cost to the community which depended on them. Water was regarded to be by far the most valuable resource and assigned

10 units, arable land was assigned only half that number, followed by grazing land and fuel with 3 units each, and by building materials with only 1 unit (Chisholm 1979:95-96). Based on this model, the unknown parameter which in approximately 30% of the cases under consideration kept the settlements at some distance from the nearest water source might thus be identified as the location of arable land. However, *every* resource within a 200-m radius is readily accessible, so that the spatial structure of resources cannot have been a criterion of site location at the semi-micro level (cf. Held 1979:38, Fig. 6). Instead, a survey of EP site types (Stanley Price 1976b:225-245 passim, 1979c:68-69, Fig. 16) suggests that once a general location (at the semi-macro level) had been chosen, the final decision depended on microtopographic features such as the presence of a hill, a conspicuous outcrop of limestone or igneous rock, a well-drained slope surface, and aspect, possibly governed by that intangible mental template which Buchholz once summed up as "the fear of flat and wooded country" (1969:25). On a regional scale, the results of the analysis bear out the close proximity of settlements to water sources, with distance variability observed on the order of tens or hundreds but certainly not thousands of meters. These findings are therefore at variance with those of Miller (1980:332) for early neolithic sites in the southern Levant, who cites ethnographic evidence to support his thesis that rural populations in semi-arid areas commonly live 5-10 km distant from water sources. However, Chisholm, while noting that a distance of 5 km occurs in about 50% of rural settlements in Eastern Nigeria, also points out that other evidence suggests that this situation is atypical, with 1.6 km being the critical distance in East Africa (Chisholm 1979:102). As the present analysis suggests, the critical distance in early prehistoric Cyprus was only 0.2 km, and this difference is likely to remain even if more precise data in the future should reduce its magnitude. The close relation of site locations and surface water supplies on the island can be interpreted in two ways. On the one hand, it could be taken as a sign that water was as scarce in early-mid Holocene times as it is today, and that its availability was thus the primary determinant of site location. However, aridity affects cultivators not only directly but also indirectly through their crops, and as the data from modern Nigeria show, in semi-arid conditions the proximity of good agricultural land is even more important than surface water. In light of this, the Cypriot evidence could also be taken to mean that both water supplies and fertile soils were so abundant that they did not represent mutually exclusive resources. In such a situation, neither soils nor water would have acted singly as the primary determinant of site location, but their spatial configuration probably did. Once a general area had been chosen on the basis of this composite criterion, the greater cost to the community of hauling

and storing water in primitive containers, coupled with the Principle of Least Effort (Zipf 1949), dictated that the settlement be located within a 200-m radius (or thereabouts) of the nearest water supply.

It remains to summarize the salient points which emerge from the discussion. An observation fundamental to the analysis of early prehistoric settlement patterns in environmental terms is that, since ecosystems of islands with the landform variety of Cyprus tend to be strongly structured, site location must be studied at different levels and with reference to this structure. The term 'location' is meaningless without a precise frame of reference such as an entire geographic region (macro level), an ecozone/ ecotone, biotope, catchment, or habitat (semi-macro level), and the immediate vicinity of the site itself (semi-macro/ semi-micro levels). Only if ecological parameters are studied at each level will it be possible to recognize patterns that elucidate the adaptive strategies of prehistoric populations. The aim of the present analysis was to determine whether zonal patterning could be recognized at the regional and inter-regional scale by means of six broad categories of environmental variables, and to test the differentiation between settlement and non-settlement sites made in the sample reduction sequence. The latter was found to be valid for the majority of variables, although the results were somewhat different from what had been predicted. The greatest latitude of measurements was found between Samples A and B on the one hand and Samples C and D on the other, demonstrating a significant difference in the distribution of Major Sites/HC Sites and Minor Sites regardless of whether or not they occur in clusters. The corollary of this unexpected result is that the distributional pattern of sites in Sample D resembles the one of Sample C rather than Sample B, even though D, as the reduction sequence shows, is derived in part from the clustered sites included in B. The only explanation for this outcome is that most of the HC sites in Sample D are in fact clustered Major Sites, making it essentially the same sample as C, and that it is wrong to assume that every cluster of minor sites masks a settlement. This conclusion exposes the site 'cluster' (in the sense of a perceived aggregation consisting mainly of surface assemblages) as the weakest link in the analysis, while at the same time substantiating the distinction between Major and Minor Sites. Clearly, further advances in the chronological ordering and quantitative spatial analysis of survey sites on Cyprus are required before the concept of 'cluster' can be raised to the level of a definable archaeological unit.

In light of the island's heterogeneous physiography, the variability in zonal site distribution among the major districts does not come as a surprise and lays the groundwork for studies of regional adaption and culture process. On an islandwide scale, the patterns recognized in the analysis are highlighted by the following features:

1. The division of the island ecosystem into two vertical zones of utilization by humans, one for settlement and intensive resource exploitation up to max. 400 m asl, and the other for extensive resource exploitation (incl. the acquisition of raw materials) and transmontane communication, generally up to 600 m asl.
2. The high density of settlements in hilly terrain relative to other landforms.
3. The importance of the 400-mm, 500-mm, and 600-mm isohyets, and the abundance of precipitation for rainfed cereal and other crops implied by the association of settlement sites with these zones.
4. The consistent association of sites with certain types of soil; namely, terra rossa, xerorendzinas, and calcareous raw soils, and, to a lesser degree, fluvisols.
5. The general correspondence between EP settlement location and modern land suitability zones which testifies to the enduring role of certain ecological factors in rural land use.
6. The close correspondence between EP settlement location and the dominant ecozone in each region, which suggests that habitat diversity was essentially an accident of geography. However, this observation must be qualified by pointing out the tendency of settlements to occur in ecotones, which can be taken as evidence for a deliberate adaptive response to regional biodiversity during the process of site selection.
7. The preponderance of settlement locations within 200 m of the nearest supply of surface water but not normally adjacent to it, a pattern most likely to result from the optimization of three conjunctive variables: water, tillable soils, and favored site topography.

3. Intra-Island Dispersal and Demographic Evolution

In an authoritative discussion of settlement patterns unfortunately never published in full, Stanley Price (1976b:267) admonished, "counting the number of sites per phase as some measure of population size is to misconceive the time-dimension of the evidence at hand." He continued: "Much more work is necessary before any quantification is possible and before the relative chronology of settlement in different parts of the island can become clear." Mindful of this warning, yet equally aware of the growth of archaeological information since it was penned

and of the dictum that there is no hypothesis testing without hypotheses, the final section of this chapter attempts to do precisely what seemed misguided thirteen years ago. Throughout, the terms 'population' and 'demography' denote sites, and specifically settlement sites, as the sole demographic aggregate that can be defined by archaeological means.

The intuitive approach to measuring early prehistoric population density is to plot sites in an isotropic plain without consideration of temporal differences. The results, embodied in Table 41, can be expressed either as *site density* (SD)[15] (number of sites per km^2) or, conversely, as *average site area* (ASA) (average area in km^2 per site). The latter unit conveys a general idea of the size of potential territories that could be exploited without encroaching on the resource base of the nearest neighbors. From such a calculation can be gleaned that site densities for each sample were highest in the Kyrenia District, lowest in the Famagusta District, and comparatively high in the Paphos District, and furthermore that the average site area for the entire island was ca. 29 km^2 when counting all sites and just under 103 km^2 when counting known and hypothetical settlement sites only. These figures demonstrate regional variation as well as the low overall density during the early prehistoric period, and as such they provide a basis for broad comparisons of population growth from one major period in the island's past to the next. However, the shortcomings of such an analysis are painfully obvious: spatial distributions, especially when measured over thousands of years, are four-dimensional, not two-dimensional, so that cumulative densities wrongly assume a degree of contemporaneity that is completely incompatible with the archaeological evidence. The least that must be done, therefore, is to measure site densities separately for each of the three early prehistoric cultures, which presupposes that all sites in the samples can be dated. Because the chronological ordering of unexcavated sites is problematic, this is where the concept of minimax counts described in the preceding section becomes an important analytical tool. Yet there are numerous lithic scatters and isolated finds which cannot even be dated on an either-or basis, and these must be left out of the analysis. For this reason, Sample A, which includes isolated Minor Sites, must now be jettisoned.

Because the introduction of the fourth dimension necessitates the breaking down of the EP site population into three non-overlapping settlement episodes, site densities for each culture turn out to be considerably lower than those produced by the cumulative analysis (Tables 42-44). If the entire island is considered, minimax densities for Sample B are 0.0027-0.0062 KCU sites/km^2, 0.0025-0.0075 SCU sites/km^2, and 0.0068-0.0197 ECU sites/km^2, corresponding to average site areas of approx. 162-370 km during the Khirokitia Culture, 134-402 km during the

Sotira Culture, and 51-147 km during the Erimi Culture (Table 42). In Samples C and D the densities are even lower, ranging from SD values of 0.0019-0.0024 Major and HC KCU Sites/km^2 to 0.0050-0.0068 Major ECU Sites/km^2, and from ASA values of ca. 420-514 km/KCU Major and HC Site to 147-201 km/Major ECU Site (Tables 43 and 44). During the Khirokitia Culture the Limassol District seems to have been the least populated region, during the Sotira Culture it was either the Famagusta District or the Paphos District, whereas during the Erimi Culture this distinction belonged either to the Famagusta District or the Limassol District, so that spatio-temporal variability is now beginning to emerge.

However, the analysis still has not taken the third dimension into account. In the preceding section, the pattern of altimetric observations clearly demonstrated that instead of being uniformly distributed among mountains and plains, EP sites are confined to areas below 400 m and 600 m, depending on which sample is analyzed. Consequently, accurate densities can only be obtained if land areas above these limits are deducted from the total area of each region and of the island as a whole. The percentages of area in the 0-400-m and 0-600-m altitudinal zones were already recognized as an important parameter of topographic site frequency above, and they must now be used to eliminate terrain types as a variable of site density. Areas of land below 600 m (Table 45) are used to obtain densities of Major Sites and site clusters (Sample B), while those below 400 m (Table 46) determine the densities of Major Sites and HC Sites (Samples C and D). The results are shown in Tables 47-49. An impression of the importance of taking altitudinal patterns into account can be gained from the two righthand columns in each table, where the increase in site density (corresponding to a decrease in average site area) relative to the isotropic measurements in Tables 42-44 is given. On average, the differences are most pronounced in the Nicosia and Limassol districts, because each possesses a large proportion of highlands/ mountainous terrain which appears to have been shunned by early prehistoric settlers. The tabulations can be summarized as follows:

When Major Sites and clustered Minor Sites are considered, the most densely populated regions during the Khirokitia Culture were the Kyrenia, Famagusta, and Larnaca districts. If all 20 sites in the Kyrenia District which could be KCU sites were positively identified as such, this region would have had by far the highest population density during the Early Formative. Furthermore, if allowance is made for the likelihood that large parts of the eastern Mesaoria were still actively prograding in the Early Holocene, creating a lagoonal or swampy back-beach biotope, the habitable part of the Famagusta District (mainly the Karpas Peninsula and the SE corner of the

island near Cape Greco) would have been more densely populated than the Larnaca District. Density in the Paphos District was considerably lower, and the most sparsely populated regions were the Nicosia and Limassol districts. Islandwide, site densities for Sample B during the Khirokitia Culture were measured at 0.0032-0.0072 site/km^2, corresponding to an average site area of 138.20-309.56 km/site. The pattern of Major Sites and HC Sites (Sample D) shows minor divergences from the preceding one. Population density is once again highest in the Kyrenia District and lowest in the Nicosia and Limassol districts, yet the Paphos District and the Larnaca districts now have comparable densities. Granting the environmental constriction of the Famagusta District, this region probably still ranked as the second most populous on the island if KCU settlement sites only are considered. Islandwide, the site density for Sample D during the Early Formative amounts to 0.0025-0.0031 site/km^2 and the average site area to 320.57-396.00 km/site. The fact that site densities are markedly higher in the eastern regions lends support to a model of East-West dispersal of the Khirokitia Culture population (see below).

Since the general aim of the analysis is to recognize the extent and rate of demographic evolution during the EP period, the next step is to relate the regional variability observed in the population of KCU sites to that of SCU and ECU sites. This is done by determining the temporal variation in SD and ASA values from one culture to the next. The results are presented in Tables 50-52. Obviously, since minimax values had to be used in measuring site densities, variations are subject to an analogous range of uncertainty, resulting in a maximum and a minimum value for each observation. In order to alleviate the problem of recognizing spatio-temporal variations when a set minimum and a set of maximum values has to be evaluated at the same time, it is useful to work with minimax averages. These can then be used to construct population curves for each of the six regions and for the entire island, and it is in such graphs that spatio-temporal variation (i.e., demographic evolution) is most readily apparent. The problem facing the analyst at this stage is that of sample bias; i.e., the inadequacy of the archaeological record when it comes to determining settlement continuity between periods. The existence of a small number of transitional occupations such as Kalavasos *Ayious* and *Kokkinoyia/ Pamboules* in the Vasilikos Valley, and Kissonerga *Mylouthkia*, *Mosphilia* 5, and perhaps Lemba *Lakkous* early 1 (see **CHAPTER 4**, infra) may imply some measure of continuity in areas beyond those clusters, but it is meaningless in terms of population statistics for entire regions. However, a distinct, islandwide gap in the record exists only for the transition from the Khirokitia Culture to the Sotira Culture. This lacuna, whose magnitude depends on how chronometric evidence is interpreted, is

frequently regarded as a sign of the abandonment and later recolonization of Cyprus during the mid-6th/ mid-5th m.BC (Stanley Price 1977b). Yet the hypothesis of complete depopulation, amounting to species extinction in ecological terms, has serious implications not only for the rate of culture process and adaptive strategy of the Khirokitia Culture but also for the population dynamics of the Sotira Culture, so that it needs to be subjected to rigorous tests as further archaeological evidence becomes available in the future. In the next chapter, chronometric data will be adduced to advance the argument that two foci of transition may already exist, one in the Mesaoria and one in the Vasilikos Valley. In the meantime, the spatial data discussed so far will be used to evaluate three possible models of demographic evolution (Figs. 48-57).

First, all regional curves for each of the three samples are plotted to fit a *continuity model* (Model A), in which the hiatus is considered to be entirely due to sample bias (Figs. 48-50). This model specifies that prehistoric populations maintained a long-term equilibrium and that the population of each culture was descended from the one preceding it, with the early Khirokitia Culture representing the founder population unless it was in turn derived from a 'proto-neolithic' culture (see **CHAPTER 2**, supra). For all datable sites (Sample B, n=232), population growth in the Kyrenia and Nicosia districts, and on the island *in toto*, is seen to have been exponential, a finding compatible with the gradual acceleration of culture process evident in the archaeological record. However, equally instructive are the regional aberrations from this general evolutionary development. The Larnaca District experienced a more gradual population growth between the Khirokitia Culture and Erimi Culture, and the Limassol District experienced a comparatively rapid growth until the end of the Sotira Culture, after which its population stabilized. Conversely, the population of the Famagusta District declined from the Khirokitia Culture to the Sotira Culture before stabilizing, whereas that of the Paphos District declined sharply to almost zero in the 5th m.BC but rose again steeply during the Erimi Culture (starting, perhaps, during the final phase of the Sotira Culture). On present evidence, therefore, the growth curve of the Paphos District resembles a 'boom and bust' curve typical of the population dynamics of many r-selected species.[16] When the curves for Sample B are compared with those for Samples C and D, the latitude of results already noted in the previous analyses is once again apparent. The population of the Kyrenia District is still the largest of any region, but its growth can now be seen to have been arithmetic, implying a demographic stability during the entire EP period that may have been related to the biodiversity of this regions and its physical boundedness on the northern side of the 'Mesaoria Forest' and the Pentadaktylos. Exponential growth rates characterize the Nicosia

District and the entire population of Cyprus, especially in the center of the island. Population growth in the Larnaca District seems to have been slow but steady. Turning to the negative-growth curves, it can be seen that demographic evolution in the Limassol and Paphos districts was diametrically opposed, with the population of the former reaching its peak during the Sotira culture, while in the Paphos District population was at its lowest at this time. In light of the fact that the Limassol District provides a natural route of access to the West, these two adjacent developments strongly suggest a causative link. Finally, the Famagusta District witnessed a decline in population after the Khirokitia Culture and appears to have remained a marginal settlement region during the Late Formative.

Next, the curves are plotted to fit an *extinction model* (Model B) which—*sensu* Stanley Price—assumes absolute discontinuity between the Khirokitia Culture and the Sotira Culture (Figs. 51-53). Whether the failed initial colonization implied by this model represents an actual, physical extinction of the human population on the island or simply its wholesale desertion is ecologically and culturally irrelevant, for in either case the result was the same: the removal of an entire species from the island ecosystem, and the inexplicable collapse of what appears as a thriving culture in the archaeological record. The graphs clearly show that this model requires all regional populations to have followed a classic 'boom and bust' pattern. The 'boom' phase applies regardless of the model and represents the rapid emergence and dispersal of the Khirokitia Culture, either following an episode of initial colonization or a yet-undiscovered antecedent founder population. The 'bust' phase, on the other hand, consists of a dramatic decline whose rate must be measured in centuries or even decades rather than millennia on the basis of available ^{14}C dates. Even more dramatic, however, is the rate of population growth that must be invoked by this model in order to account for the densities during the subsequent Sotira Culture. As the graphs clearly show, they are much higher than those of the Khirokitia Culture in all regions with the exception of the Famagusta and Paphos Districts, requiring what must be regarded as a phenomenal rate of growth during the early Sotira Culture, or a very large founder population. The hypothesis of a massive recolonization in the early/ mid-5th m.BC not only lacks mainland indicators of causative processes but is also incompatible with the absence on Cyprus of mainland traits which would have been transferred during an episode of sustained immigration. This leaves an explosive growth rate of the founder population as the alternative explanation, followed by a marked slowing down and even decline during the Erimi Culture. Such colonization curves are not unknown in island biogeography (MacArthur and Wilson 1967, Simberloff 1974,

Williamson 1981), but they have been recognized for total numbers of colonizing species rather than a single taxon and are based on studies concerned primarily with *r*-selected species; i.e., species with high reproductive rates. For humans and other large mammals, by contrast, S-shaped growth curves are the norm. In sum, on ecological as well as archaeological grounds it is difficult to accept a model which requires the sudden appearance of a vibrant and populous culture in every region of the island save the West, but which cannot reconcile this premise with the abundant evidence for its rapid decline and dissolution only ca. 500 years later.

If, as has just been shown, the Continuity Model can be faulted on stratigraphic and the Extinction Model on processual grounds, what model can be put forward as a plausible alternative? The demographic data reviewed in this section suggest an *involution model* (Model C), in which discontinuity is defined as a local phenomenon marking a period of decline and not as the extinction of an entire island population. The curves constructed for this scheme (Figs. 54-56) show a general depression of population densities that can be interpreted as a sign of cultural involution in the 6th m.BC causing the abandonment of numerous sites, thus accounting for the evidence from several excavated KCU settlements. At other sites, however, occupation is assumed to have continued. The evidence from Dhali *Agridhi* (Lehavy 1989) already points to such a focus of continuity near the eastern Troodos foothills, if not at Dhali itself. The consistently negative density curves for the Famagusta District indicate that the island's eastern region never recovered until the prehistoric 'Bronze Age', possibly because it formed an equable and isolated biotope which did not provide the same opportunities for resource exploitation and interregional contact as the adjacent Kyrenia and Larnaca districts. The Kyrenia, Larnaca, and Limassol curves then show relatively rapid increases in the 5th m.BC, though nowhere near the rates envisaged in Model B. This demographic turnaround can be attributed to endogenous forces such as a climatic amelioration, a change of habitat, or an augmentation of the food supply, to a boosting of population densities by the arrival of a new group of immigrants from the mainland (possibly introducing ceramic technology), or to a combination of endogenous and exogenous triggers. To judge from the curves for the Kyrenia and Nicosia districts and the entire island, population grew linearly during the Late Formative. Yet, as in the two preceding models, evolution in the three south-coast regions apparently followed a different course. Pending convincing ceramic and chronometric evidence for the existence of *mainphase* SCU sites in the West, it is postulated that the sudden population growth in the Paphos District during the Erimi Culture on the one hand and the simultaneous slow growth in the Larnaca District on the other are both related to

the conspicuous decline in the Limassol District. If this interpretation of the demographic evidence is correct, the most plausible cause of these correlated trends is the occurrence of a natural disaster in the central or western parts of the south coast which led to a major population transfer from the Limassol to the Paphos District and curtailed population growth in the Larnaca District. Since the southwest of the island lies in a zone of high seismicity, the results of the present analysis thus provide quantitative support for the hypothesis that the Sotira Culture was directly or indirectly terminated by an earthquake or a succession of quakes (cf. Peltenburg 1978, Stanley Price 1979c:76-77).

To conclude, the patterns recognized by the locational analysis can now be integrated into a general model of intra-island dispersal and demography for the Formative period. Disregarding for the present time the chronologically isolated Akrotiri Focus, the relatively high densities of KCU sites in the eastern regions may be interpreted as representing the primary and secondary stages of island settlement (cf. Held 1979:61-62, Figs. 17-18). The primary stage can be subdivided into a 'beach-head' phase during which landfall sites are established and the risk of extinction is greatest, and a 'frontier' phase when successful reproduction over several generations triggers an adaptive expansion of the habitat from a narrow littoral to a wider coastal or maritime zone. As suggested by Stanley Price (1976b:270, 1977b:32), the littoral positions of F/050, F/053, F/055-057, and K/037 make these settlements likely landfall sites; however, since the littoral zone occupied during the first phase need not have been abandoned during the second, it cannot be concluded that all of them, or even those located on the eastern extremities of the island, are initial settlements. Given the biological possibility that the entire KCU population was derived from a single colonization episode involving a founder group of no more than 10-15 adults and children (Angel in Dikaios 1953:421), the 'beach-head' phase may conceivably be represented by only one or two sites, and whether Rizokarpaso *Cape Andreas Kastros* was one of them remains an open question. Based on that site's ^{14}C dates, however, the stage of primary settlement may be tentatively assigned to the second half of the 8th or the first half of the 7th m.BC (see **CHAPTER 4**, infra).

The stage of secondary settlement can be associated with continuing population growth resulting from a consolidation of the settlers' hold on familiar habitats. The uniform, eastern, lowland biotope of dense lentisk/ juniper maquis on terra rossa and xerorendzinas may have been abandoned in search of a bizonal or trizonal subsistence base dependent on regions where

vertical relief increased the biomass of the environment. If the assumption of a hypothetical 'Mesaoria Forest' (i.e., a dense maquis community) and extensive Holocene alluviation in the eastern central plain is correct, biogeographic configurations in the east of the island would have channeled settlement expansion into the Kyrenia and Larnaca districts at the expense of the Famagusta district. Consequently, this stage is characterized by an interregional expansion in a westerly and southwesterly direction to which such sites as K/030, K/033, K/035, K/045 (Kyrenia District), N/002, N/005, N/015, N/097, N/377 (Nicosia District), and all sites in the southwestern Larnaca District and the southeastern/ south-central Limassol District can be related (**Map A**). Those among the primary-stage or even initial settlements sufficiently stable to survive until now may assume the role of gateway communities in sporadic overseas contacts. As already noted in the preceding chapter, one such site, Klepini *Troulli* I (K/037), was not only within sight of the Anatolian coast and hence better positioned to function in this way than *Cape Andreas Kastros* but is also distinguished by a high frequency of obsidian that fits a down-the-line trade model remarkably well (**Map F**). While this conjecture does not imply that contacts were regular or, as a matter of fact, that obsidian was imported more than once or twice during the entire Khirokitia Culture, the possible redistribution of foreign raw materials or artifacts also raises the question of interregional exchange networks and communication corridors. This issue has already been studied by Stanley Price (1976b:249-258) and need not be taken up again, except to point out that the occurrence of a small cluster of KCU sites in the Nicosia District (N/002, N/005, N/097, and N/377) can be interpreted in terms of a North-South link across the transverse watershed of the central plain. All these sites are situated at the edge rather than in the middle of the Mesaoria, near or in the eastern Troodos piedmont zone, in other words in a rich biotope at the interface of several ecozones. In contrast to Watkins (1981a:143-144), who plays down the agricultural potential of the environs of one of the sites, Kataliondas *Kourvellos* (N/005), the existing patchwork of tillable colluvial soils (brown earths and calcareous raw soils), invading pine, and hydrophile vegetation among pillow lavas can be regarded as an ideal niche for settlement based on the type of small-scale cereal farming and horticulture for which the Lythrodondas region is still valued today. In this view, it was precisely the varied resource potential of the piedmont zone in conjunction with the existence of a communication link that caused this isolated focus of settlement in the interior. If there are functional differences between Dhali *Agridhi* I (N/002) and Kataliondas, they should perhaps be explained in terms of an unusually large number of ecological options available within a short distance and not in terms of environmental constraints.

The correlation of a major route of interregional movement, ecotones, and site location at this stage of the dispersal of the Khirokitia Culture is substantiated by the position of Pano Dhikomo *Mavro Nero* (K/045) on the central south slope of the Pentadaktylos, and by several sites in the Larnaca District (R/072, R/314, and R/436). The location of the latter indicates that the route differed from that of today in following the Tremithos Valley towards the Larnaca lowlands (R/314 and other minor sites), and the Syrkatis and Pendaskhinos valleys as a shortcut to the central south coast (R/436 and R/072, respectively). Of particular interest in this respect is the location of Pano Lefkara *Vrysi tou Nikoli* (R/436) at the former intersection of the Syrkatis River and the long-forgotten, cobbled road from Delikipo to Pano Lefkara. Another communication route possibly in use during the Khirokitia Culture is the so-called 'Fox Trail', a highland route through the Arakapas Fault in the Limassol Forest that follows the Lower Pillow Lavas and Metabasalts across the major south-coast river valleys (**Map A**). Whether this trail was used as the shortest possible route from the Larnaca District in the East to the central Paphos District in the West can only be ascertained through survey work, but the occurrence of KCU sites at both ends, in the Vasilikos Valley to the east and the Ezousas Valley to the west, is certainly suggestive.[17]

During this stage, which coincides with the *floruit* of the Khirokitia Culture in the second half of the 7th m.BC, settlement thus dispersed from the Northern Seaboard to the island's remote West, indicating an adaption to numerous ecozones up to 400 m that probably owed its success as much to the continued reliance on a mixed subsistence base as to the fact that regional biotic variation on the island must have been one of degree rather than kind. There is no reason to assume intensive interregional contacts at this time; in fact it is likely that the central plain acted as an ecological buffer zone between the 'densely' populated Kyrenia District and the remainder of the island. Although overall densities probably were even lower than the analysis would indicate since absolute contemporaneity cannot be automatically assumed for all KCU sites, the occurrence of several clusters makes it impossible to rule out the existence of resource competition in some cases. Such situations may have caused neighboring communities to take defensive measures in addition to elevated site location, as in the case of Khirokitia *Vouni* and Kalavasos *Tenta*, two settlements in adjacent river valleys which on chronometric evidence were at least partly contemporary. Yet the Khirokitia Culture as a whole shows no signs of intensive and widespread competition for resources such as that noted for the Palauan archipelago, nor of possible hierarchical centers and the overdevelopment of a particular cultural system as has been suggested for the Maltese islands. Therefore, the possible causes of cultural involution at

the stage of tertiary settlement, which is marked by a contraction of settlement in the 6th m.BC, cannot be elaborated on.

If the hypothesis of a surviving population is correct, the process of culture change in the early/mid-5th m.BC can be tentatively related to a booster immigration (as opposed to a recolonization) of a new group with ceramic technology. The dark burnished wares of Amuq B/Ras Shamra VA/Mersin XXV ('Late Neolithic') may be the generic ancestor of DFB ware at Dhali *Agridhi* II and Philia *Dhrakos* A.1 (cf. Watkins 1973:49), in which case the arrival of new colonists should be dated earlier rather than later in the 5th m.BC. What followed may have been either a period of immediate, effortless acculturation between the newcomers and the indigenous population, or an adaptive period during which sudden competitive pressure from the new arrivals caused the surviving KCU population to retreat temporarily into narrow and spatially disjunct niches. This period would correspond roughly to Stage 3 of Diamond's colonization model (Diamond 1977a:251). However, since this process involves residents and newcomers belonging to the same species, without a strong factor of competitive exclusion (e.g., the division of the island ecosystem into two discrete biotopes) acculturation would have been almost inevitable in the long run, leading to a rebound of population densities in all regions except the Famagusta and perhaps the Paphos District. The concept of an acculturative process as the prime mover argument in an explanation of cultural transition from Early to the Late Formative is not at odds with the material differences between the two cultures. Only a few diagnostic traits need to be removed from a Khirokitia Culture assemblage before it is no longer recognizable as such. Thus, if penannular pendants had gone out of use during a late phase, the pathetically small stocks of imported obsidian had been depleted, the cumbersome stone vessels replaced with pottery, and house form departed from the rigid circle, on current definition the Khirokitia Culture would have ceased to exist as an archaeological entity. Admittedly, the population of Sotira *Teppes* was doliocranial as opposed to the brachycrany which makes the population of Khirokitia *Vouni* such a distinctive group in the prehistoric East Mediterranean, but Angel himself considered intraspecific regional variation a likely explanation for small Sotira sample (Angel in Dikaios 1961a:228-229), and one not contradicted by the two mesocranial individuals from Philia *Dhrakos* A (Walker 1975).

The changes in regional demographic patterns at the end of the Sotira Culture have already been put into the perspective of catastrophic events deducible for the Southern Seaboard ca. 3,900 cal BC. Stanley Price (1979c:77) has cautioned against the overuse of catastrophic

explanation to account for culture change, noting that disasters tend to trigger conservative attitudes and effect a general cultural retrenchment which jointly inhibit rather than promote change. Such a phase, however, did in fact occur between the end of the Sotira Culture and the emergence of the mainphase Erimi Culture ('Middle' Erimi *sensu* Peltenburg 1987c, n.d.a), a transitional period which witnessed a significant reversal of architectural morphology from rectilinear to curvilinear structures. The steady population growth in the Kyrenia and Nicosia districts at this time is compatible with an upheaval centered on the southern part of the island. Given the longevity of the Erimi Culture (ca. 3,850-2,400 cal BC, incl. regional variations), it would be rewarding to define demographic and distributional variability among its early, middle, and late phases in different regions. In the West, where recent surveying has been at its most intensive, a better understanding of the relative chronology of ECU sites has already provided tentative evidence for a "contraction and fundamental modification of the Erimi Culture" in the mid-3rd m.BC (Peltenburg 1987c:58). The absence of late RB/B and transitional BSC wares on LAP survey sites as well as the dearth of typical PCU assemblages possibly attests a decline in population, but without chronometric dating of these sites a regional persistence of standard RB/B and CP wares in the northern Paphos District—while the first PCU stimuli reached the southwest not via Polis Bay but via the South Coast—cannot be categorically ruled out. Similarly, an apparent shift in emphasis from deer to pig and palynological evidence for the presence of a xeric biotope during Lemba *Lakkous* 3 (Croft in Peltenburg 1985a:295-296; Renault-Miskovsky in Peltenburg 1985a:306-311) might be viewed as signs of a widespread change in site ecology in the West at this time. In both cases, however, the regional applicability of developments inferred for a pair of excavated sites in close proximity of each other is too dubious to postulate a causative link between the two. Herein lies the fundamental methodological weakness of excavating site clusters: the results, though providing a wealth of evidence for local evolution, cannot be normatively interpreted in terms of general culture process and change.

NOTES ON CHAPTER 3

1. As already noted in **CHAPTER 2**, at issue is not island size *per se*, but the variation in vertical relief and greater chance of biodiversity that is characteristic of large islands. Extreme examples such as Greenland can be used to drive home the point that the area effect is relative, and that the carrying capacity of an island must be understood in terms of species habitat rather than total area.
2. In a related footnote that throws an illuminating sidelight on this issue, Braudel (1972:152, n.190) points out that Sardinia, although poorer and more backward than the other large islands, occasionally managed to produce surplus grain for export. This seems to confirm that chronic resource stress on the other islands was exogenic, and that without foreign exploitation indigenous populations were capable of food production beyond subsistence requirements except in years of drought.
3. Additional evidence for the replacement of an egalitarian society with socioeconomic differentiation in the form of ownership and/or formal product distribution is provided by two conoid limestone stamps (seals?) from Lemba *Lakkous* (#LL.211) and Kissonerga *Mosphilia* ([#KM.597]; Peltenburg 1985a:289, Fig. 85/5, Pl. 47/11; Peltenburg et al. 1986:29, Pl. VI/2). Both are unparalleled in the EP period, and their designs differ. Furthermore, LL.211 bears what may be three count-marks incised on the periphery of its curvilinear design.
4. The sample consists of sites located up to 1983. Selective tests involving sites discovered more recently have indicated that most of them conform to the observed patterns.
5. For the purpose of differentiating clusters and identifying their component sites, the following types of clusters were defined:

    1. NUSC: NEUTRAL/UNARTICULATED SITE CLUSTER: The relative chronology and interrelationship of the component sites is not known.
    2. PASC: POSITIVE ARTICULATED SITE CLUSTER: Component sites definitely or very likely are contemporary in that they belong to the same cultural stage, although their interrelationship may not be known.
    3. NASC: NEGATIVE ARTICULATED SITE CLUSTER: A small cluster that is so chronologically heterogeneous that most of its component sites belong to different cultural stages, hence being in fact isolated sites.

4. ACSC: ARTICULATED COMPOSITE SITE CLUSTER: A large cluster comprising at least two Major Sites belonging to different cultural stages and numerous Minor Sites of unknown date that divide into an analogous number clusters.

6. For example, consider a situation in which 15 ceramic surface assemblages with no observable attributes other than ware finish can be broken down into 5 with recognizable RW-BI. and/or CB ware, 5 with recognizable RW-CI., and 5 with undiagnostic abraded slipped and formerly painted sherds that could belong either to RW-BI. or to RW-CI. but not to PRP, WP, or other wares of the prehistoric 'Bronze Age'. In a locational analysis, the only way around the quandary of classifying the 5 undiagnostic sites is by using minimax counts of 5^{min}-10^{max} SCU sites and 5^{min}-10^{max} ECU sites, or minimax averages of 7.5 sites per category.

7. In addition, one confirmed Major Site, Kritou Marottou *Ais Yiorkis* (#P.89 [P/379]), lies at an altitude of 460 m. This occurrence may be considered as a predictable exception which does not alter the observed pattern. Alternatively, the composition of the assemblage is such that the site could justifiably be viewed as a task site related to the exploitation of highland resources by the population of nearby Kannaviou *Kochina* (#P.90 [P/380]), a likely settlement site lying at ca. 345 m (see **APPENDIX 1**, infra). In this case both sites would fit the pattern.

8 Barring, of course, Akrotiri *Aetokremnos* with its shell midden deposit (**CHAPTER 1**, supra), and to a certain extent also littoral Rizokarpaso *Cape Andreas Kastros*, where fishing and shellfish gathering was more important than at other reliably analyzed KCU settlements (Le Brun 1981a).

9. Note that the previously mentioned high-altitude HC Site in the Limassol District once again diverges from the pattern (Table 23 and Fig. 34).

10. Cf. Peltenburg (1979c: 77), who notes the absence of ECU sites from soils on igneous rock in the Paphos District.

11. At the outset of the biogeographic analysis, Zones 1 and 2 were eliminated because they represent small highland forest zones in the western Troodos and on Mt. Olympus which were known to be devoid of prehistoric sites. The analysis subsequently demonstrated that sites were also absent from Zone 3, a more extensive highland zone of endemic Aleppo Pine and Golden Oak covering most of the Troodos, as well as from Zone 12, a sub-climax

zone in the deltaic environment of the eastern Mesaoria that was probably unsuitable for settlement or food procurement.

12. For a discussion of arboreal species identified at archaeological sites on Cyprus and the environmental inferences that can be made from the charcoal record, see Held (1983:122-161, 1989a: Chpt. 1).

13. For example, even though Dikaios excavated the type site of the Sotira Culture, Sotira *Teppes*, spending a considerable amount of time in the modern village, he was apparently never aware of the nearest spring used by the prehistoric settlement (Held 1988:58).

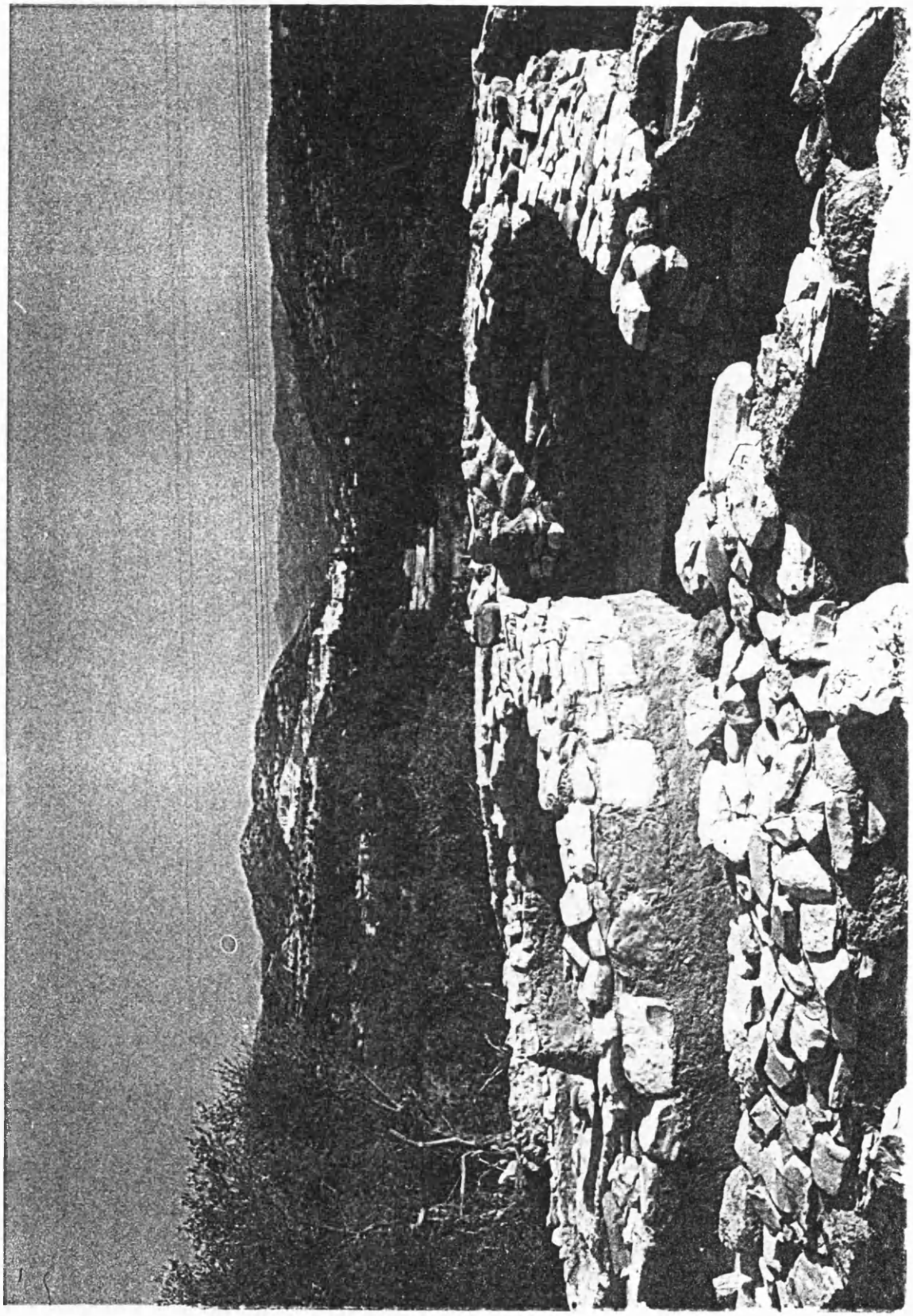
14. Cf. Swiny (1981), who reports distances of up to 600 m for MFL (MC) settlement sites in the Episkopi-Evdhimou-Anoyira region on the Southern Seaboard. Note, however, that the distances cited often refer to the parts of sites farthest from a given source of water, which for sites of several hectares means that shortest distance to source was equal or only marginally greater than in the early prehistoric period. For ECU sites, cf. Bolger 1985a; 28-35, 47-48).

15. Not to be confused with SD in the sense of 'standard deviation', which is used when discussing ^{14}C samples in **CHAPTER 4** and elsewhere.

16. Recent survey results indicate that there are at least as many sites with typical SCU ceramics in the Paphos District as there are KCU sites, implying a positive growth rate in contradiction of the conclusions reached here. However, with the exception of Peyia *Elia tou Vatani* I (P.104 [P/409]), which is situated in isolation near the Lemba Cluster and has been included in the analysis, these scatters form a tight cluster in the Stavros-tis-Psokas Valley, thus probably representing a single HC Site (P.76 [P/360], P.115 [P/420], P.117 [P/422]). Moreover, so long as none of the Paphos sites in question can be shown to have rectilinear structures of the type characteristic of excavated SCU settlements, or dated to the 5th m.BC, there is no evidence to refute the hypothesis that the Stavros cluster, Peyia, and Kouklia *Liskiovouno A/Vikla* (P.97 [P/402]) mark a population movement from the Limassol District to the West at the end of the Sotira Culture. The presence in the Stavros cluster of a ceramic scatter with transitional SCU-ECU ceramics (P.114 [P/419], Baird 1987:17) can only strengthen this argument in that it suggests a link between developments in the Vasilikos Valley and the interior Paphos District at this time. Finally, as the chronometric data discussed in the next chapter will make abundantly clear, several hundred years elapsed from the start of the SCU-ECU transition in the Limassol/western

Larnaca districts to its end in the West as represented by Kissonerga *Mylouthkia*, so that there is ample room in the early 4th m.BC for a temporary survival of standard SCU elements in this region before they were replaced by monochrome, and ultimately RW-Cl., ceramics.

17. In the Vasilikos Valley: R/062, R/065, and R/445; in the Ezousas Valley P/379 and P/380; and probably also P/398 in the upper Dhiarizos Valley.



CHAPTER 4
Temporal Configurations: The Absolute Chronology and Culture Sequence of the Formative Period

1. Methods and Procedures

Thus far, the spatial dimension of early Holocene settlement on Cyprus has framed most of the issues discussed in the preceding chapters, from the stratification of cultural remains at one particular site (Eagle Cliff), via the effect of water barriers on the biogeography of this and other islands, to the links between site distribution and the spatial structure of the island ecosystem. Since this study addresses diachronic processes, temporal problems encroached repeatedly, but they were treated essentially as ancillary evidence in an attempt to determine if, and how, spatial configurations changed through time. Yet, as was hinted at in the **PREFACE**, an area of rapid advance over the last decade is that of ^{14}C dating, both as regards theoretical research in calibration and the dramatic growth of dated contexts on Cyprus itself. Therefore, it is now necessary to shift the emphasis from space to time, and to discuss the impact of these developments on the chronology of the Formative period, from the highest date for Akrotiri to the lowest date for the ECU-PCU transition.

Notwithstanding the objectivity of a tried and tested method of chronometric analysis (boon to some and bane to others, depending one's faith in physics or the written word), constructing prehistoric chronologies remains a largely interpretive task, and for this reason it is important to understand how a particular chronological framework has evolved through changing evidence and changing views. Hence the discussion which follows presupposes knowledge of previous chronologies whose development it cannot summarize for lack of room; such summaries can be found in Held (1983:164-204) and Stanley Price 1972b, 1976b:26-47 *passim*, 1979b). The need for brevity also dictates a comparatively cursory treatment of the Kalavasos *Tenta* dates because they are now discussed in detail in the site's final report (Todd 1987:173-178), as well as the omission of preliminary chronological hypotheses concerning Akrotiri *Aetokremnos* prior to its excavation, and of a discussion of the Late ECU-PCU transition and of possible links between Khirbet Kerak pottery and local EP red-and-black wares. These can be found elsewhere (Held 1983, 1989a).

Archaeological chronologies endeavor to reconstruct segments of human history, and since historical time is sidereal, extensive use is made in this chapter of calibrated dates. Section 4 of the **PREFACE** sets out the conventions for citing ^{14}C determinations in the present study. Although the principle of dendrochronological calibration is simple, the interpretation of dates with multiple intercepts (produced by wiggles in the curve) is not, particularly since the uncertainty inherent in such dates is increased by their SDs, which also have to be taken into account. The result can be a bewildering permutation of a conventional date by the time it has been distilled into a succinct chronological statement. In order to allow the reader to determine this process, a complete set of computer calibrations and probability calculations for all currently available prehistoric radiocarbon dates has been appended (**APPENDIX 4,** infra). These data, which are based on the high-precision curves adopted by the 12th International Radiocarbon Conference (Trondheim, 1985), should be consulted in conjunction with the Compendium of ^{14}C and TL Dates that is embodied in Table 6, infra.

The effect of the first series of nine ^{14}C dates for Cyprus on Dikaios' chronology of 1961 (Dikaios 1961a:209-217) was twofold. While confirming his previous dating of the Sotira Culture stage, it necessitated adjustments of the dating of the Khirokitia Culture stage and of the end of the earlier part of the Erimi Culture stage which, in the case of the Khirokitia Culture, were substantial. Since then, even though their number has increased more than thirteenfold, measurements have continued to have a mixed effect on the conventional chronology. With a few exceptions such as Kalavasos *Tenta* (with some very early dates), Rizokarpaso *Cape Andreas Kastros*, and Dhali *Agridhi*, new series of dates for the Khirokitia and Sotira cultures have tied in fairly well with existing sets. However, the gradual process of backdating the start of the Khirokitia Culture has now been overtaken by the extremely high determinations for Akrotiri *Aetokremnos*, confirming earlier suspicions that it seemed to be culturally antecedent to typical KCU occupations (see **CHAPTER 1**, supra). The sets now available for sites of the Erimi Culture in western Cyprus (i.e., Lemba *Lakkous*, Kissonerga *Mylouthkia*, and Kissonerga *Mosphilia*), on the other hand, appear consistent in their tendency to diverge from the old Erimi *Pamboula* dates, and in the case of six out of the nine Lemba dates as well as one date for *Mosphilia* they even fall outside the upper limits of the old 'Chalcolithic I and II' periods. These divergences serve to emphasize the need to calibrate and restructure the conventional ^{14}C chronology, a need that so far has found only occasional expression in the literature (Peltenburg 1981b, 1982a, *passim*, n.d.a).

Besides the actual proliferation of radiocarbon measurements for Formative sites on the island,

four technical developments have affect the dates or will do so in future. The first, the adjustment in the mid-1960s of the previously obtained dates whose samples had not received pretreatment for the then-new NBS oxalic-acid standard (Deevey et al. 1967), effected a slight lowering of the dates used by Dikaios in his chronology of 1961—too negligible to interfere with it. The second advance was calibration, which suddenly yielded comparatively high calendric dates before ca. 1,500 BC. The third was the establishment of a more precise half-life value for ^{14}C; i.e., 5,730 ± 40, which by general consensus is more accurate than the original Libby value of 5,568 ± 30 and results in marginally higher dates. Since the present study utilizes both calibration and the long 5,730 half-life, calendar years for the early prehistoric period tend to be on the high side compared to older quotations, and this should be kept in mind throughout the remainder of this chapter. The immediate effect of calibration on the prehistoric chronology of Cyprus was to push back the beginning of the culture sequence well into the 7th m.BC, thereby lengthening the early prehistoric period considerably.

The fourth major development has been the introduction of Accelerator Mass Spectrometry (Banning and Pavlish 1978, 1979; Gowlett 1987; Hester 1987). The minute sample requirements and greater versatility as regards datable materials of the AMS technique promises to compensate for the general dearth of charcoal at EP sites on Cyprus, but due to the current long waiting periods accelerator dates have yet to make an impact on its early prehistoric chronology.[1]

At present, ^{14}C dates are available for 15 Formative sites out of a total of 46 that have been excavated partly or in full over the past sixty-five years.[2] To this must be added two thermoluminescence dates for Klepini *Troulli* II. These 110 dates, as well as 9(!) dates currently available for the late prehistoric period, are listed in Table 6, infra, and shown graphically in Figs. 16-19, supra.[3] The table contains dates calculated on both half-lives so that a check on the calibrated measurements is provided, while the dispersion diagrams clearly emphasize the clustering of dates in what corresponds to the three principal cultures of the Formative (Khirokitia, Sotira, and Erimi), as well as illustrating the gradual 'seepage' of dates into the 1,200-cal-yr lacuna separating the KCU from the SCU. Of the 14 dates that seem to bridge this gap, the three for Rizokarpaso *Cape Andreas Kastros* have been rejected by the excavator on archaeological grounds (Le Brun 1977:308, 1981a:71, 1988:28), the Akrotiri *Aetokremnos* determination is at odds with its companion dates and at any rate much too late for the site's context (cf. **CHAPTER 1**, and below), while the date from Dhali *Agridhi* has a very wide SD and moreover lacks dates from the same site to support it. Also on its own is a statistically contemporary date from Kalavasos *Vasilikos*.

COMPENDIUM OF ^{14}C AND TL MEASUREMENTS[1]

Con-text[2]	^{14}C Age BP 5,568	BC 5,568[3]	BP 5,730[3]	BC 5,730[3]	Cal BC IRCT 85[4]	Sample ID Laboratory
AKROTIRI *AETOKREMNOS* (Site ID: #S/354)						
PN	10,340±340*	8,490	10,650	8,700	BDS[5](9,490)	Beta-28795
PN	10,310±100*	8,360	10,619	8,669	BDS (9,360)	Pta-3112
PN	10,280±100*	8,330	10,588	8,638	BDS (9,330)	Pta-3322
PN	10,150± 60*	8,200	10,454	8,504	BDS (9,200)	SMU-1991
PN	10,150±130	8,200	10,454	8,504	BDS (9,200)	TX-5833B
PN	10,120±110*	8,170	10,424	8,474	BDS (9,170)	Beta-22811
PN	9,490±120	7,540	9,775	7,825	BDS (8,540)	TX-5833A
PN	9,420±550	7,470	9,702	7,752	BDS (8,470)	TX-5976B
PN	9,250±150	7,300	9,528	7,578	BDS (8,300)	Pta-3128
PN	9,240±420	7,290	9,517	7,567	BDS (8,290)	TX-5833C
PN	9,100±790	7,150	9,373	7,423	BDS (8,150)	ISGS-1743
PN	9,040±160	7,090	9,311	7,361	BDS (8,090)	TX-5976A
PN	8,330±100♠	6,380	8,580	6,630	BDS (7,380)	Pta-3281
PN	6,310±160♥♠	4,360	6,499	4,549	5,273(3)[6]	Beta-3412
PN	3,700± 60♠	1,750	3,811	1,861	2,082(3)	Pta-3435
Average[7]	**9,741**	**7,791**	**10,033**	**8,083**	**BE[5] (8,791)**	
^{14}C Dispersion[8](n=12): <8,700-8,571><8,571-[**8,150**]-7,572><7,572-7,361>						
Cal Dispersion:[8] Not applicable.						
KALAVASOS *TENTA* (Site ID: #R/062)						
KCU	9,240±130♥	7,290	9,517	7,567	BDS (8,290)	P-2972
KCU	8,870±500♥	6,920	9,136	7,186	BDS (7,920)	P-2976
KCU	8,720±400♥	6,770	8,982	7,032	BDS (7,770)	P-2785
KCU	8,480±110♥	6,530	8,734	6,784	BDS (7,530)	P-2554
KCU	8,350±200♥	6,400	8,600	6,650	BDS (7,400)	P-2548
KCU	8,020± 90♥	6,070	8,261	6,311	7,039	P-2974
KCU	8,010±360♥	6,060	8,250	6,300	7,036	P-2973
KCU	7,600±100♥	5,650	7,828	5,878	6,441	P-2782
KCU	7,430± 90♥	5,480	7,653	5,703	6,202(3)	P-2555
KCU	7,400±260♥	5,450	7,622	5,672	6,201(3)	P-2978
KCU	7,380±100♥	5,430	7,601	5,651	6,194(2)	P-2784
KCU	7,250±100♥	5,300	7,467	5,517	6,090	P-2552
KCU	7,180± 90♥	5,230	7,395	5,445	6,039(5)	P-2550
KCU	7,140± 90♥	5,190	7,354	5,404	6,016(3)	P-2551
KCU	7,130±410♥	5,180	7,344	5,394	5,985	P-2783
KCU	7,120± 90♥	5,170	7,334	5,384	5,981	P-2779
KCU	7,110± 90♥	5,160	7,323	5,373	5,978	P-2553
KCU	6,970±310♥	5,020	7,179	5,229	5,820	P-2975
KCU	6,580±290♥	4,630	6,777	4,827	5,487	P-2977
KCU	6,300± 80♥	4,350	6,489	4,539	5,240	P-2781
KCU	5,630±260♥♠	3,680	5,799	3,849	4,468	P-2549
Average	7,614	5,664	7,842	5,892	BE (6,382♣)	
^{14}C Dispersion (n=20): <7,567-6,480><6,480-[**5,661**]-5,389><5,389-4,539>						
Cal Dispersion: Not applicable.						
SCU	5,830± 60♥	3,880	6,005	4,055	4,725	P-2780
Aver.	Not applicable.					
^{14}C Dispersion: Not applicable.						
Cal Dispersion: Not applicable.						
DHALI *AGRIDHI* (Site ID: #K/002)						
KCU	7,990± 80	6,040	8,230	6,280	6,933(5)	P-2775
KCU	7,400± 60	5,450	7,622	5,672	6,201(3)	P-2768
KCU	7,290±465	5,340	7,509	5,559	6,112	GX-2848A
Average	7,560	5,610	7,787	5,837	6,598♣	
^{14}C Dispersion: Not applicable.						
Cal Dispersion (n=9): <7,028-6,969><6,969-[6,829]-6,197><6,197-6,112>						

Con-text[2]	^{14}C Age BP 5,568	BC 5,568[3]	BP 5,730[3]	BC 5,730[3]	Cal BC IRCT 85[4]	Sample ID Laboratory
DHALI *AGRIDHI* (Continued)I						
SCU	6,415±310	4,465	6,607	4,657	5,345	GX-2847A
SCU	5,700±100	3,750	5,871	3,921	4,557(3)	P-2769
Average	6,057	4,107	6,239	4,289	4,754♣	

^{14}C Dispersion: Not applicable.
Cal Dispersion: Not applicable.

RIZOKARPASO *CAPE ANDREAS KASTROS9* (Site ID: #F/056)						
KCU	7,775±125	5,825	8,008	6,058	6,598	MC-805
KCU	7,450±120	5,500	7,673	5,723	6,311(3)	MC-807
KCU	6,760±140♠	4,810	6,983	5,013	5,637	?
KCU	6,275±105♠	4,325	6,463	4,513	5,236	?
KCU	6,140±200♠	4,190	6,324	4,374	5,139(5)	MC-803
Average	7,612	5,662	7,840	5,890	6,383♣	

^{14}C Dispersion: Not applicable.
Cal Dispersion: Not applicable.

KHIROKITIA *VOUNI* (Site ID: #R/063)						
KCU	7,930±130	5,980	8,168	6,218	6,784	Ly-4307
KCU	7,930±320	5,980	8,168	6,218	6,784	Ly-3718
KCU	7,700±150	5,750	7,931	5,981	6,527(3)	Ly-3717
KCU	7,655±160	5,705	7,885	5,935	6,466	St-415
KCU	7,540±180	5,590	7,766	5,816	6,419	Ly-3719
KCU	7,515±125	5,565	7,740	5,790	6,404	St-414
KCU	7,470±140	5,520	7,694	5,744	6,314(3)	Ly-4308
KCU	7,451± 81	5,501	7,675	5,725	6,311(3)	BM-853
KCU	7,445±160	5,495	7,668	5,718	6,291(2)	St-416
KCU	7,442± 61	5,492	7,665	5,715	6,231	BM-854
KCU	7,308± 74	5,358	7,527	5,577	6,121	BM-855
KCU	7,294± 78	5,344	7,513	5,563	6,114	BM-852
KCU	7,000±150	5,050	7,210	5,260	5,840	Ly-3716
KCU	6,310±170♠	4,360	6,499	4,549	5,273(3)	Ly-4306
KCU	6,230±160♠	4,280	6,417	4,467	5,230	Ly-4309
Average	7,514	5,564	7.739	5,789	6,360♣	

^{14}C Dispersion (n=13): <6,218-5,946><5,946-[5,744]-5,680><5,680-5,260>
Cal Dispersion (n=20): <6,784-6,476><6,476-[6,360]-6,234><6,234-5,840>

KALAVASOS *VASILIKOS* River Bridge Site (Site ID: #R/382)						
KCU?	6,330±100	4,380	6,520	4,570	5,273(3)	OX-A-805
Average	Not applicable.					

^{14}C Dispersion: Not applicable.
Cal Dispersion: Not applicable.

AYIOS EPIKTITOS *VRYSI* (Site ID: #K/028)						
SCU	5,825±145	3,875	6,000	4,050	4,724	Birm-182
SCU	5,740±140	3,790	5,912	3,962	4,630(3)	Birm-337
SCU	5,420± 80	3,470	5,583	3,633	4,288(3)	GU-522
SCU	5,389± 53	3,439	5,551	3,601	4,243	BM-847
SCU	5,372± 92	3,422	5,533	3,583	4,238	BM-846
SCU	5,360± 57	3,410	5,521	3,571	4,235	BM-845
SCU	5,355± 67	3,405	5,516	3,566	4,192(3)	BM-843
SCU	5,340± 95	3,390	5,500	3,550	4,195(3)	GU-523
SCU	5,330± 57	3,380	5,490	3,540	4,194(3)	BM-848
SCU	5,275± 47	3,325	5,433	3,483	4,144(5)	BM-844
SCU	5,255±120	3,305	5,413	3,463	4,040	GU-524
SCU	5,224± 78	3,274	5,381	3,431	4,020(3)	BM-849
SCU	5,210± 85	3,260	5,366	3,416	4,020(3)	GU-1459
SCU	5,180± 60♦	3,230	5,335	3,385	3,994	BM-1908
SCU	5,120± 45♦	3,170	5,274	3,324	3,969	BM-1907
ECU	5,030± 80♦	3,080	5,181	3,231	3,836(5)	BM-1906
SCU	3,105±130♠	1,155	3,198	1,248	1,410	GU-521
Average	5,339	3,389	5,499	3,549	4,157♣	

^{14}C Dispersion (n=16): <4,050-3,592><3,592-[3,545]-3,423><3,423-3,231>
Cal Dispersion (n=39): <4,724-4,235><4,235-[4,166]-4,021><4,021-3,790>

Context[2]	^{14}C Age BP 5,568	BC 5,568[3]	BP 5,730[3]	BC 5,730[3]	Cal BC IRCT 85[4]	Sample ID Laboratory
PHILIA *DHRAKOS* A (Site ID: #N/019)						
SCU	5,270±100	3,320	5,428	3,478	4,144(5)	Birm-72
Average	Not applicable.					
^{14}C Dispersion: Not applicable.						
Cal Dispersion: Not applicable.						
SOTIRA *TEPPES* (Site ID: #S/080)						
SCU	5,405±110	3,455	5,567	3,617	4,285(3)	St-337
SCU	5,095±130	3,145	5,248	3,298	3,873(3)	St-350
Average	5,250	3,300	5,407	3,457	4,079♣	
^{14}C Dispersion: Not applicable.						
Cal Dispersion (n=6): <4,325-4,282> <4,282-[4,100]-3,840> <3,840-3,825>						
KALAVASOS *PAMBOULES* (Site ID: #R/061)						
ECU	5,085±110	3,135	5,238	3,288	3,872(3)	St-419
Average	Not applicable.					
^{14}C Dispersion: Not applicable.						
Cal Dispersion: Not applicable.						
KALAVASOS *AYIOUS* (Site ID: #R/059)						
ECU	11,020±130 ♠	9,070	11,351	9,401	BDS (10,070)	BM-1835R
ECU	5,040±110	3,090	5,191	3,241	3,867(3)	BM-1832R
ECU	5,030±120	3,080	5,181	3,231	3,836(5)	BM-1834R
ECU	5,000±170	3,050	5,150	3,200	3,785	BM-1833R
ECU	4,700±310	2,750	4,841	2,891	3,431(3)	BM-1836R
Average	4,942	2,992	5,090	3,140	3,738♣	
^{14}C Dispersion: Not applicable.						
Cal Dispersion (n=12): <3,910-3,880> <3,880-[3,802]-3,644> <3,644-3,384>						
KLEPINI *TROULLI* II (Site ID: #K/037)						
SCU	3,860±480	TL date	Ph TL 09a			
SCU	3,570±445	TL date	Ph TL 09b			
Average	3,715					
^{14}C Dispersion: Not applicable.						
Cal Dispersion: Not applicable.						
KISSONERGA *MYLOUTHKIA* (Site ID: #P/084)						
ECU	4,815± 60	2,865	4,959	3,009	3,634	BM-1475
ECU	4,790± 80	2,840	4,934	2,984	3,578(3)	BM-1539
ECU	4,765± 55	2,815	4,908	2,958	3,574(3)	BM-1473
ECU	4,740± 50	2,790	4,882	2,932	3,569(3)	BM-1540
ECU	4,665± 50	2,715	4,805	2,855	3,449(3)	BM-1474
ECU	4,650± 50	2,700	4,789	2,839	3,375	BM-1476
Average	4,737	2,787	4,879	2,929	3,537♣	
^{14}C Dispersion (n=6): <3,009-2,984> <2,984-[2,945]-2,855> <2,855-2,839>						
Cal Dispersion (n=14): <3,634-3,604> <3,604-[3,554]-3,494> <3,494-3,375>						
ERIMI *PAMBOULA* (Site ID: #S/075)						
ECU	4,575± 80	2,625	4,712	2,762	3,349	St-202
ECU	4,485± 80	2,535	4,620	2,670	3,197(5)	St-203
ECU	4,425±150	2,475	4,558	2,608	3,064(3)	St-338
Average	4,495	2,545	4,630	2,680	3,169♣	
^{14}C Dispersion: Not applicable.						
Cal Dispersion (n=9): <3,349-3,254> <3,254-[3,169]-3,080> <3,080-3,041>						

Con-text[2]	^{14}C Age BP 5,568	BC 5,568[3]	BP 5,730[3]	BC 5,730[3]	Cal BC IRCT 85[4]	Sample ID Laboratory
KALAVASOS *PANAYIA* (No Site ID)						
MC	4,330± 80	2,380	4,460	2,510	2,921	P-2980
Average	Not applicable.					
^{14}C Dispersion: Not applicable.						
Cal Dispersion: Not applicable.						
LEMBA *LAKKOUS* (Site ID: #P/085)						
ECU	5,710±100♦	3,760	5,881	3,931	4,559(3)	BM-2280
ECU	5,000±260	3,050	5,150	3,200	3,785	BM-1543
ECU	4,280±100	2,330	4,408	2,458	2,911	HAR-6173
ECU	4,090± 90	2,140	4,213	2,263	2,719(5)	BM-1542
ECU	4,050± 50	2,100	4,171	2,221	2,584	BM-1541A
ECU	4,000± 45	2,050	4,120	2,170	2,535(3)	BM-1541
ECU	3,970± 45	2,020	4,089	2,139	2,483	BM-1354
ECU	3,930±100♦	1,980	4,048	2,098	2,464	BM-2278
ECU	3,890± 50	1,940	4,006	2,057	2,432(5)	BM-1353
Average	4,324	2,374	4,454	2,504	2,794♣	
^{14}C Dispersion (n=9): <3,931-2,643><2,643-[2,221]-2,129><2,129-2,057>						
Cal Dispersion (n=21): <4,577-2,867><2,867-[2,584]-2,463><2,463-2,406>						
KISSONERGA *MOSPHILIA* (Site ID: #P/083)						
ECU	4,030±110♦	2,080	4,151	2,201	2,539(3)	BM-2279
Average	Not applicable.					
^{14}C Dispersion: Not applicable.						
Cal Dispersion: Not applicable.						
AMBELIKOU *ALETRI* (No Site ID)						
MC	3,660± 55	1,710	3,770	1,820	2,084(5)	LU-1694
Average	Not applicable.					
^{14}C Dispersion: Not applicable.						
Cal Dispersion: Not applicable.						
EPISKOPI *PHANEROMENI* (No Site ID)						
LC1A	3,720± 70	1,770	3,832	1,882	2,077(5)	P-2386
LC1A	3,640±100	1,690	3,749	1,799	2,000(3)	H-7073
LC1A	3,620± 60	1,670	3,729	1,779	2,006(5)	P-2387
LC1A	3,520± 70	1,570	3,626	1,676	1,852(3)	P-2388
LC1A	3,350±100	1,400	3,450	1,500	1,662(5)	H-7071
Average	3,570	1,620	3,677	1,727	1,918♣	
^{14}C Dispersion: Not applicable.						
Cal Dispersion (n=21): <2,139-2,035><2,035-[1,989]-1,723><1,723-1,639>						
ALAMBRA *MOUTTES* (No Site ID)						
MC	3,500±120	1,550	3,605	1,655	1,825(5)	ETH-210
MC	3,440±140	1,490	3,543	1,593	1,742	ETH-206
Average	3,470	1,520	3,574	1,624	1,811♣	
-^{14}C Dispersion: Not applicable.						
Cal Dispersion (n=6): <1,878-1,842><1,842-[1,810]-1,785><1,785-1,742>						

[1] In descending order of age, from oldest to youngest date within sets and from oldest median/average to youngest median/average among sets.

[2] Cultural association of stratigraphic sample origin as reported by the excavator(s). PN='Pre-' or 'Proto-Neolithic,' KCU=Khirokitia Culture, SCU=Sotira Culture, ECU=Erimi Culture, MC=Middle Cypriot Culture, LC=Late Cypriot Culture.

[3] Half-lives: 5,568±30 (Libby h.-l.) and 5,730±40. Observe international convention by quoting ^{14}C age on Libby half-life, but use more accurate long half-life for interpretation of data.

[4] High-precision dendrochronological calibration curves adopted by the 12th International Radiocarbon

Conference, Trondheim, 1985 (see Stuiver and Kra 1986 and **APPENDIX 4**, infra, for references to individual datasets and calibration curves).

[5] BDS=Beyond currently available dataset. Best estimates in parentheses.

* Marine sample. ^{14}C age adjusted by -690 yr (Mediterranean Delta R).

♠Age incompatible with archaeological context and hence discounted by excavator.

♦British Museum sample affected by systematic error (Tite et al. 1987). Error-corrected samples are marked ∫.

♥Sample not ^{13}C-corrected.

♣Average of all intercepts (see calibration tables, **APPENDIX 4**, infra).

[6] If more than one intercept, date represents average of (n) intercepts.

[7] Excluding ages marked ♠ (see above).

[8] For discussion of dispersion (diagrams), see Ottaway (1973). Quantiles are calculated for uncalibrated ^{14}C dates (BC) on 5,730 half-life and/or for calibrated dates (all intercepts) (cal BC), and shown as follows: <lower quartile> <interquartile, including **bolded** and bracketed median> <upper quartile>. Minimum n=6. Ages marked ♠ (see above) have been excluded from quantile calculations.

[9] Sample IDs of two recently announced dates and at least one further date not available at time of going to press.

Table 6: Compendium of ^{14}C and TL Measurements for EP Cyprus.

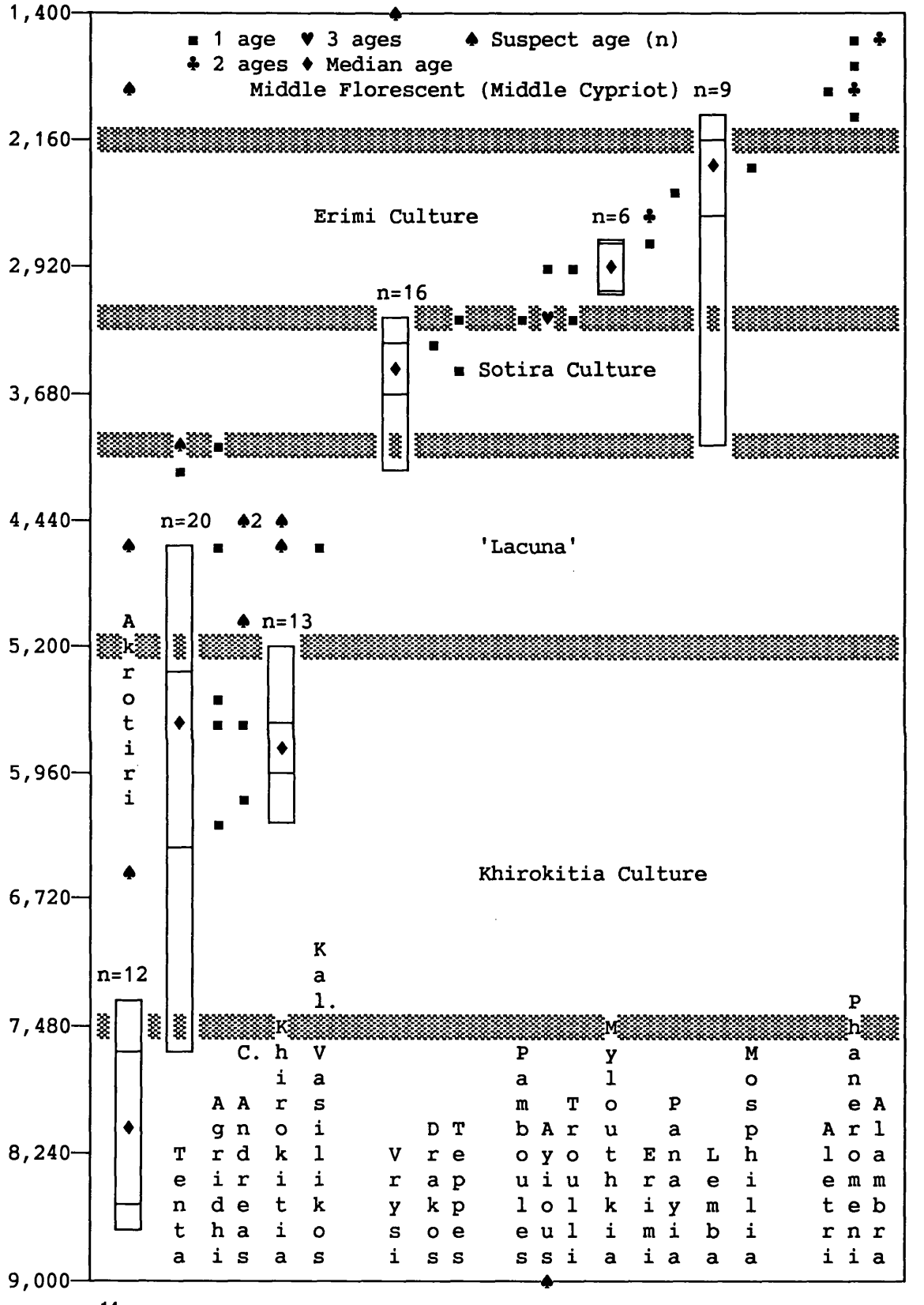


Fig. 16: ^{14}C Dispersion Diagram. Time scale and radiocarbon dates (BC) based on 5,730 half-life. Troulli TL dates have been converted to ^{14}C 'equivalents' for comparison. Caution: Display rounds numbers to nearest 152-year interval; see Table 6, supra, for precise values.

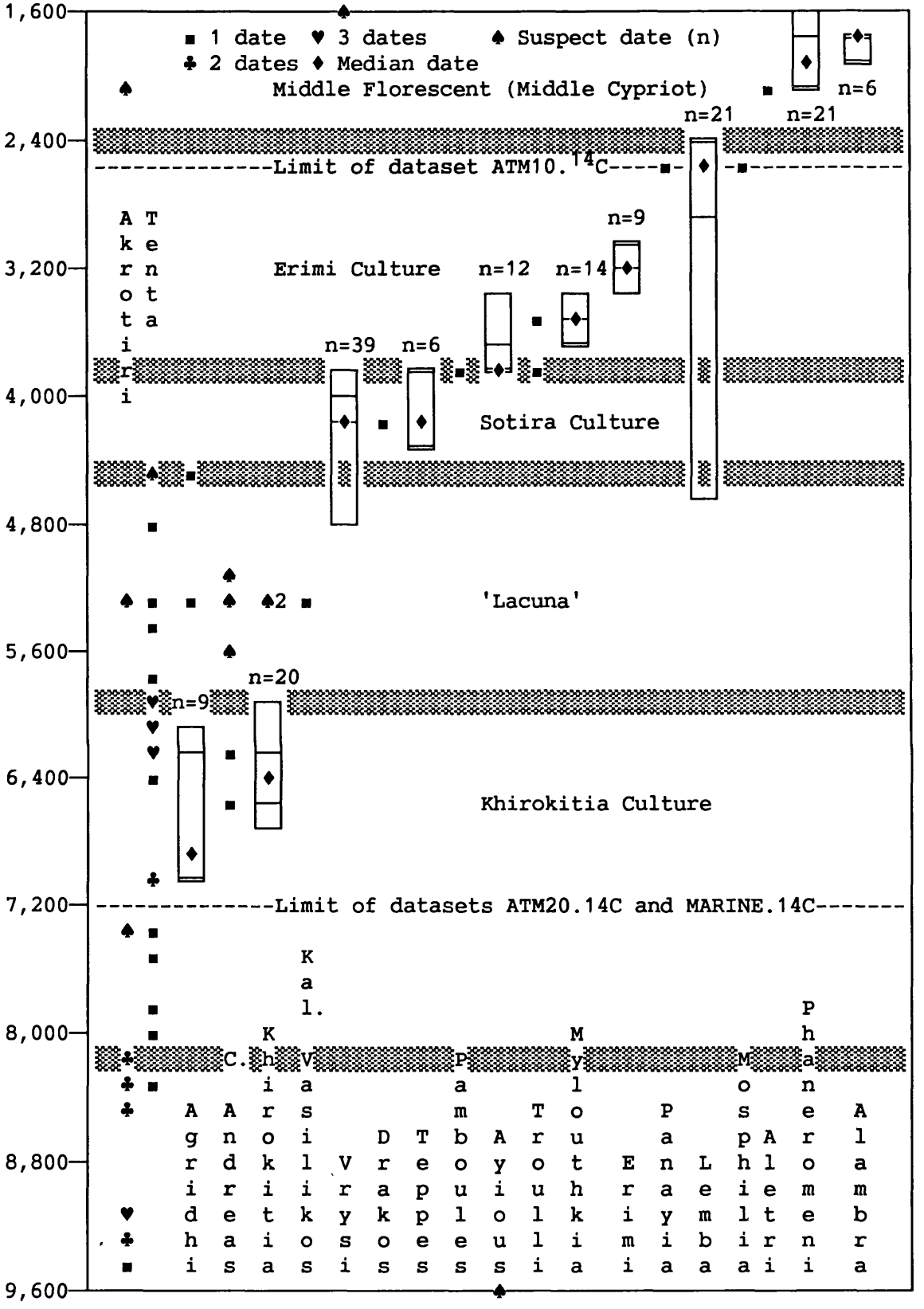


Fig. 17: Cal Dispersion Diagram. Time scale and calendric dates (cal BC) based on high-precision calibration (IRCT 1985). Caution: Display rounds numbers to nearest 160-year interval; see Table 6, supra, for precise values. Double lines indicate lower/upper quartiles too short for display.

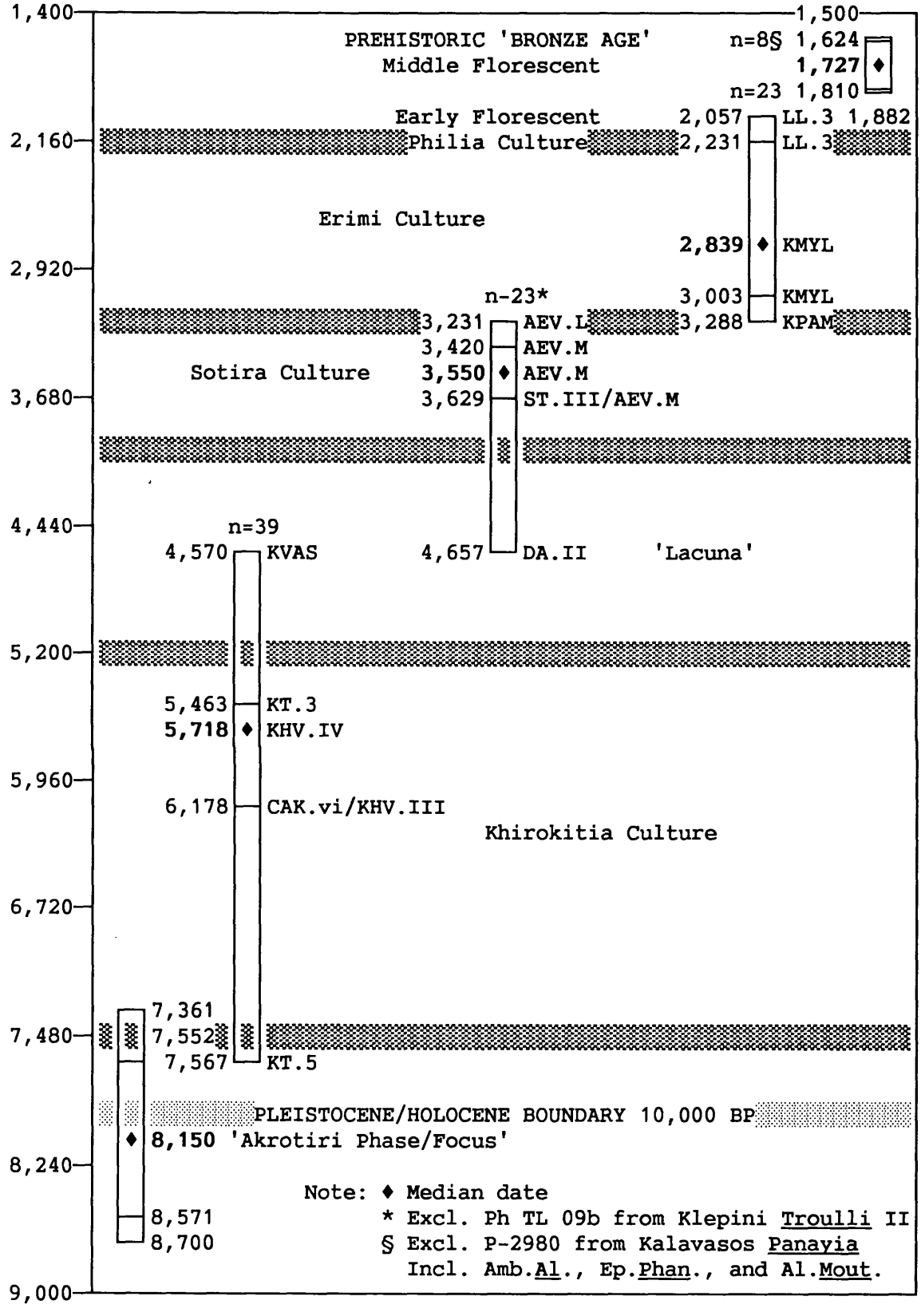


Fig. 18: Cumulative ^{14}C Dispersion Diagram. Bars contain all determinations for the same culture. Time scale and radiocarbon dates (BC) based on 5,730 half-life. Caution: Display rounds numbers to nearest 152-year interval. Note short chronometric break between ECU-MF dates.

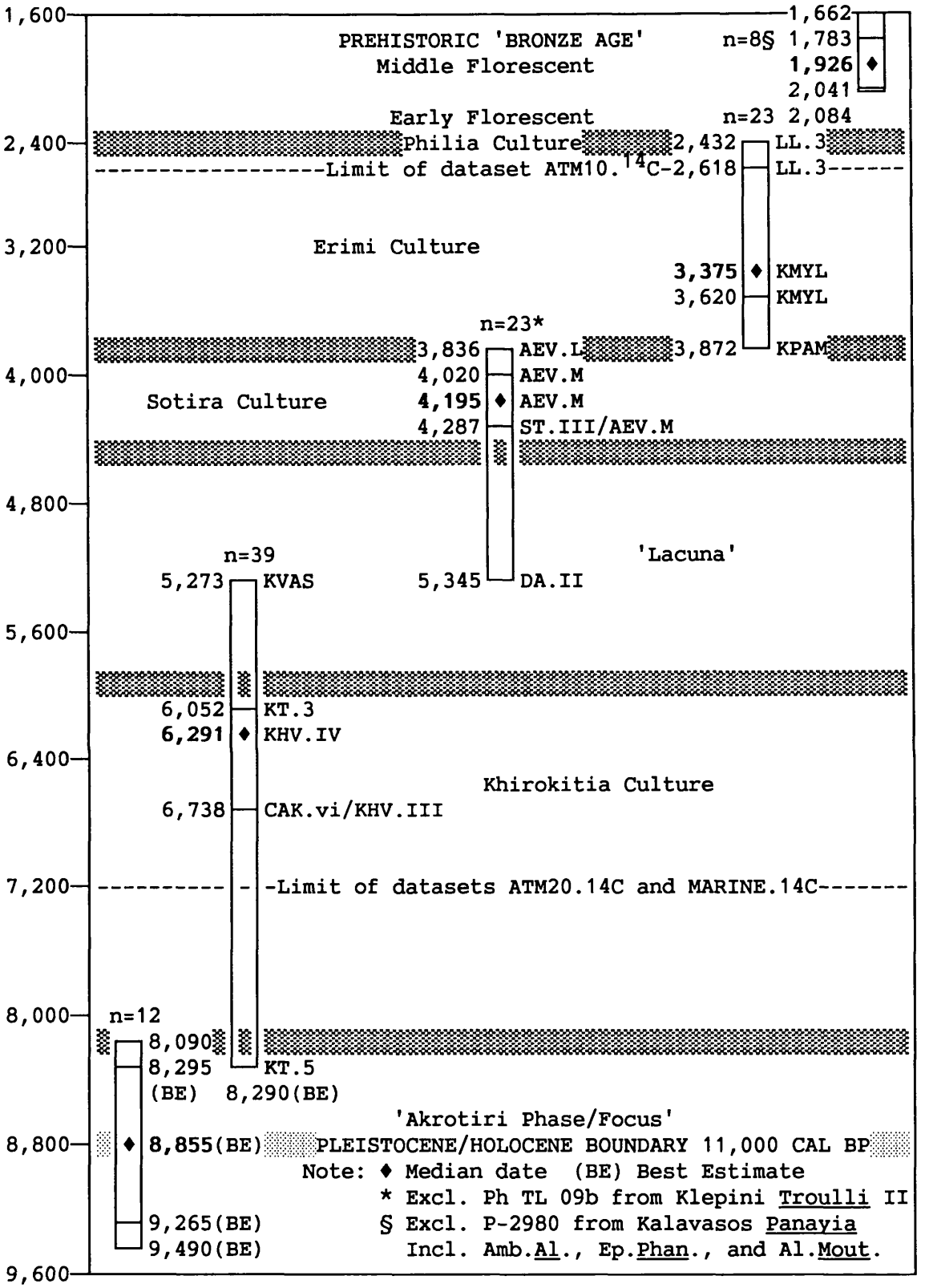


Fig. 19: Cumulative Cal Dispersion Diagram. Bars contain all determinations for the same culture. Time scale and calendric dates (cal BC) based on high-precision calibration (IRCT 1985). Caution: Display rounds numbers to nearest 160-year interval. Note short chronometric break between ECU and MF. Akrotiri dispersion based on best estimates.

The anomalous positions of these dates thus merely underscores the dearth of coherent sets of measurements for the period between approx. 5,800-4,600 cal BC. Two dates for aceramic and one for ceramic Kalavasos *Tenta*, and two others for ceramic Ayios Epiktitos *Vrysi* are more in accordance with each other and with their archaeological contexts, particularly the ones dating the ceramic reoccupation at *Tenta* and the early occupation at *Vrysi*. They furnish some welcome tangible evidence for a possible cultural continuity between the aceramic and ceramic stages of the Formative (see discussion of the 'gap chronology' below).

After these preliminary remarks, the ^{14}C and TL measurements will now be examined individually, starting with the beginning of the Early Formative. Quotations are based on the long (5,730) half-life, and the reader is referred to Table 6 for conversions to the Libby value to obtain dates as published by the laboratories and excavators. When calibrated dates are discussed in terms of the standard deviation of T, the most likely sigma ranges are given by citing the highest probability distribution (*P*) computed for each sample as shown in **APPENDIX 4**, infra.

2. Early Formative Period

In examining the earliest chronometric evidence from Cyprus, the discussion now returns to the occupation on Akrotiri Peninsula described in **CHAPTER 1**. The fact that Akrotiri *Aetokremnos* (#Lm.67 [S/354]) already ranks as one of the best-dated prehistoric sites on the island after only two short seasons is not merely a reflection of an unusually consistent set of determinations but also testifies to the priority given to the collection of datable samples (cf. discussion of Khirokitia *Vouni* set, infra). This strategy has clearly paid off, for the uniqueness of the site means that relative dating methods cannot be employed in determining its age. Furthermore, the consistency of measurements involving five different laboratories has surpassed all hopes and provided strong ammunition against arguments questioning the primary nature of the deposits and their exceptionally early age.

8,700 ± 130 BC (Beta-28795)*
8,669 ± 100 BC (Pta-3112)*
8,638 ± 100 BC (Pta-3322)*
8,504 ± 60 BC (SMU1991)*
8,504 ± 130 BC (TX-5833B)
8,474 ± 110 BC (Beta-22811)*
7,825 ± 120 BC (TX-5833A)
7,752 ± 550 BC (TX-5976B)
7,578 ± 150 BC (Pta-3128)
7,567 ± 420 BC (TX-5833C)
7,423 ± 790 BC (ISGS-1743)
7,361 ± 160 BC (TX-5976A)
6,630 ± 100 BC (Pta-3281)

4,549 ± 160 BC (Beta-3412)♥♠
1,861 ± 60 BC (Pta-3435)♠

The pre-excavation dates Pta-3112, Pta-3322, Pta-3128, Pta-3281, Beta-3412, and Pta-3435 have already been discussed (**CHAPTER 1**, supra). Since the last three measurements came from surface samples, Beta-3412 and Pta-3435 were immediately discounted. The former was obtained from a charred *Phanourios* bone and is the only sample in the set not corrected for isotopic fractionation. With an averaged true date of 5,273 cal BC, in comparative terms it falls squarely inside the lacuna separating the Khirokitia and Sotira cultures and is matched closely by dates from Dhali *Agridhi*, (GX-2847A, 5,345 cal BC), Kalavasos *Tenta* (P-2781, 5,240 cal BC) and *Vasilikos* (OX-A-805, 5,273 cal BC), Khirokitia *Vouni* (Ly-4306, 5,273 cal BC; Ly-4309, 5,230 cal BC), and Rizokarpaso *Cape Andreas Kastros* (Sample #?, 5,236 cal BC; MC-803, 5,139 cal BC). The youngest assay (Pta-3435) was obtained from a bone collagen sample, and its averaged true date of 2,082 cal BC places it well within the prehistoric Bronze Age. The third surface sample, Pta-3281, which came from a charred part of the same bone that yielded the collagen date, gave a best estimate (BE) of 7,380 cal BC. As such it may be compared with the later of the lower-quartile dates of a typical KCU settlement on the South Coast, Kalavasos *Tenta* (i.e. P-2548, BE 7,400 cal BC; P-2554, BE 7530 cal BC), and with the first two interquartile dates for the same site (i.e. P-2973, 7,036 cal BC; and P-2974, 7,039 cal BC; see below).

Consequently, prior to excavation Pta-3281 seemed too low for a pre-KCU occupation but not quite as obviously aberrant as the other two surface dates.

The youngest of the stratified pre-excavation samples was over 900 years older: Pta-3128, taken from a charred bone in the bone bed *below* the shell layer (original section), closely matches the earliest date for Kalavasos *Tenta* (P-2972, BE 8,290 cal BC) and easily overlaps with the two others (P-2976, BE 7,920 cal BC; and P-2785, BE 7,770 cal BC) if one SD is allowed for. (However, see below for confidence level of these last two dates.)

Still older and most supportive of the principal hypothesis about the site's nature were the two shell dates Pta-3112 and Pta-3322, with best estimates of 9,360 cal BC and 9,330 cal BC, respectively. Such stupefyingly high dates (by Cypriot standards, at any rate) were bound to draw fire, and the fact that both samples came from the same shell (inner and outer fraction) was promptly turned against them. It is interesting to note, however, that the issuing lab had no such qualms (see **CHAPTER 1**, n.2), so that a prima facie case for their rejection did not exist.

The poor internal coherence of these initial measurements from Site E, coupled with uncertainty

about its material culture, gave rise to three preliminary hypotheses. Based on the disparate evidence of Pta-3112, Pta-3128, and Pta-3281, these postulated that Site E either represented indeed a 'pre-neolithic'/'proto-neolithic' occupation, or a special-function site of the early Khirokitia Culture, or a contemporaneous but completely separate human group. The last scenario was the unlikely conclusion arising from the possibility that Pta-3281 was the correct date; it was used essentially as a strawman which it was hoped future evidence would knock over (Held 1983:221-233).

On exclusion of the three surface dates, the remaining 12 measurements form a very homogeneous group spanning a period of just over 1,300 radiocarbon years (1,300 cal yr). This range, as the discussion of the stratigraphy made abundantly clear, does not indicate the length of occupation but merely reflects the inherent error margin of radiometric dating. Thus the measurements do not allow the distinction of successive stratigraphic phases, but one interesting technical aspect of the set is that there seems to be a discrete chronological clustering of shell dates and the rest of the dates. The former are consistently higher than the latter, with the exception of TX-5833B, whose greater age than the other non-shell dates may derive from the presence of old carbon in the humic acid fraction that was analyzed. Since the five shell dates (Beta-28795, Pta-3112, Pta-3322, SMU-1991, and Beta 22811) average 8,597 BC (BE 9,290 cal BC) and the six bone and charcoal dates (excluding TX-5833B) only 7,584 BC (BE 8,307 cal BC), without overlap of one-sigma ranges, the presence of some systematic error cannot be ruled out. One possible cause for suspicion is the tendency towards large SDs observable in the bone and charcoal cluster (e.g., TX-5976B, TX-5833C, ISGS-1743). An alternative explanation is that the shell dates are unrealistically high because T-690 yr, which is based on a reading of surface ocean water contamination off the coast of Algeria (see Simmons 1988a:555, Table 1), inadequately compensates for the reservoir effect (Delta-R) in the East Mediterranean. Similar disparities observed at other C14-dated coastal sites in the region might help indicate the magnitude of adjustment for marine shell dates.

As regards the provenience of the Site E samples, TX-5833A (bulk organic carbon), TX-5833B (humic acid fraction), TX-5833C (humins fraction), and SMU-1991 (shell) all date the dark ashy deposit of Feature 1 in the western area (N98.E88/87). TX-5976A (bone apatite), TX-5976B (same sample, bone collagen), and ISGS-1743 (total organics, incl. collagen, from bone) were obtained from 14 *Phanourios* bone fragments on top of Level 2 near the 'original section' in the SW part of the deposits (N95/E88) and are statistically indistinguishable from Pta-3128, the pre-excava-

tion bone sample from beneath this layer (see above). Beta-28795 (shell) comes from a layer with cultural material behind (east of) a slab of roof debris that covers Features 1 and 4 in the western area (top of Level 2, N98/E89) and as such provides the first date for the deposits at the back of the shelter.

Because the site bears the signs of a short-lived occupation, its age is best summarized as a weighted average for the series of non-surface dates. The dispersion yields a median date of 8,150 BC (BE 8,855 cal BC), meaning that Site E preceded the *floruit* of the Khirokitia Culture by 2,000-2,400 years. Thus, the chronometric evidence not only confirms the view that the occupation on Akrotiri Peninsula is culturally separate from and anterior to the Khirokitia Culture but also places it ca. one millennium before the two human fossils in Hall 2 at Corbeddu Cave, Sardinia (middle of Layer 2, next to *Prolagus Sardus* bones AMS-dated to 7,062 BC/BE 7,800 cal BC [UtC-300]; see Klein Hofmeijer, Sondaar et al. 1987, Klein Hofmeijer, Martini et al. 1987; Spoor and Sondaar 1986, 1987).

The highest determinations in the Kalavasos *Tenta* set (#La.9 [R/062]), a detailed discussion of which can now be found in Todd 1987:173-178), would appear to place the start of this site just over one millennium after Akrotiri *Aetokremnos* and make it the oldest KCU settlement in the island by almost 1.5 millennia. Of this, roughly nine centuries are spanned by the lower quartile (Fig. 16, supra) which consists of the following dates:

7,567 ± 130 BC (P-2972)
7,186 ± 500 BC (P-2976)
7,032 ± 400 BC (P-2785)
6,784 ± 110 BC (P-2554)
6,650 ± 200 BC (P-2548)

P-2972 and P-2785 have been tentatively assigned to a phase preceding the erection of the first substantial buildings (Period 5), during which several stakeholes, pits, and depressions in the bedrock on the upper west side and the lower south slope may indicate the earliest occupation of the site. P-2976 and P-2548 are at variance with an otherwise fairly consistent series of 6th-m.bc dates assigned to Periods 4 and 3 on the lower south slope and have been discounted by the excavator, whereas the age of P-2554 is considered much too old for the late architectural phase on top of the site with which it is associated (Period 2). Therefore, three of the five determinations in this series are incompatible with the proposed stratigraphy of the site.

The interquartile, spanning just under one millennium on the evidence of more than twice as many dates than the lower quartile, consists of the following determinations:

6,311 ± 90 BC (P-2974)
6,300 ± 360 BC (P-2973)
5,878 ± 100 BC (P-2782)
5,703 ± 90 BC (P-2555)
5,672 ± 260 BC (P-2978)
5,651 ± 100 BC (P-2784)
5,517 ± 100 BC (P-2552)
5,445 ± 90 BC (P-2550)
5,404 ± 90 BC (P-2551)
5,394 ± 410 BC (P-2783)
5,384 ± 90 BC (P-2779)

With the exception of P-2973 and P-2974, the interquartile represents a homogeneous series of determinations which are all acceptable for the mainphase Khirokitia Culture. Like P-2554 (see above), these two divergent measurements are associated with the late Period 2 on top of the site (S.34 and S.58, respectively) and, though not suspect per se, are therefore stratigraphically problematic. The excavator, while conceding that an antecedence of Period 2 buildings to those of Periods 4 and 3 in the lower part of the settlement cannot be ruled out before a stratigraphic continuity between the two areas has been established, nevertheless declares himself "presently unwilling to advance this hypothesis on the evidence of three ^{14}C dates" (Todd 1987:178). The remaining nine dates have been assigned to Periods 4 and 3 on the lower south slope and probably also the upper part of the site. All of them are archaeologically acceptable.

The set's upper quartile comprises four determinations, excluding P-2549 (3,849 ± 260 BC) from G12A:4.3 which represents a contaminated sample (Todd 1977a:380; 1987:176), as well as one date for the ceramic occupation, P-2780, which will be discussed below:

5,373 ± 90 BC (P-2553)
5,229 ± 310 BC (P-2975)
4,827 ± 290 BC (P-2977)
4,539 ± 80 BC (P-2781)

P-2553 and P-2975 accord well with the other dates for lower south slope (see above) and have been attributed to Periods 3 and '3 or later', respectively; while P-2781 is much lower than P-2782 and P-2783, which date adjacent deposits in the same square, and too late for a mainphase KCU context. Similarly, P-2977 seems too low for its context unless one or two SDs are added, unless it reliably dates the pit cut into a Period-2 building (S.28) from which the sample originates (Todd 1987:177). P-2781 and P-2977 are intriguing on their own because, as noted earlier, they belong to the small group of ^{14}C determinations that fall in the lacuna between the Khirokitia and Sotira cultures, and they would be credible in the context of a late or final phase of aceramic occupation at *Tenta*. No KCU site has yet been dated in such a way, so that hope in this respect depends

largely on the current CNRS excavations in the upper part of Khirokitia *Vouni* which have so far produced impressive stratigraphic results but very few radiocarbon dates (Le Brun 1978a onwards, see below).

4,050 ± 60 BC (P-2780)

Finally, P-2780 provides the first date for the SCU reoccupation of the site which is attested by ceramic deposits in three separate areas on the flanks of the hill, yet despite its general agreement with the chronological range of the Sotira Culture (Figs. 16 and 17, supra) there are contextual problems. This determination is closely comparable to three others from ceramic deposits in the island; namely, Birm-182 (4,050 ± 145 BC) and Birm-337 (3,962 ± 140 BC) from Ayios Epiktitos *Vrysi* and P-2769 (3,921 ± 100 BC) from Dhali *Agridhi* II (see below). Whereas the first two dates are too high by several hundred years for the Middle Phase at *Vrysi* with which they are stratigraphically associated, the last one dates a deposit of Dark-Faced Burnished ware and therefore gives a plausible indication of the age of an early SCU occupation. Based on P-2780 alone, *Tenta* would thus seem to have been reoccupied at the very beginning of the Sotira Culture, at roughly the same time as Dhali *Agridhi* II. However, Kromholz (1981), in her analysis of prehistoric ceramics from several Vasilikos Valley sites, demonstrated the *Tenta* assemblage to belong to the very end of the Sotira Culture in terms of stylistic attributes, with Dark Burnished ware comprising a mere 1%, vs. 15% Red-on-White and 2% Combed and Painted-and-Combed (RW-Cb.) (Kromholz 1981:31, Table 2.1). The provenience of P-2780 is in square B7C:2.4 in the lower NW sector of the site, and although it is not clear whether Kromholz included material from all three ceramic areas or only from the deep deposit in O16B in the SE sector in her analysis, there is no indication that the SCU reoccupation lasted sufficiently long to reflect the ceramic evolution from DFB as evidenced at Dhali *Agridhi* II and the early phases at Philia *Dhrakos* A (see below) to a preponderance of painted and combed wares in the subsequent stages of the mature Sotira Culture. P-2780 and the ceramic deposits which it dates, even if they are slopewashed as the excavator believes (Todd 1978b:177, 1979b:16, 18; 1982b:9, 1987:178), are therefore contradictory, and since there are no grounds for doubting the results of the pottery seriation, the evidence of this single ^{14}C determination is unacceptable unless corroborated by future comparable dates from the other ceramic areas at the site.

Recapping the discussion, despite the discrepancies between some dates and their designated phases, particularly Period 2, statistical interpretation of the *Tenta* set demonstrates a general agreement with the periodization proposed on stratigraphic grounds that would not be

apparent if significantly fewer determinations were available. Judging the aceramic series as a whole, Todd's (1987:176-177) current evaluation confirms earlier impressions that is it is highly unlikely for the length of occupation at Kalavasos *Tenta* to be accurately reflected by the entire series of ^{14}C determinations for its KCU phase. The two lowest dates, which jointly extend the upper quartile of the dispersion diagram to ca. 850 radiocarbon years are suspect on archaeological grounds, but they nevertheless provide tantalizing evidence for a possible survival of the aceramic occupation into the late 6th m.BC (first half of the 5th m.bc). Of the three highest dates, which in turn extend the lower quartile by over one millennium, the two acceptable ones (P-2972 and P-2785) and their associated Period 5 must be weighed against such archaeological evidence as settlement size, succession of occupation floors, and intra-assemblage variability that, at least for the moment, argues decidedly against the aceramic use—even intermittently—of the site during three millennia, i.e. from the late 9th to the late 6th millennium cal BC. (ca. 7,500-4,500 BC). Comprising the bulk of consistent dates, the interquartile range plus P-2553 and P-2975 (which fall just outside its upper limit) still extends over 1,200 cal years, from ca. 7,200-5,980 cal BC (6,480 BC to 5,389 BC), thereby starting earlier and ending later than any other credible date from a KCU context (with the exception of Ly-3716 from aceramic Khirokitia *Vouni*, see below). In spite of the length of the interquartile, however, the median lies at ca. 6,200 cal BC (5,661 BC), and this suggests that the lower limit is distorted by the two disparate Period-2 dates P-2973 and P-2974 (see above), and that the *floruit* of *Tenta* followed than that of Khirokitia *Vouni* and may have been contemporary with or somewhat later than the occupation of Dhali *Agridhi* I (Fig. 16, supra). The removal of these two determinations would shorten the interquartile bar to just under 500 years, extending from 6,441 BC to 5,980 cal BC (5,878-5,389 BC) and reflecting the lower south slope occupation assigned to Periods 4-3. A range of this magnitude seems to be quite compatible with the general impression of EP settlements as having been relatively short-lived communities whose ekistic and social evolution was stunted by causes not operative, or less effective, among cultures on the surrounding mainland; e.g. ecological constraints and isolation, which could have adversely affected the development of an expansive subsistence base and the emergence of enduring exchange networks.

Since the Dhali *Agridhi* set is divided almost equally between KCU and SCU dates, it will be evaluated in the context of the aceramic-ceramic transition below. Next comes a set of five dates from Rizokarpaso *Cape Andreas Kastros* (F.25 [F/056]), a site whose association with the

Khirokitia Culture is borne out by close parallels in its architecture and material assemblage (Le Brun 1972-1977, 1981a, 1981c, 1985a):

6,058 ± 125 BC (MC-805)
5,723 ± 120 BC (MC-807)
5,013 ± 140 BC (Sample ?)
4,513 ± 105 BC (Sample ?)
4,374 ± 200 BC (MC-803)

MC-803, from Level V, falls in the gap between the Khirokitia and Sotira Cultures but is too late for its archaeological context—especially since, in contradistinction to Khirokitia and *Tenta*, *Cape Andreas* has yielded no evidence of later reoccupation whatsoever. The quality of the sample was poor (Le Brun 1977:308, 1981a:71), and here, as in the case of several of the *Tenta* dates, the comparatively wide SD points to unreliable test results. MC-805 (Square S13) and MC-807 (Square R13) both date occupation floors and are compatible with their aceramic context, yet as the earlier determination is reported to belong to the later level (MC-805, Level VI) (Le Brun 1981a:71), they contradict each other stratigraphically. Thus there is an internal inconsistency that could only be settled by further dates for Level V and VI. Two from Level V have recently been published (5,013 ± 140 BC and 4,513 ± 105 BC) but are evidently much too recent (Le Brun 1988:28), so that the matter would remain unresolved were it not for the fact that the overlap of two SDs can be used to reverse the order of the two dates. As the probability calculations show, MC-805 could be as late as 6,410 cal BC and MC-807 somewhat earlier, perhaps ca. 6,500 cal BC, so that both dates are in fact statistically inseparable. The relatively rapid succession of the two floors in question that is implicit in this interpretation would also be compatible with the stratigraphy of the site.

With regard to external synchronisms, the pair of credible Cape Andreas dates makes better sense. While MC-807 compares well with the medians of the Kalavasos *Tenta* and Khirokitia *Vouni* series (Fig. 16, supra), MC-805 is higher than all but two of the Khirokitia dates (Ly-4307 and Ly-3718) and closer to the upper end of the *Tenta* interquartile with its previously discussed high dates P-2973 and P-2974. Considering the fact that Level V and VI represent a late phase in the occupation of *Cape Andreas* (Le Brun 1981a) and are preceded by four undated levels, all of which except the first contain typical KCU architectural remains, the site is likely to have flourished before *Tenta* and possibly during the hypothetical early periods of Khirokitia (see below), i.e. in the first half of the 7th m.BC. This dating lends support to the hypothesis of a NE-to-SW diffusion of the Khirokitia Culture (**CHAPTER 3**, supra, and Stanley Price 1976b:270-273). Regardless of its relative position in the sequence of KCU settlements, however, the archaeological evidence

coupled with the socio-economic implications of a marginal site location militate against a long life for *Cape Andreas Kastros*.

The fourth site of the aceramic stage of the Early Formative for which ^{14}C dates are available is the type site itself, Khirokitia *Vouni* (#La.12 [R/063]). Dikaios collected samples in the late 1950s subsequent to his excavation of this site (Dikaios 1953, *Radiocarbon* 2 [1960]:193), which may have reduced their *a priori* reliability, yet they were later confirmed by a second series of dates obtained from a sounding in 1972 (Stanley Price 1975:47, Table I). Most recently, a series of further dates from the CNRS excavations has expanded the set's range upwards as well as downwards (Le Brun 1988), but, taken together, the three currently available series in fact constitute a more homogeneous set than any other for an Early Formative site (cf. dispersion bars in Figs. 16 and 17, supra). The dates reported by Dikaios, after adjustment from the provisional to the NBS oxalic-acid standard (Deevey et al. 1967) are:

5,935 ± 160 BC (St-415)
5,790 ± 125 BC (St-414)
5,718 ± 160 BC (St-416)

St-414 and its check sample St-415 reportedly originate in the bottom layer in the N sector of the corridor surrounding 'Tholos' IA ('Floor IX'?, cf. Section A-A, Dikaios 1953:14 and Pl. VI), i.e. from a locus to the west of the 'main road',[4] while the provenience of St-416 is in layers under the NW stone foundation of 'Tholos' XVII, an important building situated higher up and a short distance east of the 'road'. If considered within the framework of Dikaios' primarily architectural sequence (Dikaios 1953:308-313), the set thus dates the middle phase of the settlement, i.e. Khirokitia II, to which both structures have been ascribed. However, since 'Tholos' XVII (St-416) and 'Tholos' IA (St-414 and St-415) lie on either side of the 'main road', they should belong to different periods of occupation according to the westward expansion of the settlement more recently established by the French excavation (see below). Thus samples originating in contexts east of the partition should theoretically antedate those from the west, but in practice 'Tholos' XVII was erected in an open area free of other structures (Dikaios 1953:103) and so could conceivably be contemporary with or even later than 'Tholos' IA and other buildings belonging to the first westward expansion. Although St-415 is older than expected in light of the fact that it was obtained as a check on St-414, the SDs of the three dates overlap comfortably within a cumulative 1-sigma range of 6,680-6,130 cal BC (P = 0.83-1.00), and the close agreement of St-414 and St-416 affirms the chronological correlation of two different areas of the settlement (Area I and V, respectively) made

by Dikaios in his stratigraphic analysis of 1953.

The second series of dates for Khirokitia belongs exclusively to Area V, at the W edge of which a $2m^2$-sounding was undertaken in 1972 by Stanley Price (Stanley Price and Christou 1973). The samples were taken from successive strata inside and directly below a new building partially exposed by the pit, 'Tholos' XLVI, and as a result four dates were obtained which are listed in stratigraphic order (top to bottom):

5,563 ± 78 BC (BM-852)
5,725 ± 81 BC (BM-853)
5,715 ± 61 BC (BM-854)
5,577 ± 74 BC (BM-855)

According to the excavator, BM-855 dates a pre-building deposit or its first floor (Floor VII), BM-854 two floors succeeding the first one (Floors VI and V), BM-853 three floors formed after an intervening roof collapse (Floors III, II, and I), and BM-852 a second roof collapse and the final abandonment of the structure (Stanley Price 1975:46-47, *Radiocarbon* 19(2):146-147; cf. Stanley Price and Christou 1973:4, Fig. 2). Although the order of BM-853 and BM-855 reverses the stratigraphic succession, the series not only exhibits a some degree of internal consistency within a 2-sigma range of 6,442-5,975 cal BC (P = 0.84-1.00) but also compares very well with the first series, particularly with St-414 and St-416. The 2-sigma probability distributions for all four BM dates in their stratigraphic order indicate an 84%-chance for the *terminus post quem* to lie at 6,260 cal BC (BM-855) and a 91%-chance for the *terminus ante quem* to lie at 5,975 cal BC (BM-852), so that the true age of this building may be contemporary with, or slightly later than, 'Tholos' IA and 'Tholos' XVII as dated by the Stockholm determinations. Therefore, even though there is yet no stratigraphic connection between 'Tholos' XLVI and the rest of Area V—just as there really is none among the areas of the site as a whole—it can justifiably be taken to date from the same period of occupation. Hence it can be inferred that Khirokitia II *sensu* Dikaios falls somewhere between ca. 6,830 cal BC and 5,975 cal BC, provided that the earliest and latest dates of the two series; namely, St-415 (dating the very first use of the area west of the 'road' prior to the erection of 'Tholos' IA) and BM-852 (dating the abandonment of 'Tholos' XLVI), in fact encapsulate this period. However, since the two buildings in question do not necessarily represent the start and end of Khirokitia II, it is difficult to be specific about its duration.

The current French excavations in the NW sector of the site (Le Brun 1977-1979, 1981b onward) have meanwhile produced much-needed evidence on the stratigraphic succession between the areas east and west of what is demonstrably a substantial perimeter wall rather than a road, and

on further consecutive westward expansions that necessitates a revision of Dikaios' general tripartite ('early-middle-late') periodic scheme. Furthermore, they have at long last yielded a new series of eight ^{14}C determinations which, though considered partly problematic by the excavator (Le Brun 1988), is on the whole no less consistent statistically than the two previous series:

6,218 ± 130 BC (Ly-4307)
6,218 ± 320 BC (Ly-3718)
5,981 ± 150 BC (Ly-3717)
5,816 ± 180 BC (Ly-3719)
5,744 ± 140 BC (Ly-4308)
5,260 ± 150 BC (Ly-3716)
4,549 ± 170 BC (Ly-4306)
4,467 ± 160 BC (Ly-4309)

Ly-4306 and Ly-4309 are the two Khirokitia dates cited at the beginning of this chapter as falling in the lacuna. Coming as they do from two basal strata (F and G, respectively) a short distance east of the principal perimeter wall (now identified as Structure 100), their context is so securely aceramic as to render them clearly aberrant. Of the remaining six dates, two (Ly-4307 and Ly-4308) were stratified between the preceding pair and are thus associated with Stratum F. This Stratum, and G beneath it, has been assigned to the first period of occupation east of Structure 100, when the settlement was bounded by a thick stone-faced pisé wall. The two dates are not only in contradiction with their stratigraphic order but also too far apart for the two thin layers separating them, so that they must be evaluated in terms of their respective 2-sigma ranges, which produce a short overlap of 10 cal yr (66 yr) at ca. 6,565 cal BC (ca. 6,000 BC). Ly-3716 and Ly-3718 are associated with Stratum C in a nearby building (Structure 117) which follows Stratum F after two intervening phases of alternating construction and abandonment (Strata E and D). Since Stratum C is in turn overlain by Stratum B, which, according to the excavator, marks the construction of the long perimeter wall S.100, these two samples should date the last phase of the settlement east of this wall and hence be somewhat older than the dates for Khirokitia II discussed above. However, taken at face value, Ly-3718 (from a thin layer above the lowest (?) floor of S.117) is identical with Ly-4307 from the much deeper Stratum F and hence too old; whereas Ly-3716 (from fill marking the end of the building's use in Stratum C) is lower than all previously discussed acceptable determinations and thus too young for a context predating the construction of the long perimeter wall. As shown on the printout (**APPENDIX 4**, infra), the calibrated 2-sigma range for the high date Ly-3718 could not be computed, but if the uncalibrated dates are compared after lowering this date by two SDs, one obtains the sequence 6,024 (Ly-4308) → 5,958 (Ly-4307) → 5,578 (Ly-3718) → 5,560 (Ly-3716), corresponding to 6,570-

6,120 cal BC, which conforms to the stratigraphic succession of the samples. Not too long after the building activities associated with Stratum C, according to Le Brun's stratigraphy, the long perimeter wall 100 was built (corresponding to Stratum 2B). After a further undated interval, settlement expansion in the NW sector is documented by Stratum III, which marks the first architectural phase west of Wall 100 and the definition of a new perimeter by means of Wall 284. This first westward expansion is dated by Ly-3717 and Ly-3719 from near the base of Wall 284. This pair has a 1-sigma range overlap of 6,500-6,390 cal BC (P = 0.92), indicating that Stratum III is earlier than the occupation of 'Tholos' XLVI as expressed by the BM-series (see above). Since that building has now been tentatively assigned to the second architectural phase west of Wall 100, Stratum II (Le Brun 1988:27), the chronometric and stratigraphic evidence interdigitates fairly well given the fact that only two assays are thus far available for the NW sector between walls 100 and 284. If the dates from the top of the site are compared with the Stockholm series, two of whose samples date a structure much further downslope and hence at a considerable distance—which may conceivably also have chronological implications, the latter's 1-sigma range overlap of 6,430-6,370 cal BC (as opposed to its *cumulative*, or *combined*, 1-sigma range of 6,680-6,130 cal BC, cf. supra) can be seen to approximate that of the two Lyon dates. This suggests that the first westward expansion of the settlement beyond Wall 100 can be dated to ca. 6,400 cal BC along its entire length, in the lower as well as the upper sector of the site. The seven dates from the west sector (incl. St-416 which, although from an area in the east sector, belongs with the other six) are therefore in general agreement with each other and the proposed stratigraphy, but they clash with the sequence suggested above for the four Lyon dates from deposits east of Wall 100, according to which Stratum III in the west sector ought to postdate Stratum C by an appreciable margin. However, since these four dates (Ly-4307, Ly-4308, Ly-3716, Ly-3718) had to be 'bent into shape' employing their 2-sigma ranges in order to make them compatible with the stratigraphic succession of the sample contexts (see above), the degree of their consistency as a series is subject to interpretation. Thus it could plausibly be argued that Ly-4307 and Ly-4308 yield an average date of 6,600 cal BC or earlier for Stratum F and Ly-3718 a date of ca. 6,500 cal BC for Stratum C and the early life of the large structure 117, and that the topmost sample Ly-3716 suffered surface contamination and must hence be dismissed (as indeed suggested by the excavator, see Le Brun 1988:26-27). The construction and use of Wall 100 as a fortified perimeter would then fall between 6,500 and 6,400 cal BC. As can be seen, this scheme provides an almost seamless chronometric transition between the east

and west sectors in accordance with the stratigraphy on top of the site, but it also presupposes a relatively rapid succession of architectural phases leading up to the erection of the wall, i.e. from Stratum F through Stratum B2.

The discussion of the Khirokitia set can be summarized in the form of three observations, one methodological and two chronological in nature: First, the series of Lyon determinations is too heterogeneous and fragmented in the spatial as well as the chronological sense to permit a statistically meaningful analysis. As such it underscores the fact that the CNRS excavations have succeeded in fine-tuning the stratigraphy on either side of Wall 100 to a degree that far exceeds the precision of calibrated ^{14}C dates. Instead of interpreting this discrepancy as proof of the inadequacy of radiometric dating, however, it should be seen as the predictable consequence of a lack of a sufficient number of samples from as many layers as possible and the resultant inability to recognize clusters of compatible determinations whose mean dates can be matched with associated strata. In this respect the *Tenta* set serves as the best example in this chapter of the need for a statistical interpretation in order to weed out dates which are not obviously bad yet nevertheless wrong in the sense of deviating from contextually related assays (see above).

The potential benefit of making the collection of further ^{14}C samples a primary research objective is also highlighted by the observation that the spatial distribution of the sample contexts is thus far confined to areas immediately east and west of the long perimeter wall, primarily in the upper NW part of the site. Given the size of the settlement and the currently emerging architectural sequence in that area, it is clear that the available chronometric data pertain exclusively to a late stage in the life of the aceramic settlement. The unexcavated east sector is much larger than the west sector (Dikaios 1953:Pl. I), and recently published evidence from Section 6 shows that multiple building phases extend all the way to the lower east slopes of the hill (A. Le Brun and O. Le Brun 1986). Unless buildings belonging to the same phase were erected indiscriminately in unconnected parts of the site, it is therefore reasonable to assume that the settlement evolved through several stages before reaching the line of Wall 100. Furthermore, besides a general expansion from east to west, there is no evidence to indicate that the south and north slopes of the hill were occupied at the same time, and the considerable distance involved in fact suggests the contrary. The likelihood of successive expansions westward as well as northwards, coupled with the sheer size of the area shown by excavations, soundings, exposed sections, and magnetometer survey (Hesse 1981, Hesse and Renimel 1978) to have been built up at one time or another, has obvious chronological implications. Judged in this light, Dikaios' three periods

have almost certainly no validity beyond the spatio-temporal limits of his excavations, and the existing set of radiocarbon dates is unlikely to even approximate the duration of the settlement in its entirety.

The third observation is framed by the second, insofar as the dispersion of the Khirokitia dates can no longer be interpreted without regard to the constraints of their stratigraphic context. Consequently, the interquartile is less likely to represent the *floruit* of the entire settlement (pace Stanley Price 1975:47-48) than the end of the last period in the east sector and the early part of the first period in the west sector, i.e. the phases preceding and following the use of Wall 100 as defined above. With a range of 6,476-6,234 cal BC (5,946-5,680 BC), this stage would appear to have been approximately contemporaneous with Periods 3-4 on the lower south slope of Kalavasos *Tenta* (see above). The lower quartile of the Khirokitia set is due mainly to the two early samples Ly-4307 and Ly-3718. Yet in light of the suggestion that these may be slightly younger than their means, a date of almost 6,800 cal BC seems somewhat high even for basal layers on top of the site (i.e. Strata G and F in the CNRS sounding). Given the probable extent of architectural remains in the largely unexcavated east sector, it would seem premature to equate the bedrock occupation in this part of the site with the beginning of the settlement as a whole (contra Le Brun 1988:26), although a foundation date for Khirokitia in the early 7th m.BC would be compatible with the available evidence (see below). The upper quartile, on the other hand, dates the first architectural phases in the west sector (corresponding to Stratum III and probably also II), which would thus overlap with the occupation of the lower south slope at *Tenta* as well. Its end at 5,840 cal BC, though defined by the stratigraphically suspect sample Ly-3716, may approximate the date of the gradual abandonment of this part of the site during and following Stratum Ia (Le Brun 1984b:13). Once again, this does not mean that developments in the NW part of the site are representative of the entire settlement and that the architectural phase associated with Stratum Ia marks the end of its aceramic occupation. Although the CNRS excavations evidence a gradual shift from NNE to SSW between Stratum IIIb and Ia, accompanied by the introduction of a northern perimeter wall (245) in Stratum II (Le Brun 1984b:66 and Figs. 8-13), without extending the stratigraphy and obtaining further samples for dating it is impossible to determine whether occupational residues on the lower north slope (the 'dog-leg' trench and other soundings, Dikaios 1953:186 and Pl. I) are earlier or later and hence confirm or contradict this shift beyond the limits of the current investigations. In summary, the possibility that the occupation on top of the site and west of Wall 100 was succeeded by a further period on the

north slope, as well as an assessment of how many periods could have preceded the construction of this wall in the east sector, depends largely on whether the settlement is thought to have expanded from the top down or from the bottom up. Estimating the duration of aceramic Khirokitia without such knowledge is well-neigh impossible, but a range of ca. 6,800-5,800 cal BC spanning four or five aceramic building periods, each subdivided into shorter phases, is perhaps a more accurate extrapolation from the existing ^{14}C set of such a large village than the range of *Tenta* dates permits for the aceramic occupation of that site. Within the constraints placed upon any attempt to refine Dikaios' periodization by the patchy state of the evidence, one possible chronological scheme would be as follows:

Khirokitia I+II ca. 6,800-6,600 cal BC

One or two hypothetical early and early middle periods in order to allow for a gradual build-up of the east sector, ranging from the lower east slopes (Section 6) to the vicinity of Wall 100. Contemporary with the early levels at *Cape Andreas Kastros*, and perhaps with late Period 2 on the upper slope at *Tenta* should it be found to have preceded rather than followed Periods 4-3.

Khirokitia III 6,600-6,500 cal BC

Proliferation of buildings along the western edge of the settlement, including an expansion towards the top of the hill represented by Strata G-C and the construction of an incrementally growing perimeter wall (506, followed by 505). This period incorporates structures of Dikaios' Period I and II east of Wall 100.

Wall 100 6,500-6,400 cal BC

Stratum B2 above C and construction of the long perimeter wall, probably during the first half of this century.

Khirokitia IV 6,400-6,200 cal BC

Temporary abandonment of the upper east sector (Stratum B1) and first occupation of the west sector on the south slope and the saddle which forms the top of the site (Stratum III). Wall 100 ceases to function as a perimeter and is replaced by a new boundary, Wall 284. The relatively lengthy duration of this period considering the fact that it comprises only two phases (IIIb-a)—if inferred correctly from the available ^{14}C dates—is problematic. One possible explanation would be provided by a simultaneous expansion of the settlement down the north slope of the hill. This period incorporates structures of Dikaios' Period I west of Wall 100 and overlaps with the lower south slope occupation (Periods 4-3) at *Tenta*.

Khirokitia V 6,200-5,800 cal BC

New building phase between walls 284 and 100 and the retrenchment of occupation on top of the site behind a northern perimeter (Wall 245), represented by Stratum II (6,200-6,000 cal BC?). This sudden reversal of the northward expansion observable during the preceding period is puzzling, yet it may bear witness to a withdrawal from the steep and potentially unstable north slope in response to a landslide. Reoccupation of parts of the east sector near the defunct Wall 100 (Stratum A). Termination of this phase by a (second?) landslide, followed by a slight realignment of the western perimeter in the shape of two retaining walls (276 and 292) and a continuing regression of buildings back towards the upper south slope (Stratum Ic-a). This period probably incorporates buildings of Dikaios' Period II west of Wall 100 and also overlaps with the lower south slope occupation (Periods 4-3) at *Tenta*. Its suggested length seems excessive compared to the thickness of deposits which make up Strata II-Ia on top the site, and unless this is due to the erosional truncation of the topmost strata (Le Brun 1984b:13) adjustments to the proposed chronology will probably need to be made in future.

Khirokitia VI 5th m.BC

Ceramic occupation associated with the Sotira Culture (see below), attested by diagnostic pottery found chiefly at superficial levels between buildings on the south slopes (Dikaios 1953:274) and in the eroded Layer 2 near the surface of the saddle (Le Brun 1984:13). Corresponds to Dikaios' Period III and is stratigraphically unconnected to the underlying aceramic residues, so that the transition between the two occupations—if present—remains elusive.

The last set of dates for the Khirokitia Culture comes from aceramic Dhali *Agridhi* (#N.7 [N/002]). This site, like Klepini *Troulli* (infra), may eventually play a pivotal role in the effort to elucidate the aceramic-ceramic transition and establish the length of the hiatus (if any) between the Khirokitia and Sotira Cultures, since initial indications of discrete aceramic and ceramic deposits (Concentrations B and A, respectively) were subsequently confirmed (Lehavy 1974, 1977, 1989). After three seasons, the final report on which was long delayed, the Dhali *Agridhi* set looks as follows:

6,280 ± 80 BC (P-2775)
5,672 ± 60 BC (P-2768)
5,559 ± 465 BC (GX-2848A)
4,657 ± 310 BC (GX-2847A)
3,921 ± 100 BC (P-2769)

Without consideration of the error ranges, the set clearly bears out the break in continuity (real or artificial) between the Khirokitia Culture and the Sotira Culture, and hence GX-2847A and

P-2769 will be discussed below in the context of the Sotira Culture, to the beginning of which they seem to belong. Among the higher dates, P-2775 and GX-2848A come from a pit in Area 12 and from nearby Concentration B, respectively, both of which form part of an aceramic 'workshop' and refuse area, whereas P-2768 comes from a deposit of aceramic cultural residues at Site E, an unconnected excavation area ca. 200 m to the SW (Lehavy 1989:216, Table 6; 217, Fig. 1; 219-222, Figs. 3-6). GX-2848A, which initially appeared suspect on account of its extremely wide SD, has had its credibility restored by more recently published and closely comparable P-2768. With a 2-sigma range overlap of 6,409-6,107 cal BC (P = 0.99-1.00), both are sufficiently consistent to suggest a contemporaneous occupation of the two areas involved, and to bring the aceramic occupation of Dhali-Agridhi I into alignment with the chronological *floruit* of *Tenta* as expressed by its interquartiles, and with an early phase of Period V Khirokitia as defined above (Fig. 16, supra). P-2775, by contrast, is as anomalously high in the context of its series as the *Tenta* measurements P-2973 and P-2974 (which it matches closely), and several hundred cal yr older than the earliest dates for *Cape Andreas Kastros* (MC-805) and Khirokitia (Ly-4307, Ly-3718). Since the rather ephemeral deposits excavated thus far provide no evidence for an aceramic occupation lasting as much as 800 calendar years—especially as long as the settlement's habitation area remains undocumented, this date seems excessively high for its archaeological context and effects a marked distortion of the calibrated dispersion diagram (Fig. 17, supra). Given that the true date could be as low as 6,677 cal BC according to the sample's 2-sigma range (P = 1.00), it may belong to a group of comparable measurements which accurately reflect early 7th m.BC occupations at all the KCU settlements discussed thus far. Some intriguing features of the assemblage, such as the high relative frequency of obsidian (**Map F**, infra), the large proportion of *Dama mesopotamica* in the faunal sample (ca. 77-80%, Carter 1989:247, Table 4; Croft 1989a:259, Table 1),[5] and the first instance of wild rather than cultivated einkorn in a KCU context (Lehavy 1989:206), may be interpreted as indicators of a very early occupation, yet from the viewpoint of chronometrics it would certainly be premature to place the start of Dhali *Agridhi* I at ca. 7,000 cal BC on the basis of a single divergent date.

The last date for a non-ceramic context comes from the vicinity of Kalavasos *Tenta*, though it must be emphasized that it involves a separate locality, the *Vasilikos* river bridge site (#La.41 [R/382]):

4,570 ± 100 BC (OX-A-805)

The sample was taken from charcoal in two circular, stone-lined fire pits with associated faunal remains and chipped stone which were encountered at a depth of 5.50 m during the excavation of a bridge pier foundation trench in the early 1980s. The brief references to this discovery (Gomez 1987:354; 355, Table III; 356; Todd 1985c:11) and the subsequent destruction of the site rule out a definitive ascription of its residues to either the Khirokitia Culture or the Sotira Culture, though ceramics were apparently not observed. The date falls squarely in the middle of the lacuna, so that the slim chronological evidence which it affords could be used to argue either way. However, if its 2-sigma range is examined (P = 1.00), it can be seen that its true value may be as early as 5,480 cal BC. In this case it overlaps with the lowest acceptable measurement for aceramic *Tenta* (P-2977, supra), only ca. 300 m to the north, and could therefore possibly date extra-mural activities related to a lingering aceramic occupation of the settlement during the late 6th m.BC. Unlike Beta-3412 from Akrotiri, P-2781 from *Tenta*, one of the two unidentified samples from *Cape Andreas Kastros* ('x-xyz' in **APPENDIX 4**, infra), and Ly-4306 and Ly-4309 from Khirokitia, OX-A-805 cannot be rejected outright on stratigraphic or statistical grounds. Notwithstanding the caveat that a single credible assay is more ambiguous than five dubious assays, it might therefore be accepted as a bona fide date for a possible survival of the Khirokitia Culture beyond the bulk of ^{14}C determinations that are now available for a handful of settlement sites. The majority of these measurements place the *floruit* of the Khirokitia Culture as it is currently known in the second half of the 7th cal m.BC (first half of the 6th m.bc). Its beginning and end, however, remain to be elucidated.

The cultural stage that follows the hiatus presently has its earliest manifestation in Dhali *Agridhi* II (represented by Concentration A at the site), although caution should be exercised in applying the term 'Sotira Culture' too liberally in cases like Dhali, which lack most or all of the diagnostic traits used to define it. Nevertheless, the site displays a distinct facies of monochrome pottery, DFB ware, which precedes the characteristic bold RW ware of the ceramic Early Formative at another SCU settlement site in the Mesaoria (Philia *Dhrakos* A), and on the whole this simple monochrome facies looks more convincing as the forerunner of the ceramic wares of the Sotira Culture than the sophisticated RW-Res. and RW-Rp. wares of Troulli II (cf. Peltenburg 1979b). The latter wares had been put by Dikaios at the beginning of ceramic manufacture in his 1961 chronology (Held 1983:182-187), but in fact they appear to be part and parcel of a florescent northern manifestation of the Sotira Culture and have repeatedly been acknowledged as such

in the recent past (Catling 1970, Peltenburg 1979b, 1982a, 1982c:39-41, 1982c:73-75). The affiliation of Dhali *Agridhi* II with the Sotira Culture is underscored by a new date, P-2769:

4,657 ± 310 BC (GX-2847A)
3,921 ± 100 BC (P-2769)

Even with the wide error margin of GX-2847A, these two dates just barely overlap at 2 sigma between 4,780 and 4,710 cal BC (P = 1.00), so that the question arises as to which one is more accurate—or, in fact, whether they mark the start and end of the site's ceramic occupation. The latter is unlikely on grounds of direct as well as indirect evidence. GX-2847A, like GX-2848A from the aceramic phase of the settlement, has an uncomfortably wide SD, yet unlike the latter it is not vindicated by a closely comparable measurement. If it really marked the beginning of ceramic occupation it would have narrowed the gap by a respectable 700 calendar years or, if juxtaposed with Ox-A-805 from KCU(?) Kalavasos *Vasilikos*, eliminated it—a very desirable result indeed. However, contrary to the stratigraphic evidence, it would mean that Dhali *Agridhi* II was an extremely long-lasting settlement, and that initial ceramic production in the center of the island remained unbelievably static, with DFB still in use exclusively at Philia *Dhrakos* A:1 after at least 700 cal years and perhaps as many as 1,000, depending on the start of Phase 1 at that site. Neither implication is very plausible on archaeological grounds, and confidence in GX-2847A must therefore remain low. In contrast, P-2769 fits very well, allowing as it does for several centuries of ceramic development between the first appearance of pottery in the island in the form of DFB at Dhali *Agridhi* II and the proliferation of wares in regional variants during the heyday of the Sotira Culture. It also compares well with P-2780 for the ceramic occupation at Kalavasos *Tenta* (see above). The 1-sigma ranges of these two assays just overlap between 4,680 and 4,666 cal BC (P = 0.86-0.96); yet, as has already been pointed out, for ceramic reasons *Tenta*—with its minute quantities of DFB ware—should not be placed as early in the Sotira Culture as Dhali *Agridhi* II and early Philia *Dhrakos* A (see above). Consequently, the true date of P-2780 should lie closer to the lower end of its 2-sigma range at 4,573 cal BC (P = 0.96), whereas that of P-2769 may be nearer the upper end of its 2-sigma range at 4,780 cal BC (P = 1.00). The latter date would have the added benefit of bringing P-2769 within the 2-sigma range of GX-2847A (5,960-4,710 cal BC, P = 1.00), so that these two measurements may accurately date the same occupation after all. Pending more precise evidence for the life of DFB ware (in the form of dates for the basal levels at Philia *Dhrakos* A), for the purpose of the present discussion an approximate date of 4,750 cal BC is thus taken to mark the start of the ceramic stage of the Early Formative

Period as it is currently known.

Consequently, taking a conservative approach to the evidence, the 'gap' is framed by P-2975 (ca. 5,820 cal BC) and P-2769 (4,557 cal BC) for *Tenta* '3 or later' and for Dhali II, respectively, giving it a duration of approximately 1,250 years—marginally longer than the estimate of Dikaios after the first application of ^{14}C dating (Held 1983:181-183). Although on the face of it this does not help current efforts to eliminate the gap altogether, it should be remembered that the bulk of available ^{14}C dates probably represents the middle, rather that the end and beginning, of the Khirokitia and Sotira cultures and that Dhali II with its DFB may well be early but not the first in the latter, leaving room for adjustments. Recognizing the potential for sample bias when faced with the widespread erosion of late- and final-phase residues at aceramic sites, an alternative interpretation of current data would be to bracket the putative hiatus with P-2977 (*Tenta*) and OX-A-805 (*Vasilikos*) for a late KCU phase in the Vasilikos Valley on one hand, and with an average of GX-2847A and P-2769 (*Agridhi* II) for an early SCU phase in the Mesaoria on the other. Given a 2-sigma range overlap of 420 cal years between P-2977 and OX-A-805 (P = 0.99-1.00), this means that the lowest acceptable date for the Khirokitia Culture could be around 5,480-5,060 cal BC and the highest acceptable date for the Sotira Culture ca. 4,750 cal BC, thereby bringing about a drastic reduction of the lacuna to only 300-700 cal yr. Three future developments which might provide more substantive support for the view that such a reduction is legitimate are a) further excavations at Dhali *Agridhi* to test the hypothesis—based on the published stratification between Concentrations A and B (Lehavy 1989:220, Fig. 4)—that the deposition of the former followed that of the latter before intervening sediments could accumulate, suggesting at most a brief period of abandonment, b) the obtainment of additional radiocarbon dates for deposits with DFB ware at Dhali *Agridhi* II *and* Philia *Dhrakos* A:1, as well as for the upper strata in the aceramic deposits of Troulli I (on ceramic grounds the deposits of Troulli II can be expected to postdate the DFB horizon) and—as already suggested—for the late phases of aceramic *Tenta* and Khirokitia; and c) the discovery of further sites with stratified aceramic and ceramic deposits—ideally showing stratigraphic continuity between the two, for neither Troulli nor Dhali are really transitional sites in archaeological terms. Since the present writer is inclined to believe that, aside from a possible stimulus diffusion in the beginning, ceramic evolution in EP Cyprus was an internal development occurring by and large independent of pottery manufacture on the surrounding mainland, a defining characteristic of such hypothetical transitional sites would be the appearance and gradual increase of monochrome ware(s) at the end of an aceramic material

culture, rather than the sudden introduction into the latter of full-fledged bichrome/painted pottery that would correspond to the arrival of external elements, as envisaged by Dikaios (1953, 1961a, 1961b, 1962).

The northern variant of the fully developed Sotira Culture (sensu Peltenburg 1978) is best represented by Ayios Epiktitos *Vrysi* (#K.9 [K/028]). With 17 dates, this coastal site has yielded the second-longest set of ^{14}C determinations published at the time of writing, and on the whole they are consistent with the occupational phases distinguished by the excavator (Peltenburg 1970-1975, 1982a:18-36, 1982c, 1985c, 1985e). Unlike the sets reviewed so far, the dates below are therefore grouped according to their respective phases:

3,601 ± 53 BC (BM-847)	Early Phase
3,583 ± 92 BC (BM-846)	Early Phase
3,571 ± 57 BC (BM-845)	Early Phase

Sample BM-847 was taken from H.7.4b/Floor 2 in the North Sector, BM-846 from Level 3 in House 4B,in a ditch fill in the South Sector, and BM-845 also from the ditch fill in the context of H.4A.5 (South Sector) (*Radiocarbon* 19(2):146; Peltenburg 1975:40, 1982c:460). These measurements date an early phase of occupation at the site, when reserved circles and wavy bands were the hallmark of RW ware decoration (Peltenburg 1975:40, 1982c:73-75), but not its foundation, as there is evidence of earlier, unexcavated levels in at least one sector (Peltenburg 1975:40, 1982a:23-24). Since the basal levels were not reached, the length of *Vrysi* Early Phase is difficult to estimate. It may or may not compare with that of the Middle Phase, for which 200 years have been suggested by the excavator (Peltenburg 1975:41, cf. range of second series, below). The existence of certain ceramic parallels between this phase and Ras Shamra IVC was first construed as a possible synchronism indicating a very long duration of the former (Peltenburg 1975:36, 41; cf. Schaeffer 1962:168-170, 185, and Pl. I/12, II/10, and III/21) but subsequently rejected on ceramic as well as radiometric grounds (Peltenburg 1985d). Since the end of Ras Shamra VA has been ^{14}C-dated to 6,070 cal BC (5,449 ± 84 BC [LHL], P-457) (Mellaart 1975:286), the following Level IVC can be assigned to approximately 6,000-5,800 cal BC (5,400-5,200 BC [LHL]), leaving an interval of almost 700 cal yr (ca. 850 ^{14}C yr) in which to accommodate the succeeding levels IVB/A and early IIIC before the next assay, 5,130 cal BC (4,368 ± 173 BC [LHL], P-389), for IIIC (de Contenson 1982). Ras Shamra IVC can therefore be seen to be contemporaneous with the later Khirokitia Culture and decidedly not with *Vrysi* Early Phase. Radiometric data aside, the hypothesis of a ceramic synchronism is also weakened by the fact that no

Levantine elements are detectable in Cyprus during the early 6th m.BC, even though the westward expansion of the Early (formerly Middle, see de Contenson 1982:96) Halaf culture had a strong impact on Ras Shamra IVC, where it temporarily ousted local traditions like pattern-burnish ware and inspired a local facies of Halaf ware before giving way to other local features once more in the subsequent level (IVB). Lastly, even if the absolute dates for Ras Shamra IVC and *Vrysi* Early Phase were not so completely incompatible, to argue for a long time depth of Cypriot RW ware tradition into the early 5th m.BC makes it difficult to explain the origins and development of this ware, since the parallels at Ras Shamra are considered to be imports from, rather than prototypes for, Cyprus, and since the DFB ware of Dhali *Agridhi* II and Philia *Dhrakos* A.1 could then no longer qualify as the ancestor of RW ware. Although the earliest ceramic deposits at *Vrysi* failed to give any indication of DFB ware and there are consequently no ceramic links with Dhali *Agridhi* II and Phase 1 at Philia *Dhrakos* A that would shed more light on the problem, further evaluation of the stratigraphic evidence has more recently resulted in a drastically reduced estimate for the duration of *Vrysi* Early Phase and in the proposal of a comparatively short life-span for the settlement as a whole (Peltenburg 1982a:34-36, 1982c:108).[6] Based on this evidence, therefore, BM-846 may be regarded as a representative date for this very tightly clustered series and the start of the Early Phase of *Vrysi* (including the basal levels) put at the lower end of its 2-sigma range in the vicinity of 4,370 cal BC (3,650 BC); i.e., about 200-400 calendar years after Dhali *Agridhi* II depending on which of the two possible dates discussed above is adopted for the earlier settlement.

The Middle and Late Phases at *Vrysi* are represented by the following series (GU samples were pretreated and their lab numbers and dates corrected after initial publication in Peltenburg 1975; cf. *Radiocarbon* 18(1):162-163, and Held 1983:211, Fig. 14):

3,633 ± 80 BC (GU-522)	Middle Phase
3,566 ± 67 BC (BM-843)	Middle Phase
3,550 ± 95 BC (GU-523)	Middle Phase
3,540 ± 57 BC (BM-848)	Middle Phase
3,483 ± 47 BC (BM-844)	Middle Phase
3,463 ± 120 BC (GU-524)	Middle Phase
3,416 ± 85 BC (GU-1459)	Middle Phase
3,385 ± 60 BC (BM-1908) ♦	Middle Phase
1,248 ± 130 BC (GU-521)	Middle Phase
3,431 ± 78 BC (BM-849)	Middle-Late Phase
3,324 ± 45 BC (BM-1907) ♦	Middle-Late Phase
3,231 ± 80 BC (BM-1906) ♦	Late Phase

The proveniences of the samples have been reported as follows: GU-521: near hearth in Passage

A, Floor 5 (South Sector); GU-522: major hearth in H.2A, Floor 3 (South Sector); GU-523: same as GU-522; GU-524: SW corner of H.1, Floor 2 (North Sector) (Peltenburg 1975:40, *Radiocarbon* 18(1):162-163); GU-1459: H.4a, Floor 2 (South Sector) (Peltenburg 1982c:460, Table 54); BM-843: H.2A, Floor 3 (South Sector); BM-844: H.2B, Floor 5 (South Sector) (Peltenburg 1975:40, *Radiocarbon* 19(2):146); BM-848: Passage B East, 3-4 (North Sector); BM-849: wall tumble (Area VD.7) (*Radiocarbon* 19(2):146; Peltenburg 1982c:460, Table 54); BM-1908: occupation surfaces (Area VD.10); BM-1907: wall collapse (?), 3.50 m below present surface (Area VE.8); and BM-1906: dump/midden material earlier than latest occupation (Area VD.1) (Peltenburg 1982c:460, Table 54). GU-521 can be dismissed on archaeological grounds, yet the rest of the dates are quite consistent with their stratigraphic context as well as with each other, which accounts for the very short interquartile of the dispersion bar for the *Vrysi* set (Figs. 16, 17, supra). The median lies at 4,166 cal BC (3,545 BC); suggesting that the site's *floruit* may have preceded that of Sotira *Teppes* (infra) by several decades. Minor conflicts such as between GU-522 and the three Early-Phase dates which are in fact younger, as well as between the two Middle-Phase dates GU-1459 and BM-1908 on the one hand and the higher Middle-Late Phase transitional date BM-849 on the other, can be resolved by taking the 1-sigma range overlaps into account but nevertheless preclude a more precise definition of the beginning and end of each phase. Taking a minimum estimate, the Middle Phase is framed by BM-845 (4,235 cal BC) and BM-849 (4,020 BC), amounting to a duration of 200 cal years, i.e., exactly as proposed by the excavator on archaeological grounds (see above). *Vrysi* Middle Phase can thus be dated to the last two centuries of the 5th m.BC. The transition from this phase to the following one is again difficult to pinpoint, since there is only one determination for the late phase of the settlement. BM-1906 (3,836 cal BC) is not far off the dates for the end of Phase III at Sotira *Teppes* and for Kalavasos *Pamboules* (St-350: 3,873 cal BC, and St-419: 3,872 cal BC, respectively, see below), which it postdates slightly if taken at face value. Since it does not date the final occupation at *Vrysi* (Peltenburg 1982c:460), the true date may be marginally earlier, perhaps 3,850 cal BC. Moreover, since the Late Phase is archaeologically associated with a number of sudden ceramic innovations which cannot be shown to evolve smoothly from the Middle-Phase pottery (i.e., the presence and dominance of straight-sided and flaring bowls, the slab technique, and the miniaturization and condensation of a few linear motifs and ripple patterns), it can thus be postulated that it succeeded the destruction of Sotira III and the break between Philia *Dhrakos* A:3 and 4 and that it represents the establishment of a new ceramic canon that reappears 50-200 years later at

settlements of the early Erimi Culture such as Kalavasos *Ayious* and Kissonerga *Mylouthkia* which may have started around 3,800 cal BC and 3,650 cal BC, respectively (see Peltenburg 1982a:63-64, 1982c:109-110, and below).

At this point, three methodological aspects of interpreting the Middle-Late Phase series must briefly be considered. The first is that even though three of the assays (BM-1906 through 1908) are reportedly subject to correction for a systematic error between 0-300 yr, announced two years ago by the British Museum dating unit (Tite et al. 1987), they are fully compatible with their companion dates in relation to stratigraphic context, so that in their case the anticipated error should turn out to be minute or nonexistent. Secondly, analysis of the high-precision calibration results for the *Vrysi* set demonstrates a remarkably high incidence of assays whose 1- and 2-sigma ranges fall outside the area under the Gaussian distribution curve, i.e., cases in which neither age range reaches a probability of 85% (GU-522, BM-844, BM-847, BM-848, BM-1908, and particularly BM-845 and BM-1907). Although this makes it difficult to determine the most likely age range for each of them, the dates are credible as they are even without taking their SDs into consideration. Significantly, neither one of the two preceding inferences would be possible without a statistically meaningful set of determinations, echoing a point already made in regard of Khirokitia *Vouni* (supra). Thirdly, the fine intercalation of assays and archaeological phases attempted above underscores the fact that—in stark contrast with the KCU-SCU transition—the SCU-ECU transition is characterized nowadays by such a concentration of artifactual and chronometric data that even ^{14}C determinations with very short SDs are too imprecise to allow the dating of a rapid succession of developments. Keeping in mind the constraints which are thereby placed on the degree of precision with which dates for sites near or in the transitional period can be ordered sequentially, it is proposed that Ayios Epiktitos *Vrysi* Early-Final lasted approximately from 4,370 cal BC (3,650 BC) to 3,830 cal BC (3,230 BC).

Finally, the *Vrysi* series is complemented by two dates that are noticeably incompatible with their archaeological context:

4,050 ± 145 BC (Birm-182)
3,962 ± 140 BC (Birm-337)

Both are date fill material between occupation floors and are stratigraphically ascribable to the Middle Phase, but they predate even the oldest determination for the Early Phase by an average of 400 years. Birm-182 is stratigraphically one or at the most two floors below GU-524 in House 1 yet differs from the latter by almost 700 cal yr; similarly, Birm-337 is close to 400 years older

than BM-845 even though it dates a structure (H.4B.2/3) founded in the ditch fill from which the BM-845 sample was extracted and is therefore stratigraphically younger than the latter (Peltenburg 1975:40, 1982c:460). Using 2-sigma ranges to 'bend' the samples into sequence does not help, for if Birm-182 and GU-524 dated to 4,360 and 4,350 cal BC, respectively, they would both be too old for the Middle Phase even though fitting the stratigraphy (Peltenburg 1982c:38, Table 1). Likewise, BM-845 could be stretched within the Early Phase to 4,341 cal BC and Birm-337 to 4,340 cal BC, but then Birm-337 would still be too high for the Middle Phase to which it has been attributed and too close to BM-845 to allow for the accumulation of the intervening layers (Peltenburg 1982c:56, Table 2). Thus the two determinations must be assigned to a low level of confidence, with the contemporaneity of Birm-182 and P-2780 for ceramic *Tenta* (supra) being fortuitous. Of the two explanations for these disparities offered by the excavator (Peltenburg 1982c:460), laboratory error is here accepted as a cause more likely than old wood, since the reuse of timber yielding such dates would imply felling several hundred years prior to the archaeologically discernible presence of settlers at *Vrysi*.[7]

Turning now to other sites of the Sotira Culture, there is a single determination for Philia *Dhrakos* A (#N.42 [N/019], Watkins 1968-1971, Watkins and Gelling 1966) which—on ceramic grounds—was associated primarily with Ayios Epiktitos *Vrysi*:

3,478 ± 100 BC (Birm-72)

Although a different date was reported by Watkins; i.e., Birm-73 (3,473 ± 103 BC [LHL], Watkins 1973:52), Birm-72 is the only Philia date published in *Radiocarbon* (11, 1969:269) and will therefore be regarded as the official one in this context. The sample for Birm-72 probably comes from a hearth whose stratigraphic position has gone unmentioned, while Birm-73 is attributed to Phase 3 at the site (Watkins 1973:52).[8] On the assumption that both are quotations of one and the same sample, Philia Phase 3—if in fact dated by Birm-72—was contemporary with *Vrysi* Middle Phase as dated above, rather than with its Early Phase as has been postulated on grounds of typological parallels (Peltenburg 1975:43, Table 3; 1979b:27). Yet nothing much should be made of such a prima facie conflict, since it relates to two rather short periods of time where one SD can make the difference between one synchronism and another, so that Philia 3 and *Vrysi* Early Phase could easily overlap.[9] On the other hand, it is often dangerous to presuppose absolutely synchronous developments—be it in pottery manufacture or other facets of culture process—at sites in different regions, especially if distances and topography were liable to have

an adverse effect on communication.[10] Moreover, it is tempting to associate the apparent temporary abandonment of Philia between Phase 3 and Phase 4 (Watkins 1970b:8) with the end of Sotira III and *Vrysi* Late Phase, thereby postulating a 'ripple effect' of abandonments from south to north over a relatively short period of time early in the 4th m.BC. Such a causative alignment of events at the three settlements, however, would require Philia 3 to be at least partly contemporary with *Vrysi* Late Phase as well. Watkins has already pointed out that the relatively shallow deposits at Philia are probably deceptive (Watkins 1973:52), so that Period 3 may have been long-lived. Lacking further ^{14}C dates, its start cannot be accurately estimated either, though what can be concluded is that it must post-date the dissemination of RW ware (occurring, perhaps, from the North Coast), since the earlier DFB ware was no longer in use in Phase 3. Neither are there any indications of the absolute durations of Phase 2, a transitional phase (Watkins 1970b:6), and Phase 1. However, the latter is characterized by DFB ware, if little else, and hence cannot be too far from Dhali *Agridhi* II. To get a working hypothesis for the absolute dating of Philia *Dhrakos* A in advance of the final excavation report, the approximate synchronisms (late?) Dhali *Agridhi* II:start of Philia 1 and end of Sotira III:end of Philia 3 are therefore suggested as *maximum* termini for the length of occupation that preceded Philia 4, corresponding to dates of (very approximately) 4,600 cal BC and 3,900 cal BC.[11]

For the type site of the Sotira Culture itself, Sotira *Teppes* (#Lm.35 [S/080], Dikaios 1961a), two ^{14}C determinations are available (adjusted from provisional to NBS oxalic-acid standard after initial publication in *Radiocarbon* 1, 1959, and Dikaios 1961a; cf. Deevey et al. 1967):

3,617 ± 110 BC (St-337)
3,298 ± 130 BC (St-350)

Unlike the assays for the sites considered thus far, these two dates delimit the occupation of the settlement to which they belong fairly accurately. Sample St-337 was collected from either the floor (Floor III) or the roof collapse of House 29, which belongs to the first phase of occupation at the N edge of Area V. As Floor III was founded on bedrock and remained in use until the roof collapsed shortly after, it is very likely that St-337 dates the start of Sotira I and furnishes a reliable *terminus post quem* for the entire occupation. The end of the main occupation of the site, coinciding with the abrupt termination of Phase III, is dated by St-350, whose sample was taken from House 12 in Area V (*Radiocarbon* 1:43). This building was erected at some time during Phase III and possessed one floor, Floor II, on which the roof collapsed during the general

destruction of the settlement at the end of the phase (Dikaios 1961a:78-79, and Pl.26b/Section A-A). Considering the age difference between St-337 and St-350, the latter is more likely to belong to an advanced stage in the life of Floor II or to the roof collapse and concomitant conflagration, and not to the foundation of House 12. Disregarding Phase IV, when life at the settlement petered out, Sotira *Teppes* hence lasted from ca. 4,300 cal BC to ca. 3,900 cal BC, with the latter date marking the close of the Sotira Culture as a whole, though to associate it with a widespread 'destruction horizon' in the north, center, and south of Cyprus would be premature. This means a duration of ca. 400 years, a figure which has been regarded as exaggerated by Stanley Price, who instead proposed a maximum duration of ca. 180 years based on an estimate of six generations of 30 years each (Stanley Price 1979a:81). On the other hand, Peltenburg (1978:65) finds no fault with an average life span of 500 years for Sotira, Philia *Dhrakos* A, and Ayios Epiktitos *Vrysi*; and Stanley Price musters little evidence to support his estimate of population turnover, whose inference is an even more complex matter than quantitative population estimates and difficult under the best of circumstances. Nevertheless, the fact that only three buildings (H.36, H.38, and H.39) had more than one floor per phase demonstrates clearly that little accumulation took place from the time of erection to the time of abandonment; this is customarily construed as a sign of short life but could also arise from the habit of periodically removing old floors to replace them with new ones, instead of successive renewals—especially in buildings with restricted overhead clearance. Finally, it should be kept in mind that even a time span as short as 210 years would still be possible if the dates were compressed towards the converging ends of their respective 1-sigma ranges (4,220-4,010 cal BC, P = 0.61-0.86). Alternatively, their cumulative 2-sigma range yields termini of 4,460 and 3,640 cal BC (P = 0.95-0.97). so that various archaeological interpretations are possible without clashing with the chronometric evidence.

The last set of determinations for the Sotira Culture presently available consists of two TL dates obtained from the ceramic occupation of Klepini *Troulli* (#K.40 [K.037]) on the North Coast (Peltenburg 1982a: 115, 1985d:36), marking the first application of thermoluminescence dating in the Cypriot context. The dates, which are calendric and not subject to calibration, are :

3,860 ± 480 BC (Ph TL 09a)
3,570 ± 445 BC (Ph TL 09b)

The error margins are so wide that on chronometric evidence alone the site could fall anywhere between 4,340 cal BC and 3,125 cal BC, and to shorten this range it is therefore necessary to

enlist comparative arguments. The fact that the ceramic occupation of Troulli II, represented by Dikaios' soundings A and B as well as in Area C and probably by one or more drystone perimeter walls (Dikaios 1962:63-72), belongs with the northern Sotira Culture and shows no signs of affiliation with the Late Formative Erimi Culture has been confirmed by a re-examination of the records and material from Dikaios' excavations in 1941 (Peltenburg 1979b). Since regional retardation cannot have played a role in the case of Troulli considering its location near Ayios Epiktitos *Vrysi*, the initial conclusion must be that the site does not post-date the end of Sotira *Teppes* III or, at most, the fifty or so years which followed, down to ca. 3,850 cal BC. This rules out Ph TL 09b without its deviation. After examining the pottery stratified in Pit A above 3.60 m, Peltenburg was able to demonstrate that ceramic developments in terms of painted decoration and vessel shapes closely paralleled those at neighboring *Vrysi*, causing him to postulate the synchronism Troulli Pit A 3.60-1.80/1.60 and Area C:*Vrysi* Early Phase; Troulli Pit A 1.80/1.60-0.00:*Vrysi* Middle-Late Phase (Peltenburg 1979b:27).[12] Although the two TL samples were taken from unstratified surface material (Peltenburg 1982a:115), the attribution of the sherds used in the analysis to RW-BI. implies that the assays probably date an early phase of Troulli II and should thus correlate with either the Early Phase or the early Middle Phase at Ayios Epiktitos *Vrysi*.[13] Therefore, on the basis of the dating suggested above for these phases at the latter site, it can be posited that the true dates of Ph TL 09a and 09b lie somewhere between 4,370 cal BC and 4,100 cal BC. Coupled with the absence of DFB ware and the fully evolved RW ceramics that mark the beginning of the sequence at Troulli II, the chronometric data do not contradict a roughly simultaneous start of occupation at both sites; whereas the equation of the topmost strata in Pits A and B at Troulli with *Vrysi* Late Phase is at odds with an earlier interpretation of Peltenburg's (Peltenburg 1975:40) and, as far as this can be judged from the somewhat confusing tabulation of sherd counts from Troulli, with the minute quantity of RW-Rp. (Peltenburg 1979b:23, Table 1). Although a quantitative analysis of material from soundings undertaken without the use of probabilistic sampling is obviously fraught with statistical errors, the under-representation of ripple fillers in the stratigraphically late ceramics at Troulli is too pronounced to uphold a Troulli II Late:*Vrysi* Late correlation, making it possible to infer that Troulli II did not survive the end of *Vrysi* Middle Phase and was thus abandoned between 4,000 cal BC and 3,900 cal BC, i.e., before Sotira *Teppes* IV, Philia *Dhrakos* A:4, and *Vrysi* Late Phase.

3. Late Formative

Following the traditional culture sequence, the Late Formative would begin with a reversion to a less stable and more troglodytic life style at ^{14}C-dated Kalavasos *Pamboules* (#La.8 [R/061], Dikaios 1940a:76-77, 1962:133-140). For reasons to be discussed presently, this site is here viewed as being transitional between the Sotira Culture and the Erimi Culture rather than upholding Dikaios' eventual correlation of Kalavasos *Kokkinoyia* (Kalavasos 'A') with the former and Kalavasos *Pamboules* (Kalavasos 'B') with the latter (Held 1983:174, 187). Only a single date was obtained, and like all the other Stockholm dates originally published by Dikaios it has since been adjusted to the NBS oxalic-acid standard by Deevey et al. (1967):

3,288 ± 110 BC (St-419)

The provenience of the sample was reported as between bedrock and the lowest floor (Floor VI) of Pit VIII at the site (*Radiocarbon* 2:194), the same pit that provided the ceramic material for the seriation carried out by Dikaios (1962:139-140). On the face of it, Kalavasos *Pamboules* thus post-dates the destruction of Sotira *Teppes* III by only 1 cal year (10 radiocarbon years), a temporal proximity which Peltenburg initially thought was in conflict with its Erimi-type pottery (1978:68), noting nonetheless the possibility of internal chronological and typological differences at Kalavasos *Pamboules* and the adjacent Kalavasos *Kokkinoyia*. In fact, the balance of current evidence indicates that the ceramic assemblages of the two sites, as Dikaios thought of them, are considerably more in agreement with each other on the basis of both his own seriations and recent analysis of surface-collected ceramics than his conclusions would have it (Dikaios 1962). The differences in the percentages of some of the wares considered by him to be diagnostic of either the Sotira Culture or the Erimi Culture and consequently utilized as criteria for attributing each site to its respective culture now seem not significant enough to warrant a chronological and cultural differentiation of the sites of the order formerly proposed but are more likely to be the outcome of intrasite variation.

The recent VVP excavations at Kalavasos *Ayious* (#La.4 [R/059]), ca. 600 m north of *Kokkinoyia/Pamboules*, and survey of the latter, although confirming pits, hollows, subterranean passages and possibly dwellings with light timber superstructures to be typical features of SCU-ECU transitional sites (Kingsnorth 1982, Todd 1979b:25-28, 1981b:59-67, 1985a:86-87, 1985b:8-9, 1985c:8-10, 1986b:20-23),[14] until very recently compounded the problem of their relative and absolute chronological positions by producing a new set of ^{14}C dates (Todd 1982b, 1987:9, 1987:174, Table 4, for Kalavasos *Ayious*) and a ceramic sequence (Kromholz 1981) that

were partially contradictory. In order to illustrate the discrepancy between the chronometric and ceramic evidence, the *Ayious* dates, as hitherto published, must be included in the present discussion:

9,164 ± 80 BC (BM-1835) ♦
3,004 ± 45 BC (BM-1832) ♦
2,994 ± 70 BC (BM-1834) ♦
2,973 ± 140 BC (BM-1833) ♦
2,664 ± 290 BC (BM-1836) ♦

The provenience of the samples was reported as follows (Todd 1982b:9): BM-1832: NW Area, Pit 2:6.3; BM-1833: Square C11C:6.1; BM-1834: NW Area, F.117.4; BM-1835: Square C11B:6.1; BM-1836: Square C11C:6.2. BM-1835 was evidently much too high for a ceramic Formative context and could hence be dismissed on archaeological grounds. BM-1836, by contrast, was not a priori in conflict with a Late Formative assemblage, even though it obviously diverged from the remaining three determinations. Significantly, however, this sample also stood out on account of its wide SD and differed by about three centuries from BM-1833, which dates a stratum immediately above, so that it had be brought into alignment with BM-1832, BM-1833, and BM-1834. If so adjusted, it would round out an unusually coherent set whose weighted average dated the occupation of the site to ca. 3,550 cal BC, making it contemporaneous with Kissonerga *Mylouthkia* (see below).

Despite the stratigraphic division of the pitfills into as many as four phases of use and the association of all dates except BM-1834 with lower or basal fill levels, it was (and still is) well-neigh impossible to infer the position of the four valid determinations relative to the length of occupation or the duration of the site itself. The reason for this is that the depths of deposit in the various pits cannot be measured against a known long-term or short-term function, and the absence of an interconnecting stratigraphy for the various features and excavation areas precludes the determination of a sequence of occupational phases for the site as a whole. Hence, it could merely be speculated that—within the range their dispersion—the published *Ayious* dates either clustered or spread somewhere between 3,633 and 3,104 cal BC, depending on whether they were taken to represent a short-lived single-phase site or a multi-phase occupation of longer duration.[15]

The bearing which the *Ayious* set has on the present discussion is that on the evidence of a homogeneous and perfectly credible series of ^{14}C determinations the site seemed to post-date Kalavasos *Pamboules* by approximately 300 calendar years despite their spatial proximity and general cultural affinity, whereas the scheme of ceramic evolution in the Vasilikos Valley proposed

by Kromholz (1981) in her study of the pottery assemblages of ceramic *Tenta*, *Ayious*, and *Kokkinoyia/Pamboules* postulates the opposite sequence, i.e., *Tenta* > > *Ayious* > > *Kokkinoyia/Pamboules*. To put these conflicting data in perspective, it is useful to explore their implications by means of three consequential hypotheses. Thus it could be postulated that:

*H*1: The proposed ceramic sequence was correct and the chronometric evidence from both sites was wrong or misleading, so that *Kokkinoyia/Pamboules* would post-date *Ayious* by a margin wide enough to allow for the observed ceramic developments, with both sites positioned somewhere between Sotira III (3,900 cal BC) and Kissonerga *Mylouthkia*/Erimi *Pamboula* I(?) (3,400-3,700 cal BC, see below).

*H*2: The proposed ceramic sequence was correct and the chronometric evidence from one of the two sites was wrong, so that either *Ayious* predated *Kokkinoyia/Pamboules* at 3,890 or the latter post-dated the former at ca. 3,640 cal BC.

*H*3: The proposed ceramic sequence was wrong and the chronometric evidence was correct in principle, meaning that the chronological order was conveyed accurately even though the absolute ages of both sites might vary within the ranges of their respective SDs.

First, *H*1 was based on the inherent flexibility of all ^{14}C determinations due to their SDs. Thus, as has been noted repeatedly so far, it was feasible to literally stretch the evidence through the sigma ranges until the respective dates for the two sites overlapped—reversing their order, rather than to resort to the unlikely premise that all determinations were erroneous. With 1-sigma limits of 3,700 cal BC, (P = 1.00) for *Ayious* (BM-1833) and 3,780 cal BC (P =0.97) for *Pamboules* (St-419), the two sites just failed to overlap, so that two SDs had be used. This resulted in a possible upper limit for *Ayious* of 3,820 cal BC (P = 0.90) and a lower limit for *Pamboules* of 3,680 cal BC (P = 0.91), creating a maximum overlap of 140 cal yr.

Second, if (as in *H*2) the question were one of choosing between *Ayious* and *Pamboules*, the single date for the latter site was naturally more liable to be wrong that an entire set of consistent determinations, suggesting that *Kokkinoyia/Pamboules* in fact post-dated *Ayious* after the middle of the 4th m.BC.

Third, *H*3 proved more complicated to interpret because it involved not merely an evaluation of the ceramic sequence proposed by Kromholz (1981) but also an assessment of the inferential validity of her analysis and of Dikaios' frequency seriations of Kalavasos 'A' and 'B' (1962) for the relative ordering of these sites. There was no reason for questioning the soundness of the conclusions reached by Kromholz, since her analyses demonstrated a steady ceramic develop-

ment of multivariate character, with analogous changes apparent in constructional as well as morphological and stylistic attributes. This view has meanwhile been partially confirmed by Baird's (1986) analysis of the ceramics from *Ayious*. As regards construction, the material from this site and *Tenta* shares the layered, or slab, technique (Kromholz 1981:47, Fig. 2-10) that is an innovative feature of the Middle-Late Phases at Ayios Epiktitos *Vrysi* (Peltenburg 1982a:33, 1982c:61, 100) and is found also at other SCU sites in southern Cyprus, but not at *Kokkinoyia/Pamboules*. According to Kromholz (1981:28-29), the disappearance of this distinctive technique may be causally related to the gradual substitution of a particular local clay with which it was commonly associated at *Tenta* and *Ayious* ('Fabric A') with a darker and more workable fabric ('Fabric B') once a light-colored slip began to be applied to the vessel surface. In its morphological aspects the *Kokkinoyia/Pamboules* assemblage was also found to be more developed than *Tenta* and *Ayious*, with a greater variety of rims and base types, the latter including knob, omphalos, and pedestal shapes, lug handles, bowls with straight and flaring walls, jugs with cylindrical, plain-rimmed necks and tapering necks with everted rims, and lastly flat-bottomed CW trays, so that it incorporates features of the (late) Sotira Culture as well as the Erimi Culture (Kromholz 1981:25, 52, Fig. 2-13; 53, Fig. 2-14; cf. Peltenburg 1982a:44-45, 1982c:64-67). Most diagnostically, the decorative motifs and painting technique of the RW pottery at *Kokkinoyia/Pamboules* bring the trend from Broadline RW (RW-Bl.) toward the densely-textured lattice fillers of Closeline RW (RW-Cl.) almost up to classic ECU standards while at the same time displaying similarities with elements of late SCU RW that are more characteristic of the *Tenta* and *Ayious* assemblages (Kromholz 1981:55, Fig. 2-15).[16] One variable where the analysis failed to produce conclusive comparative results was the relative frequency of ware types, and since it was already noted that the cultural attribution of *Kokkinoyia/Pamboules* has traditionally been based on the frequency seriation undertaken by Dikaios after his trials of 1947 (Dikaios 1962) while Kromholz's study collection represents only 50% of a *partial* collection of surface material (Kromholz 1981:24), the second point to be clarified which regard to *H*3 concerns the reliability of the statistically documented assemblage for the purpose of fitting these transitional sites to the bimodal adaption of the previously mentioned old Kroeberian cycle that has been suggested for the alternating predominance of Monochrome and Patterned ware classes (Stanley Price 1979c:38, Fig. 8). In order to facilitate the comparison of the available seriations, the frequencies of the two main classes Monochrome (Mono) and RW as well as the subclass CB are tabulated below:[17]

	MONO	RW	CB
I-Surface	83.1%	2.8%	0.0%
II-I	71.2%	11.6%	9.9%
III	88.1%	4.8%	1.8%
V/IV	89.8%	4.8%	1.9%
V	90.4%	3.7%	1.8%
VI	78.5%	0.0%	7.3%
Cumulative Frequency Average:	**83.5%**	**4.6%**	**3.8%**

Table 7: Amalgamated Ware Frequencies at Kalavasos *Kokkinoyia* (Pit XI) (Dikaios 1962:111-112).

	MONO	RW	CB
40-20 cm	37.6%	56.0%	00.0%
60-40 cm	19.6%	75.5%	00.0%
II-I upper 80-60 cm	20.2%	69.0%	00.0%
II-I lower 100-80 cm	93.6%	6.4%	00.0%
III-II	9.5%	76.2%	00.0%
IV-III	41.3%	47.2%	00.0%
V-IV	67.3%	26.2%	0.9%
VI-V	74.5%	21.6%	00.0%
VI	66.1%	25.0%	1.8%
Bedrock-VI	76.4%	11.1%	00.0%
Cumulative Frequency Average	**50.6%**	**41.4%**	**00.0%**

Table 8: Amalgamated Ware Frequencies at Kalavasos *Pamboules* (Pit VIII) (Dikaios 1962:139-140).

	Kokk./Pam.[a] Surface	*Pamboules* Exc.	*Kokkinoyia* Exc.	*Ayious* Surface+Exc.
MONO	78.0%	50.6%	83.5%	55.6%
RW	4.0%	41.4%	4.6%	5.5%[a] 18-35%[b] 79-25%[c]
CB	0.03%	1.35%	3.8%	0.15%
MONO:RW	**20:1**	**1.24:1**	**21:1**	**11:1**[a] **4.5-1.86:1**[b]

Table 9: Amalgamated Cumulative Average Ware Frequencies at SCU-ECU Transitional Sites in the Vasilikos Valley ([a]Kromholz 1981:31, Table 2-1; [b]closed shapes, Baird 1986:23; [c]open shapes, Baird 1986:24).

The chronological inferences to which Dikaios was led by his interpretation of the seriated assemblage from *Kokkinoyia* and *Pamboules* have already been mentioned above (cf. Dikaios 1962:184-185), and while the data embodied in Tables 7-9 incorporate his original percentages they nevertheless reveal weaknesses in his conclusions on several counts. At *Kokkinoyia/Pamboules* the ratio and frequencies of the Monochrome and RW classes from Dikaios' Pit XI are almost identical with those pertaining to the surface material collected by the VVP. Although the percentages of CB ware from the surface are substantially lower than in the excavated material, even in the latter it reaches only 3.8% as opposed to over 36% at Sotira *Teppes* (Stanley Price 1979c:32, Table 7), so that its description as an "important feature" of the *Kokkinoyia* assemblage (Dikaios 1962:140, 184) is misleading particularly when used in support of close cultural and ceramic links between the two sites in general. Similarly, the steady internal evolution from an earlier (i.e., post-SCU) predominance of Monochrome wares to a later (i.e., ECU) predominance of RW ware postulated by Dikaios for *Pamboules* (ibid.:140) is contradicted rather than supported by his own quantitative data. As Table 8 illustrates, the decrease of Monochrome and concomitant increase of RW applies only to a comparison of the lowermost and topmost levels in Pit VIII, whereas the intervening deposit is marked by fluctuations that are especially pronounced between Floors IV and II.[18] With the element of unambiguous internal change thus removed, and with no convincing architectural sequence present at *Pamboules* or *Kokkinoyia*, there is no factual basis for regarding the former as a 'bridging site'; i.e., a site whose material assemblage constitutes the missing link in a discontinuous development. Judging strictly from the ratio of Monochrome and RW pottery, it lies halfway between Sotira and Erimi; yet, on the other hand, it possesses ten times more CB ware than *Ayious* (Table 9, supra), and in this respect it is ceramically closer to the Southern SCU than the latter site. A further puzzling aspect of the assemblage from Pit VIII at *Pamboules* that has elicited comment in the past (Peltenburg 1978:68; Watkins 1981b:15) is that the few illustrated RW sherds (Dikaios 1962:Fig. 42/4) display the Broadline style of the Northern Sotira Culture instead of the Erimi-like dense lattice patterns present in the samples from other pits (Dikaios 1962:Fig. 42/1-3/5). These sherds could of course represent an isolated archaizing element found only in Pit VIII and might have been selected for publication precisely because they were oddities. Yet their presence in an assemblage that Dikaios claimed to be "representative" (1962:139) of the other pits excavated in 1947 serves to underscore the disparity of the available data. At *Ayious*, by contrast, even in advance of the final publication of the ceramics, Broadline RW (particularly with reserve decoration) is already known

to make up on average 79-25% of the open and 35-18% of the closed vessel shapes from the early to the late levels (Baird 1986), and this augmentation of Kromholz's count of 5.5% would seem to confirm her view of strong ceramic links of this site with the Late Sotira Culture. Thus, more recent evidence consistently pointed to an early position of *Ayious* in the sequence; followed by *Kokkinoyia/Pamboules*, where ceramic affinities with the Erimi Culture are more persuasive and intrasite variability and sample bias more likely than Dikaios' claim of diachronic development between two discrete assemblages, A and B. As a result, *H*3 became much less convincing even though it could not be entirely eliminated as long as the complete analyses of the *Tenta* (Baird n.d.) and *Ayious* material were still outstanding.

To sum up, by the mid-1980s ceramic analysis increasingly supported the misgivings that Peltenburg, Watkins, and others working with the Erimi Culture harbored about Dikaios' interpretation of the *Kokkinoyia/ Pamboules* assemblage(s), whereas the radiometric data from *Ayious* and Kissonerga *Mylouthkia* hampered rather than helped the search for a transitional sequence by opening a gap of several hundred years. If, as suggested by Peltenburg (1978:67, 72; 1981b:34; 1982a:56) and now generally accepted, the two Vasilikos Valley sites represented an architectural adaption to a period of seismic activity that (at least along the Southern Seaboard) wrecked most of the traditional free-standing buildings of Late SCU settlements, they could be assumed to have been founded immediately after, or at least very soon after, the earthquake, or wave of quakes, that leveled Sotira *Teppes* III and probably a good many other sites. The founders presumably were a group displaced from their village(s) in or outside of the Vasilikos Valley, and at this point it is worth recalling that there are many Sotira Culture settlement sites south of the Troodos which, although not yet excavated, are likely to have been caught up in whatever catastrophe befell the region (**Map C**, infra). Similar events probably took place at Mari *Paliambela* with its semi-subterranean structures (Dikaios 1953:318-319), and at other sites as far afield as Ayios Epiktitos *Kelali* (Dikaios 1938a:74, Peltenburg 1985e:100, 102), at Erimi *Pamboula* I (Dikaios 1938a:8-13), and in southwestern Cyprus at Kissonerga *Mylouthkia* and Lemba *Lakkous* Area I (Baird in Peltenburg 1985a:20; Peltenburg 1979a:23-25, 1979c:80-83, 1980a:1-7, 9-13; 1981a:28-31, 32-34; 1982b:36, Fig. 1, 37-41; 1985a:314-316, and Fig. 12). Because of the distances involved, sites in the North and West may have been established later or affected later, so that their transitional architecture and ceramic repertoires could well post-date those found on the South Coast. For this reason there is no conceptual difficulty with accepting the radiometric evidence from *Mylouthkia*, which places that site almost in the middle of the 4th m.B.C.,

particularly if it is viewed as a manifestation of renewed immigration into western Cyprus stemming from the demise of the Sotira Culture (see **CHAPTER 3**). A similar time lag is hard to invoke for *Ayious*, however, not only because of its ceramics but also for a further reason. This is the presence of underground passages and chambers of enigmatic purpose, which it shares with SCU Philia *Dhrakos* A:4 and which may turn out to be characteristic only of the very end of the Sotira Culture proper and *early* part of the SCU-ECU transition, while semi-subterranean features and light free-standing timber-frame structures spanned the entire transition on the evidence from Erimi I, Lemba Area I, and *Mylouthkia*. Since, unless the episode of seismicity was prolonged, populations might be expected to have reverted to a healthier and more comfortable mode of building after a relatively short time and begun to erect flimsy superstructures over shallow pits, and then light free-standing timber structures, sites possessing these traits should theoretically belong to the middle and late phases of the SCU-ECU transition, particularly in regions at some distance from the Southern Seaboard—if indeed that was where the putative disaster struck.

Hence, evaluation of the Vasilikos Valley transitional sites and *Mylouthkia* along the lines just described failed to provide a satisfactory explanation for the late date of the *Ayious* set, suggesting that something was wrong with the ^{14}C measurements. This conclusion was confirmed by the British Museum's discovery of the previously mentioned error (Tite et al. 1987), which concerned not only several of the samples from Ayios Epiktitos *Vrysi* (supra) but all those from *Ayious*, as well as several from Lemba *Lakkous* and Kissonerga *Mosphilia* (infra). Now that the error corrections have been released, it is clear that *Ayious* was affected almost to the maximum predicted extent of the error range:[19]

9,401 ± 130 (BM-1835R) ⌠
3,241 ± 110 (BM-1832R) ⌠
3,231 ± 120 (BM-1834R) ⌠
3,200 ± 170 (BM-1833R) ⌠
2,891 ± 310 (BM-1836R) ⌠

Comparison of the uncorrected with the corrected dates proves the latter to be 230-240 radiocarbon years higher (BM-1835R can again be excluded), yielding an average true date of 3,738 cal BC. The new weighted average lies at 3,802 cal BC, as opposed to 3,550 cal BC for the uncorrected set (see above), and is bracketed by a short interquartile ranging from 3,880-3,644 cal BC (see Table 6 and Fig. 17, supra). In perspective of the foregoing discussion, the significance of these revised determinations is obvious: *Ayious* can now be seen to predate Kissonerga *Mylouthkia*, whose dates are not subject to the BM correction and whose median

therefore remains at 3,554 cal BC. Since the interquartiles of these two sites now fail to overlap by 40 cal yr, in statistical terms their occupations were temporally close yet did probably not overlap, so that the new ^{14}C evidence allows for a diffusion lag between the central South Coast and the West that may be related to a period of demographic instability and migration in the sense described above. Furthermore, its higher median brings *Ayious* into chronometric alignment with Kalavasos *Pamboules*, thus pushing it to the beginning rather than the end of the transitional period. That the average of three intercepts for St-419 (3,872 cal BC) is slightly higher than the raised median of the *Ayious* set (3,802 cal BC) need not be a cause of grave concern, since there is ample room for a reversal of this order within the 1-sigma range of St-419 and the interquartile of the *Ayious* dates. Therefore, the corrected set from that site can be greeted with considerable satisfaction—and the caveat that the relative chronology of the transitional Vasilikos Valley sites can only be resolved definitively by means of a larger sample of stratified ceramics from *Kokkinoyia/Pamboules* and an accurate assessment of the degree of intra-site variability.

Assuming that the date for *Pamboules* is correct, and than the new evidence proves *H2* to be the only true hypothesis, several hundred years would have elapsed until the re-emergence of stone-built structures at Erimi *Pamboula* III around 3,350 cal BC (see below), rather than the few decades that would have been possible had *Ayious* been occupied during the full extent of its previous interquartile (i.e., 3,597-3,415 cal BC, see n.14). More enigmatic even than the architectural developments during the transition is the fate of the ceramic hallmark of the Southern Sotira Culture, the Combed Ware. Its frequencies at the sites under scrutiny are more significant than those of the two main classes, Monochrome and RW, even within the statistical limitations outlined above, because they are consistently low compared to Sotira *Teppes* itself (see above), posing the question whether spatial distance or temporal distance is the cause of this sudden drop. Continuing research, consisting mainly of archaeological surveys, has strengthened the impression that the Southern Sotira Culture was as homogeneous ceramically as its northern variant, with CB pottery figuring prominently at yet unexcavated sites from the large hilltop settlements of Alekhtora *Laoni tou Kotsiri* (#Lm.70 [S/357]) and Pissouri *Ayia Eleni* (#Lm.75 [S/362]) in the western Limassol District, and Ayios Yeoryios *Louizos* in the upper Kouris Valley (#Lm.74 [S/361])[20] to the recently located Tremithos Valley sites (#La.44 [R/388], La.45 [R/389], La.51 [R/395]) and Pyla *Gypsaroi* (#La.23 [R/070]) in the eastern Larnaca District (Dikaios 1938a:77), so that regional variation is unlikely to account for the dearth of CB ware at *Tenta*, *Ayious*, and *Kokkinoyia/ Pamboules*. This leaves the argument of temporal distance as the only

plausible explanation, according to which sufficient time elapsed between the Sotira Culture and early transitional sites such as *Ayious* for this diagnostic ware to become a minor feature. Whether this decline was a steady and rapid process cannot be determined without further chronometrically dated transitional sites with representative ceramic assemblages. The fact that *Tenta*, even though attributed by Kromholz to the end of the SCU, also produced atypically small quantities of CB ware, while Mari *Paliambela* with its transitional semi-subterranean structures less than 1 km to the south was noted for its combed designs (Dikaios 1953:318-319), possibly reflects the haphazard use of this formerly popular ware during a critical and unstable period that renders it patently unsuitable for frequency seriation.

While the purpose of the preceding discussion was to draw attention to the gaps and inconsistencies in the present corpus of material which place severe limitations on its use in ordering the transitional sites on the basis of frequency seriation, the available ceramics and chronometrics nevertheless provide sufficient data to propose the following chronology:

1. Sotira *Teppes* IV, Philia *Dhrakos* A:4, Ayios Epiktitos *Vrysi* Late Phase/Final, Khirokitia *Vouni* VI (see above), (late) ceramic Kalavasos *Tenta* (see above) and squatter occupations: **ca. 3,900-3,850 cal BC.** CB ware production becomes erratic and/or usage relies on surviving stocks. While Monochrome is thus the sole major class in the South, Broadline RW in the North goes through several rapid constructional and stylistic changes that are in turn felt in the South (slab technique, ripple patterns).
2. *Ayious* and other early transitional sites (possibly including Mari *Paliambela*): **ca. 3,850/3,800-3,770 cal BC.** Subterranean passages continue to be built at some sites.
3. *Kokkinoyia/Pamboules*, Erimi *Pamboula* I, Ayios Epiktitos *Kelali* and other middle/late transitional sites: **ca. 3,750-3,700 cal BC).** Broadline RW has now evolved into Closeline RW in the north and spreads to the central south coast, but CB ware and some Broadline RW motifs linger on.
4. Kissonerga *Mylouthkia*, Peyia *Maa-Palaeokastro*, early Kissonerga *Mosphilia*, and early Lemba *Lakkous* (early 1 or pre-1): **ca. 3,600-3,500 cal BC).** As the result of East-West population movements along the Southern Seaboard during the transition, the West is eventually recolonized by groups holding on to monochrome wares in regional variation (GB and RMP wares) as well as even older types such as CB ware and RW-Bl. of the Sotira Culture. The production of female figurines increases sharply and becomes standardized.

Hence, dates of 3,900 cal BC and 3,600 cal BC are suggested as approximate termini for the

SCU-ECU transition, corresponding to the changeover from the Early Formative to the Late Formative in culture-historical terms.[21]

The type site of the culture which eventually evolved following the demise of Early Formative traditions, Erimi *Pamboula* (#Lm.12 [S/075]), has produced a series of three dates (adjusted to the NBS oxalic-acid standard by Deevey et al. [1967] subsequent to their initial publication in 1957 and 1959):

2,762 ± 80 BC (St-202)[22]
2,670 ± 80 BC (St-203)
2,608 ± 150 BC (St-338)

The dates are on average only 80 years apart and hence sufficiently consistent to belong to one or perhaps two phases of occupation within a single period. The provenience of the samples was reported only as somewhere in the upper levels of an unusually deep deposit (Dikaios 1962:198), so that it is reasonable to assume that the latter part of Erimi III is dated.[23] The set's interquartile of 3,254-3,080 cal BC consequently dates not the *floruit* of the entire occupation but a late phase that may have started ca. 3,300 cal BC. Therefore, in light of the relative increase and design elaboration of RW-CI. that begins between Levels VI-VIII (Dikaios 1938a:28-36; Bolger 1985a:124-127) and is accompanied by the establishment of free-standing and fully circular structures on stone foundations, in conjunction with the depths of deposits belonging to each of the three phases (Stanley Price 1976b:105, Table 3.13), a date of ca. 3,450 cal BC seems not implausible for the start of Erimi II, and for the mainphase Erimi Culture in general provided its type site was in step with developments elsewhere. Hence, the chronometric argument that has been developed thus far reinforces Peltenburg's estimated starting date of ca. 3,500 cal BC for his 'Middle Chalcolithic' (Peltenburg 1987c, n.d.a), aside from terminological differences regarding the revival of a rigid tripartite periodic scheme that connotes inter-regional uniformity. Furthermore, even without taking the preceding discussion and the recent ^{14}C series for Kalavasos *Ayious* and Kissonerga *Mylouthkia* into account, it can be concluded on purely stratigraphic grounds that much less time passed between the end of Sotira *Teppes* III and the start of Erimi *Pamboula* I than evidenced by the repeatedly cited chronometric lacuna of 520 years (supra, n.20), since the ^{14}C determinations on which it used to be based—St-350 for Sotira and St-202 for Erimi—must be placed at the opposite ends of a development leading from the end of the SCU *floruit* to the abandonment of Erimi in the middle of the Late Formative. Apart from the evidence discussed in the preceding pages, this interpretation receives strong support

in the form of small quantities of CB ware and large quantities of RL and [R.SI.] ware as well as the semi-subterranean buildings with light superstructures which all characterize the lower levels (I-IV, and less exclusively V-VI) of Erimi (Dikaios 1938a, 1962:113-132). These are echoes of the old Sotira Culture and signs of the monochrome horizon of the initial stage of the Late Formative in the south of the island, whose spread and character is gradually emerging through excavations at contemporary or chronologically overlapping sites such as those forming the Lemba cluster in the West (Peltenburg 1977 onward), and may reflect the persistence of a 'quake syndrome' among populations.

To sum up, if the evidence from Erimi is interpreted within the chronological framework of the transition period proposed above, an estimate of ca. 600 cal yr for the life span of this settlement with its deep vertical stratification is perhaps not too far from the truth, giving termini of ca. 3,700-3,100 cal BC.

The remaining ^{14}C determinations for the Late Formative—pending further assays from newly excavated Kissonerga *Mosphilia* and a breakthrough in attempts to date the intractable Sotira *Kaminoudhia* charcoal samples—are represented by two sets from LAP excavations at the two southwestern sites of Lemba *Lakkous* and Kissonerga *Mylouthkia* (Peltenburg 1977, 1979a, 1979c, 1980a-1981c, 1982b, 1983a, 1984a, 1984b, 1985a; Peltenburg et al. 1983). Since the latter, as previously indicated, appears to belong to a late phase of the SCU-ECU transition on the basis of archaeological and chronometric evidence and is marked by remarkably consistent dates unaffected by the British Museum error, it will be discussed first. The set for Kissonerga *Mylouthkia* (#P.24 [P/084]) is as follows (Peltenburg 1979a:45, 1981a:28, 1981b:24, Fig. 2; n.d.a:Table 2; Burleigh 1981:21):

3,009 ± 60 BC (BM-1475)
2,984 ± 80 BC (BM-1539)
2,958 ± 55 BC (BM-1473)
2,932 ± 50 BC (BM-1540)
2,855 ± 50 BC (BM-1474)
2,839 ± 50 BC (BM-1476)[24]

Three of the samples came from Feature 1 (F.1), a roughly circular hollow that on current interpretation was used either for living or as a trash dump: BM-1473 from F.1.2, BM-1474 from F.1.11, and BM-1475 from F.1.13 (Peltenburg 1979a:23, Fig. 7; 24-25, 45; 1979c:84, Fig. 2; 1982a:58-60). The provenience of the other three samples is reported as Feature 16 (F.16), an enigmatic hollow that may have functioned first as a well or cistern (Morrison 1982:57) and

subsequently as a dump for heated craft debris and waste products from specialized workshop areas nearby (Peltenburg 1980:5-7, 1981a:30-31, 1982a:60-61): BM-1476 from the North Section, BM-1539 from F.16.1, and BM-1540 from F.16.4 (Peltenburg 1979a:45, 1980:5, 1981a:28). In common with the vast majority of British Museum dates discussed in this chapter, the *Mylouthkia* assays distinguish themselves by very short SDs, but before this is judged to be a mark of precision it should be noted that reported sample age errors smaller than 80 years betray a reliance on Poisson-derived count interpretations instead of measurement replication that is known to lead to underestimates. Although lack of information on the laboratory-specific error multipliers that correct this variance prevented their inclusion in the calibrated age range computations embodied in **APPENDIX 4** (infra), recent ^{14}C research indicates that the quoted errors of the *Mylouthkia* dates must be multiplied by 2 (Pearson and Stuiver 1986:840; cf. the appreciable increase in variance between the old and new *Ayious* SDs of BM-1832, BM-1834, and BM-1835 [supra], which amounts to an average factor of 1.9). Without this adjustment, the dates fall into two groups. BM-1475, BM-1539, BM-1473, and BM-1540 have a 1-sigma range overlap of 3,629-3612 cal BC (P = 0.47-0.95), whereas BM-1474 and BM-1476 have a 1-sigma range overlap of 3,504-3,407 cal BC (P = 0.81-0.87), so that there is a break of 108 cal yr that might indicate a considerable interval between the deposition of the contexts of the respective samples in both Feature 1 as well as 16. This possibility, however, is not only at variance with the stratigraphic order of BM-1473 (Group I) and BM-1474 (Group II) in Feature 1 (see above), but it also clashes with the result of comparing the two ^{14}C dates (LHL) framing the apparent break (BM-1540 [Group I] and BM-1474 [Group II]). This can be done by comparing the arithmetic difference between the two dates with their combined SDs, using the formula $([SD1]^2+[SD2]^2)$, and the resulting value of 77 ± 71 yr shows the difference between the two dates to be statistically insignificant. Consequently, the ^{14}C dates do not fall into two groups as do their calendar versions and there is no 68% chance of the same hollows having been in use for over 100 cal years. The chronometrics can therefore be interpreted in two different ways with contradictory results—suggesting a rather long interval in one case and none in the other. If the sample age errors are doubled, however, the 1-sigma cal ranges (=2-sigma ranges before adjustment) show now break and overlap between 3,531-3497 cal BC; and hence it can be concluded, at the usual 68% level of confidence, that the fills of F.1 and F.16 accumulated fairly rapidly in the late 36th c.BC. If this conclusion is put in perspective of the calibrated dispersion diagram for the *Mylouthkia* set (Table 6 and Fig. 17, supra), it can be seen that there is a close fit between the calculated median of

the dates (3,554 cal BC) and their adjusted 1-sigma range overlap as just discussed. Assuming that all dates are valid assays —and, judging from the excavation reports, there is no reason to believe otherwise, it is therefore postulated that the most accurate interpretation of the dates from this site is not to stretch them along their cumulative 2-sigma range of 3,701-3,336 cal BC (which would be even longer if adjusted SDs were used in the computations), but to compress them into their adjusted 1-sigma range overlap. If interpreted in this manner, the chronometric evidence therefore substantiates the excavator's view of the hollows as having been in use synchronously over a relatively short period of time (Peltenburg 1979c:81, 1981a:28, 1982a:63). Ceramic uniformity—exemplified by GB ware and CW platters—in the hollows is likely to reflect a similarly short life of the hypothetical settlement nearby from which material was discarded. Yet since only five of at least 30 spatially and stratigraphically discrete hollows have been excavated, it is clear that overall synchronicity is notional and that the life span of the entire settlement cannot be equated with the use of only two features. Thus the ^{14}C determinations for the latter, as interpreted above, should be regarded as a chronometric anchor, rather than a demarcation, for the site, whose duration may correspond more closely to the dates' interquartile of 3,604-3,494 cal BC. In this case *Mylouthkia* would have been occupied during the later part of Erimi *Pamboules* I (see above).

In its wider context, the homogeneous *Mylouthkia* set establishes a welcome quasi-continuity of ^{14}C determinations for the first half of the Late Formative and unarguably places the site in the early Erimi Culture, a position which is corroborated by the predominance of GB ware, minute quantities of CB ware, general ceramic parallels with the *Ayious* assemblage (Baird 1986), and some Early Formative RW ware reminiscent of the decorative style of Ayios Epiktitos *Vrysi* Late Phase (Peltenburg 1979c:81, 1980a:3-4, 1982a:63-64). Thus the site demonstrates the regional survival of the southern monochrome horizon and a tenuous affiliation with southern as well as northern aspects of the old Sotira Culture. Real spatio-temporal continuity, however, may only be established through the excavation of a SCU-ECU transitional site with intermediate frequencies of CB and GB wares and radiocarbon dates in the 3,800-3,600 cal BC range that could be present in the Ayios Thomas (southwestern Limassol District) and/or Kouklia (southeastern Paphos District) clusters (**Map C+D**, infra).

The last set to be considered dates a second Lemba Cluster site, Lemba *Lakkous* (#P.31 [P/085], Peltenburg 1985a:16-18):

3,931 ± 100 BC (BM-2280) ♦
3,200 ± 260 BC (BM-1543)
2,458 ± 100 BC (HAR-6173)
2,263 ± 90 BC (BM-1542)
2,221 ± 50 BC (BM-1541A)
2,170 ± 45 BC (BM-1541)
2,139 ± 45 BC (BM-1354)
2,098 ± 100 BC (BM-2278) ♦
2,057 ± 50 BC (BM-1353)

All samples were charcoal, and, with the exception of BM-1543 and HAR-6173, all came from Area II at the site, where remains have been attributed mainly to middle and late phases of the settlement. The highest date (BM-2280), however, came from what has been reported as an ash hollow associated with residues of a Period I occupation in Area II (Peltenburg 1985a:16, 128). BM-1353 (B2.2) and BM-1354 (B2.2 F17) date roof supports of B2, the largest circular building at Lemba, BM-1541 and BM-1541A a nearby firepit (L34a F2) and BM-1542 a timber post associated with a late phase of adjacent B7 (Burleigh 1981:21, Peltenburg 1981a:32, 1981b:35, 1985a:16-17). Except for the possibility of a squatter occupation on top, this building complex seems to represent the last occupation at Lemba, Period 3 (Peltenburg 1985a:318-320), so that BM-1353 can reasonably be viewed as the terminal date of this somewhat heterogeneous set of determinations. On the face of it, this opens a gap of ca. 700 cal years between the end of Erimi *Pamboula* III (St-338) and Lemba Late/Final Phase (BM-1353), and in light of the close overall artifactual kinship of the two Late Formative settlements this initially caused some apprehension (Peltenburg 1979a:36, 1979c:95). The more recent determinations, however, indicate an appreciable reduction of this chronometric hiatus to ca. 400 cal years (BM-1542, assigned to Period 3). As a matter of fact, this interval is not a sign of discontinuity but a slot for developments leading from the *floruit* of the Erimi Culture with its predominance of Late Formative RW ware (RW-Cl.), epitomized by Erimi *Pamboula* III, Souskiou *Vathyrkakas*, Kissonerga *Mosphilia* 3, and Period 2 in both areas at Lemba, to the rebound of a monochrome tradition in the late Erimi Culture to which the final building cluster in Area II, with its ^{14}C dates and RB/B pottery, must be assigned (Peltenburg 1979a, 1979c, 1980-1982a, 1982c). The average calibrated dates bracketing the statistically homogeneous Period 3 series (BM-1542 and BM-1353, but note short SDs with regard to earlier caveat) give a duration of just under 300 cal yr from 2,719-2,432 cal BC, approximating the excavator's estimate (Peltenburg 1985a:17). If the extremes of the five intercepts for each sample are considered, this range increases to almost 450 cal yr, spanning the period 2,853-2,406 cal BC. If these dates are compared with the calibrated quantile distribution (Table 6, Fig.

17), Period 3 can be seen to span most of the interquartile and upper quartile, yielding a median value of 2,584 cal BC, which leads to the question whether the very long (1,700 cal yr) lower quartile accurately conveys the duration of Periods 1 and 2.

The reason for breaking with the practice established thus far and discussing the Lemba set from the bottom up, instead of from the top down, is that the remaining four assays, as Peltenburg has already pointed out (1985a:16-17), are too disparate to date the earlier periods with an acceptable degree of accuracy. To begin with, two of the three British Museum dates contained in this series are potentially affected by the systematic error that was discussed in the context of the Kalavasos *Ayious* set (supra, Tite et al. 1987). Since corrections could not be obtained in time to be evaluated, these dates can only be interpreted in terms of their calibrated age ranges. The provenience of BM-2278 has been described as an ash- and charcoal-filled Type 2 pit (M34c.3a F9) capped with stones, which is ascribed to an extra-mural storage area in use during Period 2 in the NE part of Area II (Peltenburg 1985a:239, Table 147; 316, Fig. 6.2; Fig. 37A, Section E-F; Fig. 37B, Section I-J). The date of this sample is intermediate between BM-1354 and BM-1353 and hence falls in the later part of Period 3. A prima facie differentiation between a middle and a late period at Lemba in chronometric terms is therefore not possible. Before this is used in conjunction with the lack of a clear stratigraphic separation between the two periods in support of a functional explanation for the pronounced ceramic differences between Period 2 and Period 3 buildings—a possibility not ruled out yet deemed unlikely by the excavator (Peltenburg 1985a:316-317), the error terms of this single assay must be examined. Its SD is reasonably wide (>80 yr), so that there are no grounds for rejecting the 1-and 2-sigma ranges. The 2-sigma range extends from 2,670 cal BC to 2,140 cal BC ($P = 0.94$), so that there is less than a 5% probability of the sample context preceding the start of Period 3 as dated above—unless that event did not take place before the middle of the 27th c.BC. However, such low dates for Period 2 and, in consequence, for the start of Period 3 are difficult to sustain from the point of view of ceramic developments between the main phase and the late phase of the Erimi Culture (Peltenburg's 'Middle' and 'Late Chalcolithic'), for they would mean that developed RW-Cl. did not become popular at Lemba until 400-500 cal yr after Erimi III (see above) and peaked only shortly before being superseded by RB/B during Lemba 3—requiring a very sudden swing of the pendulum from patterned to monochrome traditions in the mid-3rd m.BC indeed. A single radiometric determination cannot legitimately be used to put an entire sequence of carefully correlated systemic changes out of joint, including observed diachronic transformations in the fields of

pottery manufacture, architecture, and craft specialization (see Peltenburg n.d.a), so that the published age of BM-2278 must be rejected on chronometric as well as archaeological grounds. Given the problems pertaining to many of the Lemba charcoal samples (Peltenburg 1985a:16), it may simply be poor sample, in which case only further assays for Period 2 contexts will have a chance of providing accurate dates. On the other hand, the correction range predicted by Tite et al. (1987) for error-affected British Museum determinations means that TBM-2278 could be as much as 300 yr higher, so that this sample could turn out to be as early as 4,230 BP (2,823 cal BC, average of 3 intercepts on the bidecadal curve). Assuming a similar SD for the corrected sample, this yields a 2-sigma range of 3,050-2,570 cal BC, in which case BM-2278 could be said to reliably date Lemba 2 to approximately 3,000 cal BC. For now, these are the limits to which chronometrics can be utilized in attempting to date the middle period, and its duration can only be inferred archaeologically. Based on the equation Lemba 2 = mainphase ECU, the excavator has proposed approximate brackets of 3,400 and 2,800 cal BC (Peltenburg 1985a:316-318), and this interval provides a general chronological link between Erimi III and Lemba 3 while at the same time allowing for occupational breaks at the latter site before and after Period 2.

The exiguity of ^{14}C determinations for the early phases at Lemba also prevents an accurate dating of Period 1. Although three dates have thus far been obtained for this occupation, and although all three are earlier than the six associated with Periods 2 and 3, the measurements differ so significantly from each other that they might as well date three separate periods. Two of the samples came from Period 1 buildings in Area I (BM-1543 and HAR-6173) and one from a ceramically contemporaneous extra-mural area containing the earliest building in Area II (BM-2280). Together they make up a lower quartile spanning slightly over 1,700 cal BC (Table 6 and Fig. 17, supra), and such a longevity is irreconcilable with the stratigraphic, ceramic, and architectural evidence for this period in both settlement areas, even if erosion has abridged the occupational record in the spatial as well as the temporal sense (Baird in Peltenburg 1985a:19-20; Peltenburg 1985a:315). At least one, and possibly two, of these dates are therefore bound to be wrong, so that an attempt must be made to identify the aberrant assay(s). Worse, all three may be wrong if it is considered that the Harwell determination was made on an undersized sample, that the context of BM-1543 has been reported as contaminated through a later stratigraphic disturbance, and that BM-2280 is subject to the systematic error correction announced by Tite et al. (1987) as well as being a composite sample (Peltenburg 1985a:16). Whether the counting method used on HAR-6173 makes that assay more reliable cannot be determined without a

check-sample, and the date seems somewhat too low for Period 1. Examination of the calibrated age ranges shows that if HAR-6173 and BM-1543 are compressed by using their respective 2-sigma ranges (P = 0.94-0.96), they still fail to overlap by 150 cal yr, with HAR-6173 dating B9.3 in Area I to 3,110 cal BC and BM-1543 dating B8.1 in the same area to 3,260 cal BC. Although it was not possible to establish a stratigraphic connection between these two buildings, a minimum interval of 150 cal yr between the abandonment of B8 and a middle phase of B9—only ca. 4 m away—does not fit the notion of broad contemporaneity for all recorded units on the Lower Terrace that is held by the excavators (Baird in Peltenburg 1985a:19-20. Such a possibility cannot be categorically rejected, of course, as long as the meaning of 'broad' is not quantified, but to argue for a late 4th m.BC date would also require the acceptance of a substantial overlap between Period 1 and Period 2. As Peltenburg himself points out, however, ceramic, faunal, and other evidence militates against such a scenario, so that his dates of ca. 3,500-3,000 cal BC for Period 1 and 3,400-2,800 for Period 2 should probably be understood to allow for considerable flexibility regarding the end of the former and the beginning of the latter, and not to imply an actual overlap of as much as 400 cal yr (Peltenburg 1985a:314).

A further approach to interpreting the Period 1 series is to consider HAR-6173 as being too late and to compare the 2-sigma range of BM-1543 with that of BM-2280 (4,780-4,360 cal BC, P = 1.00). Since these ranges can be seen to be conterminous at 4,360 cal BC, the ash hollow in Area II and the disuse of B8 in Area I would have to be dated to that century if not precisely that date. This would place Lemba 1 firmly in the Sotira Culture, and, without digressing into the multifaceted evidence to the contrary that has been eloquently presented by Peltenburg on numerous occasions (e.g., 1982a:51-83; 1985a:passim, 1985e:96-99), blind faith in chronometrics is required to accept a late 5th m.BC date as a credible alternative. Granted the possibility of an elusive pre/initial-Period 1 occupation at Lemba *Lakkous*, granted the presence of infinitesimal quantities of SCU CB and BK ware in a Period 1 context (Stewart in Peltenburg 1985a:261; Peltenburg 1985a:Fig. 62/12-14, Pl. 34.11), granted the lack of continuous stratigraphy and the possibility of an occupational break between Period 1 and Period 2, granted the likelihood of a stronger SCU presence in the West than was hitherto assumed,[25] and granted equally that the dissimilarities between Lemba 1 and nearby Kissonerga *Mylouthkia* remain to be explained, BM-2280 effects an unrealistic distortion of the Lemba dispersion and must be dismissed. Since the systematic error reported by the BM resulted in dates that are too low by varying amounts, the corrected measurement of this sample cannot be expected to redress the balance.

The low confidence in BM-2280 leads to a further consideration—namely, that an accurate chronometric fixpoint for Period 1 is contained within the large amplitude of BM-1543. With a 2-sigma range of 1,100 cal yr at 96% probability, this sample is amenable to almost any archaeological interpretation imposed upon it. TBM-1543 puts Lemba 1 at approximately 3,785 cal BC; i.e., well before the neighboring site of Kissonerga *Mylouthkia* and between Erimi *Pamboula* I and Kalavasos *Ayious* as dated above. Since it differs from the lowest date for the site by over 1,300 calendar years, it, too, would make Lemba *Lakkous* an extremely long-lived settlement—presupposing continuous occupation—in absolute terms, and even more so in comparison with the site's shallow deposits and not overly massive architecture. Further, it would mean that the recolonization of western Cyprus followed the end of the Sotira Culture much more closely than the ^{14}C dates for Kissonerga *Mylouthkia* indicate, and if this alternative conclusion is seen in conjunction with the apparent use of pit dwellings and light timber structures in the first phase at Lemba, the connection of these events in the West with the earthquake hypothesis discussed earlier becomes a strong corollary. From the point of view of culture process, the hypothesis that catastrophic events functioned as a catalyst for immediate population expansion has more attractions than arguments couched in assumptions of demographic and economic pressures, yet judgment on the rate of developments must be reserved pending further dates for the early phases at Lemba and Kissonerga *Mosphilia* and more data on the time depth and spatial extent of pure SCU assemblages in the West. A reduction of 260 ^{14}C years brings BM-1543 down to the lower end of its 1-sigma range of 3,510 cal BC ($P = 0.92$) and thus aligns it with the end of Kissonerga *Mylouthkia* (supra). Since the sample does not date the start of Lemba 1, the two settlements, would consequently have been broadly contemporaneous during the century 3,600-3,500 cal BC. In this case, the mutual exclusion of dominant ceramic styles at these neighboring sites (RMP at Lemba 1 vs. GB at *Mylouthkia*) and other artifactual disparities would have to be explained in terms of different site functions, and GB would have to be considered as a local idiosyncrasy of potters at *Mylouthkia*, *Mosphilia* (infra), and Miliou *Ayii Anaryrii/Rhodaeos* (#P.35 [P/087]) and not necessarily as the predecessor of monochrome wares at Lemba (cf. Peltenburg 1979c:87, 1981a:32, 1982b:37, 1985a:18, 1985e:98; Peltenburg et al. 1983:13). A general Lemba 1 = *Mylouthkia* equation is also marred by the architectural evidence, for it would mean that the inhabitants of the Lower Terrace building cluster at Lemba had already reverted to free-standing circular structures with drystone and cob footings while their contemporaries further east (from where they may have emigrated) (Erimi I) and in the vicinity (*Mylouthkia* and

possibly early *Mosphilia*) adhered to their reactionary pit dwellings and light timber buildings. Consequently, BM-1543 needs to be lowered by more than one SD in order to allow the correlation of the small circular buildings of Lemba 1 with the comparable Type III structures of Erimi II (cf. Dikaios 1938a, 1962:113, 128), perhaps to 3,300 cal BC as a terminus rather than a mid-life date for Lemba 1. This correspondence is supported by the ceramic evidence, for the RMP ware which characterizes Period 1 in Area I and II (Peltenburg 1980:13, 1981a:32, 1985a:13, Fig. 2.1, 1987c:55) seems to be a derivative, or variant, of Dikaios' [R.SI.] as far as surface treatment is concerned (Stewart 1978:9, n. 1, ii), and [R.SI.] predominates in the assemblage of the first two periods at Erimi (Dikaios 1962:129; Stanley Price 1976:104-106). Acceptance of these links in principle leads to the notion that Erimi II provides a *terminus post quem* for Lemba Late 1, with the possibility that regional variation accounts for a short time lag. If, as the excavator concedes (Peltenburg n.d.a), the loss of early residues in the SW part of the site means that the earlier part of Period 1 has not been archaeologically documented, it could be plausibly argued that the *initial* occupation at Lemba *Lakkous* took place contemporaneously with that at Kissonerga *Mylouthkia* and *Mosphilia* 2—perhaps by groups from those sites—(pace Peltenburg 1987c:55), and that if ceramic or other artifactual links ever existed, they were confined to this phase of Period 1. In furtherance of this hypothesis, the following sequence of approximate foundation dates may thus be suggested:

> Erimi I: **3,700 cal BC** → *Mylouthkia* + Lemba Pre/Early 1: **3,600 cal BC** → Erimi II + Lemba Late 1: **3,450 cal BC** → Erimi III: **3,300 cal BC** → Lemba 2: **3,300/3,200 cal BC.**

Of course, the precision of these dates arises from the need to demonstrate a developmental sequence and should hence not be regarded as the direct result of available ^{14}C determinations. As already noted, *Mylouthkia* is here considered as a single-phase site that was probably abandoned before the start of Lemba Late 1, which would go some way towards explaining the virtual absence of its diagnostic GB ware in the latter's ceramic repertoire, whereas the continuing reliance on deer-hunting may attest to a greater stability of the economic system than of ceramic manufacture. On the basis of this chronological scheme, the occupation of Lemba *Lakkous* falls between ca. 3,600 cal BC and 2,406 cal BC, yet it must be reiterated that this does not imply absolute continuity during 1,200 cal years. Given the shallowness of the deposits and the lack of stratigraphic links between Area I and Area II, it is conceivable that Lemba 1, 2, and 3 are separated by periods of abandonment (Peltenburg 1985a:18) during which the Erimi Culture

flourished elsewhere. If there was such a hiatus after Period 2, reoccupation would have taken place several centuries after Erimi III, when the culture was still thriving but started showing the first signs of decline in its RW ware (Peltenburg 1981b:29), resuming possibly around ca. 2,800 cal BC and lasting for ca. 400 calendar years throughout the late Erimi Culture.

The last chronometric date currently available for the Late Formative is for Kissonerga *Mosphilia* (#P.23 [P/083]). The most recently excavated of the three Lemba-Cluster sites, *Mosphilia* is a 5-period settlement of exceptional size, duration, and material wealth, spanning the Late Formative from the Sotira Culture to the Philia Culture (Peltenburg 1983a, 1984a, 1984b, 1985b, 1986, 1987a, 1987b; Peltenburg et al. 1986-1988). Unfortunately, however, the plethora of archeological finds is not yet matched by radiometric assays, so that a basis for a detailed chronometric cross-check of the proposed ceramic and architectural sequences remains to be established. Thus far, a single determination has been published (Peltenburg 1987b:221, n.d.a:Table 2; Peltenburg et al. 1986:29):

2,201 ± 110 BC (BM-2279) ♦

The sample's provenience has been reported as Unit 3, adjacent to the SW edge of the main excavation area, a rich and well-preserved circular structure ascribed to the penultimate period of occupation, Period 4 (Peltenburg et al. 1986:33-35, and Pl. V/3-4; 1987:2, Fig. 1; 3). Since the analyzed material was carbonized wood believed to come from rafters or joists burnt during a conflagration, BM-2279 is probably a long-life sample whose date of 2,539 cal BC may be somewhat too high for the true date of the occupation of the building, and particularly for so the end of occupation in light of its lengthy period of use (Peltenburg 1987b:223). Since it is also affected by the BM systematic error (Tite et al. 1987), its corrected age could be even higher. *Mosphilia* 4 has been linked on ceramic and other grounds to Lemba 3, an analogy confirmed by specific typological parallels encountered in Unit 3 residues; i.e., large storage jars and other vessels belonging to CW, RMP, RB/B, but not RW-Cl., and a Lemba Type 3 hearth (Peltenburg et al. 1986:34, 1987:6-7). This relative synchronism is matched closely by the intermediate position of BM-2279 between BM-1541 and BM-1541A for Lemba 3. With a 1-sigma range overlap of ca. 100 cal yr (P = 0.39-1.00), these three samples place their respective occupations in the period 2,578-2,477 cal BC, so that Unit 3 at *Mosphilia* would appear to have been in use during the middle or later part of Period 3 at Lemba *Lakkous*. Nevertheless, there is considerable room for adjustment of the *Mosphilia* end of this synchronism given that the 2-sigma range of BM-2279

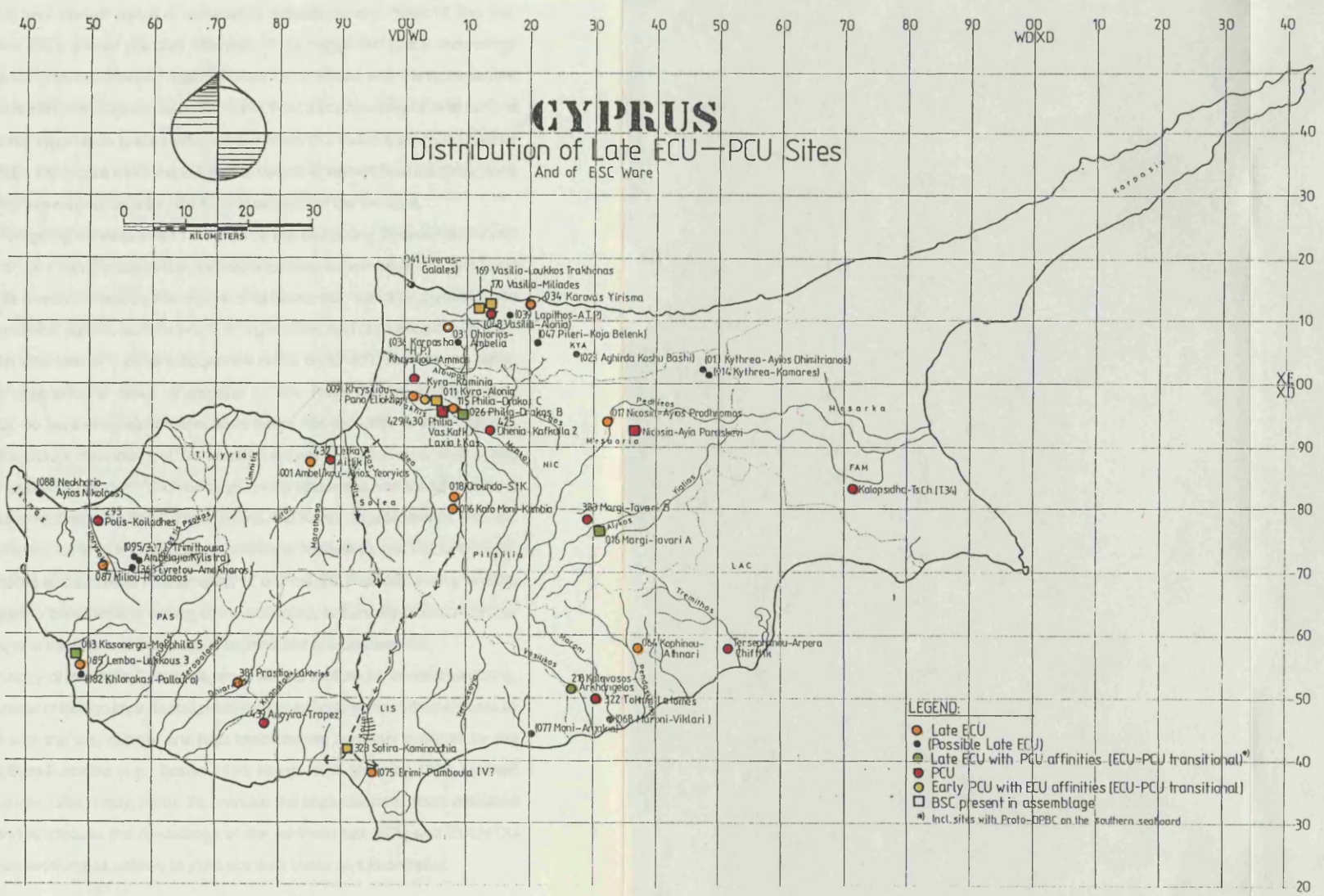


Fig. 20: Distribution of Late ECU and PCU Sites and BSC ware in the 3rd millennium cal BC (see also **Map D**, infra).

excavations at *Mosphilia* attests the presence of two new types of ceramics that are highly diagnostic of the Late Formative-Early Florescent transition, PRP and BSC (Fig. 20, supra), it reveals more about the local complexity of the final Erimi Culture than about the identity and diffusion of the Philia Culture. Because these wares were absent from Lemba *Lakkous* (however, cf. the RB/B spouted jug from the last phase of occupation, Peltenburg et al. 1983:17, Fig. 2a), the demise of settlement there should pre-date *Mosphilia* 5, as suggested in the chronology proposed above. Depending on the absolute date of Period 5 at the latter site, the replacement of western ECU traditions with a homogeneous repertoire of PCU traits covering several cultural systems hence should not have taken place before ca. 2,400 cal BC, but this inference neither establishes a synchronism with Sotira *Kaminoudhia* on the central Southern Seaboard nor does it preclude a much earlier transitional date for late ECU sites north of the Troodos.

The purpose of the foregoing remarks was to emphasize the dichotomy between the undeniably crucial position of the Philia Culture in the prehistoric culture sequence on the one hand and our knowledge of its absolute duration, the degree of its interaction with an indigenous and on the whole introverted island culture, and the extent of regionalism and chronological differentiation that impinges on attempts to impose a sequential order on LF-EFL sites on the other. Because there are no chronometric dates whatsoever for the Philia Culture and the Early Florescent (and, in fact, no excavated settlements save Sotira *Kaminoudhia* to yield datable, stratified samples), the absolute chronology of this transitional period is left in an analytical and methodological limbo, created by the EP ^{14}C chronology on the upper end and the LP historical chronology on the lower end. Following BM-2279 for Period 4 at Kissonerga *Mosphilia*, the next lower ^{14}C determinations are for MFL and early LFL contexts at Ambelikou *Aletri* (2,084 cal BC [LU-1694]; Merrillees 1984) and Episkopi *Phaneromeni* (2,077 cal BC [P-2368]; Swiny 1986b), respectively. They require a considerable raising of the accepted, historically-derived chronologies of these periods, and the *Phaneromeni* assays in particular are problematic.

Therefore, the chronology of the Philia Culture depends almost exclusively on relative dating, as well as on a small number of foreign imports and putative local exports whose inferred absolute dates tend to oscillate with the low, middle, and high chronologies currently available for the Aegean, Anatolia, and Syro-Palestine (e.g., Easton 1976, Kemp 1980, Manning 1988, Mellaart 1979, Ross, n.d., Weinstein 1980, Yakar 1979). To evaluate the implications of each mainland scheme for Cyprus, and to discuss the chronology of the northern late ECU and ECU-PCU transitional sites is an undertaking as unlikely to yield absolute dates as it is complex.

Thus, although it would provide an appropriate ending for this chapter, the brief and poorly understood interregnum of the Philia Culture and its connections with the Late Formative form a tangential issue that exceeds the scope of a discussion devoted to chronometric evidence. Detailed, up-to-date treatments are in press (Held 1989a, Peltenburg n.d.a), and in their place a tentative model for the transition is provided in Fig. 21 (infra). This and the following two diagrams summarize the temporal configurations of the early prehistoric period as they are beginning to appear in a growing but still woefully inadequate archaeological record. Because the limits of knowledge are often defined by the way in which knowledge is pursued, to determine the nature and chronology of cultural change at the close of the Formative period may require a different approach to fieldwork and analysis from the one taken thus far. Pending future excavations of other PCU and 'EC' settlement sites like Sotira *Kaminoudhia*, one potentially profitable line of inquiry would be to obtain thermoluminescence dates on ceramics and bone collagen and ESR dates on skeletal and dental material from existing PCU and 'EC' tomb groups. In purely interpretive terms, another would be to consider the possibility that the 'Early Bronze Age' on the Southern Seaboard and in the West is either hidden in transitional monochrome wares or that it represents an artificial taxonomic construct without cultural or chronological relevance for those regions (Herscher 1981). Until such research generates new data with which current models of regional overlap and exclusion can be put to the test, the absolute chronologies of the early and late prehistoric periods remain separated by a methodological fault line. As long as this disjuncture persists and an accurate assessment of the rate of acceleration of culture process in various regions of the island in the late 3rd millennium cal BC remains impossible, no discussion such as the present one can be brought to its logical conclusion. If, despite this deficiency, it has succeeded in demonstrating the pivotal role of chronometrics in the interpretation of a very fragmentary EP record, then it may also have drawn attention to the opportunities which the vast corpus of late prehistoric material provides for similar studies in the years to come.

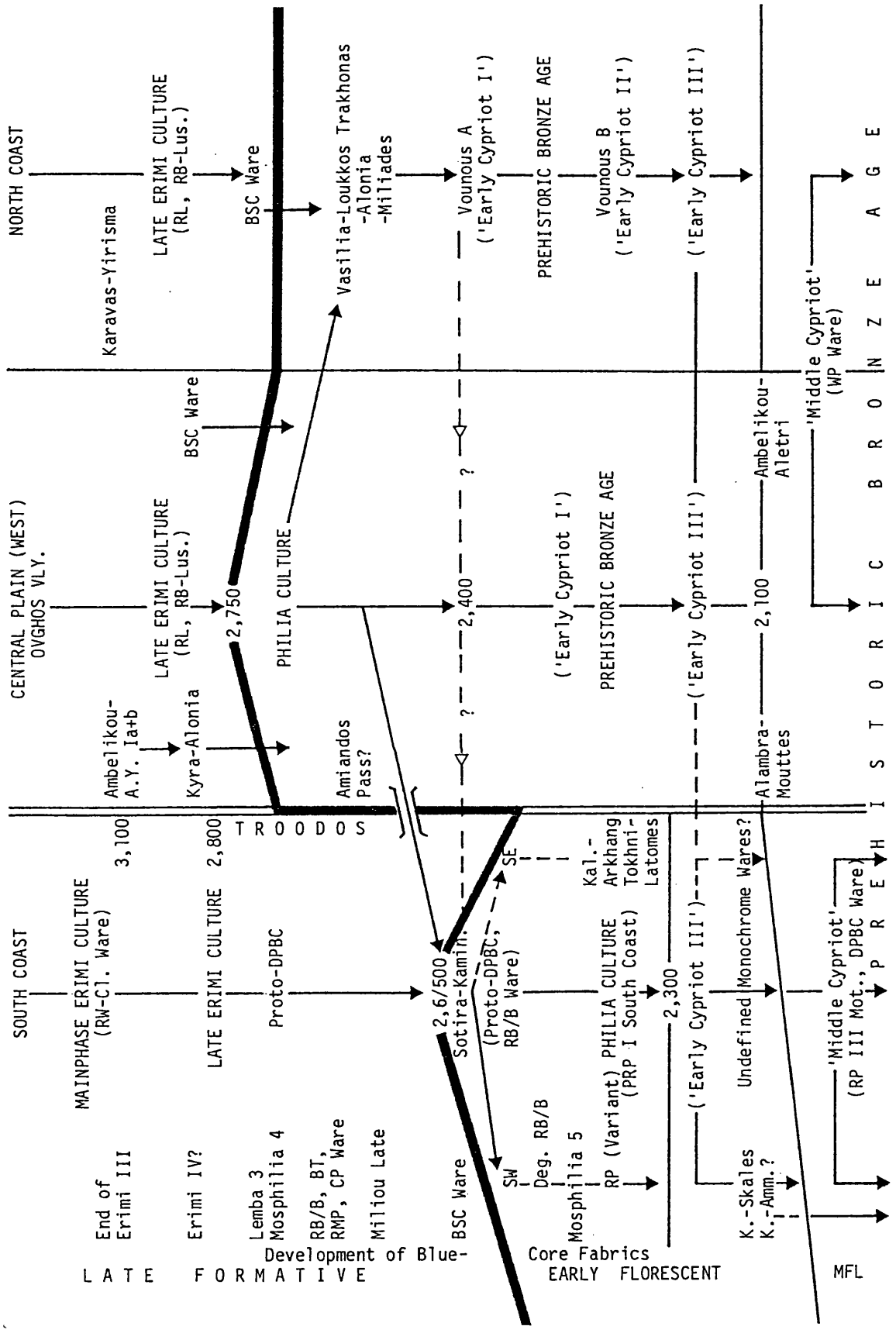


Fig. 21: Chronology of the Late Formative-Early Florescent Transition. Scheme shows proposed regional variation.

	"PROTO-NEOLITHIC" (Akrotiri Focus or Phase)	**ca. 8,800 cal BC**
	Hunter-Gatherer Bands Rockshelter Sites Relic Pleistocene 'Mini-Megafauna'	
	Early KCU	**ca. 8,000/7,500 cal BC?**
E A R L Y F O R M A T I V E	**KHIROKITIA CULTURE** Mainphase KCU Sedentary Tribes Farming/Herding, Hunting/Fishing Nucleated Settlements Incised Groundstone Vessels Obsidian Blades, Penannular Pendants	ca. 7,000/6,500 cal BC **ca. 5,700/5,500 cal BC**
	LACUNA IN THE ARCHAEOLOGICAL RECORD (Obscuring KCU-SCU transition?)	
	Dark Monochrome Ceramics	**ca. 4,750 cal BC**
	SOTIRA CULTURE Northern SCU: RW-Bl. Southern SCU: CB Sedentary Tribes/Clans Farming/Herding, Hunting/Fishing Nucleated Settlements, Rect./Sub-rect. Bldgs. Red Monochrome and Red-White Bichrome Ceramics, Saddle Querns, Phallic Stone Figurines	 **3,900 cal BC**
	Post-SCU Squatter Occupations	**3,900 cal BC**
	Subterranean Complexes (Food caching/shelter?)	**ca. 3,850 cal BC**
	SCU-ECU TRANSITION	**ca. 3,850 cal BC**
L A T E F O	Pits, Hollows, Semi-Subterranean Bldgs. Light Antiseismic Structures Replacement of RW-Cl. and CB with RW-Cl. Emigration to the West Early ECU	 **ca. 3,600 cal BC**
R M A T I V E	**ERIMI CULTURE** Mainphase Sedentary Tribes/Clans Farming/Herding, Hunting/Fishing Northern Nucleated, Shifting Settlements Late ECU: Foreign Contacts, Organized Food Storage Copper, Serpentinite, Cruciform Idols	**ca. 3,600 cal BC** ca. 2,900-2,750 cal BC **ca. 2,750/2,350 cal BC**

Table 10: Summary of Cultural Evolution During the Formative Period.

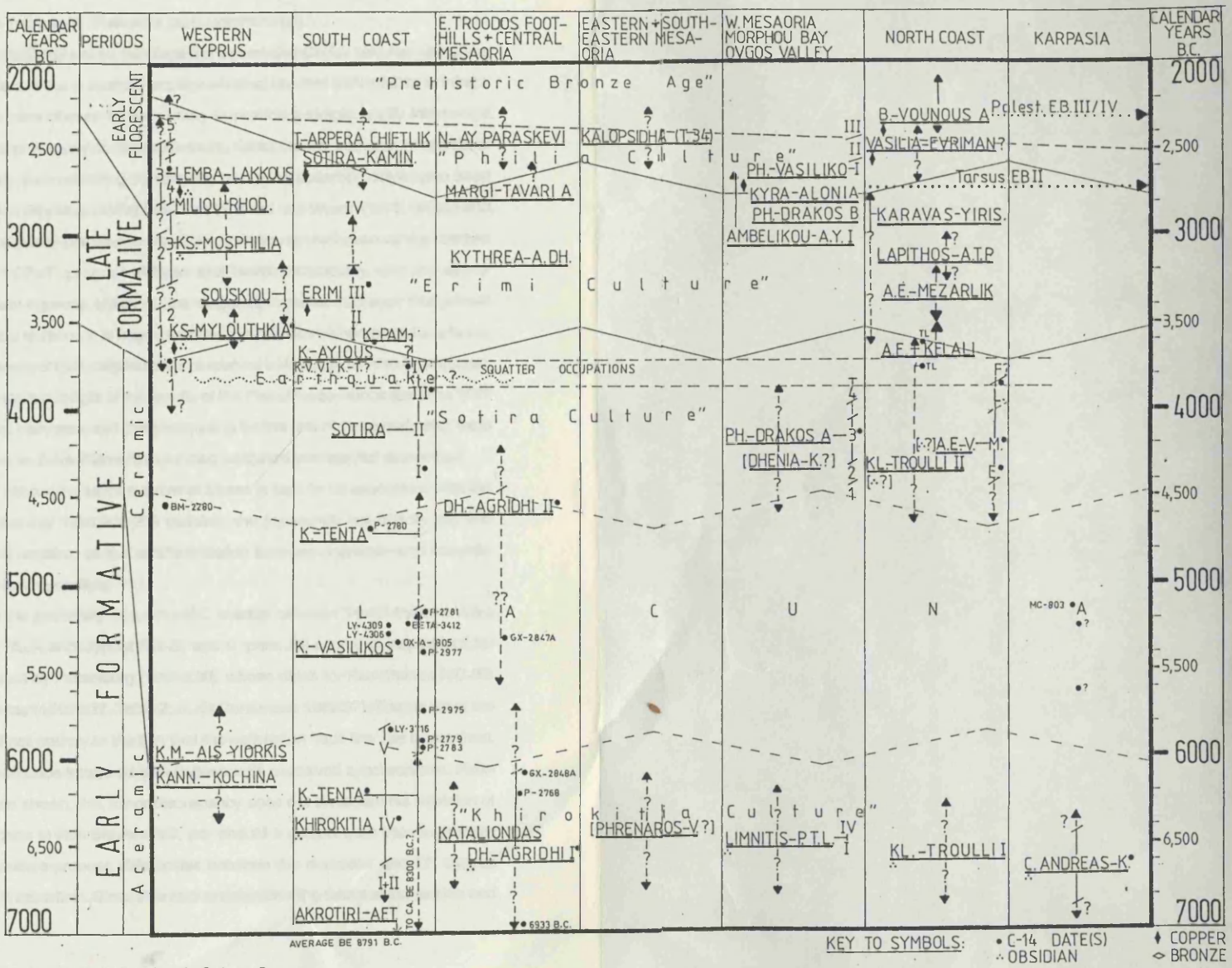


Fig. 22: Chronological Table for the Early Prehistoric Culture Sequence.

NOTES ON CHAPTER 4

1. Several AMS dates have been obtained, however, for a small 4th-century BC smelting installation near Ayia Varvara (W. Fasnacht, pers. comm. 1989).
2. This tally includes Philia Culture sites. See Digit 6 of Descriptive Codes listed as part of the site designation system in the numerical and alphabetical site lists (**APPENDIX 1**, infra).
3. Dispersion diagrams were chosen for their ability to provide a simple, easily interpreted picture of combined chronometric measurements. Other, more complex methods of averaging, combining, and evaluating contextually related radiocarbon dates have been discussed by Long and Rippetau (1974) as well as by Ward and Wilson (1978, Wilson and Ward 1981). It was originally planned to adopt the techniques discussed by the last two authors, using the 'DSPLIT' program (Wilson and Ward 1981:36-39), with the aim of obtaining a statistically rigorous check on the dispersion results; however, this proved unfeasible for technical reasons. It is hoped that the analysis can be completed at a future date, in which case some of the interpretations presented below may have to be adjusted.
4. This term no longer applies in light of the results of the French excavations (Le Brun 1977 onwards), which have demonstrated this structure to be the first of three perimeter walls that became obsolete as the settlement expanded westward but was not dismantled.
5. Note, however, that although a large number of bones is said to be associated with the aceramic deposits (Lehavy 1989:208-209 passim), the reports do not specify the find contexts of the faunal remains, so that a differentiation between aceramic- and ceramic-context frequencies is not possible.
6. This also eliminates the possibility of a 5th-m.BC overlap between 'Halaf' Painted Ware during Ras Shamra IVB/A and Cypriot RW-BI. and a "potential source of inspiration" for the latter, as suggested by Peltenburg (1985d:39), whose dates for Ras Shamra IVC-IIIB seem somewhat too low (1985d:37, Table 2; cf. de Contenson 1982:97). The cause of the problem lies partly if not entirely in the fact that the calibration 'fault line', as it was then, extended across and hence interfered with Peltenburg's perceived synchronisms. However, as has just been shown, this minor discrepancy does not invalidate his rejection of putative Cypriot imports in Ras Shamra IVC, nor should it detract from the much more important issue of culture-process differentials between the mainland and EP Cyprus which is also raised in the article. Since attempts to determine the extent of interaction and

isolation must form part of a systematic investigation of insular modifiers of culture change, Peltenburg's approach to interpreting the Ras Shamra 'parallels' can be seen to adumbrate the 'Covering Issue' described in Held 1989a: Chpt. 6.

7. Of course, there is always the possibility that deadwood or driftwood was utilized for the construction of Middle-Phase buildings; cf. Cutler (1982:453).

8. Hopefully, the identity and context of the sample(s) will be clarified once the final report, which apparently is now in preparation, becomes available.

9. In the case of Birm-72, the most likely 1-sigma range does in fact not allow to carry the date over into the Early Phase at *Vrysi* (4,170-4,000 cal BC, $P = 0.77$). Its 2-sigma range (4,350-3,940 cal BC, $P = 0.98$), on the other hand, covers the entire time span from the suggested start of *Vrysi* Early to the beginning of *Vrysi* Late, so that a precise synchronism cannot be established on radiometric grounds.

10. That a certain flexibility must be attached to the comparative interpretation of inter-site and inter-regional ceramic motif statistics is not only evidenced by the presence of 'Early Phase patterns' in Philia *Dhrakos* A.2 as well as 3 and of 'Middle Phase patterns' in 3 (Peltenburg 1975:40), but has also been emphasized by Peltenburg (1979b:31).

11. The rationale behind an admittedly speculative date of 4,600 cal BC for the approximate start of Philia *Dhrakos* A.1 is that it creates a credible measure of overlap/continuity between the use of early monochrome ceramics at this site and at Dhali *Agridhi* II with its alternative dates of 4,750 and ca. 4,560 cal BC (P-2769). It also fits the proposed model of DFB ware evolution in the center of the island by allowing time for the diffusion of this facies to the Southern Seaboard and ceramic Kalavasos *Tenta* (with a suggested date of ca. 4,570 cal BC, P-2780) and to the North Coast, where it may be present in the basal levels at Ayios Epiktitos *Vrysi* (pre-4,400 BC?) and at unexcavated sites such as Ayios Epiktitos *Xylomandra* (#K.10 [K/029]) and Orga *Palialona/Ambellia* (#K.64 [K/043]). Once these northern settlements had been founded, their proximity to the Syro-Cilician painted pottery horizon may have led to ceramic developments overtaking the center of the island, establishing the Kroeberian cycle discussed by Hockings (1963) and Stanley Price (1979c:38-39).

12. The full correlation includes Philia *Dhrakos* A.3 (*Troulli* 3.60-1.80/1.60) and 4 (*Troulli* 1.80/1.60-0.00). See also Peltenburg 1975:40-41, where a slightly different correlation is proposed—namely, *Troulli* Pit A, 3.60-1.80, and Area C:*Vrysi* Early:Philia *Dhrakos* A.2/3;

and *Troulli* Pit A,1.80-0.00:*Vrysi* Middle:*Dhrakos* A.3 (cf. n.9, supra).

13. In this context, the term 'Broad Line RW' used in the publication of the *Troulli* dates (Peltenburg 1985d:36) should be taken to refer specifically to the bold painted patterns of the *early* RW pottery of the northern Sotira Culture, and not generically to SCU RW as a whole (which is also called Broadline [RW-Bl.] to differentiate it from ECU Closeline RW [RW-Cl.]).

14. Other transitional sites with semi-subterranean architecture, or sites at which such architectural features as pits and traces of light timber structures belong to early phases that may date to the SCU-ECU transition, are Ayios Epiktitos *Kelali* (K.6 [K/026]), Erimi *Pamboula* I (Lm.12 [S/075]), and Lemba *Lakkous* I (P.31 [P/085]).

15. The original *Ayious* T's were calibrated using the same high-precision curves and method of probability computation as for all assays presented in this chapter. However, since they are now superseded by corrected measurements, they have been omitted from **APPENDIX 4**, infra.

16. Ripple fillers, which epitomize late SCU patterns of decoration at *Troulli* II, *Vrysi* Late Phase, and Philia *Dhrakos* A.3/4 and have also been identified at SCU *Tenta*, have not yet been reported from either *Ayious* or *Kokkinoyia/Pamboules* (Baird 1986, Kromholz 1981).

17. 'Monochrome' is a catchall including Dikaios' Red Lustrous, Black Lustrous, Red-and-Black Lustrous, Red-on-Red, and Red Slip, as well as Vasilikos Valley Dark Burnished wares. Red-on-White includes Plain White; while, strictly for the purpose of SCU-ECU transitional assemblages, Combed ware here includes RW-Cb. and is ranked equally with the two main classes, Monochrome and Patterned, as defined by Stanley Price (1979c:37).

18. This was already noted by Stanley Price (1976b:107, 1979c:36).

19. The writer is grateful to Dr. Ian A. Todd for permission to quote the corrected *Ayious* assays in advance of the site's final publication (*Vasilikos Valley Project 8: Excavations at Kalavasos-Ayious*, edited by I. A. Todd. SIMA, vol. 71:8. Paul Åströms Förlag, Göteborg. Forthcoming).

20. Unpublished information on Ayios Yeoryios *Louizos* courtesy of Dr. S. Swiny; see **APPENDIX 1**, infra.

21. Cf. Peltenburg's views of the SCU-ECU transition, including his postulation of a 500/600-year gap prior to the ^{14}C dates for Kissonerga *Mylouthkia* and Kalavasos *Ayious* (Peltenburg 1979c:81-83, 1981b:34-35, 1982a:51-66, 1985e:96-97, n.d.a; Peltenburg et al.

1983:12-13).

22. Thomas (1967:Table II.6a) inexplicably lists the late ECU site of Ambelikou *Ayios Yeoryios* (#N.2 [N/001]) as the provenience of this sample, and Buchholz (1977:299), without verifying his sources, repeats the error.

23. Adopting the stratigraphic division proposed by Stanley Price (1976b:65-69); as opposed to the original stratigraphy, which comprises two main phases (I and II) separated by an intermediate phase (Dikaios 1938a:12-14, 23). Bolger (1985a:6-8) discusses, but does not challenge, Dikaios's scheme.

24. Several of the *Mylouthkia* assays were initially reported with slightly different T's and SD's (Peltenburg 1979a:45): thus, BM-1473: 2,956 ± 53 BC; BM-1474: 2,853 ± 47 BC; BM-1475: 3,009 ± 56; BM-1476: 2,840 ± 47 BC (after conversion to LHL).

25. At such recently discovered sites as Peyia *Elia tou Vatani* 1 (#P.104 [P/409]) and perhaps some of the ceramic CPSP sites in the eastern Ktima Lowlands (see **APPENDIX 1**, infra; Fox 1987:27), although—as evident from the model proposed in **CHAPTER 3**, supra—the present writer is inclined to view these sites as reflecting an early population expansion during the final phase of the Sotira Culture or the beginning of the SCU-ECU transition, rather than an indigenous SCU settlement in the West.

26. This is a hypothetical late period at this site, introduced here to accommodate the late ceramics BT and Proto-DPBC attested in small amounts in the 1980 soundings S and SE of Dikaios' excavation (Heywood et al. 1981). According to Whittingham's analysis, RW-Cl. was still a major ware—especially on inclusion of her 'white slip' ware (=[PW]?), which may represent abraded RW-Cl. sherds, whereas BT and Proto-DPBC merely adumbrate late ECU ceramic developments and possible connections with Sotira *Kaminoudhia* and the Lemba Cluster. BT peaks during late Period 1 at Lemba (Peltenburg 1985a:13-14) but makes only a token appearance in Dikaios' material (Bolger 1985a:82). Since late Lemba 1 can be equated with Erimi II based on other ceramic factors as well as architectural parallels, the exchange of BT between the two sites cannot have been very intensive. Consequently, unless the ceramic disparities between the main excavation area and the 1980 soundings are entirely due to intra-site variability, the higher proportion of BT in Whittingham's assemblage cannot be construed as evidence for a broad synchronism of this material with Lemba 1.



APPENDIX 1
SUPPLEMENT TO THE GAZETTEER OF EARLY PREHISTORIC SITES

1. Introduction:

The *Supplement* (hereafter *GEPS Supplement*) is intended to update the *Gazetteer of Sites* compiled by Stanley Price in 1979 (Stanley Price 1979c:83-159), itself a revision of the *Catalogue of Sites and Finds* prepared by him for his D.Phil. dissertation three years previously (Stanley Price 1976b). The widespread consultation enjoyed by the published *Gazetteer* over the past nine years has firmly established it as a standard reference work and indispensable research tool in Cypriot Prehistory — complementary in subject and equal in importance to Catling's catalog of Bronze Age sites (Catling 1963). Although no major prehistoric archaeological surveys have been undertaken by the Department of Antiquities since 1975 (cf. Hadjisavvas 1977), the revision of Stanley Price's dissertation and the small-scale fieldwork carried out to support it came at a time when two foreign missions embarked on major regional projects on the central South Coast (VVP) and in the Ktima Lowlands (LAP). Since their inception in 1976-1978, both these projects have meanwhile included more or less systematic field surveys in their respective regions. Furthermore, the year in which the *Gazetteer of Early Prehistoric Sites* was published also saw the launching of the Canadian Palaipaphos Survey Project (CPSP), whose fieldwork in southwestern Cyprus between 1979 and 1986 constitutes the most extensive, most systematic, and arguably the most significant single contribution to archaeological surveying ever to be undertaken in the island.

Coupled with parallel field surveys elsewhere (Akamas survey in NW Cyprus, KSUS in the Episkopi region, SKS in the Sotira area, TVP survey in the hinterland of the Larnaca Plain) and with a number of nonsystematic surveys and chance finds (e.g., the Akrotiri Peninsula survey by Brian L. Pile; as well as the Alekhtora Valley and other intermittent surveys by Stuart Swiny and the author), these activities during the 1980s mark a phase of intensified prehistoric research and increasing returns in terms of both local and regional data. Consequently, there now exists a growing backlog of unpublished or insufficiently publicized sites located shortly before or after the completion of the *Gazetteer of Early Prehistoric Sites*. In order to bring the inventory up to date, the *GEPS Supplement* therefore includes a) sites where recent fieldwork and other research

necessitate changes or expansions of the *GEPS* entries, b) sites located but not reported prior to June 1978, and c) sites discovered between 1978 and 1988. The *Supplement* comprises sites attributable to the early prehistoric cultures of the island, from the earliest human settlement down to the Philia Culture. A comprehensive database of sites of all periods is currently being compiled by Rupp.

PROJECT	YEAR(S)	REGION	METHOD	AREA	EP SITES
APS	1980	Akrotiri Pen.	Non-syst.	12 km^2	Yes
AVS	1982	Alekhtora Vly.	Non-syst.	5 km^2	Yes
CPSP	1979-86	Khapotami-Ezousas Vly.	System.	634 km^2	Yes
KSUS	1978	Episkopi/Evdhimou	Non-syst.	85 km^2	No
LAP DS	1983	Drousha	System.	8 km^2	Yes
LAP PS	1982-83	Peyia	System.	11 km^2	Yes
LAP SPS	1979/85	Stavros-tis-Psokas Vly.	System.	17 km^2	Yes
SKS	1983-84	Sotira	System.	10 km^2	Yes
SUNY AS	1982	Akamas Pen.	Non-syst.	42 km^2	No
TVP	1981-83	Tremithos Vly.	Non-syst.	10 km^2	Yes
VVP	1976-	Vasilikos Vly.	System.	36 km^2	Yes

Table 11: Archaeological Surveys in Cyprus 1978-1988. For project names, see **ABBREVIATIONS**, supra. Survey areas are approximations only.

2. Notes on the Entry Format:

To aid standardization and facilitate cross-referencing, the original *GEPS* entry format (Stanley Price 1979c:85-90) has on the whole been retained in the *Supplement*. However, a number of modifications have been made for the purpose of accommodating an expanded set of ecological data and adhering to the standards adopted in the remainder of this dissertation. Paragraph numbers given below refer to *GEPS* introductory notes.

a) **Site Numbering System:** *GEPS* entries are ordered alphanumerically by modern Administrative District; this system, while working well for a self-contained catalog, is unsuitable for a site inventory whose claim to authority depends largely on whether it is kept up to date. Since an active inventory has to allow for the continual addition of new sites, as well as for the occasional deletion of entries or changes in village and/or locality names, the most flexible ordering system is by site designation number. These numbers, which must allow the numerical identification of each recorded site on an islandwide basis and should thus not be broken down according to extraneous variables such as geographic areas, appear in the *GEPS Supplement* as three-digit numbers preceded by a letter-code and are explained further in the section on the Site Designation System, infra. However, purely numerical listings are impractical for purposes of consultation, especially if the aim is to find the entry of a particular site in a particular region. For this reason, Stanley Price's

system of grouping sites by District and numbering the entries consecutively has been retained, even though it will be noted that new entries have been added as they were registered and are no longer in alphabetical order. To facilitate the use of the *Supplement*, the gazetteer itself is preceded by several concordances in which sites are listed numerically and alphabetically. Site numbers and page numbers which are **bolded** in the columns headed *GEPS/Suppl.#* and Page mean that these sites are included in the *Supplement*; unbolded entries that they are included in the *GEPS*; bolded and unbolded page numbers together direct the reader to both sources.

b) **3.1.3. Altitude:** Also listed are modern annual rainfall zones (annual mean precipitation in millimeters) (AAPMC 1972, 1983), climax vegetation zones (see **Map G**, infra), principal soil zones (**Map H**, infra), geologic formations (GMC 1979), and modern land use zones (LUMC 1975).

c) **3.2. Map References:** The current 1:50,000 topographical map series (GSGS 1973) is the sole base map used in the *Supplement* and in the remainder of this dissertation and is also widely consulted by fieldworkers and researchers. This map, which has now been in restricted circulation for several years, includes Cadastral Survey references directing the user via cadastral sheets to the 1:5000 topographical map series (TMC 1977) and ultimately to the cadastral plans. The six-digit coordinates are accurate to the nearest 100 meters unless the location of a site could not be ascertained, and, in the case of large sites, mark the approximate center. For complete cartographic information, see **MAP REFERENCES CITED**, infra.

d) **3.6. Absolute Dating:** ^{14}C citations are based on the high-precision calibration curves adopted by the 12th International Radiocarbon Conference, Trondheim, 1985 (Stuiver and Kra 1986), presented in detail in **APPENDIX 4**, infra. ^{14}C ages beyond currently available datasets are listed as 'best estimates' based on the 5,730 half-life and are distinguished from cal BC dates by lower-case bc. Due to the asymmetrical distribution of sigma intercepts, cal BC dates are quoted without standard deviation (see **APPENDIX 4**, explanatory notes, infra). Cal BC dates that are averages of multiple intercepts are marked ♣. Akrotiri *Aetokremnos* (#S/354) dates marked * are from marine shells and have had 690 years subtracted from laboratory-quoted ^{14}C ages to compensate for the reservoir effect (Delta R). British Museum dates numbered BM-1700 through BM-2315 are affected by a systematic error which resulted in measurements that are too low by amounts of up

to 300 years (Tite et al. 1987). Corrections of this error have recently been obtained for Kalavasos *Ayious* (#R/059) (quoted by courtesy of I. A. Todd, pers. comm. 1988) and are marked ∫. A complete, annotated list of chronometric dates for prehistoric sites in Cyprus is provided in Table 6, **CHAPTER 4**, supra.

e) **3.7.1. Material:** Items listed in this section do not necessarily represent complete assemblages, nor does the inclusion of a particular item always mean that it has been surface-collected and can be found in the museum(s) indicated. For abbreviations of museums, institutes, and private collections, see **ABBREVIATIONS**, supra. Information on unpublished Rizokarpaso Survey sites (marked * in Numerical and Alphabetical Site Lists) courtesy of A. Le Brun (pers. comm. 1981); on Ora *Klitari* courtesy of I. A. Todd (pers. comm. 1989); and on unpublished CPSP sites courtesy of D. W. Rupp (pers. comm. 1988).

f) **3.7.3. Pottery:** Only diagnostics are listed. See **KEY TO EARLY PREHISTORIC CERAMICS**, supra.

SITE DESIGNATION SYSTEM

X/000-000000

•DISTRICT CODE:

N/ Nicosia District

K/ Kyrenia District

F/ Famagusta District

R/ Larnaca District

S/ Limassol District

P/ Paphos District

•CATALOG NUMBER: From 001 to ...

Assigned consecutively to every site as it is entered in the Gazetteer. Provides a permanent identification that is also used on distribution maps **A-H**, infra. Numbers of deleted entries are struck from the catalog.

•DESCRIPTIVE CODE:

A site-specific code representing six variables that allows the computerized organization and management of the Gazetteer as an electronic database, either through such simple applications as the search and sort functions of powerful word processors like WordPerfect 5.0* (WordPerfect for the MacIntosh*) or by means of more complex relational database systems like dBase IV* (dBase Mac*). Each of the variables encoded in the six digits provides a maximum of ten options for describing a total of 60 predetermined features of a site. Unlike the catalog number, which is unalterable, the descriptive code number may thus change as more precise information about a site requires that its entry be updated. The variables and options are tabulated on the following page.

*WordPerfect and WordPerfect for the MacIntosh are registered trademarks of WordPerfect Corporation.
*dBase IV is a registered trademark of Ashton-Tate Company.
*MacIntosh is a registered trademark of Apple Computer, Inc.

1st Digit:

TOPOGRAPHY:

0=No data

1=Inland, isolated hill

2=Inland, level

3=Inland, slope

4=Inland, plateau edge/ promontory/ river terrace

5=Inland, rock shelter/ cave

6=Coastal, hill

7=Coastal, level/ slope/ cave

8=Littoral, slope/ terrace

9=Littoral, onshore (headland, promontory, peninsula), or offshore (island)

2nd Digit

ELEVATION (m):

0=No data

1=0-99

2=100-199

3=200-299

4=300-399

5=400-599

6=600-799

7=800-999

8=1000+

3rd Digit:

SITE TYPE:

0=No data

1=Permanent sttt.: village

2=Permanent sttt.: homestead

3=Seasonal sttt.: camp/ hunting station

4=Burial site/ cemetery

5=Task site: quarry/ knapping/ agricultural site

6=Kill site/ butchering site

7=Inconclusive: 1 or 2

8=Inconclusive: 2 or 3

9=Inconclusive: 3 or 5 or 3 or 6

4th Digit:

ARCHITECTURE:

0=No data

1=Absent (not in evidence)

2=Present

3=Hollow/ occupation layer/ floor only

5th Digit:

CERAMICS;

0=No data

1=Absent (not in evidence)

2=Present

3=Aceramic and ceramic phases

6th Digit:

INFO RETRIEVAL:

0=No data

1=Isolated find

2=Surface scatter/ exposed section/ looted tombs: survey (grab sample)

3=Surface scatter/ exposed section/ looted tombs: survey (systematic sample)

4=EP finds during excav. of later component

5=Test excav.

6=Full-scale excav.

NUMERICAL SITE LIST

Site Design.#	Site Name (Village *Locality*)	*GEPS/Suppl.#*	Page
N/001-327225	Ambelikou *Ayios Yeoryios*	**N.2**	91, **309**
N/002-431336	Dhali *Agridhi*	**N.7**	92, **309**
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Timi *Mesokambos* B	**P/444**-710123	**P.122**	**379**
Tokhni *Latomes*	**R/322**-420123	**La.40**	**331**
Trakhoni *Vounaro*	**S/364**-617112	**Lm.77**	**351**
Trikomo *Krina*	**F/215**-010111	F.30	124
Trimithousa	**P/308**-032111	P.70	152
Trimithousa *Ambelajia*	**P/095**-437123	**P.68,**	151, **362**
Trimithousa *Kilistra/Plevra tou Papanikola*	**P/307**-040123	**P.69**	151, **363**
Trimithousa *Paravoulena/Vizaja*	**P/375**-030113	**P.87**	**367**
Vasilia *Alonia*	**K/048**-727125	**K.78**	116, **318**
Vasilia *Ayios Sina*	**K/172**-030111	K.84	117
Vasilia *Harma Tarlasi*	**K/049**-720122	K.80	116
Vasilia *Khorio* 1	**K/177**-017322	K.89	117
Vasilia *Khorio* 2	**K/178**-020122	K.90	118
Vasilia *Loukkos Trakhonas*	**K/169**-014122	K.81	116
Vasilia *Myliades*	**K/170**-014122	K.82	116
Vasilia *Pyrgos Triantaphylia*	**K/171**-010100	K.83	117
Vasilia *Spitia tous Lenous*	**K/173**-910122	K.85	117
Vasilia *Stypia* 1	**K/174**-810122	K.86	117
Vasilia *Stypia* 2	**K/175**-810111	K.87	117
Vasilia *Vavilas Khiliomodhousa*	**K/176**-710111	K.88	117
Vouno	**K/179**-001111	—	
Yerani *Arones*	**F/216**-010111	F.31	124
Yeri	**N/118**-020111	N.51	101
Yeroskipos *Argakin tou Koliokremnou*	**P/406**-710123	**P.101**	**372**
Yeroskipos *Chouvlijin tis Yermaninis* A	**P/400**-710123	**P.95**	**370**
Yeroskipos *Ierokipia*	**P/309**-710112	P.71	152
Yialia	**P/312**-020111	P.74	152
Yialia *Appourkia*	**P/310**-710122	P.72	152
Yialia *Ayios Anaryiros*	**P/311**-020111	P.73	152
Yiolou *Rodies*	**P/313**-020111	P.75	152
Zanaja	**S/256**-040111	Lm.36	139

NICOSIA DISTRICT

N.2 Ambelikou *Ayios Yeoryios*

Alt. Zone **2**: 180 m

N/001 Map: VD823.868

Prec. Zone **2**: 300-400 mm

- *GEPS*:91.

Climax Veg. Zone(s) **4+10+11**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive in Troodos piedmont zone; Mesaoria Maquis of unknown composition, with greenbelt of hydrophile plant community along Yialias River; and Hypothetical Larnaca Forest (see **Map G** for composition).

Principal Soil Zone(s) **8+10**: Interface of deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.

Geologic Zone(s) **1**: Alluvium.

Modern Land Use Zone(s) **1+2**: Interface of irrigated vegetable cultivation and cereal dry farming.

Publ.: Bolger 1987:72, 75, Gjerstad 1980:5-11, Peltenburg 1982a:71-73, 91-92; 1987c:59, n.d.a:passim; Swiny 1985a:14; Toumazou 1987:202; Watkins 1981:passim.

Dated: Late ECU.

Obs.: For extent and location, see published refs. Not visited, material not seen.

N.7 Dhali *Agridhi*

Alt. Zone **3**: 210 m

N/002 Map: WD391.770

Prec. Zone **2**: 300-400 mm

- *GEPS*:92.

Climax Veg. Zone(s) **10**: Mesaoria Maquis of unknown composition, with greenbelt of hydrophile plant community along nearby Ovgos and Menikos rivers.

Principal Soil Zone(s) **2**: Terra Rossa on Kafkalla. Deep Red Earths (**4**) and Alluvial Soils (**10**) nearby.

Geologic Zone(s) **3**: Fanglomerate.

Modern Land Use Zone(s) **2**: Cereal dry farming.

Publ.: Lehavy 1989, Carter 1989, Croft 1989a.

Dated: KCU, Early SCU.

Additional ^{14}C determinations:

6,201♣ cal BC P-2768 Lehavy 1989:216, Table 6
4,557♣ cal BC P-2769 Lehavy 1989:216, Table 6
6,933♣ cal BC P-2775 Lehavy 1989:216, Table 6

Obs.: For extent and location, see published refs.

Visited: 7/18/77 etc.

N.9 Dhenia *Kafkalla* 2

Alt. Zone **2**: 180 m

N/425 Map: WD128.913

Prec. Zone **1**: 200-300 mm

- *GEPS*:92.

Climax Veg. Zone(s) **10**: Mesaoria Maquis of unknown composition, with greenbelt of hydrophile plant community along nearby Ovgos and Menikos rivers.

Principal Soil Zone(s) **2**: Terra Rossa on Kafkalla. Deep Red Earths (**4**) and Alluvial Soils (**10**) nearby.

Geologic Zone(s) **3**: Fanglomerate.

Modern Land Use Zone(s) **2**: Cereal dry farming.

Publ.: Catling 1963:149, #28; Nicolaou 1988:71, 103-106; Swiny 1985a:14, n.3; Toumazou 1987:193-195.

Dated: PCU (min. 2 tombs).

Obs.: For extent and location, see published refs. Not visited, material not seen.

N.17 Khrysiliou *Ammos* Alt. Zone **1**: 80 m

N/426 Map: WD013.984 Prec. Zone **2**: 300-400 mm

- *GEPS*:94.

Climax Veg. Zone(s) **10**: Interface of Mesaoria Maquis of unknown composition and greenbelt of hydrophile plant community along Ovgos R.
Principal Soil Zone(s) **7+10**: Interface of Xerorendzinas on Kythrea beds and Alluvial Soils in Ovgos Valley.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **1**: Irrigated citrus cultivation.
Publ.: Bolger 1983; Gjerstad 1980:5; Peltenburg n.d.a:passim; Swiny 1985a:14, n.3; Toumazou 1987:202.
Dated: PCU, with EC component.
Obs.: For extent and location, see published refs. Not visited, material not seen.

N.22 Kyra *Alonia* Alt. Zone **2**: 100 m

N/011 Map: WD059.956 Prec. Zone **2**: 300-400 mm

- *GEPS*:96.

Climax Veg. Zone(s) **10**: Mesaoria Maquis of unknown composition and greenbelt of hydrophile plant communities along Ovgos R.
Principal Soil Zone(s) **1+10**: Interface of Kafkalla and Alluvial Soils.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming and uncultivable land.
Publ.: Bolger 1987:71-72; Gjerstad 1980:1-2; Peltenburg 1982a:93; Swiny 1985a:14, n.3; Toumazou 1987:177-181.
Dated: Final ECU/Early PCU.
Obs.: For extent and location, see published refs. Not visited, material not seen.

N.24 Kyra *Kaminia* Alt. Zone **2**: 100 m

N/427 Map: WD058.954 Prec. Zone **2**: 300-400 mm

- *GEPS*:96.

Climax Veg. Zone(s) **10**: Mesaoria Maquis of unknown composition and greenbelt of hydrophile plant communities along Ovgos R.
Principal Soil Zone(s) **1+10**: Interface of Kafkalla and Alluvial Soils.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming and uncultivable land.
Publ.: Gjerstad 1980:2; Peltenburg 1982a:93; Swiny 1985a:14, n.2, 3; Toumazou 1987:177-181.
Dated: Early PCU.
Obs.: For extent and location, see published refs. Not visited, material not seen.

N.35 Margi *Tavari* A Alt. Zone **3**: 294 m

N/016 Map: WD297.762 Prec. Zone **2**: 300-400 mm

- *GEPS*:98, as *Alonia*.

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **5+8**: Brown Earths, and Xerorendzinas on limestones/ chalks/ Pliocene marls/ very calcareous deposits.
Geologic Zone(s) **9+22**: Interface of Lefkara Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming and uncultivable land.
Rept.: S. Swiny, S. O. Held, 1983.
Dated: Final ECU-Early PCU transition.
Mat.: CS.2654, 2657. CM. CAARI. EM. CM.1952/VI-6/8 (R.R.2612), marked as "Margi" and consisting of 6 RL sherds (incl. 4 large pithos frags.) may come from this site.

Obs.: Reports of an EP (ECU) site in the general area of *Alonia* (Stanley Price 1979c:98, #N.35), supported by a single diagnostic RB-Lus. sherd, are contradicted by the homogeneous EC/MC character of the RP surface ceramics at that locality. A site of probable ECU-PCU transition date was, however, discovered off the W periphery of the Bronze Age settlement which is now intersected by a recent stretch of road leading to Margi. It occupies a riverine slope position ca. 15 m above a bend in the Alykos R., with definite drystone walls and a thick burnt deposit eroding out into two parallel gullies from under the old Margi road where it curves away from the embankment. E gully: pottery, chert, bone, and *murex* shell in section of ashy layer and in scatter ca. 10 m downslope. Ceramics: BSC (1), Philia RP I(?)/RL, RP Mottled with better burnish than usual RP III Mottled; Bone (2); Chipped Stone (3, incl. snapped blade). W gully: Surface scatter: Ceramics: RL, RL/RP, BT? (1), BSC (3); Ground Stone: jar stopper (1), pounder (1), grinder (1); Chipped Stone: flakes (2); Shell: *Murex*, perforated, (1). More material in scatter on wide cultivated terrace on other side of track, incl. undiagnostic RL/RP, 1 axe frag., extending toward western periphery of *Alonia*, so that the surface demarkation of the two sites is obscured. For possibly contemporaneous cemetery, see Margi *Tavari* B, infra.

Visited: 3/27/83.

N.38 Nicosia *Ayia Paraskevi*

Alt. Zone **2**: 160m

N/428 Map: WD338.911

Prec. Zone **3**: 300-400 mm

- *GEPS*:99.

Climax Veg. Zone(s) **10**: Mesaoria Maquis of unknown composition and greenbelt of hydrophile plant community along nearby Pedhieos R.

Principal Soil Zone(s) **10**: Alluvial Soils.

Geologic Zone(s) **4**: Athalassa Formation.

Modern Land Use Zone(s) **11**: Urban Area.

Publ.: Bolger 1983; Hennessy et al. 1988; Kromholz 1982:14-16, 54-60, 305-306; Peltenburg n.d.a; Swiny 1985a:14, n.3; Toumazou 1987:202.

Dated: PCU, with EC component.

Obs.: Recent publications deal with T.7, one of the five tombs containing PCU material excavated by Stewart in 1955. Much of this site has been all but obliterated by the building boom of the 1980s. For extent and location, see published refs.

Visited: 6/26/78, etc.

N.47 Philia *Vasiliko Kafkalla*

Alt. Zone **2**: 120 m

N/429 Map: WD072.945

Prec. Zone **2**: 300-400 mm

- *GEPS*:101.

Climax Veg. Zone(s) **10**: Mesaoria Maquis of unknown composition and greenbelt of hydrophile plant community along nearby Ovgos and Serrakhis rivers.

Principal Soil Zone(s) **1+10**: Interface of Kafkalla and Alluvial Soils.

Geologic Zone(s) **1+4**: Interface of Alluvium and Athalassa Formation.

Modern Land Use Zone(s) **1+9**: Interface of irrigated citrus cultivation and uncultivable land.

Publ.: Gjerstad 1980:3-5; Peltenburg 1982a:93, n.d.a:passim; Swiny 1985a:14, n.2, 3; Toumazou 1987:170-176.

Dated: PCU.

Obs.: For extent and location, see published refs. Not visited.

N.48 Philia *Laxia tou Kasinou*

Alt. Zone **2**: 120 m

N/430 Map: WD072.946

Prec. Zone **2**: 300-400 mm

- *GEPS*:101.

Climax Veg. Zone(s) **10**: Mesaoria Maquis of unknown composition, with greenbelts of hydrophile plant community along rivers.

Principal Soil Zone(s) **1+8**: Interface of Kafkalla and Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **1+4**: Interface of Alluvium and Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Publ.: Gjerstad 1980:3-5; Peltenburg 1982a:93, n.d.a:passim; Swiny 1985a:14, n.2, 3; Toumazou 1987:170-176.
Dated: PCU.
Obs.: For extent and location, see published refs. Not visited.

N.52 Alambra *Archaies Mouttes*

Alt. Zone **4**: 320 m

N/377 Map: WD360.714

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **5+6**: Interface of Brown Earths and Calcareous Raw Soils.
Geologic Zone(s) **22**: Upper Pillow Lavas.
Modern Land Use Zone(s) **2+9**: Interface of Cereal dry farming and uncultivable land.

Rept.: W. A. Fox, 1982 (the general area of *Mouttes* has been mentioned repeatedly in the literature with respect to post-Formative remains).
Dated: KCU? (Non-ceramic assemblage, but diagnostics are entirely lacking in the surface scatter.)
Mat.: CAARI, Cornell University excavation store, Alambra? Chipped stone, some groundstone.
Obs.: Site covers a large terraced field on upper NE slope of *Moutes* hill, overlooking the excavated Bronze Age settlement to the NE and the site of Gjerstad's 1924 investigations to the SW. Abundant Lefkara chert. Lithics scatter consists of massive blade/ flake industry with considerable post-manufacture patination on artifacts, pointing to the presence of a quarry/ workshop site of substantial age (Fox, pers. comm. 1982). Dating must remain tentative, however, since no similar assemblage of such "macro-tools" exists on Cyprus or the surrounding mainland save the better retouched "Campignian" industry of the Byblos Neolithic.
Visited: 8/3/82.

N.53 Margi *Tavari* B

Alt. Zone **4**: 300 m

N/383 Map: WD295.765

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **5+8**: Brown Earths, and Xerorendzinas on limestones/ chalks/ Pliocene marls/ very calcareous deposits.
Geologic Zone(s) **9+22**: Interface of Lefkara Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming and uncultivable land.

Publ.: Karageorghis 1958:147, 151 (as *Davari*); Catling 1963:152, #110, together with adjacent cemetery of *Kapparka*); Brown and Catling 1980:98-99, #17; both sites dated mid-EC III in the original report (Karageorghis *loc.cit.*); Swiny 1985a:14, n.3; Toumazou 1987:202.
Dated: PCU, EC/MC.
Mat.: CS.2659. CM. CAARI. EM.
Obs.: Heavily looted cemetery of approx. 130 tombs on river terrace and small promontory 450 m NW of *Tavari* A settlement (supra, #N.35 [N/016]) across Alykos R., and separate from *Kapparka*, which is ca. 300 m WNW and of MC date. Philia RP and RW/WP I indicate affiliation with *Tavari* A settlement during first stage of cemetery (represented by tombs on upper, N, side of site), with subsequent use evidenced by RP II/III and RP III.
Visited: 3/27/83.

N.54 Lefka *Aitlik*

Alt. Zone **2**: ca. 100 m

N/432 Map: VD86?.85?

Prec. Zone **2**: 300-400 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **5+10**: Interface of Brown Earths and Alluvial Soils.
Geologic Zone(s) **1+5**: Interface of Alluvium and Nicosia Formation.
Modern Land Use Zone(s) **0**: No data.

Rept.: M. Markides, 1917.
Excav.: M. Markides for CM, 1917.
Publ.: Catling 1963:152, #104; Gjerstad 1926:8, 1980:5; Stewart 1962:223-296 passim; Swiny 1985a:14, n.3; Toumazou 1987:202.
Dated: PCU.
Obs.: Tomb(s) with Philia RP I on "east side of village." Precise location unknown. Not visited, material not seen.

N.55 Peristerona *Litharomata*

Alt. Zone **3**: 245 m

N/435 Map: WD076.869

Prec. Zone **1**: 200-300 mm

Climax Veg. Zone(s) **10**: Mesaoria Maquis of unknown composition, with greenbelt of hydrophile plant community along Peristerona R.
Principal Soil Zone(s) **10**: Alluvial Soils.
Geologic Zone(s) **1+3**: Interface of Alluvium and Fanglomerate.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Rept.: S. Hadjisavvas for DAC, 1976.
Dated: UD (non-ceramic), with post-Formative component (LC?/ROM).
Mat.: CS.2385. Groundstone: grinder frag. (1); ceramics: LC(?) pithos frags.
Obs.: Extensive surface scatter of EP and later material above right bank of Peristerona R., ca. 400 m SE of village, in cultivated fields extending from stables near the road to Orounda to edge of terrace above river. Numerous very large and heavy igneous grindstones (saddle querns), occurring almost exclusively in heaps of field stones at edges of cultivated areas; no other lithics or EP ceramics. Traces of curvilinear stone foundations reported by DAC in uncultivated part of site could not be relocated during visit. A single stone mortar accessioned by the CM in the late 1950s (#CM.1957/VII-24/4), said to come from "*Litharounda*," may belong with this assemblage (see Stanley Price 1979c:155, #9). Presence of a prehistoric component at this site is doubtful unless diagnostics are found and existence of curvilinear structures can be confirmed by resurvey.
Visited:6/19/88.

N.56 Mitsero *Kryadis*

Alt. Zone **6**: 619 m

N/437 Map: WD128.785

Prec. Zone **2**: 300-400 mm

Climax Veg. Zone(s) **4+10**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Mesaoria Maquis of unknown composition, with greenbelts of hydrophile plant community along rivers.
Principal Soil Zone(s) **4+5+10**: Interface of Red Earths, Brown Earths, and Alluvial Soils.
Geologic Zone(s) **4+5+22**: Interface of Athalassa Formation, Nicosia Formation, and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+9**: Interface of Cereal dry farming and uncultivable land.

Rept.: S. Swiny, 1987, as Agrokipia *Kreatos*.
Publ.: Reed 1932:512, 514.
Dated: SCU, with ROM component.
Mat.: CS.2685. CAARI. Chipped stone: flakes, cores; jasper: nuggets (5); groundstone: axe (1), grindstone (1), grindstone frag. (1), grinder frag. (3), pounder (2), pestle (1), rubbing stone (1), pebble (1); ceramics: RW-Bl. (1), EP (1), ROM CW, fine ware, painted rim sherd (1).

Obs.: Very large, prominent, mostly uncultivated hill immediately ENE of Mitsero, with open view N across Mesaoria and S into northern Troodos foothills. Site lies in Mitsero lands, except E slopes which are in Agrokipia lands. Locality reads *Kryadis* on cadastral plan but *Kreatos* on topo. map GSGS 1973. Large summit defined by two knolls and covered with gorse, spiny burnet and lentisk among extensive debris of former limestone capping. Lithics scatter on hill top observed mainly around trigonometric marker 619 on eastern knoll. Recent scoop (gun emplacement?) next to marker has exposed 20cm-thick topsoil section containing chert flakes, ground-stone, and at least 1 EP sherd. Extent of surface scatter uncertain, but finds of several shattered chert cores halfway down the steep, scree-covered S slope and of a chert flake and an igneous pestle in barley field on lower W slope suggest presence of a large EP component. In the early 1930s, C. P. Manglis collected a fossil invertebrate near the trigonometric point. This find was later identified as *Jagonia reticulata* Poli. and dated to the Miocene by Reed (loc. cit.). Superb location for a major SCU site in a fertile ecotone between the central lowlands and the Troodos piedmont forest.

Visited: 5/1/88.

N.57 Politiko *Mazovounos*

Alt. Zone **5**: 465 m

N/438 Map: WD221.734

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.

Principal Soil Zone(s) **5**: Brown Earths.

Geologic Zone(s) **23**: Lower Pillow Lavas.

Modern Land Use Zone(s) **2+8+9**: Interface of cereal dry farming, low and dense scrub, and uncultivable land.

Rept.: S. Swiny, 1987.

Dated: UD (non-ceramic).

Mat.: CS.2686. CAARI. Chipped stone.

Obs.: Cultivated terrace above right bank of Pedhieos R., which runs through a ca. 20 m deep gorge approx. 50 m SW of site. Thin surface scatter of approx. 25x25 m at junction of two tracks between wheat field and outcrops of pillow lava. Mostly blade tools, some debitage.

Visited: 5/7/88.

KYRENIA DISTRICT

K.6 Ayios Epiktitos *Kelali*

Alt. Zone **1**: 50 m

K/026 Map: WE353.093

Prec. Zone **4**: 500-600 mm

- *GEPS*:103.

Climax Veg. Zone(s) **7+9**: Interface of Pentadaktylos Forest of Mediterranean Cypress and Aleppo Pine, with or without Golden Oak above 450 m asl; and Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+7**: Interface of Terra Rossa on kafkalla and Xerorendzinas on Kythrea Beds.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Publ.: Peltenburg 1985e:100, 103; 105, Fig. 3; 1987c:58; Bolger 1987:71.
Dated: Mainphase ECU.
Obs.: Not located by U. Glasgow Survey, 1973. For extent and location, see published refs. Not visited, material not seen.

K.7 Ayios Epiktitos *Mezarlik*

Alt. Zone **1**: 40 m

K/027 Map: WE350.094

Prec. Zone **4**: 500-600 mm

- *GEPS*:103.

Climax Veg. Zone(s) **7+9**: Interface of Pentadaktylos Forest of Mediterranean Cypress and Aleppo Pine, with or without Golden Oak above 450 m asl; and Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+7**: Interface of Terra Rossa on kafkalla and Xerorendzinas on Kythrea Beds.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Publ.: Peltenburg 1985e:100, 103; 106-107, Figs. 4-5; 1987c:58; Bolger 1987:71.
Dated: Mainphase ECU.
Mat.: KCM (U. Glasgow Survey, 1973). Chipped stone; groundstone: vessels, implements; antigorite pendant frag. (1); ceramics: RL, RW, [R.Sl.]; MC, LC, ROM.
Obs.: For extent and location, see published refs. Not visited, material not seen.

K.9 Ayios Epiktitos *Vrysi*

Alt. Zone **1**: 13 m

K/028 Map: WE384.101

Prec. Zone **3**: 400-500 mm

- *GEPS*:104.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **4**: Dry-farmed carobs or carobs and olives.

Publ.: Peltenburg 1982c, etc.; 1985c, 1985d:35 and passim, 1985e:92-96.
Dated: Middle-Final SCU (Northern)/ Early SCU-ECU transition?
Additional ^{14}C determinations:
Peltenburg 1982c:460:

4,020♣	cal BC	GU-1459	
3,836♣	cal BC	BM-1906	*Radiocarbon* 25:46
3,969	cal BC	BM-1907	*Radiocarbon* 25:46

3,994 cal BC BM-1908 *Radiocarbon* 25:46

N.B.: For BM assays with sample numbers -1700 to -2315, read relevant section in Gazetteer Introduction, supra.

Mat.: KCM. CAARI.

Obs.: For extent and location, see published refs. Not visited, material not seen.

K.10 Ayios Epiktitos *Xylomandra*

Alt. Zone **1**: 10 m

K/029 Map: WE373.104

Prec. Zone **3**: 400-500 mm

- *GEPS*:104.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.

Geologic Zone(s) **2**: Terrace Deposits.

Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Publ.: Peltenburg 1985e:100, 104; 107, Fig. 6.

Dated: SCU (Northern).

Mat.: KCM (U. Glasgow Survey, 1973). Chipped stone (35); groundstone: axe (3), vessel (1); ceramics: RW (21); jasper nugget.

Obs.: On coastal headland. For extent and location, see published refs. Not visited, material not seen.

K.15 Bellapais *Vasiliki*

Alt. Zone **3**: 200m

K/030 Map: WE323.074

Prec. Zone **4**: 500-600 mm

- *GEPS*:105.

Climax Veg. Zone(s) **7**: Pentadaktylos Forest of Mediterranean Cypress and Aleppo Pine, with or without Golden Oak above 450 m asl.

Principal Soil Zone(s) **3+7**: Interface of Terra Rossa on hard limestone and Xerorendzinas on Kythrea Beds.

Geologic Zone(s) **2**: Terrace Deposits.

Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Publ.: Peltenburg 1985e:100, 104; 108, Fig. 7.

Dated: KCU.

Mat.: KCM (U. Glasgow Survey, 1973). Chipped stone; groundstone: axe (1), vessel frags. (4), mortar frags. (3), grindstone frags., pounder frags.; ceramics: MED (5).

Obs.: For extent and location, see published refs. Not visited, material not seen.

K.24 Karavas *Yirisma*

Alt. Zone **2**: 100 m

K/034 Map: WE178.106

Prec. Zone **4**: 500-600 mm

- *GEPS*:107, as *Gyrisma*.

Climax Veg. Zone(s) **7**: Pentadaktylos Forest of Mediterranean Cypress and Aleppo Pine, with or without Golden Oak above 450 m asl.

Principal Soil Zone(s) **2+7**: Interface of Terra Rossa on kafkalla and Xerorendzinas on Kythrea Beds.

Geologic Zone(s) **7**: Pakhna Formation.

Modern Land Use Zone(s) **1+7**: Interface of irrigated citrus cultivation and forest.

Publ.: Peltenburg 1985e:101, 104; 109, Fig. 8; Bolger 1987:71; Toumazou 1987:102-104.

Dated: ECU (Final SCU?/ Early ECU-Lat ECU?).

Mat.: KCM (U. Glasgow Survey, 1973). Chipped stone, incl. core (1); groundstone: pestle (1); ceramics: EP (182), incl. RW and MONO, MED/MOD (10).

Obs.: For extent and location, see published refs. Not visited, material not seen.

K.31 Karmi *Phountji* (Fountzi)

Alt. Zone **2**: 100 m

K/136 Map: WE249.095

Prec. Zone **4**: 500-600 mm

- *GEPS*:108.

Climax Veg. Zone(s) **7**: Pentadaktylos Forest of Mediterranean Cypress and Aleppo Pine, with or without Golden Oak above 450 m asl.
Principal Soil Zone(s) **2+7**: Interface of Terra Rossa on kafkalla and Xerorendzinas on Kythrea Beds.
Geologic Zone(s) **2+7**: Interface of Terrace Deposits and Pakhna Formation.
Modern Land Use Zone(s) **3+7**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and forest.

Publ.: Peltenburg 1985e:101, 104; 110, Fig. 9; 1987c:58; Bolger 1987:71.
Dated: Final SCU/ECU? Mainphase ECU.
Mat.: KCM (U. Glasgow Survey, 1973). Chipped stone (2); groundstone: vessels (2), axe/ adze (6), pestle (2), rubbing stone (1); ceramics: EP (168), incl. RL, RW; Glazed (20).
Obs.: Small hill by creek. Slope scatter. For extent and location, see published refs. Not visited, material not seen.

K.40 Klepini *Troulli*

Alt. Zone **1**: 10 m

K/037 Map: WE421.106

Prec. Zone **3**: 400-500 mm

- *GEPS*:109.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **4**: Dry-farmed carobs or carobs and olives.

Publ.: Peltenburg 1979b, 1982a:38, 1985d:34, 36 and passim.
Dated: KCU/SCU (Northern).
Peltenburg 1982a:115, 1985d:36:
3,860 ± 480 B.C. Ph TL 09a
3,570 ± 445 B.C. Ph TL 09b
(N.B.: These determinations pertain to the SCU occupation of the site; i.e., *Troulli* II. They are thermoluminescence dates to which calibration does not apply.)

K.64 Orga *Palialonia/Ambellia*

Alt. Zone **2**: 160 m

K/043 Map: WE028.126

Prec. Zone **3**: 400-500 mm

- *GEPS*:113.

Climax Veg. Zone(s) **7**: Pentadaktylos Forest of Mediterranean Cypress and Aleppo Pine, with or without Golden Oak above 450 m asl.
Principal Soil Zone(s) **2+7**: Interface of Terra Rossa on kafkalla and Xerorendzinas on Kythrea Beds.
Geologic Zone(s) **15**: Lapithos Formation.
Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.

Publ.: Peltenburg 1985e: 101, 104; 111, Fig. 10.
Dated: SCU (Northern).
Mat.: KCM (U. Glasgow Survey, 1973). Chipped stone (27); groundstone: axe (6), chisel (1); ceramics: RW (380), incl. RW-Bl.; CB (1), partly pierced disc (1); MED (S end of site). CAARI. EM.
Obs.: Small plateau between two limestone outcrops above terraced hill slope. For extent and location, see published refs. Not visited, material not seen.

K.78 **Vasilia *Alonia*** Alt. Zone **2**: 100 m

K/048 Map: WE111.115 Prec. Zone **4**: 500-600 mm

- *GEPS*:116.

Climax Veg. Zone(s) **7**: Pentadaktylos Forest of Mediterranean Cypress and Aleppo Pine, with or without Golden Oak above 450 m asl.
Principal Soil Zone(s) **2+3+7**: Interface of Terra Rossa on kafkalla; Terra Rossa on hard limestone; and Xerorendzinas on Kythrea Beds.
Geologic Zone(s) **2+15**: Interface of Terrace Deposits and Lapithos Formation.
Modern Land Use Zone(s) **2+7+8**: Interface of cereal dry farming, forest, and low and dense scrub.

Publ.: Swiny 1985a:14, n.3, 24; 1986a:30.
Dated: PCU.
Obs.: For extent and location, see published refs. Not visited, material not seen.

K.79 **Vasilia *Evrima*** *DELETE* 100 m

Map: WE102.117 500-600 mm

- *GEPS*:116.

Publ.: Swiny 1985a:14, n.3; 23-24; Toumazou 1987:202.
Obs.: PCU attributes of site, such as funerary architecture, metal types, and ceramic wares, have recently been called into question (Swiny, loc. cit.).

FAMAGUSTA DISTRICT

F.1 Akanthou *Arkosyko*

Alt. Zone **1**: 10 m

F/050 Map: WE686.188

Prec. Zone **3**: 400-500 mm

- *GEPS*:119.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Publ.: Held 1989b.
Dated: KCU.
Mat.: CS.1931. Bone: fossilized, modified shaft bone (1).
Obs.: Faunal bones surface-collected by Stanley Price in 1972 include an unreported, completely permineralized shaft bone fragment possibly belonging to a Pleistocene mammal and likely to have been collected by KCU occupants at nearby Akanthou *Vourna*, a known Pleistocene fossil site ca. 1.2 km E of *Arkosyko* (#F.48 [F/376], and **APPENDIX 2**, #FOS-21F, infra). Fragment represents ca. ⅓-segment of original limb bone, measuring 85 mm long, 15 mm (max.) thick, and 36.5 mm long along the chord, with a man-made groove 29 mm from one end. Although species identification is impossible, size of original bone is possibly too large for a pygmy hippopotamus and may therefore belong to a dwarf elephant (D. S. Reese, pers. comm. 1988). Not visited.

F.23 Rizokarpaso *Apostolos Andreas*

Alt. Zone **1**: 10 m

F/055 Map: XE424.484

Prec. Zone **4**: 500-600 mm

- *GEPS*:122.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+2**: Interface of Kafkalla and Terra Rossa on kafkalla.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **8**: Low and dense scrub.

Mat.: Chipped stone: core (1), blade/ bladelets (9), backed blade (1), flakes (22), scrapers (6), retouched projectile point (1); ground stone: hammerstone (2). Collected by RKS 1971 and marked as site #R.503 (A. Le Brun, pers. comm. 1981; cf. infra).

F.25 Rizokarpaso *Cape Andreas Kastros*

Alt. Zone **1**: 10 m

F/056 Map: XE436.514

Prec. Zone **4**: 500-600 mm

- *GEPS*:123.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1**: Kafkalla.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **8**: Low and dense scrub.

Publ.: Le Brun 1981a, 1981c, 1985a; Le Brun et al. 1987:passim; Davis 1987:124-125, 1989; Toumazou 1987:64-71.
Dated: KCU.
Additional ^{14}C determinations:

5,637 cal BC Sample ID? Le Brun 1988:28
5,238 cal BC Sample ID? Le Brun 1988:28

Obs.: For extent and location, see published refs. Not visited, material not seen. See **APPENDIX 2**: GAZETTEER OF PLEISTOCENE FOSSIL SITES, *SECTION B*, #9, infra.

F.26 Rizokarpaso *Cape Andreas* district

- *GEPS*:123.

For Entire Region (Approximate):

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **1/2/7**: Kafkalla/ Terra Rossa on kafkalla/ Xerorendzinas on Kythrea Beds.

Geologic Zone(s) **2/4/13**: Terrace Deposits/ Athalassa Formation/ Pakhna or Kythrea Formations.

Modern Land Use Zone(s) **3+8**: Dry-farmed carobs/ olives intercropped with cereals, and low and dense scrub.

Rept.: A. Le Brun, 1971.

Publ.: *ARDA 1971* (1972):14 (mention of survey only).

Mat.: 17 finds of stone and chert implements. Two of these findspots correspond to two known major sites (#F.23 [F/055], supra, and #F.27 [F/057]), and four others may correlate spatially with two known minor sites; i.e., #F.24 (F/197), and #F.29 (F/199). Unpublished data courtesy of Dr. A. Le Brun, pers. comm. 1981.

This entry comprises the following sites in addition to #F.23 (F/055), supra:

F.32 Rizokarpaso *Survey #R.504*

Alt. Zone **0**: No data

F/200 Map: XE4??.5??

Prec. Zone **4**: 500-600 mm

Rept.: A. Le Brun, 1971.

Mat.: Chipped stone: core (2), blade (2), scraper (1), flake (4); groundstone: hammerstone (1).

Obs.: Not visited, material not seen.

F.33 Rizokarpaso *Survey #R.505*

Alt. Zone **0**: No data

F/201 Map: XE4??.5??

Prec. Zone **4**: 500-600 mm

Rept.: A. Le Brun, 1971.

Mat.: Chipped stone: blade (3), lame à crête (1), scraper (1), flake (9), core (1): groundstone: hammerstone (1).

Obs.: Not visited, material not seen.

F.34 Rizokarpaso *Survey #R.506*

Alt. Zone **0**: No data

F/202 Map: XE4??.5??

Prec. Zone **4**: 500-600 mm

Rept.: A. Le Brun, 1971.

Mat.: Chipped stone: blade (13);, notched blade (1), flake (5); groundstone: polished axe (1).

Obs.: At entrance of cave which itself contained no material. Not visited, material not seen.

F.35 Rizokarpaso *Survey #R507*

Alt. Zone **0**: No data

F/203 Map: XE4??.5??

Prec. Zone **4**: 500-600 mm

Rept.: A. Le Brun, 1971.

Mat.: Chipped stone: blade (2), lame à crête (1), scraper (1), flake (12); groundstone: hammerstone (1).

Obs.: At entrance of another cave, near #R.506, which itself contained no material. Not visited, material not seen.

F.36 Rizokarpaso *Protikephali* (Survey #R.508) Alt. Zone **0**: No data

F/204 Map: XE4??.5?? Prec. Zone **4**: 500-600 mm
Rept.: A. Le Brun, 1971.
Mat.: Chipped stone: blade (4), backed blade (2), scraper (2), flake (22), core frags. (4).
Obs.: Not visited, material not seen.

F.37 Rizokarpaso *Survey #R.509* Alt. Zone **0**: No data

F/205 Map: XE4??.5?? Prec. Zone **4**: 500-600 mm
Rept.: A. Le Brun, 1971.
Mat.: Chipped stone: blade (3), lame à crête (2), end scraper (1), flake (32), core (1); groundstone: hammerstone (1), grindstone (1).
Obs.: Not visited, material not seen.

F.38 Rizokarpaso *Survey #R.510* Alt. Zone **1**: ca. 10 m

F/206 Map: XE39?.49? Prec. Zone **4**: 500-600 mm
Rept.: A. Le Brun, 1971. Possibly linked to #F.27 (F/057), Rizokarpaso *Kordhyli* (see Stanley Price 1979c:123).
Mat.: Chipped stone: blade (2), borer (1), flake (9).
Obs.: Not visited, material not seen.

F.39 Rizokarpaso *Survey #R.511* Alt. Zone **0**: No data

F/207 Map: XE3??.4?? Prec. Zone **4**: 500-600 mm
Rept.: A. Le Brun, 1971.
Mat.: Chipped stone: blade (2), scraper (1), flake (7).
Obs.: Not visited, material not seen.

F.40 Rizokarpaso *Survey #R.512* Alt. Zone **0**: No data

F/208 Map: XE4??.5?? Prec. Zone **4**: 500-600 mm
Rept.: A. Le Brun, 1971.
Mat.: Chipped stone: blade (1), backed blade (1), flake (9).
Obs.: Not visited, material not seen.

F.41 Rizokarpaso *Survey #R.513* Alt. Zone **0**: No data

F/209 Map: XE4??.5?? Prec. Zone **4**: 500-600 mm
Rept.: A. Le Brun, 1971. Near row of dressed stones.
Mat.: Chipped stone: scraper (1), flake (7), core (3).
Obs.: Not visited, material not seen.

F.42 Rizokarpaso *Survey #R.514* Alt. Zone **0**: No data

F/210 Map: XE3??.4?? Prec. Zone **4**: 500-600 mm
Rept.: A. Le Brun, 1971.
Mat.: Chipped stone: blade (2), scraper (1), borer (1), flake (8).
Obs.: Not visited, material not seen.

F.43 Rizokarpaso *Survey #R.515* Alt. Zone **1**: ca. 60 m

F/211 Map: XE24?.42? Prec. Zone **4**: 500-600 mm
Rept.: A. Le Brun, 1971. Possibly linked to #F.24 (F/197), Rizokarpaso *Ayios Philon* (see Stanley Price 1979c:122).

Mat.: Groundstone: grindstone frag. (1), "which could just as well be modern" (Le Brun, pers. comm. 1981).
Obs.: Not visited, material not seen.

F.44 Rizokarpaso *Survey #R.516* Alt. Zone **2**: ca. 100 m

F/212 Map: XE26?.38? Prec. Zone **3**: 400-500 mm

Rept.: A. Le Brun, 1971. See comment for #F.46 (F/213a), infra.
Dated: SCU?/ECU?
Mat.: Ceramics: elongated perforated pendant (1); ground stone: perforated stone (1), grindstone frag. (1).
Obs.: In cultivated field, spring nearby. Not visited, material not seen.

F.45 Rizokarpaso *Survey #R.517* Alt. Zone **1**: ca. 90 m

F/213 Map: XE26?.38? Prec. Zone **3**: 400-500 mm

Rept.: A. Le Brun, 1971. See comment for #F.46 (F/213a), infra.
Mat.: Groundstone: polished axe (1), pestle (1), grindstone frag. (1).
Obs.: Ca. 50-75 m SW of #F.44 in field. Not visited, material not seen.

F.46 Rizokarpaso *Survey #R.518* Alt. Zone **1**: ca. 90 m

F/213a Map: XE26?.38? Prec. Zone **3**: 400-500 mm

Rept.: A. Le Brun, 1971. #F.45 and #F.46 are most likely parts of one and the same scatter and, together with #F.44, are possibly linked to #F.29 (F/199), Rizokarpaso *Sylla* (see Stanley Price 1979c:123).
Mat.: Groundstone: grindstone frag. (2).
Obs.: Not visited, material not seen.

F.47 Rizokarpaso *Survey #R.519* Alt. Zone **0**: No data

F/214 Map: XE2??.3?? Prec. Zone **3**: 400-500 mm

Rept.: A. Le Brun, 1971.
Mat.: Chipped stone: scraper (1), flake (3); groundstone: axe (3), grindstone frag. (1), stone with depressions (1) (gaming stone?).
Obs.: Not visited, material not seen. If stone with depressions in fact is a gaming stone, site is unlikely to antedate PCU or has a late prehistoric component.

F.48 Akanthou *Vourna* Alt. Zone **1**: 15 m

F/376 Map: WE698.188 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Rept.: R. A. Reyment, 1971, as *Afrodision*; D. S. Reese, 1973, as *Afrodision/ Neraidhes*. Chipped stone implements supposedly in stratigraphic association with Pleistocene faunal remains.
Mat.: CM(?): Chipped stone. GSD (Mantis Collection): Dwarf elephant molar frag. and pygmy hippopotamus remains.
Publ.: Boekschoten and Sondaar 1972:315-316, Held 1989b, Reese 1974a:5-7, 11; 1974b:6-7, 1977:6-8, Figs. 2-4; 1988b:3, n.d.c:4; Swiny 1988.
Obs.: Cave site in W scarp of gully, ca. 1.2 km E of KCU site of *Arkosyko* [F.1, F/050], 800 m SW of Ayios Mikhalos chapel and approx. 200 m from the coast. Attempts to locate the chipped stone, said to number ca. 10 specimens identified soon after their discovery as clearly man-made (D. S. Reese, pers. comm. 1988), in the CM have so far been unsuccessful. Although the possibility cannot be discounted that

they represent modern, intrusive *dhoukani* flake-blades left by the goatherder(s) who used the cave as a *mandra*, there seems to be no *aloni* nearby from where they might have been retrieved. An alternative explanation, namely, that such flake-blades were actually produced at the *mandra*, thus representing a secondary functional component of the site's recent use, is contradicted by the fact that historical flake-blade production on Cyprus was a highly specialized activity carried out by master chert-knappers (*athkiakadhes*) in close proximity to southern chert source localities and that the North Coast *dhoukani* production centers at which the blades were utilized did not include Akanthou (Pearlman 1983:127-168). If the flakes are intrusive, they could equally well date from the EP period, having been used during the extraction of fossil bones by the KCU occupants of *Arkosyko*, where one modified, fossilized shaft bone was found by N. P. Stanley Price in 1972 (see above). This issue remains to be clarified. Not visited, material not seen. See **APPENDIX 2**: GAZETTEER OF PLEISTOCENE FOSSIL SITES, #FOS-21F, infra.

F.49 Kalopsidha *Tsaoudhi Chiftlik*

Alt. Zone **1**: 40 m

F/433 Map: WD706.845

Prec. Zone **2**: 300-400 mm

Climax Veg. Zone(s) **9+12**: Interface of Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m; and Edaphic Sub-Climax Vegetation in areas of high water table and salinity.

Principal Soil Zone(s) **2+10**: Interface of Terra Rossa on kafkalla and Alluvial Soils.

Geologic Zone(s) **3+4**: Interface of Fanglomerate and Athalassa Formation.

Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: J. L. Myres, 1894.

Excav.: J. L. Myres for Ashmolean Museum, 1894; E. Gjerstad for SCE, 1924; P. Åström for SCE, 1959. One pit grave with PCU ceramics sealed under floor of MC III building in Trench 3 (T.34).

Publ.: Åström 1966:30-31, 47; Fig. 1; Merrillees in Åström 1966:31-35; Swiny 1985a:14, n.3; Toumazou 1987:182-189.

Dated: PCU, with post-Formative components.

Obs.: On edge of low, uncultivated mesa ca. 1.6 km WSW of village. Not visited. For extent and location, see published refs.

LARNACA DISTRICT

La.3 Kalavasos *Arkhangelos*

Alt. Zone **2**: 120 m

R/218 Map: WD265.489

Prec. Zone **3**: 400-500 mm

- *GEPS*:125.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+10**: Interface of Calcareous Raw Soils and Alluvial Soils.

Geologic Zone(s) **1+9**: Interface of Alluvium and Lefkara Formation.

Modern Land Use Zone(s) **4+8**: Interface of dry-farmed carobs or carobs and olives and low and dense scrub.

Publ.: Todd 1977b:27, 1979a:284, 1979b:31; Bolger 1987:77, n.42; Swiny 1985a:14, .3; Toumazou 1987:202.

Dated: Late ECU/PCU.

Mat.: VVP; EP material includes RW, RB/B, BT, RP, and Proto-DPBC sherds.

Obs.: Extensive lithic scatter (groundstone and chipped stone); MC and LC sherds in southern and northwestern parts of site. Wide, gently sloping terrace on W side of valley above river floodplain.

Visited: 4/10/83.

La.4 Kalavasos *Ayious*

Alt. Zone **1**: 70 m

R/059 Map: WD284.458

Prec. Zone **3**: 400-500 mm

- *GEPS*:125-126.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+8+10**: Interface of Calcareous Raw Soils; deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.

Geologic Zone(s) **1+6**: Interface of Alluvium and Kalavasos/ Koronia Formations.

Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.

Excav.: I. A. Todd for Brandeis Univerity, 1978-80. Area of ca. 2000 m^2; depth of deposits up to 2.50 m in some pits. Pits/ hollows, and tunnel complex.

Publ.: Todd 1979a:278, 281-283; 1979b:25-28, 1979c:690, 692; 1980a:778-779, 1980c, 1981b:59-67, 1982b:9, 1985a:86-87, 87-89 passim; 1985b:8-9, 1985c:8-10, 12, 14; 1986b:20-23; Todd and South 1981; Baird 1986; Croft 1982; Kingsnorth 1982; Kromholz 1981:21-24; Peltenburg 1987c:54; South 1985.

Dated: Final SCU? (Southern)/ Early ECU.

Todd 1982b:9, 1985c:14, 1986b:23, 1987:174, Table 4:

3867	♣ cal BC	BM-1832R	(ex-1832: *Radiocarbon* 24:274)
3785	cal BC	BM-1833R	(ex-1833: *Radiocarbon* 24:274)
3836	♣ cal BC	BM-1834R	(ex-1834: *Radiocarbon* 24:274)
9401	± 130 bc	BM-1835R	(ex-1835, as BM-1935 in Todd 1986b:23)
3431	♣ cal BC	BM-1836R	(ex-1836: *Radiocarbon* 24:275)

N.B.: For BM assays with sample numbers -1700 to -2315, read relevant section in Gazetteer Introduction, supra.

Mat.: VVP. CM. CAARI.

Obs.: Site now mostly destroyed by Nicosia-Limassol freeway. For extent and location, see published refs.

Visited: 7/10/78 etc.

La.6 Kalavasos *Mandres tou Lani* *DELETE*

160 m

Map: WD279.478

400-500

- *GEPS*:126.

An EP-LP confusion in the ceramic scatter has been settled in favor of a MC date (Todd 1979b:32).

La.9 Kalavasos *Tenta*

Alt. Zone **1**: 60 m

R/062 Map: WD278.458

Prec. Zone **3**: 400-500 mm

- *GEPS*:126-127.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+8+10**: Interface of Calcareous Raw Soils; deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.

Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.

Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.

Excav.: (1) Dept. Antiquities, 1947. Area of 90 m^2, trial pit. (2) I.A. Todd for Brandeis University, 1976-9, 1984. Area of approx. 540 m^2. Curvilinear stone and mudbrick buildings, assigned to 5 aceramic phases.

Publ.: Todd 1987, etc. Kromholz 1979, 1981:18-21; Le Brun et al. 1987:passim; Toumazou 1987:8-20.

Dated: Early-Late KCU, with (Final?) SCU (Southern) reoccupation.
Additional ^{14}C determinations:
Todd 1982b:8, 10; 1985c:14,1986b:23, 1987:173-178:

5,981	cal BC	P-2779	*Radiocarbon* 26:214
4,725	cal BC	P-2780	*Radiocarbon* 26:214
5,240	cal BC	P-2781	*Radiocarbon* 26:213
6,441	cal BC	P-2782	*Radiocarbon* 26:214
5,985	cal BC	P-2783	*Radiocarbon* 26:214
6,194♣	cal BC	P-2784	*Radiocarbon* 26:214
7,032 ±	400 bc	P-2785	*Radiocarbon* 26:214
7,567 ±	130 bc	P-2972	*Radiocarbon* 26:213
7,036	cal BC	P-2973	*Radiocarbon* 26:213
7,039	cal BC	P-2974	*Radiocarbon* 26:213
5,820	cal BC	P-2975	*Radiocarbon* 26:213
7,186 ±	500 bc	P-2976	*Radiocarbon* 26:213
5,487	cal BC	P-2977	*Radiocarbon* 26:213
6,201♣	cal BC	P-2978	*Radiocarbon* 26:214

Mat.: VVP. CM. CAARI.

Obs.: For extent and location, see published refs.

Visited: 7/5/77 etc.

La.12 Khirokitia *Vouni*

Alt. Zone **3**: 200 m

R/063 Map: WD313.506

Prec. Zone **3**: 400-500 mm

- *GEPS*:127-128.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+8**: Interface of Calcareous Raw Soils and deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.

Geologic Zone(s) **6**: Kalavasos/ Koronia Formations.

Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives.

Excav.: A. Le Brun for CNRS, 1977-78, 1980-81, 1983-84, 1986, 1988. Area of approx. 465 m^2 (end 1981). Curvilinear stone and mudbrick buildings.

Publ.: Le Brun 1983, 1984a, 1984b, 1985a, 1985b, 1985c, 1985d, 1986, 1987a, 1987b, 1988; Le Brun and Daune-Le Brun 1986; Le Brun et al. 1987:passim; *ARDA 1987* (1988):65 and Fig. 67; Toumazou 1987:21-63.

Dated: Middle-Late KCU, with SCU (Southern) reoccupation.
Additional ^{14}C determinations:

5,840	cal BC	Ly-3716	Le Brun 1987b, 1988:25
6,527♣	cal BC	Ly-3717	Le Brun 1987b, 1988:25
6,784	cal BC	Ly-3718	Le Brun 1987b, 1988:25
6,419	cal BC	Ly-3719	Le Brun 1987b, 1988:25
5,273♣	cal BC	Ly-4306	Le Brun 1988:25
6,784	cal BC	Ly-4307	Le Brun 1988:25
6,314♣	cal BC	Ly-4308	Le Brun 1988:25
5,230	cal BC	Ly-4309	Le Brun 1988:25

Mat.: Groundstone: andesite idol with long cylindrical neck (#CM.1987/I-15/1), of same type and almost exactly same size as a surface find made in 1948 at Omodhos 1 (#Lm.20 [S/244]) in the Limassol District (#CM.1948/V-17/2, see Dikaios 1953:299, n.1; Pl.XCVII; Buchholz and Karageorghis 1973:160, 464, #1690).

Obs.: For extent and location, see published refs.

Visited: 7/5/77 etc.

La.17 Mari *Mesovouni*

Alt. Zone **1**: 50 m

R/065 Map: WD284.434

Prec. Zone **2**: 300-400 mm

- *GEPS*:128.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+8+10**: Interface of Calcareous Raw Soils; deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.

Geologic Zone(s) **1+4**: Interface of Alluvium and Athalassa Formation.

Modern Land Use Zone(s) **1+3**: Interface of irrigated vegetable cultivation and dry-farmed carobs/ olives, intercropped with cereals.

Rept.: VVP, 1978.

Publ.: Todd 1979a:285, 1979b:34, 1979c:693; *ARDA 1978* (1979):24, and Fig. 27; 1985c:11, 1987:180; South 1985:68.

Dated: KCU, with SCU (Southern) reoccupation.

Mat.: CS.2478, 2684. CM 1978/XII-19/1, 1978/XII-19/2. VVP. CAARI. Groundstone: Incised vessel frag (1), zoomorphic figurine (1). A smaller but intact and much finer parallel was recently published by Flourentzos (1988:Pl. D/5, see frontispiece, this appendix, supra; #CM.W.19, unprovenanced and presumably acquired before 1920). Both finds clearly belong to the same stylistic type of a quadruped representing a grazing animal (reminiscent of fat-tailed sheep).

Obs.: Isolated hill with gently sloping top, ca. 1 km from coast and ca. 300 m W of Vasilikos R. Area ca. 250x75 m, with concentration of lithics in southeastern part and on heavily eroded SE slope. Completely obliterated by bulldozing in May 1989.

Visited: 8/3/78, 7/9/81, 5/22/85.

La.18 Mari *Moutsounin* Alt. Zone **1**: 60 m

R/226 Map: WD275.451 Prec. Zone **3**: 400-500 mm

- *GEPS*:128-129.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7**: Pakhna Formation.
Modern Land Use Zone(s) **4**: Dry-farmed carobs or carobs and olives.

Rept.: VVP, 1978.
Rept.: Todd 1979a:285-286, 1979b:34.
Dated: SCU (Southern)/ECU.
Mat.: VVP.
Obs.: Few EP sherds on surface, but much CA and later material. Flat-topped hill overlooking Nicosia-Limassol freeway.
Visited: 8/16/79.

La.19 Mari *Paliambela* Alt. Zone **1**: 30 m

R/066 Map: WD282.444 Prec. Zone **3**: 400-500 mm

- *GEPS*:129.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **8+10**: Interface of deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.
Geologic Zone(s) **1+4**: Interface of Alluvium and Athalassa Formation.
Modern Land Use Zone(s) **1+3**: Interface of irrigated vegetable cultivation and dry-farmed carobs/ olives, intercropped with cereals.

Publ.: Todd 1977b:29, 1979a:285, 1979b:34-35, 1987:1.
Dated: (KCU?), SCU (Southern).
Mat.: VVP (1978 surface collection). CAARI.
Obs.: For extent and location, see published refs.
Visited: 7/5/77, 8/3/78, 7/29/81.

La.26 Skarinou *Kholetra* Alt. Zone **2**: 160 m

R/072 Map: WD338.541 Prec. Zone **3**: 400-500 mm

- *GEPS*:131, as *Holetra*.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **9**: Lefkara Formation.
Modern Land Use Zone(s) **4**: Dry-farmed carobs or carobs and olives.

Publ.: Todd 1979a:286, 1987:180.
Dated: KCU.
Obs.: For extent and location, see published ref.
Visited: 12/28/80.

La.31 Ayia Anna *Phramena* 1 Alt. Zone **2**: 120 m

R/314 Map: WD457.655 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.

Geologic Zone(s) **9+22**: Interface of Lefkara Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming and low and dense scrub.

Rept.: E. Baudou, 1980, as *Perivolia*/ Ayia Anna 3, suggesting a "paleolithic"/ "mesolithic" date. "Flint" objects.
Excav.: E. Baudou for University of Umea and SCE at Hala Sultan Tekké (University of Göteborg), 1981-1982. Area of 60 m2. Undiagnostic chipped stone (383) in test trenches to depth of ca. 200 cm, mixed with and stratified below ceramics reported to range from NEO to ROM/BYZ.
Publ.: *ARDA 1980* (1981):27, *ARDA 1981* (1982):23, *BCH* 105:990; Baudou 1982, 1983; Baudou and Engelmark 1983:4-8; Baudou et al. 1985:370-371.
Dated: KCU?/SCU (Southern)?
Chipped stone assemblage too undiagnostic to define cultural association, and artifact-bearing layers are reported by the excavators to be redeposited. Judged in conjunction with the presence of SCU ceramics in the same excavated layers as LP and later pottery, the stratigraphy of the site remains to be clarified, and the use of the terms "paleolithic" and "mesolithic" to describe the EP component is certainly premature. See comments on #La.42 (R/386), infra.
Mat.: SCE (Hala Sultan Tekké).
Obs.:Chipped stone and post-BA ceramics in cultivated field and on slope down to bank of Tremithos R. Area of ca. 200x150 m on sloping terrace in bend of river, which skirts site to NW, W, and S.
Visited: 6/14/83.

La.32 Ayia Anna *Phramena* 3

Alt. Zone **2**: 168 m

R/315 Map: WD455.652

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **9+22**: Interface of Lefkara Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming and low and dense scrub.

Rept.: E. Baudou, 1981, as Ayia Anna 4.
Publ.: Baudou and Engelmark 1983:1-2, *passim*; Baudou et al. 1985:371.
Dated: SCU (Southern).
Mat.: SCE (Hala Sultan Tekké). Chipped stone and ceramics.
Obs.: Chipped stone, some groundstone, and ceramics (RL, CB, RW) in area of ca. 100x75 m. Walls visible near river. Steep uncultivated hillside across Tremithos R. from *Phramena* 1 and 2, sloping down to river bank ca. 150 m NE of site. N and S peripheries of site bounded by two gullies. See #La.43 (R/387) and #La.44 (R/388), infra.
Visited: 6/14/83.

La.33 Kalavasos *Angastromeni*

Alt. Zone **3**: 239 m

R/316 Map: WD267.479

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+10**: Interface of Calcareous Raw Soils and Alluvial Soils.
Geologic Zone(s) **9**: Lefkara Formation.
Modern Land Use Zone(s) **8**: Low and dense scrub.

Rept.: VVP, 1981.
Dated: SCU (Southern).
Mat.: VVP. Sherds, groundstone, and chipped stone.

Obs.: RL and CB sherds and lithics, washed down N and W slopes of prominent ridge forming the central constriction of the Vasilikos Valley, directly above Kalavasos. Area of approx. 150x75 m. See published refs.
Visited: 4/10/83.

La.34 Kalavasos *Kambanaris* Alt. Zone **2**: 130 m

R/317 Map: WD281.474 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+8**: Interface of Calcareous Raw Soils and Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **7+9**: Interface of Pakhna Formation and Lefkara Formation.
Modern Land Use Zone(s) **4+8**: Interface of dry-farmed carobs or carobs and olives, and low and dense scrub.
Rept.: VVP, 1977.
Publ: Todd 1978b:186, 1979b:32.
Dated: Early(?) ECU, following initial reports of MC material.
Mat.: VVP. Sherds and lithics.
Obs.: Sherds, chipped stone and groundstone tools, on eroded and terraced hillslope by Vasilikos tributary, bounded by pronounced gullies. Area ca. 150x150 m. For extent and location, see published refs.
Visited: 7/8/80.

La.35 Kalavasos *Kafkalia* V Alt. Zone **1**: ca. 90 m

R/318 Map: ca. WD270.456 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7**: Pakhna Formation.
Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.
Rept.: VVP, 1979. Bldg. material and chert debitage.
Publ.: Johnson and Hordynsky 1982:64; 65, Fig.19.
Dated: MED, with possible EP component if lithics belong to a KCU chert-knapping site.
Mat.: VVP.
Obs.: Not visited, material not seen. For extent and location, see published ref.

La.36 Kalavasos *Argaki tou Yeoryiou* Alt. Zone **1**: ca. 90 m

R/319 Map: ca. WD273.463 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+10**: Interface of Calcareous Raw Soils and Alluvial Soils.
Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.
Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.
Rept.: VVP, 1979, as *Yerakia*.
Publ.: Johnson and Hordynsky 1982:65, Fig. 19; 66.
Dated: SCU (Southern), ECU, and post-Formative.
Mat.: VVP. EP, LP, and later sherds.
Obs.: Not visited, material not seen. For extent and location, see published ref.

La.37 Kalokhorio 1

Alt. Zone **2**: 110 m

R/320 Map: WD462.648

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **9**: Lefkara Formation.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming and low and dense scrub.
Rept.: E. Baudou, 1980, as Kalokhorio **1**, suggesting a "paleolithic"/ "mesolithic" date. "Flint."
Publ.: Baudou and Engelmark 1983:1; 2, Fig.1; Baudou et al. 1985:Fig.1.
Dated: KCU? See comments for #La.31 (R/314), supra.
Mat.: SCE (Hala Sultan Tekké). Chipped stone.
Obs.: Thin chipped-stone scatter in sharp bend of Tremithos, ca. 100 m west of site. Area 100x100 m. Site bounded by scarp on N edge, sloping down to river bank on W and S sides, ground rising to hilltop 160 m, approx. 300 ENE of site.
Visited: 6/14/83.

La.38 Kophinou *Akhnari*

Alt. Zone **2**: 120 m

R/064 Map: WD344.541

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **4+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **9+24**: Interface of Lefkara Formation and Basal Group.
Modern Land Use Zone(s) **4+8**: Interface of dry-farmed carobs or carobs and olives, and low and dense scrub.
Rept.: VVP, 1978, as *Pera Mouti*, and by P. Flourentzos for DAC, 1979, as *Akhnari*. Cadastral plan XLIX:47 shows *Pera Mouti* to lie ca. 650 m ESE of this locality. DAC report mentions chalcolithic ceramics and ROM settlement/ cemetery in Plots #54(part), 256(part), 257, and 258/1.
Publ.: Todd 1979a:286.
Dated: Late ECU (?), with post-Formative components.
Mat.: CS.2562. VVP. CAARI. Ceramics: RMP(?), CW, and post-Formative.
Obs.: On plateau edge near left bank of Pendaskhinos R., ca. 500 m due N of Skarinou Station. Surface scatter of EP and ROM ceramics and ROM cemetery in carob grove. Original extent of EP material and ROM settlement/ cemetery reported by DAC approx. 150x300 m, but S flanks of rise and most of the site now truncated by Nicosia-Limassol freeway.
Visited: 12/28/80.

La.39 Mari *Skali* I

Alt. Zone **1**: ca. 70 m

R/321 Map: WD268.451

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.
Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.
Rept.: VVP, 1979.
Publ.: Johnson and Hordynsky 1982:65, Fig. 19; 66.
Dated: SCU (Southern)/ECU (?), ROM.
Mat.: VVP. Ceramics and lithics of possible EP date.

Obs: Not visited, material not seen. For extent and location, see published ref.

La.40 **Tokhni *Latomes*** Alt. Zone **2**: 165 m

R/322 Map: WD286.475 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+8**: Interface of Calcareous Raw Soils and deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **1+9**: Interface of Alluvium and Lefkara Formation.
Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.

Rept.: VVP, 1977, as *Latomaes*.
Publ.: Todd 1978b:187, 1979b:35; Swiny 1985a:14, n.3; Toumazou 1987:202.
Dated: PCU (?), EC-MC.
Mat.: VVP. Ceramics and lithics.
Obs.: Flat-topped ridge overlooking Vasilikos Valley to W. Site bounded by steep slope dropping into a stream gully on W side, gentle slopes on S and E sides.
Visited: 7/8/80.

La.41 **Kalavasos *Vasilikos* (River Bridge Site)** Alt. Zone **1**: 34 m

R/382 Map: WD282.456 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **10**: Alluvial Soils.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Rept.: VVP, 1982.
Publ.: Todd 1985c:11; Gomez 1987:354; 355, Table III; 356.
Dated: Late KCU?
5273♣ cal BC OX A-805 Gomez 1987:355-356.
Mat.: VVP. Chipped stone, bones.
Obs.: Pit with 2 cobble-lined hearths containing ash and bone, in bridge pier foundation trench. Not visited, material not seen.

La.42 **Ayia Anna *Phramena* 2** Alt. Zone **2**: 145 m

R/386 Map: WD459.658 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **9+22**: Interface of Lefkara Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1980, as Ayia Anna 2.
Excav.: E. Baudou for University of Umea and SCE at Hala Sultan Tekké (University of Göteborg), 1982. 9 test trenches dug in slope between this site and *Phramena* 1 (#La.31 [R/314]), supra, below it.
Publ.: Baudou and Engelmark 1983:2-3, Figs. 1-2; 4, 6; Baudou et al. 1985:Fig.1.
Dated: SCU and post-Formative.
Mat.: SCE (Hala Sultan Tekké).
Obs.: On uncultivated hillslope near left bank of Tremithos R.; ca. 200 m NE of and above *Phramena* 1, and ca. 350 m WSW of Ayia Anna-Kalokhorio road. Surface scatter of ceramics and chipped stone ca. 200x175 m, extending downslope to *Phramena* 1. Given the spatial relationship of the two scatters and the questionable

stratigraphy of the excavated deposits between them, it is possible that the two are in fact part of a single site with EP and later components, and furthermore that the lower scatter has resulted from natural and/or anthropogenic downslope displacement of material from above; i.e., from this site.
Visited: 6/14/83.

La.43 Ayia Anna *Phramena* 4 Alt. Zone **2**: 160 m

R/387 Map: WD455.650 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **9+22**: Interface of Lefkara Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1981, as Ayia Anna 5.
Publ.: Baudou and Engelmark 1983:2-3, Figs. 1-2.
Dated: SCU.
Mat.: SCE (Hala Sultan Tekké). Ceramics and chipped stone.
Obs.: On uncultivated hillslope, ca. 150-200 m S of *Phramena* 3 (#La.32 [R/315]), supra, across gully formed by small side drainage of Tremithos R. Scatter of chipped stone and EP ceramics, ca. 150x150 m.
Visited: 6/14/83.

La.44 Ayia Anna *Phramena* 5 Alt. Zone **2**: 148 m

R/388 Map: WD457.647 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **9**: Lefkara Formation.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1981, as Ayia Anna 6.
Publ.: Baudou and Engelmark 1983:2-3, Figs. 1-2.
Dated: SCU.
Mat.: SCE (Hala Sultan Tekké). Ceramics and chipped stone.
Obs.: On uncultivated hillslope, ca. 750 m S of *Phramena* 1 (La.31 [R/314]), supra; and ca. 400 m due W of Kalokhorio 1 (La.37 [R/320]), supra, across Tremithos R. Scatter of chipped stone and EP ceramics, ca. 200x150 m.
Visited: 6/14/83.

La.45 Ayia Anna *Dhimma* Alt. Zone **2**: 148 m

R/389 Map: WD431.675 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8+11**: Interface of Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy; and Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **5+6**: Interface of Brown Earths and Calcareous Raw Soils.
Geologic Zone(s) **9+22**: Interface of Lefkara Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1980, as Ayia Anna 1, suggesting a "paleolithic"/ "mesolithic" date.
Publ.: Baudou and Engelmark 1983:1.
Dated: SCU.
Mat.: SCE (Hala Sultan Tekké), CAARI. Chipped stone.
Obs.: Gently sloping field on good, soft forest soil under open stands of pine and olive; near right bank of Tremithos R. and Psevdhas-Ayia Anna village boundary, some

distance N of Mosphiloti-Ayia Anna road. Thin but extensive scatter of chipped stone extends down to river bed, with most of the material collected by Tremithos Valley Project originating in exposed section SW of dam. Single CB sherd found on surface ca. 50 m S of river during visit in 1983, contradicting date suggested by the discoverers. No igneous material.
Visited: 9/15/83.

La.46 Mosphiloti *Dhiplopotamos*

Alt. Zone **2**: 170 m

R/390 Map: WD413.684

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **4+11**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **5**: Brown Earths.
Geologic Zone(s) **23+24+26**: Interface of Lower Pillow Lavas; Basal Group; and Plagiogranite, Plutonic Complex.
Modern Land Use Zone(s) **2+8+9**: Interface of cereal dry farming; low and dense scrub; and uncultivable land.

Rept.: E. Baudou, 1983, as Mosphiloti 1.
Dated: KCU?
Mat.: SCE (Hala Sultan Tekké), CAARI. Chipped stone, groundstone.
Obs.: Gently sloping cultivated field above right bank of Tremithos R. in corner of Psevdhas-Mosphiloti village boundary, surrounded by scrub-covered, partially denuded hills. Scatter ca. 100x75 m, consisting mostly of chipped stone. 1 igneous discoidal pebble with one side beveled, possibly through use, found in 1983. No ceramics.
Visited: 9/15/83.

La.47 Kalokhorio 2

Alt. Zone **2**: 105 m

R/391 Map: WD462.646

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **9**: Lefkara Formation.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1980-1982.
Publ.: Baudou and Engelmark 1983:2, Fig. 1; Baudou et al. 1985:Fig.1.
Dated: KCU?/SCU?
Mat.: SCE (Hala Sultan Tekké).
Obs.: 100 m due S of Kalokhorio 1 (#La.37 [R/320]), supra, across Tremithos R. Small scatter of lithics and/or EP ceramics. Not visited, material not seen.

La.48 Kalokhorio 3

Alt. Zone **2**: 112 m

R/392 Map: WD463.647

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **1+9**: Interface of Alluvium and Lefkara Formation.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1980-1982.
Publ.: Baudou and Engelmark 1983:2, Fig. 1: Baudou et al. 1985:Fig.1.
Dated: KCU?/SCU?
Mat.: SCE (Hala Sultan Tekké).
Obs.: Above left bank of Tremithos R., ca. 150 m SE of Kalokhorio 1 (#La.37 [R/320]), supra, and ca. 100 m E of Kalokhorio 2 (#La.47 [R/391]), supra. Small scatter of lithics and/or EP ceramics. Not visited, material not seen.

La.49 Kalokhorio 4 Alt. Zone **2**: 104 m

R/393 Map: WD464.643 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **1+9**: Interface of Alluvium and Lefkara Formation.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1980-1983, as aceramic.
Dated: KCU?
Mat.: SCE (Hala Sultan Tekké).
Obs.: Ca. 500 m SE of Kalokhorio 1 (La.37 [R/320]), supra, in next downstream bend and above left bank of Tremithos R., opposite a cluster of sheepfolds. Not visited, material not seen.

La.50 Kalokhorio 5 Alt. Zone **1**: 80 m

R/394 Map: WD482.632 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **1+9**: Interface of Alluvium and Lefkara Formation.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1983, as aceramic.
Dated: KCU?
Mat.: SCE (Hala Sultan Tekké), CAARI. Chipped stone.
Obs.: Above right bank of Tremithos R., between river and Kalokhorio-Klavdhia village boundary. Not visited, material not seen.

La.51 Klavdhia *Kojaseki* Alt. Zone **2**: 120 m

R/395 Map: WD476.634 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **1+9**: Interface of Alluvium and Lefkara Formation.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming, and low and dense scrub.

Rept.: E. Baudou, 1983, as ceramic NEO.
Dated: SCU (?)
Mat.: SCE (Hala Sultan Tekké), CAARI. Chipped stone and ceramics (RL).
Obs.: Conspicuous hill, 142 m, ca. 300 m SSW of Tremithos R. and ca. 750 m WNW of Kalokhorio 5 (#La.50 [R/394]), supra. Ceramic and chipped stone scatter, ca. 150x200 m, on E slope. Klavdhia-Kalokhorio village boundary traverses N slope of hill. Not visited.

La.52 Tersephanou *Arpera Chiftlik/Mosphilos* Alt. Zone **1**: 50 m

R/434 Map: WD500.580 Prec. Zone **2**: 300-400 mm

Climax Veg. Zone(s) **11**: Hypothetical Larnaca Forest (see **Map G** for composition).
Principal Soil Zone(s) **8**: Deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **1+2+9**: Interface of Alluvium; Terrace Deposits; and Lefkara Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: M. Markides, 1914.
Excav.: M. Markides for CM, 1914. One tomb with PCU ceramics in EC cemetery (T.3).

Publ.: *ARCA* 1914 (1916):15, *ARCA* 1915 (1916):7; Catling 1963:149, #14; Dikaios 1940b:160-161, Pl. XXXVIII; Stewart 1962:261,269, 296; Swiny 1985a:14, n.3; Toumazou 1987:202.

Dated: PCU, with EC component.

Obs.: On almost level ground at the foot of a large mesa on which a LC cemetery is located. A small test excavation conducted in 1977 by the Brock University Practicum among the looted tombs revealed a segment of drystone wall with associated RP sherds.

Visited: 7/26/77.

La.53 Pano Lefkara *Vrysi tou Nikoli*

Alt. Zone **3**: 215 m

R/436 Map: WD298.604

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.

Principal Soil Zone(s) **6**: Deep Calcareous Raw Soils.

Geologic Zone(s) **22+23+24**: Interface of Upper Pillow Lavas; Lower Pillow Lavas; and Basal Group.

Modern Land Use Zone(s) **1+8**; Interface of irrigated vegetable cultivation, and low and dense scrub.

Rept.: S. Hadjisavvas for DAC, 1979. Scatter of chipped stone and igneous grindstones (saddle querns).

Publ.: Christou 1983:14.

Dated: KCU?

Mat.: CS.2482.

Obs.: N and below Pano Lefkara, on the higher of two fluvial terraces on the W bank of the Syrkatis R., adjacent to an unpaved, overgrown *aloni* marked by a circle of igneous cobbles, and near a spring. Surface scatter reported in two fallow fields (Plots 246, 247) separated by a row of four large carob trees, overlooking the stream bed. Quantities of igneous field stones, but no grindstones or other groundstone tools present. Large number of plow-fractured chert nodules (occurring naturally in the area), but very few decorticated pieces and even fewer flakes. These occur mostly in eastern field near the threshing floor, and two in fact resemble *dhoukani* flake-blades. The only clear artifacts observed were two large (palm-size) semi-circular end scrapers of butterscotch Lefkara chert, one with steep edge retouch. Light scatter of historical ceramics (red monochrome), incl. recent blue-white glazed ware. No diagnostics, no traces of architecture.

Visited: 5/28/88.

La.54 Ora *Klitari*

Alt. Zone 2: 152 m

R/445 Map: WD252.511

Prec. Zone 3: 400-500 mm

Climax Veg. Zone(s) **4+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **5+6**: Interface of Brown Earths and Calcareous Raw Soils.

Geologic Zone(s) **9+22+27**: Interface of Lefkara Formation; Upper Pillow Lavas; and Gabbro, Plutonic Complex.

Modern Land Use Zone(s) **3+8+9**; Interface of dry-farmed carobs/olives, intercropped with cereals, low and dense scrub, and uncultivable land.

Rept.: VVP 1988. Scatter of ground stone and chipped stone.

Dated: KCU, with small MC, CA, ROM, MOD components.

Mat.: VVP. EP lithics and post-Formative ceramics. Groundstone: vessels (no incised specimen), grindstones, pounders, few axes, no pestles; chipped stone: flakes with little or no retouch, debitage, nodules; all in a variety of Lefkara chert. Some jasper and chalcedony, no antigorite or obsidian.

Obs.: NE side of upper Vasilikos Valley, on a broad, gently sloping NE-SW spur overlooking Vasilikos R. ca. 300 m to the SW and approx. 400 m WSW of Dhrapia church (Ayios Yeoryios). Locality defined by heavily eroded gullies with upper-pillow-lava outcrops under invading *P. brutia* on N, W, and S sides, but spur itself covered with well-drained brown earths and calcareous raw soils which may attain considerable depth and form the SW extremity of a sizable pocket of arable soils to which the location of Dhrapia village can be related. Moderately dense lithic scatter covers ca. 50x100 m (E-WxN-S) in western half of spur, extending in a wide strip from N edge across dry-farmed cereal field on top of spur to freshly-plowed upper S slope, where olives are intercropped with cereals, but does not reach W edge or extend into side drainages. Few artifacts and little igneous material in evidence during visit. Site occupies a strategic ecotone position above confluence of Vasilikos R. and major tributary, at W end of the E-W highland corridor ('Fox Trail').
Visited: 7/2/89.

LIMASSOL DISTRICT

Lm.2 Anoyira *Trapezi* Cemetery

Alt. Zone **3**: 240 m

S/439 Map: VD761.419

Prec. Zone **4**: 500-600 mm

- *GEPS*:133.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7**: Pakhna Formation.
Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.
Publ.: Dikaios 1961b:14; Catling 1963:149, #13; Swiny 1979:292-296, 1981:74-75, 1985a:14, n.3: Toumazou 1987:202.
Dated: PCU.
Mat.: CM.1944-V-19 (R.R.1619). EM: RP Philia (8).
Obs.: Not visited. For extent and location, see published refs.

Lm.12 Erimi *Pamboula*

Alt. Zone **1**: 70 m

S/075 Map: VD928.372

Prec. Zone **3**: 400-500 mm

- *GEPS*:134-135.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **8+10**: Interface of deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.
Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.
Excav.: H. Heywood, S. Swiny and H. W. Swiny for WSBA Archaeological Society, 1980. Limited test trenches ca. 25-75 m S and SE of Dikaios' area.
Publ.: Dikaios 1938a; Heywood et al. 1981; *ARDA 1979* (1980):45, Figs. 28, 29; *BCH* 103:678, Figs. 15, 16.; Bolger 1985a, 1985b, 1988b; Toumazou 1987:95-1-1; Vagnetti 1987.
Dated: ECU.
Mat.: EM. CAARI.
Obs.: Area of DAC excavations lies in citrus grove on N outskirts of village. Trenches were backfilled, and there are no visible remains, except for a large scatter of ECU ceramics and lithics extending up to 350 m E and 400 m NE of Dikaios' area. 1980 trials (Area A-E) were located in built-up sector of village and backfilled. For extent and location, see published refs.
Visited: 6/27/77, 7/20/87.

Lm.34 Sotira *Kaminoudhia*

Alt. Zone **3**: 290 m

S/323 Map: VD871.418

Prec. Zone **4**: 500-600 mm

- *GEPS*:138, (cemetery only).

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7**: Pakhna Formation.
Modern Land Use Zone(s) **3+7+8**: Interface of dry-farmed carobs/ olives, intercropped with cereals; forest; and low and dense scrub.

Excav.: S. Swiny for ASOR, 1981; G. Rapp, Jr. and S. Swiny for ASOR/University of Minnesota, Duluth, 1983; S. Swiny for ASOR, 1986; Archaeological Survey by S. O. Held for ASOR/U. Minnesota, 1983-1984.
Publ.: Dikaios 1948:16, 1961b:14; Swiny 1979:263-271, 1982a, 1982b, 1982c, 1985a, 1985b:117-123, 1987; Held 1988; Toumazou 1987:196-201.
Dated: Final ECU(?)/Early PCU (Southern).
Mat.: EM; CM (#SK-M-6/7). CAARI.
Obs: Sole PCU/EC settlement excavated in Cyprus. For extent and location, see published refs.
Visited: 7/9/77, etc.

Lm.35 Sotira *Teppes* Alt. Zone **4**: 320 m

S/080 Map: VD870.414 Prec. Zone **4**: 500-600 mm

- *GEPS*:138.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7**: Pakhna Formation.
Modern Land Use Zone(s) **3+7+8**: Interface of dry-farmed carobs/ olives, intercropped with cereals; forest; and low and dense scrub.
Publ.: Peltenburg 1982a:41-42 and passim; Toumazou 1987:82-91.
Dated: SCU.
Obs.: For extent and location, see published refs.
Visited: 7/9/77, etc.

Lm.37 Akrotiri *Vounarouthkia ton Lamnion* 1 Alt. Zone **1**: 65 m

S/324 Map: VD990.257 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.
Rept.: B. L. Pile, 1980, as #1. In general area of *Lamnies*, marked ca. 250 m NE of this site.
Dated: ECU.
Mat.: EM. CW sherds.
Obs.: Very small surface scatter on heavily eroded gentle slope by radar installation. Few blades, flakes, and shell; admixture of ceramics from neighboring BYZ/MED site.
Visited: 2/17/82.

Lm.38 Akrotiri *Vounarouthkia ton Lamnion* 2 Alt. Zone **1**: 62 m

S/325 Map: VD992.257 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.
Rept.: B. L. Pile, 1980, as #2. In general area of *Lamnies*, marked ca. 200 m N of this site. "Microliths," structure?

Dated: ECU.
Mat.: EM. Chipped stone, CW sherds.
Obs.: On small earth mound, ca. 15 m diam. Blades, flakes, fire-cracked stones, shell, and BYZ sherds.
Visited: 2/17/82.

Lm.39 Akrotiri *Vounarouthkia ton Lamnion* 3 Alt. Zone 1: 62 m

S/326 Map: VD990.257 Prec. Zone 3: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #5. In general area of *Lamnies*, marked ca. 230 m NE of this site. "Many burins, blades, borers;" very weathered and probably eroded out of low scarp immediately N of scatter.
Dated: ECU.
Mat.: EM. Chipped stone, CW sherds.
Obs.: Chipped-stone scatter in area of ca. 10x10 m. Gentle slope backed by low scarp.
Visited: 2/17/82.

Lm.40 Akrotiri *Vounarouthkia ton Lamnion* 4 Alt. Zone 1: 62 m

S/327 Map: VD989.257 Prec. Zone 3: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #6. In general area of *Lamnies*, marked ca. 300 m NE of this site. Small number of chipped-stone tools. CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Few surface finds. Gently sloping sand dune, approx. 20 m SW of radar installation.
Visited: 2/17/82.

Vounarouthkia ton Lamnion 1-4 form a discrete cluster and are probably part of one single site which may also include #Lm.41 (S/328), infra.

Lm.41 Akrotiri *Vounarouthkia ton Lamnion* West Alt. Zone 1: 61 m

S/328 Map: VD987.258 Prec. Zone 3: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #7. "Microliths," hearths? BYZ and CW sherds.
Dated: ECU.
Mat.: EM.

Obs.: Scatter area of a few square meters, only around small eroding mound. Chipped stone and shell. Gentle slope between perimeter road N of site and cliff track S of site.
Visited: 2/17/82.

Lm.42 Akrotiri *Arkosyja* Alt. Zone **1**: 5-10 m

S/329 Map: WD022.264 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as Area B. CW sherds, antigorite, chipped stone, bone, shell, hearths.
Dated: ECU.
Mat.: EM.
Obs: Finds in area of ca. 300x150 m near Buttons Bay Club. Gentle slope by disfunct fuel pump station, access to which traverses the site. Not visited.

Lm.43 Akrotiri *Ammos* 1 Alt. Zone **1**: 58 m

S/330 Map: WD012.254 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #8. Hearths and CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Chipped stone: blades, scrapers; groundstone: hammerstones; shell, lumps of red ocher, fire-cracked stones, "pre-BYZ" ceramics. Open area on eroded sand dune N of cliff track, ca. 50 m NW of New Lighthouse Trigonometric Point. Not visited.

Lm.44 Akrotiri *Ammos* 2 Alt. Zone **1**: 56 m

S/331 Map: WD014.259 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #9. Hearths and CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Chipped stone; groundstone: hammerstone, grinding stone frags., weathered ceramics; shell, fire-cracked stones, all within 50-meter radius of well-defined dune crest, ca. 300 m W of Kart Club track and ca. 100 m ENE of #Lm.43 (S/330). Heavily eroded, with possible building stones. Not visited.

Lm.45 Akrotiri *Ammos* 3 Alt. Zone **1**: 53 m

S/332 Map: WD014.253 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #12. Copper/ bronze frags. and CW sherds.
Dated: ECU/LP.
Mat.: EM.
Obs.: Chipped stone, shell, on slope to cliff edge. Ca. 50 m SE across cliff track from #Lm.44 (S/331), and ca. 150 m ESE of New Lighthouse Trigonometric Point. Not visited.

Lm.46 Akrotiri *Ammos* 4 Alt. Zone **1**: 53 m

S/333 Map: WD013.255 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #13. CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Chipped stone on surface. On N side of ridge, ca. 60-70 m N of #Lm.43 (S/330) and #Lm.44 (S/331). Not visited.

Lm.47 Akrotiri #14 Alt. Zone **1**: 55 m

S/334 Map: WD011.255 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #14. Few blades, scrapers, debitage; CW sherds, and lumps of red ocher.
Dated: ECU.
Mat.: EM.
Obs.: Heavily eroded N slope; few surface finds. Not visited.

Ammos 1-4 form a discrete cluster and, together with #Lm.47 (S/334), supra, and possibly #Lm.48 (S/335), infra; are probably components of one single site.

Lm.48 Akrotiri #10 Alt. Zone **1**: 59 m

S/335 Map: WD011.254 Prec. Zone **3**: 400-50 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.

Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #10. Blades, debitage, pecking stone, CW sherds, shell, fire-cracked stones.
Dated: ECU.
Mat.: EM.
Obs.: Heavily eroded sand dune ridge N of cliff track, approx. 120 m NW of New Lighthouse Trigonometric Point. Report mentions "interesting" stone configuration at east end of dune. Not visited.

Lm.49 Akrotiri *Glossa tou Shillou* 1

Alt. Zone **1**: 14 m

S/336 Map: WD029.256

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #22. Small quantities of chipped stone and groundstone, CW sherds, shells, and fire-cracked stones.
Dated: ECU.
Mat.: EM.
Obs.: Small surface scatter; site sloping down to perimeter road leading to Mole Harbor. Not visited.

Lm.50 Akrotiri *Glossa tou Shillou* 2

Alt. Zone **1**: 24-30 m

S/337 Map: WD024.254

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #24/Area D. Many recently eroded chipped stone implements, incl. blades and scrapers, over a 100 m2 area. CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Gently sloping terrain, traversed by track. Area 250x150 m. Not visited.

Lm.51 Akrotiri *Limassol Lighthouse*

Alt. Zone **1**: 54 m

S/338 Map: WD022.250

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #3. Chipped stone, CW and BYZ sherds, many shells.
Dated: ECU.
Mat.: EM.
Obs.: Eroding dune slope immediately N of cliff track, ca. 150 m NW of lighthouse. Not visited.

Lm.52 Akrotiri *Katharaes* Alt. Zone **1**: 35 m

S/339 Map: WD020.256 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #20. Chipped stone; groundstone: grinder, "stone-bowl/ quern frag."; CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: On E slope of low rise, ca. 200 m SE of Kart Club track; small surface scatter. Not visited.

Lm.53 Akrotiri *Tris Kazoulies* 1 Alt. Zone **1**: 35 m

S/340 Map: WD016.263 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #15. Chipped stone: extensive blade scatter; groundstone: axe frag.; CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Scatter on eroded N slope. This scatter and Skaloua 1 (#Lm.58 [S/345]), infra, may constitute on single, large site. Not visited.

Lm.54 Akrotiri *Tris Kazoulies* 2 Alt. Zone **1**: 39 m

S/341 Map: WD016.257 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #4. Blades, debitage, pecking stone, CW sherds.
Dated: ECU.
Mat.: ECU.
Obs.: Scatter on heavily eroded N slope, approx. 150 m SW of Kart Club track. Not visited.

Lm.55 Akrotiri *Tris Kazoulies* 3 Alt. Zone **1**: 44 m

S/342 Map: WD014.256 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #16. Chert scrapers, pecking stones, groundstone, CW and "other" sherds, shells, red ocher, fire-cracked stones, hearths.
Dated: ECU.
Mat.: EM.
Obs.: Gentle N slope. Two hearth areas within 30-meter radius. Not visited.

Lm.56 Akrotiri *Tris Kazoulies* 4 Alt. Zone **1**: 44 m

S/343 Map: WD014.256 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #17. CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Some chipped-stone implements (scrapers) reported subsequently. 30 m E of #Lm.55 (S/342), with which this scatter may belong. Not visited.

Lm.57 Akrotiri #19 Alt. Zone **1**: 39 m

S/344 Map: WD012.258 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: A. Heywood, B. L. Pile, and S. Swiny, 1982 as #19. Little chipped stone but large quantity of groundstone; unworked antigorite; CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Small eroding hill halfway between main road from airfield to Mole Harbor and New Lighthouse Trigonometric Point. Not visited.

This scatter and *Tris Kazoulies* 2-4 may be components of one single site.

Lm.58 Akrotiri *Skaloua* 1 Alt. Zone **1**: 17-26 m

S/345 Map: WD018.262 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as Site A. Large amount of lithics; BYZ and CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Large site, min. 400x150 m. Gentle E slope ca. 150 m N of main road leading from airfield to Mole Harbor. Not visited.

Lm.59 Akrotiri *Skaloua* 2 Alt. Zone **1**: 30 m

S/346 Map: WD014.261 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #31. Blades, scrapers, debitage; CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: North of main road leading from airfield to Mole Harbor, near Kart Club track. Not visited.

Lm.60 Akrotiri *Shiliostasha/Ammos tou Dhiplarkakou* 1 Alt. Zone **1**: 13 m

S/347 Map: WD019.264 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #25. Chipped stone, worked igneous stones, CW sherds, hearths, fire-cracked stones.
Dated: ECU.
Mat.: EM.
Obs.: Small surface scatter in flat terrain near sea, next to Lady's Mile Road. Not visited.

Lm.61 Akrotiri *Shiliostasha/Ammos tou Dhiplarkakou* 2 Alt. Zone **1**:8-12 m

S/348 Map: WD016.268 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as Area C. Walls? Hearths? Chipped stone, grinding-stone frags., antigorite, CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Site lies astride Lady's Mile Road on gentle scrub-covered E slope, near sea. Not visited.

Lm.62 Akrotiri *Phrakhtaes* Alt. Zone **1**: 12 m

S/349 Map: WD031.252 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as Area F. Chipped stone, CW sherds, shells.

Dated: ECU.
Mat.: EM.
Obs.: Coastal slope near Cape Gata, cut by track. Not visited.

Lm.63 Akrotiri *Langouna tou Tarratsou* South Alt. Zone **1**: 19 m

S/350 Map: WD009.269 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #29. Chipped stone, "worked stone," CW and BYZ sherds.
Dated: ECU.
Mat.: EM.
Obs.: Area ca. 100x100 m near tank farm. Gentle NE slope. Not visited.

Lm.64 Akrotiri *Vatha* Alt. Zone **1**: 58 m

S/351 Map: VD968.266 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #30. Few lithics, CW sherds.
Dated: ECU.
Mat.: EM.
Obs.: Low hillock ca. 250 m E of covered reservoirs. *Vatha* marked on hill with trigonometric point approx. 300 m SSW of site. Not visited.

Lm.65 Akrotiri *Langouna tou Tarratsou* Alt. Zone **1**: ca. 10 m

S/352 Map: WD009.277 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **1**: Alluvium.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #26. Chipped stone, CW sherds, some shells.
Dated: ECU.
Mat.: EM.
Obs.: Area ca. 100 m diam., by Lady's Mile Road. Not visited.

Lm.66 Akrotiri *Vounari tou Kambiou* Alt. Zone **1**: 20 m

S/353 Map: VD958.259 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #21. Chipped stone, CW and BYZ sherds.
Dated: ECU.
Mat.: EM.
Obs.: Slope site by shooting range, overlooking main road to RAF hospital. Not visited.

Lm.67 Akrotiri *Aetokremnos*

Alt. Zone **1**: 40 m

S/354 Map: VD992.256

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.
Geologic Zone(s) **4**: Athalassa Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: D. J. Nixon, 1971 (discovered 1961), as *Lamnies* (report on file in CM, Nicosia [File #195/36/9-10], and BMNH, London): hippopotamus bones, 5 'flints,' and several top shells. Rediscovered and reported independently by B. L. Pile, 1980, as **Site E.**

Excav.: A. H. Simmons for Desert Research Institute, University of Nevada System, Reno, 1987-1988. Trial excavation in area of ca. 5 m^2 in 1987; full-scale excavation of an additional 22 m^2 in 1988. Large quantity (more than 100,000) of non-fossilized, non-articulated bones of pygmy hippopotamus, *Phanourios minutus* (ca. 120+ individuals of all age groups), as well as some dwarf elephant, *Elephas cypriotes* (min. 3 subadults), bones of birds ranging from dove and 2 goose species to large bustard the size of *Otis tarda*, sea urchins, crab jaws, fishbone (probably gray mullet), and remains of large viper and grass snake in sealed stratigraphic association with ca. 360 chipped-stone artifacts (primarily blade/ flake debitage, but also burins, scrapers, notched pieces, 1 microlith, 1 axe preform, and a distinctive thumbnail scraper industry), 23 igneous and in some cases man-modified stones (incl. an intact shallow mortar), a perforated serpentinite pendant, 1 antigorite and 55 shell beads; overlain by a layer or burned and cracked sea shells: top shells (*Monodonta turbinata* Born), dove shells (*Columbella rustica*), tusk shells (*Dentalium dentalis*), cone shells (*Conus mediterraneus*) and limpets (*Patella* sp.). Deep deposit with 3 discrete activity areas, shells, bones, and chipped and ground stone in rear NW part of former rock shelter. Surface finds include tooth and limb bones of dwarf elephant, and the bone of a bustard-size bird (species identification pending) (D. S. Reese, pers. comm. 1988), two igneous frags. with possible grinding surfaces, and a groundstone object with transverse grooves.

Publ.: *ARDA 1987* (1988):42-43; Heywood 1982:167-168; Held 1983:219-233, 1986:6-10, 1989a, 1989b; Reese 1989:26-29; Simmons 1988a, 1988b, 1988c, 1989; Simmons et al. 1989, Swiny 1988:10.

Dated: Proto-Neolithic? ('Akrotiri Phase.')

5,273♣	cal BC	Beta-3412	Simmons 1988a, 1988b:556
8,474 ± 110	bc	Beta-22811*	Simmons 1988a, 1988b:556
8,700 ± 130	bc	Beta-28795*	Simmons 1989
8,669 ± 100	bc	Pta-3112*	Simmons 1988a, 1988b:556
7,578 ± 150	bc	Pta-3128	Simmons 1988a, 1988b:556
6,630 ± 100	bc	Pta-3281	Simmons 1988a, 1988b:556
8,638 ± 100	bc	Pta-3322*	Simmons 1988a, 1988b:556
2,082♣	cal BC	Pta-3435	Simmons 1988a, 1988b:556
7,825 ± 120	bc	TX-5833A	Simmons 1988a, 1988b:556
8,504 ± 130	bc	TX-5833B	Simmons 1988a, 1988b:556
7,567 ± 420	bc	TX-5833C	Simmons 1988a, 1988b:556
7,361 ± 160	bc	TX-5976A	Simmons 1988a, 1988b:556
7,752 ± 550	bc	TX-5976B	Simmons 1989
8,504 ± 60	bc	SMU-1991*	Simmons 1988a, 1988b:556
7,423 ± 790	bc	ISGS-1743	Simmons 1988a, 1988b:556

Mat.: CS.1849. EM. CAARI. Bone, shell, chipped stone (364), groundstone, stone pendant (1), antigorite bead (1), shell beads (55).

Obs.: Toponym *Aetokremnos* marked on Kitchener's map, but modern 1:10,000 Topographic Map (Series K912, Edition 2-GSGS, 1979) shows *Vounarouthkia ton Lamnion* for general area overlooking site. Very steep slope on rapidly eroding talus S of sea cliffs, broken on W side by vertical cliffs, less precipitous on S and E sides. Break line of roof former rock shelter clearly visible above site, with roof debris in form of several large boulders on site itself. First positive identification of hippopotamus bones collected by D. J. Nixon made by the late K. P. Oakley (BMNH). If ^{14}C determinations and cultural nature of deposits are accurate, and if human remains from Level 2 in Hall 2 of Corbeddu Cave (Sardinia) are considered the earliest unquestionable cultural evidence at that site (Klein Hofmeijer, Sondaar et al. 1987; Klein Hofmeijer, Martini et al. 1987; Spoor and Sondaar 1986, 1987), Akrotiri Site E would represent the first instance of island colonization in the Mediterranean. See **APPENDIX 2**: GAZETTEER OF PLEISTOCENE FOSSIL SITES, #FOS-28S, infra.

Visited: 2/17/82, etc.

Lm.68 Akrotiri *Vounarouthkia ton Lamnion* East

Alt. Zone **1**: 58 m

S/355 Map: VD996.256

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.

Geologic Zone(s) **4**: Athalassa Formation.

Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. L. Pile, 1980, as #23.

Publ.: Held 1986:9, Swiny 1988:5, Fig. 4; 10-11.

Dated: KCU?

Mat.: EM. Lithics include a large end scraper, and a unique knife and tanged, shouldered projectile point similar to Near Eastern Byblos type, both on blades struck from the same kind of mottled chert. Frag. possibly belonging to a second projectile point of the same type found on surface ca. 70 m S of site. No close parallels in EP chipped-stone industries on Cyprus.

Obs.: Chipped stone and groundstone, BYZ sherds, shells, and concentration of igneous stones in area of ca. 10x10 m. Eroded S slope of low mound outside SE corner of RAF compound. Top shells (*Monodonta turbinata* Born) were collected in 1988 for ^{14}C dating. Deposit containing top shells and chipped stone observed at center of scatter.

Visited: 2/17/82, 7/20/87, 11/26/88.

Lm.69 Akrotiri #11

Alt. Zone **1**: 58 m

S/356 Map: WD001.258

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **1+13**: Interface of Kafkalla and Blown Sand.

Geologic Zone(s) **4**: Athalassa Formation.

Modern Land Use Zone(s) **9**: Uncultivable land.

Rept.: B. Pile 1980 as #11. Some chert flakes, CW sherds.

Dated: ECU.

Mat.: EM.

Obs.: By path to radio station. Not visited.

Lm.70 Alekhtora *Laoni tou Kotsiri* Alt. Zone **3**: 225 m

S/357 Map: VD678.366 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+8**: Interface of Calcareous Raw Soils; and Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.

Geologic Zone(s) **7+9**: Interface of Pakhna Formation and Lefkara Formation.

Modern Land Use Zone(s) **8**: Low and dense scrub.

Rept.: S. O. Held and S. Swiny, 1982. Site lies almost exactly on border between Limassol and Paphos districts and on junction of Pissouri, Alekhtora, and Kouklia village boundaries.

Publ.: Held 1982:10, 1986:40; Fox 1987:19; Rupp 1987:5, Map 1; Rupp et al. 1987:33, n.19.

Dated: SCU (Southern).

Mat.: CS.2678. EM. CAARI. EP ceramics, chipped stone, groundstone.

Obs.: Prominent flat-topped hill overlooking the coastal gateway to the Ktima Lowlands, connected to the *Rathimnon* plateau to N by a short saddle. E slope heavily eroded and very steep. Extensive slopewashed lithics and ceramics scatter on W slope. Hilltop has good deposit of crumbly brown topsoil around limestone outcrop, with abundant ceramics (RL, CB, ?RW-Broadline), chipped stone (blades, end scrapers and side scrapers on flakes, debitage, cores), and groundstone (bowl, grindstone, axe, flaked tool). More material on N slope, dislodged by recent gun emplacement. No conclusive evidence of architecture, but otherwise location has all marks of a classic SCU settlement site in the sense of Sotira *Teppes*.

Visited: 5/22/82, 9/23/85. 5/16/87.

Lm.71 Ayios Tykhonas *Pirtakharis/Thetekou* Alt. Zone **2**: 136 m

S/358 Map: WD137.436 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and deep Silicate Raw Soils on Mamonia rocks.

Geologic Zone(s) **9+10**: Interface of Lefkara Formation and Moni Formation.

Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.

Rept.: B. Bousquet and P.-Y. Péchoux, 1977.

Publ.: *BCH* 102:972-974.

Dated: KCU ? (Non-ceramic.)

Mat.: LIM. CAARI. Chipped stone, groundstone.

Obs.: Site extends across Ayios Tykhonas-Parekklisha track; on W part of large, gently sloping terrace, ca. 100x100 m, rising to hillock to N. Entire site heavily plowed and cultivated; open stands of carob, olive, and lentisk. Chipped stone and some groundstone tools in southern half of west terrace, on surface and in terrace wall.

Visited: 5/23/82.

Lm.72 Ayios Tykhonas *Thrumbo Vouni* Alt. Zone **2**: ca. 180 m

S/359 Map: ca. WD125.431 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6**: Calcareous Raw Soils.

Geologic Zone(s) **9**: Lefkara Formation.

Modern Land Use Zone(s) **4**: Dry-farmed carobs or carobs and olives.

Rept.: B. Bousquet and P.-Y. Péchoux, 1977.
Publ.: *BCH* 102:974.
Dated: KCU ? (Non-ceramic.)
Mat.: LIM. Chipped stone implements (4).
Obs.: Exact location not known. Material not seen.

Lm.73 Amathus *Northern Necropolis*

Alt. Zone **1**: ca. 28 m

S/360 Map: ca. WD129.418

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+8+10**: Interface of Calcareous Raw Soils; Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.
Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.
Modern Land Use Zone(s) **2+4**: Interface of cereal dry farming; and dry-farmed carobs or carobs and olives only.

Rept.: P. Aupert, 1977. 1 projectile point in tomb excavation.
Publ.: *BCH* 102:974.
Dated: EP ?
Mat.: LIM. Chipped stone (1).
Obs.: Unprovenanced single find, possibly from a former EP site in the area of the Northern Necropolis.

Lm.74 Ayios Yeoryios *Louizos*

Alt. Zone **5**: 500 m

S/361 Map: VD910.520

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7+9**: Interface of Pakhna Formation and Lefkara Formation.
Modern Land Use Zone(s) **5**: Dry-farming: vines.

Rept.: S. Swiny, 1982.
Publ.: Held 1982:10.
Dated: SCU (Southern).
Mat.: CS.2680. EM. CAARI. Groundstone: pounders (3), grindstones (7); ceramics: CB (1), RL (5), RW-Res. (1), Black-on-Red Wheelmade (1).
Obs.: EP lithics and ceramics in area of ca. 1 ha. Vineyard on gentle slope from terrace wall at N end of site to uncultivated land at S end. CG tombs reported nearby. Not visited.

Lm.75 Pissouri *Ayia Eleni*

Alt. Zone **2**: 140 m

S/362 Map: VD687.360

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+8**: Interface of Calcareous Raw Soils; and Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **7+9**: Interface of Pakhna Formation and Lefkara Formation.
Modern Land Use Zone(s) **8**: Low and dense scrub.

Rept.: P. F. Swiny, 1977.

Publ.: Swiny 1979:261, #3, Fig. 1 (as *Trapezonia*); Held 1982:10, 1986:39; Fox 1987:19; Rupp 1987:5, Map 1; Rupp et al. 1987:33, n.19.
Dated: SCU (Southern).
Mat.: CS.2679. LIM. RL (3), CB (2); adze (1); chert flakes (4).
Obs.: Conspicuous hilltop site across *Argaki tis Skotinis* from, and E of, #Lm.70 (S/357), supra. Naturally fortified access in NE corner of plateau is unique for EP sites in Cyprus and due to the exposed limestone capping of the hill. Large quantities of chipped stone, groundstone, and ceramics on top and slopes of hill. Ceramics show little weathering and include RL, high percentage of CB, also RW, RW-Res.(?), RW-Bl.(?), RW-Rp., and CW. Chipped stone: blades and flakes; groundstone: grindstones and grinders, axes, adzes, and pounders.
Visited: 4/24/82, 5/22/82, 5/16/87.

Lm.76 Pissouri *Jephalos*

Alt. Zone **1**: 88 m

S/363 Map: VD693.357

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+8**: Interface of Calcareous Raw Soils; and Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **7+9**: Interface of Pakhna Formation and Lefkara Formation.
Modern Land Use Zone(s) **8**: Low and dense scrub.

Rept.: S. O. Held and S. Swiny, 1982.
Dated: SCU?
Publ.: Held 1986:40.
Mat.: CAARI. EM. Chert: bladelet (1), debitage, cores, chunks of chert.
Obs.: Small hill with saddle top ca. 300 m SE of *Ayia Eleni* (#Lm.75 [S/362]), supra, connected by long, broad ridge to southern flank of *Trapezonia* mesa. Possibly chert quarry/ knapping site used by *Ayia Eleni* and/or *Laoni tou Kotsiri* (#Lm.70 [S/357]), supra.
Visited: 5/24/82.

Lm.77 Trakhoni *Vounaro*

Alt. Zone **1**: 51 m

S/364 Map: VD956.353

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **1+2**: Interface of Kafkalla and deep Terra Rossa on kafkaila.
Geologic Zone(s) **1+4**: Interface of Alluvium and Athalassa Formation.
Modern Land Use Zone(s) **1+2+9**: Interface of irrigated citrus and vegetable cultivation; cereal dry farming; and uncultivable land.

Rept.: H. W. and S. Swiny, 1980.
Publ.: *ASOR Newsletter* 7, May 1982:4; Held 1982:7-8, 1986:20, Heywood 1982:167, Swiny 1982:4.
Dated: KCU.
Mat.: CS.2677. EM. CAARI. Chipped stone and groundstone implements, incl. blade (1), stone tray frag. (1), stone figurine frag. (1), grinder (2), rubbing stone (1).
Obs.: Isolated, flat-topped hill in Limassol Plain W of Trakhoni. Uncultivated, but localized disturbances through mechanical digging. Size of recognizable surface scatter ca. 90x180 m, close to water tank. Site now being destroyed by cattle farm development.
Visited: 8/3/82.

Lm.78 Monagroulli *Lakkos tou Nikola/Kaliskes* Alt. Zone **2**: 130 m

S/384 Map: WD199.445 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **10**: Moni Formation.
Modern Land Use Zone(s) **3+9**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and uncultivable land.

Rept.: S. O. Held, 1983.
Dated: Late(?) SCU (Southern)/Early ECU?
Mat.: CS. CAARI. Ceramics: CB (2/3), RW-Bl. (1), RL (10), Red Mono (1); chipped stone: flakes (8); groundstone: axe (1), grinder frag. (1).
Obs.: Elongated hill, approx. 500 m N of Nicosia-Limassol freeway. Flat-topped twin peaks (135 m N, 130 m S), with formerly cultivated saddle in between. Small scatter near S edge of rock capping on N peak.
Visited: 4/10/83, 11/06/83.

Lm.79 Sotira *Arkolies* Alt. Zone **4**: 300 m

S/396 Map: VD866.419 Prec. Zone **4**: 500-600 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7**: Pakhna Formation.
Modern Land Use Zone(s) **3+8**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and low and dense scrub.

Rept.: S. Swiny, 1981 (part); SKS, 1983.
Publ.: Held 1988; *ARDA 1981*:46; Fig. 58; *BCH* 106:689, Fig. 10; 690; Karageorghis 1986:45-46, Swiny and Swiny 1983.
Dated: SCU?/PCU?
Mat.: CM.1981/VIII-19/1. Limestone figurine. EM. Ceramics, chipped stone, groundstone.
Obs.: Very large site on cultivated fields extending along E rim of *Symboulos* Canyon, W-NW of Sotira *Teppes*. Reported as four separate scatters by SKS: *Arkolies* North, *Arkolies* Center, *Arkolies* Hill 322, and *Arkolies* South; coordinates and height refer to Center. Large quantities of chipped stone, groundstone implements and one anthropomorphic limestone figurine; smaller quantities of EP (RL) and undiagnostic CW sherds. Function of site probably related to resource exploitation of EP settlements at *Teppes* and/or *Kaminoudhia*.

Lm.80 Pissouri *Pikrokremmos* West Alt. Zone **2**: ca. 140 m

S/397 Map: VD738.351 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.
Geologic Zone(s) **5**: Nicosia Formation.
Modern Land Use Zone(s) **1+4+8**: Interface of irrigated cultivation; dry-farmed carobs or carobs and olives; and low and dense scrub.

Rept.: B. L. Pile, 1983.
Dated: SCU (Southern).
Mat.: EM. Chipped stone; groundstone: axe (1), grindstone frag. (1); ceramics: RL, CB.

Obs.: Uncultivated, bilobate hill, ca. 1.2 km NW of Columbia Hotel and coast. Thin scatter of chipped stone, 1 axe, and a few EP sherds around limestone outcrop on NE spur, near abandoned sheepfold; and second thin scatter of chipped stone, several EP sherds, and one grindstone frag. on SW spur, on either side of trail. Not visited, material not seen.

PAPHOS DISTRICT

P.13 Inia *Aliki tis Laras*

Alt. Zone **1**: 10 m

P/268 Map: VD365.681

Prec. Zone **3**: 400-500 mm

- *GEPS*:141-142, as Kato Arodhes.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.

Geologic Zone(s) **2+8**: Interface of Terrace Deposits and Terra Formation.

Modern Land Use Zone(s) **3+8**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and low and dense scrub.

Publ.: *AR* 1955 (*JHS* 75, Suppl.):30; *ARDA 1954* (1955):16; *Arch.Anz.* 1963:col.532; Dikaios 1971:908; Åström 1972:42; Fortin 1978:63-64; 1981:390, Fig. IX.17; 391-392.

Dated: ECU, with LC and later components.

Obs.: Peninsula/promontory site in Inia village territory, not Kato Arodhes as originally reported (D. W. Rupp, pers. comm. 1988). Buried ECU material comes from Megaw's Trench B, which began 51 m W of old salt guard's house (Custom House) and extended W for 28x1 m across "dog-leg entrance" in LC fortification wall. Megaw reported ECU ceramics and worked igneous (1) in hollows in bedrock, encountered in eastern segment of trench (i.e.,between guard's house and fortification wall) at average depth of 0.6 m. Large chipped-stone scatter incl. blades and flakes and igneous axe frag. (1) near SE corner of guard's house, as well as chert outcrops ca. 35 m NE of guard's house, reported by M. Fortin and S. Swiny 1976. Not visited, material not seen.

P.20 Kedhares *Pezoules/Menikos*

Alt. Zone **5**: 500 m

P/274 Map: VD756.545/VD756.552

Prec. Zone **5**: 600-700 mm

- *GEPS*:142-143.

Climax Veg. Zone(s) **4+5**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.

Principal Soil Zone(s) **5+6**: Interface of Brown Earths and Calcareous Raw Soils.

Geologic Zone(s) **7+9**: Interface of Pakhna Formation and Lefkara Formation.

Modern Land Use Zone(s) **5**: Dry-farming: vines.

Publ.: Schaeffer 1936:17-18.

Obs.: This locality probably corresponds to *Pezoulia*, reported by CPSP as part of a very large (34 ha) EP-LP surface scatter (#86-D-36), although the EP component there has been tentatively dated late ECU/PCU (D. W. Rupp, pers. comm. 1988).

P.21 Khlorakas *Palloura*

Alt. Zone **1**: 20 m

P/082 Map: VD450.516

Prec. Zone **3**: 400-500 mm

- *GEPS*:143.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2+10**: Interface of Terra Rossa on kafkalla; and Alluvial Soils.

Geologic Zone(s) **2**: Terrace Deposits.

Modern Land Use Zone(s) **1+2**: Interface of irrigated banana and vegetable cultivation; and cereal dry farming.

Publ.: Peltenburg 1979a:10, Fig. 1; 1979c:79, 1979d:695-696, 1980a:37, Fig. 2; Bolger 1987:70.
Mat.: CS.2282.
Obs.: For extent and location, see published refs.
Visited: 10/13/81.

P.23 Kissonerga *Mosphilia*

Alt. Zone **1**: 40 m

P/083 Map: VD448.540

Prec. Zone **3**: 400-500 mm

- *GEPS*:143.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+10**: Interface of Terra Rossa on kafkalla; and Alluvial Soils.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **1**: Irrigated vegetable and banana cultivation.

Excav.: E. J. Peltenburg for University of Edinburgh, 1979-1980 (soundings), 1982-83, 1985-89. Ca. 1,500 m^2. Circular/ curvilinear and rectangular stone-and-pisé structures up to 15m in diameter, assigned to 5 phases.
Publ.: Peltenburg 1979a:14, 25-27; 1979c:79, 80-84; 1979d:695, 1980a:7-9, 1980c:782, 1981a:31-32, 1981b:passim, 1982a:89-90, 1982b:35-36, 55-56; 1983:919-920, 1984a:58-62, 1984b:934-936, 1985b:53-62, 1985e:passim, 1986, 1987a:674, 676-678, 1987b, 1987c:passim, 1988a, 1988b, 1988c, 1988d, n.d.a, n.d.b; Peltenburg et al. 1983:passim, 1986, 1987:1-15, 1988; *ARDA 1984* (1985):59, and Fig.67; *ARDA 1985* (1986):67, and Figs. 101-102; *BCH* 109 (1985):907, Fig. 24; *BCH* 110 (1986):839-840, Figs. 54-55; Bolger 1987:passim; Maier and Karageorghis 1984:38-40; Morrison 1982:55-56; Stewart 1983; Toumazou 1987:139-149; Watkins 1987:43-45, 121-123.
Dated: Final SCU/ECU/ECU-PCU transition.
Peltenburg 1987b:221, n.d.a:Table 2; Peltenburg et al.1986:29:
2,539♣ cal BC BM-2279
N.B.: For BM assays with sample numbers -1700 to -2315, read relevant section in Gazetteer Introduction, supra.
Mat.: LAP. PM.
Obs.: Site covers approx. 12 ha in banana plantation above right bank of Skotinis R. For extent and location, see published refs.
Visited: 10/13/81 etc.

P.24 Kissonerga *Mylouthkia*

Alt. Zone **1**: 30 m

P/084 Map: VD443.544

Prec. Zone **3**: 400-500 mm

- *GEPS*:143-144.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+10**: Interface of Terra Rossa on kafkalla; and Alluvial Soils.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **1**: Irrigated vegetable and banana cultivation.

Excav.: E. J. Peltenburg for University of Glasgow and University of Edinburgh, 1977-1979; rescue excavations 1989. Occupation debris in min. 30 stratigraphically isolated hollows.
Publ.: Peltenburg 1979a:23-25, 1979c:79-83, 1979d:694, 695, Fig. 58; 1980a:1-7, 18-20; 1980c:782, 1981a:28-31, 47, 48-49; 1981b:25-26, 1981c:984, 1982a:56-66, 1982b:35, 56-57; 1983b:41-42, 44, Fig. 1, 47-48, Pl. VIII:1, 2; 1985e:97-98, 1987c:53-54 and passim, n.d.a:passim; Peltenburg et al. 1983:passim; Betts 1979, Bolger

1987:70, 73; Burleigh 1981:21, Croft 1983, Elliott 1983b; Maier and Karageorghis 1984:40; Morrison 1982:56.
Dated: Late SCU-ECU transition.
Additional ^{14}C determinations:
Burleigh 1981:21, Peltenburg 1982a:112, n.d.a:Table 2:
3,578♣ cal BC BM-1539 *Radiocarbon* 24:239
3,569♣ cal BC BM-1540 *Radiocarbon* 24:239
Mat.: LAP. PM.
Obs.: Area of approx 6 ha on coastal headland. For extent and location, see published refs.
Visited: 10/13/81 etc.

P.26 Kithasi *Ayia Mavri*

Alt. Zone **4**: 300 m

P/277 Map: VD746.527

Prec. Zone **5**: 600-700 mm

- *GEPS*:144.

Climax Veg. Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **9+10**: Interface of Lefkara Formation and Moni Formation.
Modern Land Use Zone(s) **9**: Uncultivable land.
Publ.: Buchholz 1969:20, Fig. 3.
Obs.: Not visited.

P.28 Kouklia *Chiftlik*

Alt. Zone **1**: 80 m

P/279 Map: VD610.408

Prec. Zone **3**: 400-500 mm

- *GEPS*:144.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+10**: Interface of Calcareous Raw Soils; and Alluvial Soils.
Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.
Publ.: Maier 1981:104, 1983:231, 1985:7; Maier and Karageorghis 1984:42-46; Maier and von Wartburg 1985:145; Rupp 1981:263, Table 2 (#2).
Dated: ECU.
Mat.: KM. Groundstone: axe (2), other worked (3); antigorite: cruciform figurine frag. (1); ceramics: RW.
Obs.: Small finds and two hollows found during excav. in Hall of LC sanctuary. Further ECU material, incl. chipped stone, groundstone, RW ceramics, and a typologically and materially unusual anthropomorphic *bone* pendant (#KC754), is reported from Mitford's 1953 investigation of a ROM building at *Alonia*, approx. 100 m W of this site. Further groundstone material (axes/ pounders/ pestles) and late ECU RB/B ceramics have been reported without precise provenience from the general *Chiftlik/ Alonia* area. For extent and location, see published refs.
Visited: 8/2/77 etc.

P.29 Kouklia *Evreti/Asproyi*

Alt. Zone **1**: 60-80 m

P/280 Map: VD615.407

Prec. Zone **3**: 400-500 mm

- *GEPS*:144, as *Evreti*, *Mantissa*.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7**: Pakhna Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.

Excav.: T. B. Mitford for St. Andrews University and Liverpool Museums, 1953.
Publ.: *ARDA 1983* (1984):37, *ARDA 1984* (1985):42, *BCH* 108:948; Maier 1983:232, 1985:7; Maier and Karageorghis 1984:42-46; Maier and von Wartburg 1985:145; Rupp 1981:263, Table 2 (#16, #19), as *Evreti/ Mantissa*.
Dated: Late SCU (Southern)?/ ECU?, with CA and CC components.
Mat.: KM. Groundstone: igneous cruciform figurine frag. (1) (#KD EV 53.1), axe (4), pestle (2), pounder (1).
Obs.: Coordinates provided by Stanley Price (*GEPS*) and Rupp are wrong for either *Mantissa* or *Evreti/ Asproyi*, the former locality being ca. 200 m N of *Asproyi* near road to Souskiou and Pano Arkhimandrita. Coordinates given here are for site of Mitford's excavation, marked on Fig.1 in Maier and von Wartburg (1985:144). Groundstone figurine #KD EV 53.1. is SCU rather than ECU type, as is a close parallel, surface find #PM.2621 from Kissonerga *Mosphilia* (#P.23 [P/083]), supra (cf. *BCH* 109:907, Fig. 24). Not visited, material not seen.

P.30 Kouklia *Lingrin tou Dhiyeni/Germanos*

Alt. Zone **3**: 220 m

P/281 Map: VD656.390

Prec. Zone **3**: 400-500 mm

- *GEPS*;143, as *Randhi Forest*, *Germanos*.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+10**: Interface of Calcareous Raw Soils; and Alluvial Soils.
Geologic Zone(s) **9+10**: Interface of Lefkara Formation and Moni Formation.
Modern Land Use Zone(s) **8**: Low and dense scrub.

Excav.: R. Zahn for Staatliche Museen, Berlin, 1910.
Publ.: *BCH* 105:1003; Maier 1981:105; Rupp 1981:265, Table 4 (#74).
Dated: ECU.
Mat.: Groundstone: axe (12) and other implements, chipped stone: flakes; ceramics: RW; unworked antigorite (1); all in fill dumps of looted tombs, reported 1980 by Swiss-German Kouklia Expedition.
Obs.: Hill site, overlooking Kha River ca. 800 m to NW and creek ca. 300 m to SE. Approx. 1 km NE of site is Hill 315 (*Ayios Yeoryios*), where "chalcolithic" material was reported by M. Popham in 1955 (Maier 1981:105, n.13). Not visited, material not seen.

P.31 Lemba *Lakkous*

Alt. Zone **1**: 60 m

P/085 Map: VD457.524

Prec. Zone **3**: 400-500 mm

- *GEPS*:145.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.

Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **1+2**: Interface of irrigated vegetable and banana cultivation; and cereal dry farming.

Excav.: E. J. Peltenburg for University of Glasgow, 1976-1978, for University of Edinburgh 1979-1980, 1981-1983; area of ca. 1030 m^2. Curvilinear timber structures and circular stone-and-pisé buildings, assigned to 3 phases.
Publ.: Peltenburg 1985a, etc.; 1987c:54-55 and passim; n.d.a; Betts 1979; Elliott 1981; Maier and Karageorghis 1984:31-38; Toumazou 1987:105-131.
Mat.: LAP. PM.
Dated: Early ECU-Final ECU (Western).
Additional ^{14}C determinations:
Burleigh 1981:21; Peltenburg 1985a:16-18, n.d.:Table 2:

2,535♣	cal BC	BM-1541	*Radiocarbon* 24:238
2,584	cal BC	BM-1541A	*Radiocarbon* 24:238
2,719♣	cal BC	BM-1542	*Radiocarbon* 24:238
3,785	cal BC	BM-1543	*Radiocarbon* 24:238
2,464	cal BC	BM-2278	
4,559♣	cal BC	BM-2280	
2,911	cal BC	HAR-6173	

N.B.: For BM assays with sample numbers -1700 to -2315, read relevant section in Gazetteer Introduction, supra.
Obs.: For extent and location, see published refs.
Visited: 7/6/77 etc.

P.35 Miliou *Ayii Anaryirii/Rhodaeos*

Alt. Zone **3**: 200 m
Prec. Zone **5**: 600-700 mm

P/087 Map: VD514.665

- *GEPS*:145-146, as *Ayii Anargyrii*.

Climax Veg. Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **6+8**: Interface of Calcareous Raw Soils; and Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **4+7**: Interface of Athalassa Formation and Pakhna Formation.
Modern Land Use Zone(s) **2+5**: Interface of cereal dry farming; and dry-farming: vines.

Publ.: Peltenburg 1980c:782, 1981a:36-38, 1987c:59; n.d.a; Stewart 1981; Bolger 1987:70, 75.
Dated: (Early-Late?) ECU.
Mat.: CS.2467. PM. LAP. Chipped stone: flakes, blades, debitage; groundstone: vessel (2), grinder (4), "handstones" (2), rubbing stones (2), pestles (7), flaked tool (4), chisel (3), axe (27), adze (13), incised plaque (1), counter (1), incised cylinder (1); antigorite: cruciform figurine (1), pendant (1), cylinder (1); ceramics: Khrysokhou-RW (incl. RW-Cl.), MR; Khrysokhou-RW, Ginger; Khrysokhou-RMP, Ginger; RMP, CP, GB, RB/B; figurine (2); perforated disc (2+); bone: frags.
Obs.: Large ECU settlement site with building remains on prominent ridge ca. 200 m W of and overlooking Paphos-Polis road. For extent and location, see published refs.
Visited: 6/16/82, 7/4/87.

P.40 Neokhorio *Fontana Amorosa*

Alt. Zone **1**: 10 m
Prec. Zone **3**: 400-500 mm

P/287 Map: VD360.833

- *GEPS*:146.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2+11**: Interface of Terra Rossa on kafkalla; and Silicate Raw Soils on igneous rocks.
Geologic Zone(s) **2+22**: Interface of Terrace Deposits; and Upper Pillow Lavas.
Modern Land Use Zone(s) **8**: Low and dense scrub.

Dated: ECU.
Obs.: Visited 9/1/80, 9/4/81.

P.48 Peyia *Yeronisos*

Alt. Zone **1**: 20 m

P/090 Map: VD372.623

Prec. Zone **3**: 400-500 mm

- *GEPS*:148.

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Excav.: DAC, 1982 (soundings and survey).
Publ.: Karageorghis 1983; *ARDA 1982* (1983):39-40.
Dated: ECU, with HEL, ROM components.
Mat.: PM. Ceramics and lithics.
Obs.: Small offshore island ca. 300 m W of Cape Drepanum. Raised plateau with area of approx. 1 ha. Large quantity of ECU lithics and ceramics found in unspecified area in trenches, among architectural remains of HEL sanctuary and fortifications. This confirms earlier reports of an EP occupation on the island, which probably was a coastal headland during the Early Holocene.
Visited: 4/16/84.

P.52 Polis *Kokkina* 1

Alt. Zone **1**: 20 m

P/431 Map: VD489.778

Prec. Zone **3**: 400-500 mm

- *GEPS*:149, as *Koiladhes*.

Climax Veg. Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **8+10**: Interface of Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.
Geologic Zone(s) **1+2**: Interface of Alluvium and Terrace Deposits.
Modern Land Use Zone(s) **1+2**: Interface of irrigated vegetable cultivation; and cereal dry farming.

Publ.: Bolger 1983:65, #15; Swiny 1985a:14, n.3; Toumazou 1987:190-192.
Dated: PCU(?) (T. #130).
Obs.: Ca. 100 m SE of Polis-Pomos road and ca. 700 m SW of Myrmikoph Creek. Looted tomb in EC cemetery dated to PCU on the basis of diagnostic "Band-Burnished"/ "RP I (Philia) Stroke-Burnished" ware. Not visited, material not seen.

P.57 Prastio *Ayios Savvas tis Karonos Monastery* A

Alt. Zone **4**: 330 m

P/300 Map: VD717.488

Prec. Zone **5**: 600-700 mm

- *GEPS*:149, as *Ayios Savvas*.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex. and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.

Geologic Zone(s) **9+10+36**: Interface of Lefkara Formation; Moni Formation; and Serpentinite, Mamonia Complex.
Modern Land Use Zone(s) **5+8**: Interface of dry-farming: vines; and low and dense scrub.

Rept.: Re-reported by CPSP, 1986, as #86-D-14.
Publ.: Rupp 1987b:220, 1987c:5; *ARDA 1986* (1987):Fig. 71, *BCH* 111:666, Fig. 8; 667; Pearlman 1987.
Dated: ECU.
Mat.: KM. CPSP. PM.2928 (cruciform antigorite figurine frag.); antigorite figurine roughouts (2). Groundstone: see below; Chipped stone: blade (1); chalcedony: nugget (1); ceramics: EP Red Monochrome (4).
Obs.: Site lies in cultivated vineyard of ca. 0.5 ha adjacent to E side of ruined monastery. Abundant EP lithics and ceramics, together with a BYZ component, reported by CPSP, but few ceramics and a limited number of groundstone implements (incl. grinders, shallow mortar, discoidal pounder, axe) were observed, clustered in lower SW part of site.
Visited: 7/17/88.

P.60 Souskiou *Ayia Irini/Kafkalla*

Alt. Zone **3**: 270 m

P/303 Map: VD620.460

Prec. Zone **3**: 400-500 mm

- *GEPS*:150, as *Ayia Irini*.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **12**: Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **10**: Moni Formation.
Modern Land Use Zone(s) **5+8**: Interface of dry-farming: vines; and low and dense scub.

Rept.: CPSP, 1979, as #79-D-15.
Publ.: Rupp 1981:262, Table 1; 266, Table 5.
Obs.: Rediscovered by CPSP in 1979. Not visited, material not seen.

P.61 Souskiou *Laona* 1

Alt. 2: 140 m

P/092 Map: VD620.429

Prec. Zone **3**: 400-500 mm

- *GEPS*:150.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **2+10**: Interface of Terra Rossa on kafkalla; and Alluvial Soils.
Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.
Modern Land Use Zone(s) **3+8**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and low and dense scrub.

Publ.: Maier and Karageorghis 1984:24; Rupp 1981:264, Table 3.
Dated: Mainphase ECU.
Obs.: For extent and location, see published refs.
Visited: 8/1/80, 4/25/86.

P.62 Souskiou *Laona* 2 (Cemetery)

Alt. Zone **2**: 160 m

P/092a Map: VD625.432

Prec. Zone **3**: 400-500 mm

- *GEPS*:150.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **2+10**: Interface of Terra Rossa on kafkalla; and Alluvial Soils.

Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.

Modern Land Use Zone(s) **3+8**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and low and dense scrub.

Publ.: Maier and Karageorghis 1984:24; Peltenburg n.d.a; Rupp 1981:265, Table 4; Toumazou 1987:132-138.

Dated: Mainphase ECU.

Obs.: For extent and location, see published refs.

Visited: 8/1/80, 4/25/86.

P.63 Souskiou *Teratsoudhia*

Alt. Zone **3**: 220 m

P/304 Map: VD633.432

Prec. Zone **3**: 400-500 mm

- *GEPS*:150.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **2+6**: Interface of Terra Rossa on kafkalla; and Calcareous Raw Soils.

Geologic Zone(s) **7+10**: Interface of Pakhna Formation and Moni Formation.

Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming; and low and dense scrub.

Publ.: Rupp 1981:265, Table 4.

Mat.: CS.2317.

Dated: ECU.

Obs.: Not visited, material not seen.

P.64 Souskiou *Vathyrkakas* 2 (Cemetery)

Alt. Zone **2**: 100 m

P/093 Map: VD620.428

Prec. Zone **3**: 400-500 mm

- *GEPS*:150-151, as *Vathirkakas*.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **2+10**: Interface of Terra Rossa on kafkalla; and Alluvial Soils.

Geologic Zone(s) **1+7**: Interface of Alluvium and Pakhna Formation.

Modern Land Use Zone(s) **3+8**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and low and dense scrub.

Publ.: *BCH* 103:683-684; Karageorghis and Vagnetti 1981; Maier and Karageorghis 1984:24-30, 34; Peltenburg n.d.a; Peltenburg et al. 1983:15; Rupp 1981:264, Table 3; Toumazou 1987:132-138; Vagnetti 1980.

Dated: Mainphase ECU.

Obs.: For extent and location, see published refs.

Visited: 8/1/80, 4/25/86.

P.66 Terra *Ayios Theodoros*

Alt. Zone **4**: 380 m

P/306 Map: VD476.693(?)

Prec. Zone **4**: 500-600 mm

- *GEPS*:151, as Terra.

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **12**: Deep Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **4+7**: Interface of Athalassa Formation and Pakhna Formation.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Publ.: Baird 1984:64.
Dated: UD (non-ceramic).
Obs.: In cultivated land ca. 100 m SE of village across creek. Ruined *Ayios Theodoros* church ca. 400 m due E. Locality visited, but no material found on surface. Finds reported by Dikaios (see *GEPS*, loc. cit.) may be linked to other groundstone scatters reported by LAP (see Terra *Pervoli*, #P.113 [P/418], infra).
Visited: (locality only) 4/22/81.

P.67 Theletra *Skales*

Alt. Zone **4**: 300 m

P/094 Map: VD505.642

Prec. Zone **5**: 600-700 mm

- *GEPS*:151.

Climax Veg. Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **6+7**: Interface of Kalavasos/ Koronia Formations and Pakhna Formation.
Modern Land Use Zone(s) **2+5**: Interface of cereal dry farming; and dry-farming: vines.

Publ.: *BCH* 84:264; Nicolaou 1967:52, #77; Peltenburg 1979c:82, Fig. 1; 1982b:36-37; Bolger 1987:70.
Dated: ECU.
Mat.: PM.1383. LAP. Groundstone: axes, chisels; antigorite: figurine frag. (1); ceramics: Khrysokhou-RW-Cl.(?).
Obs.: On small plateau at confluence of two creeks. Not visited, material not seen.

P.68 Trimithousa *Ambelajia*

Alt. Zone **3**: 260 m

P/095 Map: VD527.705

Prec. Zone **4**: 500-600 mm

- *GEPS*:151.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+8+10**: Interface of Calcareous Raw Soils; Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.
Geologic Zone(s) **5+6**: Interface of Nicosia Formation and Kalavasos/ Koronia Formations.
Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.

Publ.: Bolger 1987:70.
Dated: ECU.
Mat.: Ceramics include CP and RW (coarse).
Obs.: On *right* bank of Phassaneras R. (E. J. Peltenburg, pers. comm. 1982). Not visited, material not seen.

P.69 Trimithousa *Kilistra/Plevra tou Papanikola*

Alt. Zone **4**: 300 m

P/307 Map: VD530.706

Prec. Zone **4**: 500-600 mm

- *GEPS*:151, as *Kylistra*.

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+8+10**: Interface of Calcareous Raw Soils; Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.

Geologic Zone(s) **5+6**: Interface of Nicosia Formation and Kalavasos/ Koronia Formations.

Modern Land Use Zone(s) **3+4**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farmed carobs or carobs and olives only.

Rept.: ARK, 1972/73, as #KR33.

Publ.: Elliott 1983a.

Dated: ECU.

Mat.: CS.1994 (ARK, 1972/73). PM. (LAP Survey, 1979). Groundstone: axe (8), axe frag. (2), adze (3), flaked tool (5), grinder (4), grinder/ pounder (1), rubbing stone (1), hammerstone/ grinder (3), pestle (1), pounder/ polisher (1), grindstone (1), grindstone frag. (5), vessel frag. (6).

Obs.: Large scatter of EP material (groundstone, chipped stone, ceramics), in cultivated field. For extent and location, see published ref. Not visited, material not seen.

P.76 Evretou *Amakharos*

Alt. Zone **2**: ca. 185 m

P/365 Map: VD541.686

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+5+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+8+10**: Interface of Calcareous Raw Soils; Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.

Geologic Zone(s) **5+11**: Interface of Nicosia Formation and Kannaviou Formation.

Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: LAP, 1979.

Publ.: Sheen 1981:42; Elliott 1983a:46; Baird 1987:16; Bolger 1987:70.

Dated: Late SCU/ECU, with historical component.

Mat.: CS.2603. PM. LAP. Groundstone; ceramics: some RW and abundant RM.

Obs.: On low bluff overlooking Evretou-Sarama road and Stavros-tis-Psokas tributary Argakin Kokkinokremnos. Surface scatter ca. 45x150 m. For extent and location, see published refs. Material not seen.

Visited: 6/15/82.

P.77 Evretou *Mazerokambos/Loura tou Yiasoumi*

Alt. Zone **3**: ca. 230 m

P/366 Map: VD531.692

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+5+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+8+10**: Interface of Calcareous Raw Soils; Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.

Geologic Zone(s) **5+11**: Interface of Nicosia Formation and Kannaviou Formation.

Modern Land Use Zone(s) **2+4**: Interface of cereal dry farming; and dry-farmed carobs or carobs and olives.

Rept.: ARK, 1972/73, as #KR164.
Publ.: Sheen 1981:40, as *Mazerokambos*.
Dated: UD (non-ceramic).
Mat.: CS.2597. PM. LAP. Groundstone: axe roughouts (2), hammerstone (1), hammerstone frag. (2), worked limestone (1).
Obs.: N of Evretou. For extent and location, see published ref. Not visited, material not seen.

P.78 Kouklia *Laonas*

Alt. Zone **2**: ca. 105 m

P/367 Map: VD618.410

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **7**: Pakhna Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: F. G. Maier, 1980.
Publ.: Rupp 1981:263, Table 2.
Dated: ECU.
Mat.: KM.
Obs.: On site of CG I-III cemetery excavated by St. Andrews University/ Liverpool Museums Kouklia Expedition, 1952 (Catling, *RDAC 1979*:275). Hill slope ca. 0.5 km NE of Temple of Aphrodite. Not visited, material not seen.

P.79 Phasli *Khorio*

Alt. Zone **5**: 510 m

P/368 Map: VD426.714

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **12**: Deep Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **33+35**: Interface of Mamonia Formation and Vlambouros Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: ARK, 1972/73, as #KR226.
Publ.: Peltenburg 1982b:36; Elliott 1983a:38.
Dated: ECU.
Obs.: Concentration of ECU material, incl. RW sherds, on knoll, surrounding a spring.
Visited: 7/11/82.

P.80 Phasoula *Mavroloizos*

Alt. Zone **2**: ca. 130 m

P/369 Map: VD657.460

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+10+12**: Interface of Calcareous Raw Soils; Alluvial Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **1+10**: Interface of Alluvium and Moni Formation.
Modern Land Use Zone(s) **2+4+9**: Interface of cereal dry farming; dry-farmed carobs or carobs and olives; and uncultivable land.

Rept.: CPSP, 1979, as #79-D-14.
Publ.: Rupp 1981:262, Table 1; 266, Table 5.
Dated: ECU, with ROM, BYZ, and MED components.
Mat.: KM. CPSP.
Obs.: Above left bank of Dhiarizos R., ca. 700 m SW of Mamonia *Kalamos* A (#P.99 [P/404]), infra. Surface scatter of ca. 2.25 ha. Not visited, material not seen.

P.81 Philousa *Koprikoes*

Alt. Zone **4**: ca. 340 m

P/370 Map: VD558.693

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **11+22**: Interface of Kannaviou Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+5**: Interface of cereal dry farming; and dry-farming: vines.
Rept.: LAP, 1979.
Publ.: Sheen 1981:42; Bolger 1987:70.
Dated: ECU.
Mat.: CS.2604. PM. LAP. Chipped stone (3); groundstone: axe roughout (1), adze roughout (1), hammerstone frag. (1); ceramics: RW, RMP.
Obs.: Between Argakin Seryiou and Argakin tou Pitharkou, ca. 900 m NNW of late SCU/?Early ECU site at Sarama *Alineri* 1 (#P.114 [P/419]), infra. For extent and location, see published refs. Not visited, material not seen.

P.82 Philousa *Matsikhoridhia*

Alt. Zone **4**: ca. 390 m

P/371 Map: VD549.701

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6**: Calcareous Raw Soils.
Geologic Zone(s) **11+23**: Interface of Kannaviou Formation and Lower Pillow Lavas.
Modern Land Use Zone(s) **2+5**: Interface of cereal dry farming; and dry-farming: vines.
Rept.: LAP, 1979.
Publ.: Sheen 1981:40; 41, Fig. 3:8/9.
Dated: UD (non-ceramic).
Mat.: CS.2598. PM. LAP. Chipped stone: blade (1); groundstone: axe frag. (2), axe roughout (1).
Obs.: On plateau near Philousa cemetery. For extent and location, see published ref. Not visited, material not seen.

P.83 Sarama *Aletri*

Alt. Zone **3**: ca. 265 m

P/091 Map: VD567.681

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **11**: Kannaviou Formation.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming; and uncultivable land.
Rept.: LAP, 1979.
Publ.: *ARDA 1979* (1980):24; Peltenburg 1980c:382; Elliott 1983a:43.
Dated: ECU.

Mat.: PM. LAP.
Obs.: For extent and location, see published refs. Not visited, material not seen.

P.84 Simou *Ayios Leonitos*

Alt. Zone **3**: ca. 220 m

P/372 Map: VD532.682

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+5+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **8+10**: Interface of Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.
Geologic Zone(s) **5+11**: Interface of Nicosia Formation and Kannaviou Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: ARK, 1972/73, as #KR174.
Publ.: Sheen 1981:40; 41, Fig. 3:6.
Dated: UD (non-ceramic).
Mat.: CS.2599. PM. LAP. Groundstone: axe pounder (1).
Obs.: At head of small Stavros-tis-Psokas tributary, Argakin tis Redjebous. For extent and location, see published ref. Not visited, material not seen.

P.85 Simou *Likhalos*

Alt. Zone **3**: ca. 240 m

P/373 Map: VD534.681

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+5+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **8+10**: Interface of Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.
Geologic Zone(s) **5+11**: Interface of Nicosia Formation and Kannaviou Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: ARK 1972/73, as #KR173.
Publ.: Sheen 1981:40; 41, Fig. 3:3.
Dated: UD (non-ceramic).
Mat.: CS.2600. PM. LAP. Groundstone: hammerstone (1).
Obs.: East of small Stavros-tis-Psokas tributary, Argakin tis Redjebous. For extent and location, see published ref. Not visited, material not seen.

P.86 Simou *Loukkos*

Alt. Zone **3**: ca. 220 m

P/374 Map: VD553.683

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **10+12**: Interface of Alluvial Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **11+22**: Interface of Kannaviou Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+5**: Interface of cereal dry farming; and dry-farming: vines.

Rept.: LAP, 1979.
Publ.: Sheen 1981:40; 41, Fig. 3:1/2/7/10.
Dated: UD (non-ceramic).
Mat.: CS.2601. PM. LAP. Chipped stone: core (2); groundstone: vessel (1), vessel frag. (1), adze frag. (1), pestle (1), hammerstone (2), hammerstone frag. (1).
Obs.: Ca. 200 m S of Sarama-Evretou road in cultivated land near vineyard. For extent and location, see published ref. Material not seen.
Visited: (locality only) 6/15/82.

P.87 Trimithousa *Paravoulena/Vizaja*

Alt. Zone **3**: ca. 295 m

P/375 Map: VD533.705

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+5+8**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6**: Calcareous Raw Soils.

Geologic Zone(s) **5+11+22**: Interface of Nicosia Formation; Kannaviou Formation; and Upper Pillow Lavas.

Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: ARK, 1972/73, as #KR34.

Publ.: Sheen 1981:41 (as Tremythousa [sic] *Paravoulena*).

Dated: UD (non-ceramic), with ROM component.

Mat.: CS.1995, 2602, 2607. PM. LAP. Groundstone: axe frag. (1), hammerstone (2).

Obs.: In cultivated land immediately W/SW of village. For extent and location, see published ref. Not visited, material not seen.

P.88 Kritou Marottou *Katsounoti*

Alt. Zone **5**: 445 m

P/378 Map: VD601.644

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.

Principal Soil Zone(s) **12**: Deep Silicate Raw Soils on Mamonia rocks.

Geologic Zone(s) **11**: Kannaviou Formation.

Modern Land Use Zone(s) **3+5**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farming: vines.

Rept.: CPSP, 1980, as #80-E-47.

Publ.: Rupp et al. 1984:152.

Dated: Late ECU.

Mat.: KM. CPSP. CAARI. Chipped stone, some groundstone; ceramics: EP (RL) and later ceramics.

Obs.: Terraced slope with intercropped carobs, vineyard in upper part of site. Very little surface material in evidence. Classified by CPSP as large (ca. 7 ha) multicomponent site with general prehistoric (EP-LP), CA, HEL, and possibly ROM occupations (D. W. Rupp, pers. comm. 1988).

Visited: 8/20/82, 4/16/84, 2/20/86.

P.89 Kritou Marottou *Ais Yiorkis*

Alt. Zone **5**: 460 m

P/379 Map: VD601.649

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.

Principal Soil Zone(s) **12**: Deep Silicate Raw Soils on Mamonia rocks.

Geologic Zone(s) **11**: Kannaviou Formation.

Modern Land Use Zone(s) **3+5**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farming: vines.

Rept.: CPSP, 1980, as #80-E-46, *Katsounoti* B.

Publ.: Rupp 1984:148, 155; Rupp et al. 1984:140-141; 1987:42-43; Held 1986:20-21; Fox 1987:19, 20-22, 26; 32-33, Figs. 1-2; Reese 1987.

Dated: KCU.

Mat.: KM. CPSP. CAARI. Chipped stone: blade tools, lame à crête (29), debitage; groundstone: vessel frag. (6), axe (1), axe frag. (4), grindstone (1), grinder (1), rubber pounder (2), hammerstone (4), polisher (1), hammerstone/ polisher (1), worked cobbles; black polished cylindrical stone object (1); serpentinite: penanular pendant frag. (1), incised thimble (1), discard frag. (1); obsidian: bladelet (1) (Chiftlik source); worked bone: awl frags. (3); faunal bone; marine shell (3); carbonized seeds: *Hordeum spontaneum*.

Obs.: S-SE facing slope site on terraces; surface scatter ca. 4000 m^2, upslope deposits ca. 0.6 m thick and visible in sections containing chipped stone and quantities of faunal bones (*Dama mesopotamica*, smaller quantities of ovicaprines, *sus*, and canid), downslope scatter in recently abandoned vineyard and thus heavily disturbed. During recent visit, exposed section was found to contain frags. of historical pottery, indicating redeposition of material. Portable appearance of assemblage and altitude of site suggest specialized site function; e.g., hunting camp, possibly linked to settlement at Kannaviou *Kochina* (#P.90 [P/380]), infra., ca. 0.75 km to SE in Ezousas Valley.

Visited: 8/20/82, 4/16/84, 2/20/86, 10/23/88.

P.90 Kannaviou *Kochina*

Alt. Zone **4**: ca. 345 m

P/380 Map: VD613.635

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.

Principal Soil Zone(s) **12**: Deep Silicate Raw Soils on Mamonia rocks.

Geologic Zone(s) **11**: Kannaviou Formation.

Modern Land Use Zone(s) **2+5**: Interface of cereal dry farming; and dry-farming: vines.

Rept.: CPSP, 1980, as #80-E-38.

Publ.: Rupp 1984:148; Rupp et al. 1984:140-141; Held 1986:21-22; Fox 1987:19, 22, 26; 34, Fig. 3.

Dated: KCU (?)

Mat.: KM. CPSP. CAARI. Chipped stone: blade tools, lame à crête (1), debitage; groundstone: vessel frags. (33), axe (2), axe frags. (5).

Obs.: Gentle WNW slope on cultivated second river terrace, overlooking Ezousas River, mostly covered by vineyard and a number of carob trees. Prominent rock outcrop ca. 20 m high on S periphery of site, shielding it from southerlies blowing up the river valley. Size of scatter approx. 1.5 ha. Abundant groundstone, incl. vessel frags., mortars, and grindstones; as well as chipped stone.

Visited: 8/20/82, 4/16/84, 2/20/86, 10/23/88.

P.91 Prastio *Lakhries*

Alt. Zone **3**: 285 m

P/381 Map: VD717.498

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.

Geologic Zone(s) **1+10+36**: Interface of Alluvium; Moni Formation; and Serpentinite, Mamonia Complex.

Modern Land Use Zone(s) **5**: Dry-farming: vines.

Rept.: CPSP, 1982, as #82-D-1, as *Lakvies*.

Publ.: Rupp 1984:150, n.7; Rupp et al. 1984:153; Sørensen et al. 1987:265.

Dated: Late(?) ECU, with MC, ROM/MED components.

Mat.: KM. CPSP. Chipped stone (in same area as ECU ceramics), little groundstone, EP, MC and later ceramics.

Obs.: Terraced slope with cultivated vineyard above right bank of Dhiarizos R., rising to bedrock plateau. Entire site approx. 1.5 ha, EP surface scatter ca. 2500 m2. Settlement and tombs.

Visited: 8/14/83, 5/4/85.

P.92 Kholetria *Ortos*

Alt. Zone **2**: 130 m

P/385 Map: VD615.474

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **8+10+12**: Interface of Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; Alluvial Soils; and Silicate Raw Soils on Mamonia rocks.

Geologic Zone(s) **7+10**: Interface of Pakhna Formation and Moni Formation.

Modern Land Use Zone(s) **2+5+9**: Interface of cereal dry farming; dry-farming: vines; and uncultivable land.

Rept.: CPSP, 1983, as #83-X-1.

Publ.: Rupp 1984:153; Rupp et al. 1987:33, 42; Fox 1987:19, 22-24, 26; 35-37, Figs. 4-6; 1988; Held 1986:23; Reese 1987.

Dated: KCU, with CA and recent reoccupations.

Mat.: KM. CPSP. CM.1988/V-16/1. Chipped stone (201): blades, flakes, fragments, lame à crète (2); groundstone (165): decorated/ plain vessel frags., incl. anthropomorphic vessel frag. (1), incised cobbles (18), axe and axe frag. (33), ?chisels (3), cruciform ?figurine frag. (1), ?whetstone with red ocher marks (1), hammerstone, worked pebbles (6), perforated cobble/ pebble (2), macehead frag. (1); pendant frag. (2), including one made of antigorite; antigorite pebble/ frag. (4); shell: marine shell frag. (7), incl. *Charonia sp.*; bone frag. (3). A rare groundstone figurine head (CM.1988/V-16/1) was surface-collected by D. A. Pearlman on 5/8/88. The only two parallels for this specimen were found by Dikaios at Khirokitia (Dikaios 1953:298, #I, #1068; Plates XCVI, CXLIV). The stylistic similarity between the Kholetria head and the Khirokitia heads is so remarkable that it is now justified to subsume them under a new type, whose main attributes are a relatively flat cross-section, a pointed chin with/ without stylized beard, and pierced ears which may have held rings of perishable material. The same type also seems to be present in residual form on the handle of a stone vessel (?) found at Kalavasos *Tenta* (#K-T 660, Todd 1982a:50). Although *Ortos* has yielded other KCU diagnostics, this recent chance find proves the site's cultural affiliation beyond any shadow of doubt.

Obs.: Very large, prominent hill occupying strategic location in lower Xeros Valley, ca. 1 km SW of abandonded village of Kholetria, in bend and on left bank of Xeros River. N, W, and S slopes steep and uncultivated, E slope forms saddle between hill and mid-level topography of eastern valley slopes. Hill top relatively flat and cultivated vineyard. Large and dense lithic surface scatter of approx. 2.5-4 ha covers top and E slope of site and is continually being rearticulated through mechanical tilling of vineyard. Artifacts were systematically collected by CPSP in three areas on top and E slope (Fox 1988:Fig. 1), but abundant chipped stone and groundstone remains in evidence. No ceramics. No structures visible, but assemblage suggests presence of a major KCU settlement.

Visited: 8/14/83, 5/4/85, 2/20/86, 10/23/88.

P.93 Kedhares *Yero Vasili*

Alt. Zone **4**: ca. 390 m

P/398 Map: ca. VD750.548

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+5**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.

Principal Soil Zone(s) **5+6**: Interface of Brown Earths; and Calcareous Raw Soils.

Geologic Zone(s) **7+9**: Interface of Pakhna Formation and Lefkara Formation.

Modern Land Use Zone(s) **5**: Dry-farming: vines.

Rept.: CPSP, 1986, as #86-D-53.

Publ.: Rupp 1987b:220, 1987c:5; Fox 1987:19, 24, 26.
Dated: KCU.
Mat.: KM. CPSP. Chipped stone: cores, blade tools, lame à crête (3); groundstone: vessel frag. (3), axe frag. (2), worked cobble (1).
Obs.: Terraced hill side facing W across upper Dhiarizos R. Chipped stone and groundstone scatter, ca. 1000 m2. Ash and faunal bones in exposed 0.5 m thick section. Not visited, material not seen.

P.94 Kedhares *Kasparis*

Alt. Zone **4**: ca. 385 m

P/399 Map: ca. VD747.539

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4+5**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **5+6**: Interface of Brown Earths; and Calcareous Raw Soils.
Geologic Zone(s) **7+9**: Interface of Pakhna Formation and Lefkara Formation.
Modern Land Use Zone(s) **5**: Dry-farming: vines.

Rept.: CPSP, 1986, as #86-D-32.
Publ.: Rupp 1987b:220, 1987c:5; Fox 1987:19, 26.
Dated: SCU (Southern)/ Early ECU?
Mat.: KM. CPSP. Chipped stone, incl. lame à crête; groundstone: vessel frags., grindstone frag. (1), worked cobble (1), worked cobble plane (1). No info on ceramics.
Obs.: Surface scatter of ca. 5,000 m2 on hilltop, saddle and terraced N slope above left bank of upper Dhiarizos R., ca. 1 km SSW of *Yero Vasili* (#P.93 [P/398]), supra. Not visited, material not seen.

P.95 Yeroskipos *Chouvlijin tis Yermaninis* A

Alt. Zone **1**: ca. 12 m

P/400 Map: ca. VD493.448

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **5+9**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+10**: Interface of Terra Rossa on kafkalla; and Alluvial Soils.
Geologic Zone(s) **2+8**: Interface of Terrace Deposits and Terra Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: CPSP, 1986, as #86-E-1.
Publ.: Rupp 1987b:220, 1987c:5; Fox 1987:19, 25.
Dated: (Late?) SCU (Southern)/ Early ECU?
Mat.: KM. CPSP. Chipped stone, groundstone, ceramics (RMP).
Obs.: Surface scatter and tombs in area of ca. 2.5 ha. Not visited, material not seen.

P.96 Pano Arkhimandrita *Phroukalia* A

Alt. Zone **3**: ca. 280 m

P/401 Map: ca. VD691.459

Prec. Zone **4**: 500-600 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **10+36**: Interface of Moni Formation; and Serpentinite, Mamonia Complex.
Modern Land Use Zone(s) **4+9**: Interface of dry-farmed carobs and uncultivable land.

Rept.: CPSP, 1986, as #86-D-21.
Publ.: Fox 1987:19, 25-26.
Dated: SCU (Southern)?/ Early ECU?

Mat.: KM. CPSP. Chipped stone; groundstone: axe (1), axe frag. (1), hammerstone (2), grindstone frag. (1); ceramics (RMP).

Obs.: Two discrete scatters in area of approx. 7000 m2. On ridge and west-facing slope at confluence of two streams. Not visited, material not seen. "Small lithic assemblage which is neolithic in character" (Fox, loc.cit.:19).

P.97 Kouklia *Liskiovouno A/Vikla*

Alt. Zone **1**: 11 m

P/402 Map: VD605.397

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.

Principal Soil Zone(s) **6+10**: Interface of Calcareous Raw Soils and Alluvial Soils.

Geologic Zone(s) **1**: Alluvium.

Modern Land Use Zone(s) **1+2**: Interface of irrigated vegetable cultivation; and cereal dry farming.

Rept.: CPSP, 1983, as #83-D-1, *Vikli*.

Publ.: Rupp 1984:153; Rupp et al. 1987:33-34, 42-43; Fox 1987:19, 24-25, 27; 39, Fig. 8; 40, Fig. 9; 42, Figs. 2-3; Maier 1983:231, n.20; Maier and von Wartburg 1985:Plate V:5; Sørensen et al. 1987:259-263 passim.

Dated: Late(?) SCU (Southern)/ Early(?) ECU, with several historical components.

Mat.: KM. CPSP. Chipped stone, groundstone, chalcedony pecking stones (3); antigorite cruciform figurine frag. (1); ceramics: RL, CB, RW, RMP, GB.

Obs.: Original surface scatter of approx. 6000 m2 in field on recent alluvium S of Kouklia. Heavily disturbed and rearticulated by intensive cultivation. Single groundstone axe found during excavation in 1980-1982 of Late MED sugar mill/ refinery at nearby *Stavros* may also come from this site (cf. Maier 1983:231, n.20).

Visited: 3/27/88.

P.98 Koloni *Ennea Skales*

Alt. Zone **1**: 47 m

P/403 Map: ca. VD515.465

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.

Principal Soil Zone(s) **2+6**: Interface of Terra Rossa on kafkalla; and Calcareous Raw Soils.

Geologic Zone(s) **2+8+9**: Interface of Terrace Deposits; Terra Formation; and Lefkara Formation.

Modern Land Use Zone(s) **1+2**: Interface of irrigated cultivation: vegetables and vines; and cereal dry farming.

Rept.: CPSP, 1983, as #83-E-18.

Publ.: Rupp et al. n.d.; Fox 1987:19, 25; Sørensen et al. 1987:259-261 passim.

Dated: SCU/ECU, and post-Formative components.

Mat.: KM. CPSP. Some chipped stone, groundstone, chalcedony pebble polisher, ceramics: CB (1 rim frag.), RW, GB (1 rim frag.), RMP.

Obs.: EP material forms scatter of ca. 2 ha on left bank of creek. CPSP reports EP component as SCU (Fox, loc. cit.), but identification of GB ware (Sørensen et al., loc. cit.) suggests a somewhat later, final SCU/early ECU, date. Not visited, material not seen.

P.99 Mamonia *Kalamos A*

Alt. Zone **2**: ca. 150 m

P/404 Map: ca. VD663.464

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and

Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+10+12**: Interface of Calcareous Raw Soils; Alluvial Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **1+10+36**: Interface of Alluvium; Moni Formation; and Serpentinite, Mamonia Complex.
Modern Land Use Zone(s) **2+8**: Interface of cereal dry farming; and low and dense scrub.

Rept.: CPSP, 1983, as #83-D-25.
Publ.: Rupp 1984:153; Rupp et al. 1987:34; Sørensen et al. 1987:263 (CW).
Dated: ECU(?), with CG, CA, and MOD components.
Mat.: KM. CPSP.
Obs.: Above left bank of Dhiarizos R., ca. 700 m NE of Phasoula *Mavroloizos* (#P.80 [P/369]), supra. Not visited, material not seen.

P.100 Kannaviou *Vouni*

Alt. Zone **4**: 390 m

P/405 Map: ca. VD612.629

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils and deep Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **9+10**: Interface of Lefkara Formation and Moni Formation.
Modern Land Use Zone(s) **5+8+9**: Interface of dry farming: vines; low and dense scrub; and uncultivable land.

Rept.: CPSP, 1983, as #83-E-87.
Publ.: Rupp (in preparation).
Dated: ECU, with MED-MOD components.
Mat.: KM. CPSP.
Obs.: Reported as settlement and modern chert-knapping area. Surface scatter of approx. 5,500 m2 in vineyard on gently sloping hillside near side drainage of Ezousas R. Not visited, material not seen.

P.101 Yeroskipos *Argakin tou Koliokremnou*

Alt. Zone **1**: ca. 95 m

P/406 Map: ca. VD512.472

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **5+9**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+8**: Interface of Terra Rossa on kafkalla; and Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **2+8**: Interface of Terrace Deposits and Terra Formation.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming; and uncultivable land.

Rept.: CPSP, 1983, as #83-E-59.
Publ.: Rupp 1984:153; Rupp et al. n.d.; Sørensen et al. 1987:263 (RB/B).
Dated: Late ECU/Early PCU?, and post-Formative components.
Mat.: KM. CPSP. Ceramics, incl. RB/B ware.
Obs.: Surface scatter of ca. 3 ha. For extent and location, see published refs.

P.102 Kritou Marottou *Limnes*

Alt. Zone **5**: ca. 440 m

P/407 Map: ca. VD601.644

Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **12**: Deep Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **11**: Kannaviou Formation.

Modern Land Use Zone(s) **3+5**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farming: vines.

Rept.: CPSP, 1980, as #80-E-45.

Publ.: Rupp et al. 1984:152; Sørensen 1983:284, Fig.2; 285, 291 ("10 RP Chalco III sherds").

Dated: Late ECU/PCU?

Mat.: KM. CPSP. CAARI.

Obs.: Surface scatter of ca. 4,000-6,000 m^2 on gently sloping hillside, next to aceramic *Ais Yiorkis* (#P.89 [P/379], supra).

P.103 Peyia *Maa-Palaeokastro* — Alt. Zone **1**: 13 m

P/408 Map: VD417.571 — Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2+8+10**: Interface of Terra Rossa on kafkalla; deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; and Alluvial Soils.

Geologic Zone(s) **2**: Terrace Deposits.

Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming; and uncultivable land.

Rept.: DAC, 1986.

Excav.: P. Dikaios for CM, 1954; V. Karageorghis for DAC, 1978-1985, V. Karageorghis and G. Thomas, for DAC/ University of Edinburgh, 1986. Circular timber structure, pit graves, and hollows containing daub and ECU pottery.

Publ.: *ARDA 1980* (1981):29, *ARDA 1983* (1984):35, *ARDA 1986* (1987):40-41, *BCH* 105:991, *BCH* 108:946, *BCH* 110:850, Bolger 1988a, Croft 1988, Karageorghis and Thomas 1987, Thomas 1988, Peltenburg n.d.a.

Dated: Early(?) ECU, LC.

Mat.: PM. Groundstone: vessel frags., pounder (1), limestone figurine (1); ceramics: RW, RMP, and other wares.

Obs.: Peninsula/ headland site with scrub vegetation. ECU occupation largely obscured by extensive LC settlement.

Visited: 7/15/82, 8/21/83.

P.104 Peyia *Elia tou Vatani* 1 — Alt. Zone **1**: 35 m

P/409 Map: VD420.583 — Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2+8**: Interface of Terra Rossa on kafkalla; and deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.

Geologic Zone(s) **2**: Terrace Deposits.

Modern Land Use Zone(s) **3+5**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and dry-farming: vines.

Rept.: LAP, 1983.

Publ.: Baird 1985:342-343, 1987:17; Peltenburg 1985b:64, 1987c:53.

Dated: (Late?) SCU (Southern).

Mat.: PM. LAP. Groundstone: vessel frag. (1), axe frag. (1), hammerstone (1), pestle (1); ceramics: RW-Bl., RW-Res.(?), RW-Cb., CB, RL (?), CP, ROM(?) (1).

Obs.: Site area ca. 200x150 m on gentle NW slope, above left bank of creek, in cultivated field and vineyard. Systematic surface collection defined two spatially discrete scatters, at SW (with CB and RW-Cb. sherds) and NE ends of site.

Visited: 4/26/86.

P.105 Peyia *Pervolia/Koutsouros*

Alt. Zone **1**: 65 m

P/410 Map: VD420.594

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2+6**: Interface of Terra Rossa on kafkalla; and Calcareous Raw Soils.

Geologic Zone(s) **2**: Terrace Deposits.

Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Rept.: LAP, 1983.

Publ.: Baird 1985:343.

Dated: ECU.

Mat.: PM. LAP. Groundstone: perforated cobble (1), tray frag. (1); ceramics: RMP, RW, RB/B(?), Black-on-Red (1), LC sherds belonging to post-Formative component at *Koutsouros*.

Obs.: EP material reported in two small, dense scatters in cultivated fields, separated by two creeks. *Koutsouros*, on gentle slope near left bank of Piskaka Creek, has large LC component. For extent and location, see published ref. Not visited, material not seen.

P.106 Peyia *Karavopetra*

Alt. Zone **1**: ca. 35 m

P/411 Map: VD416.587

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2**: Terra Rossa on kafkalla.

Geologic Zone(s) **2**: Terrace Deposits.

Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.

Rept.: LAP, 1983.

Publ.: Baird 1985:347.

Dated: UD (non-ceramic).

Mat.: PM. LAP. Groundstone: axe frag. (1), pestle/ pounder (1), polisher (1).

Obs.: For extent and location, see published ref. Not visited, material not seen.

P.107 Peyia *Kokkinokambos*

Alt. Zone **1**: ca. 40 m

P/412 Map: VD435.575/434.573

Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.

Principal Soil Zone(s) **2+8+10+12**: Interface of Terra Rossa on kafkalla; deep Xeror-endzinas on limestones, chalks, Pliocene marls, and very calcareous deposits; Alluvial Soils; and Silicate Raw Soils on Mamonia rocks.

Geologic Zone(s) **2**: Terrace Deposits.

Modern Land Use Zone(s) **3+9**: Interface of dry-farmed carobs/ olives, intercropped with cereals; and uncultivable land.

Rept.: LAP, 1983.

Publ.: Baird 1985:347.

Dated: UD (non-ceramic).

Mat.: PM. LAP. Groundstone: vessel frag. (1), axe (1), axe frag. (2), hammerstone (2), hammerstone frag. (2), hammerstone/ pounder (1).

Obs.: For extent and location, see published ref. Not visited, material not seen.

P.108 Peyia *Parpaourin* 1 Alt. Zone **1**: ca. 20 m

P/413 Map: VD409.588 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+8**: Interface of Terra Rossa on kafkalla; and deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.
Rept.: LAP, 1983.
Publ.: Baird 1985:348.
Dated: UD (non-ceramic).
Mat.: PM. LAP. Groundstone: axe (1).
Obs.: For extent and location, see published ref. Not visited, material not seen.

P.109 Peyia *Parpaourin* 2 Alt. Zone **1**: ca. 19 m

P/414 Map: VD409.587 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+8**: Interface of Terra Rossa on kafkalla; and deep Xerorendzinas on limestones, chalks, Pliocene marls, and very calcareous deposits.
Geologic Zone(s) **2**: Terrace Deposits.
Modern Land Use Zone(s) **3**: Dry-farmed carobs/ olives, intercropped with cereals.
Rept.: LAP, 1983.
Publ.: Baird 1985:348.
Dated: UD (non-ceramic).
Mat.: PM. LAP. Groundstone: axe (1), axe(?) frag. (1).
Obs.: For extent and location, see published ref. Not visited, material not seen.

P.110 Peyia *Viklarin* Alt. Zone **1**: 60 m

P/415 Map: VD393.645 Prec. Zone **3**: 400-500 mm

Climax Veg. Zone(s) **9**: Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **2+5+6**: Interface of Terra Rossa on kafkalla; Brown Earths; and Calcareous Raw Soils.
Geologic Zone(s) **1+2**: Interface of Alluvium and Terrace Deposits.
Modern Land Use Zone(s) **8**: Low and dense scrub.
Rept.: LAP, 1982.
Publ.: Baird 1984:64.
Dated: (Late?) ECU, with CC component.
Mat.: PM. LAP. Chipped stone: blade (4), flake (12), scraper (5), debitage (18); groundstone: axe (8), adze (2), chisel (1), hammerstone (4), pounder (3), chert pounder (2), pestle (1), chert polisher (1), chert hammer (1), vessel frag. (2), cupped stone (1), mortar (1), anvil (2); ceramics: RW, RL, RMP, BT, RB/B, Classical.
Obs.: Ridge top site overlooking Kalamoulli Creek to S, ca. 750 m W of coast and near ruined Ayios Theodoros church. Scatter on scrub-covered top and recently terraced slopes; max. size reported as under 2 ha, but no more than approx. 1 ha observed during visit.
Visited: 4/26/86.

P.111 **Drousha *Karka*** Alt. Zone **6**: 605 m

P/416 Map: VD446.693 Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and deep Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **33**: Mamonia Formation.
Modern Land Use Zone(s) **2+4**: Interface of cereal dry farming; and dry-farmed carobs or carobs and olives only.

Rept.: LAP, 1982.
Publ.: Baird 1984:65.
Dated: UD (non-ceramic).
Mat.: PM. LAP. Groundstone: axe (1), hammerstone (1), pestle frag. (1), other (3).
Obs.: Isolated finds clustered around spring on W outskirts of Drousha, on either side of road to Phasli. Not visited, material not seen.

P.112 **Kato Arodhes *Kadhos/Phraktoudhia*** Alt. Zone **5**: ca. 570 m

P/417 Map: VD455.672 Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and deep Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **8+10**: Interface of Terra Formation and Moni Formation.
Modern Land Use Zone(s) **2**: Cereal dry farming.

Rept.: LAP, 1982.
Publ.: Baird 1984:65.
Dated: UD (non-ceramic).
Mat.: PM. LAP. Groundstone: vessel (1), vessel frag. (2), pounder (2), pestle (1).
Obs.: 2 separate findspots reported N of Kato Arodhes in fields by road to Inia, near one of the upper drainages of the Inia Creek. Material not seen.
Visited: (locality only) 7/5/87.

P.113 **Terra *Pervoli*** Alt. Zone **4**: 340 m

P/418 Map: VD475.700 Prec. Zone **4**: 500-600 mm

Climax Veg. Zone(s) **8**: Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **12**: Deep Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **4+7**: Interface of Athalassa Formation and Pakhna Formation.
Modern Land Use Zone(s) **3+8**: Interface of dry-farmed carobs/ olives, intercropped with cereals and low and dense scrub.

Rept.: LAP, 1982, as including *Exo Terra*, *Lourtea*, and *Kambos*.
Publ.: Baird 1984:64.
Dated: UD (non-ceramic EP component), MED, REC.
Mat.: PM. LAP. Chipped stone: *dhoukani* flake blades? (10); groundstone: axe (8), chisel (1), hammerstone (20), grindstone (1), pounder (2), pestle (2), polisher (1), polisher/ pounder (1), rubbing stone frag. (4), other (5); ceramics: background scatter of historical sherds.
Obs.: Several separate lithic scatters and isolated findspots in scrub and cultivated land N and NE of village along Argakin tou Kambou. In conjunction with earlier reports of lithics SE of village (ca. 700 m distant), listed here as *Ayios Theodoros* (#P.66 [P.306], supra), this widespread distribution points to the existence of an EP settlement site in the vicinity.
Visited: 7/4/87.

P.114 Sarama *Alineri* 1 Alt. Zone **3**: ca. 245 m

P/419 Map: VD559.684 Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **6+10+12**: Interface of Calcareous Raw Soils; Alluvial Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **11+22**: Interface of Kannaviou Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+5**: Interface of cereal dry farming; and dry-farming: vines.

Rept.: LAP, 1985.
Publ.: Baird 1987:15; 16, Fig. 4; 17.
Dated: Late SCU/?Early ECU.
Mat.: PM. LAP. Ceramics: SCU and possibly early ECU material.
Obs.: In cultivated land N of Evretou-Sarama road, ca. 600 m SE of ECU site at Philousa *Koprikoes* (#P.81 [P/370]), supra, and ca. 200 m N of a late ECU site at Sarama *Katavlaka* 2 (#P.116 [P/421]), infra. Scatter approx. 200x100 m. Not visited, material not seen.

P.115 Sarama *Gonies* Alt. Zone **3**: ca. 245 m

P/420 Map: VD568.679 Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **10+12**: Interface of Alluvial Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **10+11**: Interface of Moni Formation and Kannaviou Formation.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming; and uncultivable land.

Rept.: LAP, 1985.
Publ.: Baird 1987:15; 16, Fig. 4.
Dated: Late SCU.
Mat.: PM. LAP. Ceramics.
Obs.: Surface scatter of approx. 800 m2 in cultivated land ca. 100 m S of Stavros tis Psokas R., approx. 400 m WNW of Annadhiou *Pappares* (#P.117 [P/422]), infra. Not visited, material not seen.

P.116 Sarama *Katavlaka* 2 Alt. Zone **3**: ca. 215 m

P/421 Map: VD558.682 Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **6+10+12**: Interface of Calcareous Raw Soils; Alluvial Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **11+22**: Interface of Kannaviou Formation and Upper Pillow Lavas.
Modern Land Use Zone(s) **2+5**: Interface of cereal dry farming; and dry-farming: vines.

Rept.: LAP, 1985.
Publ.: Baird 1987:15; 16, Fig. 4; 17.
Dated: Late ECU, with CG, CA, components.
Mat.: PM. LAP. Ceramics: EP diagnostics include RB/B; historical sherds.
Obs.: Surface scatter of approx. 1.3 ha in cultivated land between right bank of Stavros tis Psokas R. and Sarama-Evretou road, ca. 200 S of *Alineri* 1 (#P.114 [P/419]), supra. Not visited, material not seen.

P.117 Annadhiou *Pappares* Alt. Zone **3**: 270 m

P/422 Map: VD572.677 Prec. Zone **5**: 600-700 mm

Climax Veg. Zone(s) **4**: Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **10+11**: Interface of Moni Formation and Kannaviou Formation.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming; and uncultivable land.

Rept.: LAP, 1985.
Publ.: Baird 1987:15; 16, Fig. 4; 17.
Dated: Late SCU.
Mat.: PM. LAP. Ceramics, incl. CB, RW, RW-Cb.
Obs.: Surface scatter of approx. 2000 m2 in cultivated land ca. 400 m ESE of *Gonies* (#P.115 [P/420]), supra. Not visited, material not seen.

P.118 Ayios Dhimitrianos *Platani*

Alt. Zone **5**: 540 m

P/440 Map: ca. VD584.635

Prec. Zone **5**: 600-700 mm

Climax Vegetation Zone(s) **4+5**: Interface of Upland Forest of Aleppo Pine, Hermes Oak, and Wild Olive; and Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and deep Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **10+11**: Interface of Moni Formation and Kannaviou Formation.
Modern Land Use Zone(s) **5**: Dry-farming: vines.

Rept.: CPSP, 1983, as #83-E-103.
Publ.: Rupp (in preparation).
Dated: SCU/Early ECU, with general prehistoric component.
Obs.: Surface scatter of approx. 1 ha on terraced slope between Hill 561 and Ayios Dhimitrianos-Lasa road. Not visited, material not seen.

P.119 Marathounda *Loukkarka* A

Alt. Zone **2**: 128 m

P/441 Map: ca. VD530.472

Prec. Zone **3**: 400-500 mm

Climax Vegetation Zone(s) **5+9**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maritime Scrub Forest of Lentisk and Common Cyprus Juniper, with or without Carob and Wild Olive under localized Aleppo Pine canopy, from sea level to ca. 350 m.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **9+11+34**: Interface of Lefkara Formation; Kannaviou Formation; and Petra tou Romiou/ Marona Formations, Phasoula Lava.
Modern Land Use Zone(s) **5+8**: Interface of dry-farming: vines; and low and dense scrub.

Rept.: CPSP, 1983, as #83-E-20.
Publ.: Rupp (in preparation).
Dated: Early ECU(?), with general prehistoric, LC, and ROM-MOD components.
Obs.: Large (ca. 6 ha) surface scatter and lithic resource/ production area in vineyard, low scrub, and under scattered trees on top and slope of plateau E of Kochatis R. Not visited, material not seen.

P.120 Prastio *Kokkinolaona* A

Alt. Zone **4**: 336 m

P/442 Map: ca. VD714.487

Prec. Zone **5**: 600-700 mm

Climax Vegetation Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **6+12**: Interface of Calcareous Raw Soils; and Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **9+10+36**: Interface of Lefkara Formation; Moni Formation; and Serpentinite, Mamonia Complex.
Modern Land Use Zone(s) **5+8**: Interface of dry-farming: vines; and low and dense scrub.

Rept.: CPSP, 1986, as #86-D-18.
Publ.: Rupp (in preparation).
Dated: Early(?) ECU.
Obs.: Surface scatter of approx. 4,000 m2 in vineyard on top and terraced side of ridge, ca. 300 m WSW of Ayios Savvas tis Karonos Monastery (see #P.57 [P/300], supra). Material not seen.
Visited: (Locality only) 7/17/88.

P.121 Souskiou *Kokkina*

Alt. Zone **3**: 225 m

P/443 Map: ca. VD629.450

Prec. Zone **3**: 400-500 mm

Climax Vegetation Zone(s) **5+8**: Interface of Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex; and Maquis of Carob and Lentisk, replaced below 350 m asl. by Maritime Scrub Forest of Lentisk and Common Cyprus Juniper with or without Carob or Wild Olive under localized Aleppo Pine canopy.
Principal Soil Zone(s) **12**: Silicate Raw Soils on Mamonia rocks.
Geologic Zone(s) **9+10+34**: Interface of Lefkara Formation; Moni Formation; and Petra tou Romiou/ Marona Formations, Phasoula Lava.
Modern Land Use Zone(s) **2+9**: Interface of cereal dry farming; and uncultivable land.
Rept.: CPSP, 1983, as #83-D-41.
Publ.: Rupp (in preparation).
Dated: Early(?) ECU, with MOD component.
Obs.: Surface scatter (incl. recent chert-knapping area) of approx. 2 ha in sloping field. Not visited, material not seen.

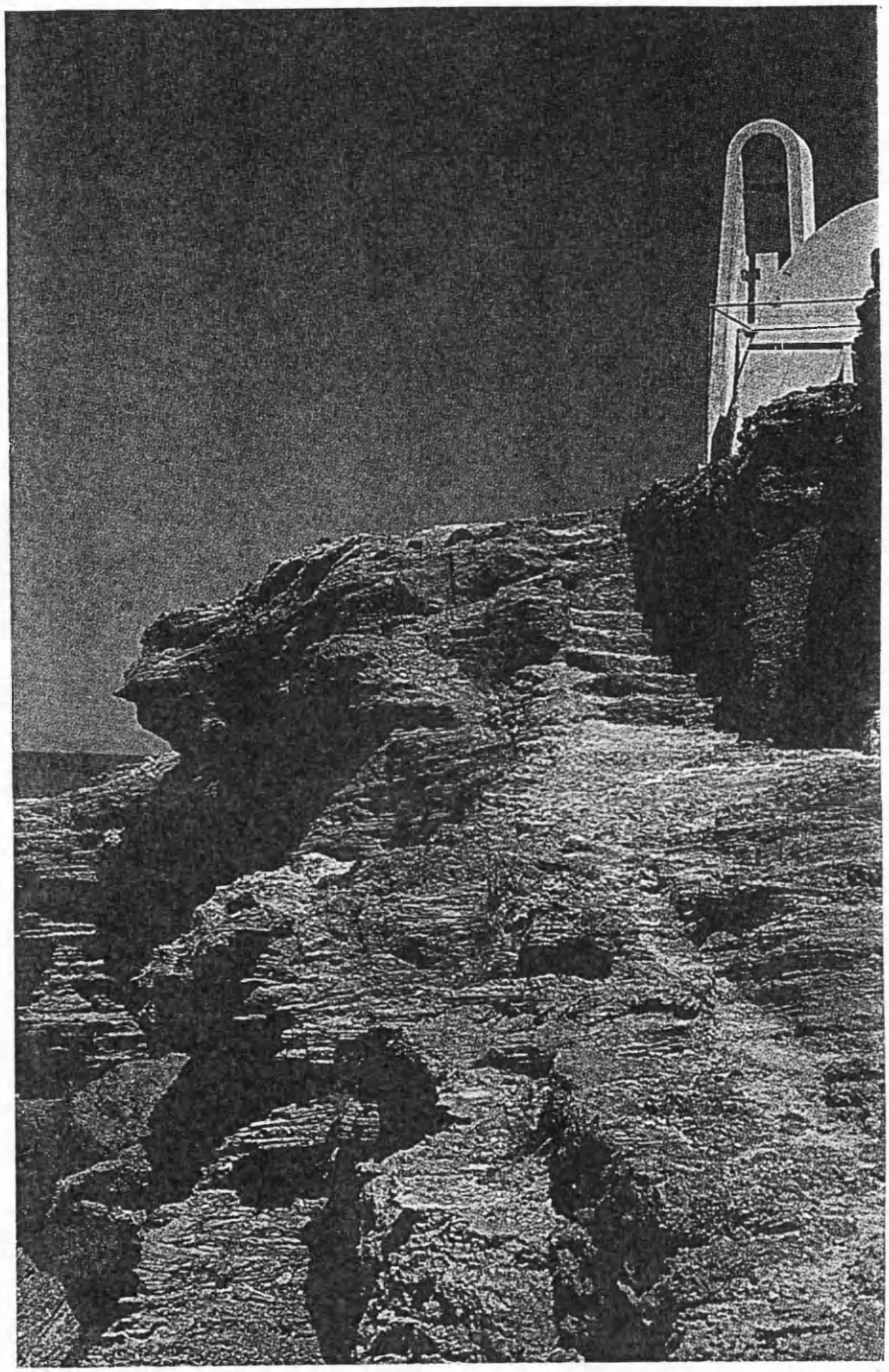
P.122 Timi *Mesokambos* B

Alt. Zone **1**: 35 m

P/444 Map: ca. VD557.426

Prec. Zone **3**: 400-500 mm

Climax Vegetation Zone(s) **5**: Western Upland Forest of Cyprian Oak and Hermes Oak on limestone and Mamonia Complex.
Principal Soil Zone(s) **10**: Alluvial Soils.
Geologic Zone(s) **1+2**: Interface of Alluvium and Terrace Deposits.
Modern Land Use Zone(s) **1+2**: Interface of Irrigated cultivation: vegetables and vines; and cereal dry farming.
Rept.: CPSP, 1983, as #83-E-15.
Publ.: Rupp (in preparation).
Dated: ECU(?), with HEL and MOD components.
Obs.: Large surface scatter of almost 6 ha, incl. lithic resource/ production area, in coastal plain S of Limassol-Paphos highway. Not visited, material not seen.



APPENDIX 2
GAZETTEER OF PLEISTOCENE FOSSIL SITES

1. Introduction:

The current excavations at Akrotiri *Aetokremnos*, on the South Coast of Cyprus, have opened a new window on the island's prehistoric past. While it was long taken as an article of faith that the earliest settlers brought with them all the socio-economic traits of sedentary subsistence agriculturalists, including a number of common Southeast Asian cultivars and animal domesticates, the evidence emerging at Akrotiri strongly suggests a coexistence between initial hunter-gatherer colonists and a remnant population of Pleistocene terrestrial mammals (Held 1989a, 1989b; Reese 1989; Simmons 1988a, 1988b, 1988c, 1989; Simmons et al. 1989; Swiny 1988). Recognition of this biotic overlap of the island's endemic Quaternary fauna and early man has generated new interest among prehistoric archaeologists in paleontological research carried out on Cyprus as well as other Mediterranean islands since the beginning of the century (see Davis 1985; Reese 1975b, 1976; and Sondaar 1977, 1986, 1987, for summary discussions of the issue).

The two salient features of the Quaternary faunal assemblage of Cyprus are a pronounced lack of species diversity and the presence of evolutionary nanism. As both phenomena have already been discussed in the context of island biogeography in **CHAPTER 2**, supra, it suffices to reiterate that they are the reason why Pleistocene fossil sites on the island consist almost exclusively of the remains of two dwarfed terrestrial mammals, the endemic pygmy hippopotamus and the endemic dwarf elephant. Both animals have been the subject of extensive comparative studies by paleontologists, and consequently the official taxonomic identification adopted in this gazetteer is as follows:

a) ***Phanourios minutus*** (Cuvier, 1824). Common Name: Cypriot Pygmy Hippopotamus. Distinguishing Anatomical Features: Extreme lophodonty and brachyodonty of the molars, indicative of lateral chewing motion; absence of permanent upper 4th premolar P4; short metacarpals and phalanges, facilitating anterior-posterior movement indicative of

slow locomotion in rugged terrain; body generally smaller and leaner than the West African hippo, *Hexaprotodon liberiensis*. Principal References: Faure et al. (1983), Houtekamer and Sondaar (1979), Reese (n.d.b).

b) ***Elephas cypriotes*** Bate, 1902. Common Name: Cypriot Dwarf Elephant. Distinguishing Anatomical Features: Dentition (post-cranial remains of this species are scanty). Type Locality: #FOS-06K, Pano Dhikomo *Imbohary* (Kyrenia District, northern Cyprus). Principal References: Bate (1905b), Reese (1988b).

Although largely ignored by archaeologists until the rediscovery of Akrotiri *Aetokremnos* in 1980, paleontological research has produced a respectable body of knowledge about the occurrence and osteology of these mammals. The bulk of past work, however, can be attributed to the sporadic efforts of a few individual scientists since the beginning of the twentieth century. They had to contend with a public predilection for archaeology and with an increasingly practical approach to the earth sciences which stressed hydrology, economic and historical geology, and more recently the investigation of the island's renowned ophiolite complex, which has turned it into a giant field laboratory for plate-tectonics research. Partly because of these developments, and partly because Cyprus lacks the rich records of spectacular skeletal and trace fossils that have helped paleontology to prominence in other parts of the world, much of the Pleistocene fossil material has languished in obscurity, be it in unpublished papers or buried in museum and private collections here and abroad. The present gazetteer is an attempt to correct the imbalance between what has been done and what is known to have been done. As a collation of disparate research efforts, systematic or otherwise, and the results they have produced, its twofold purpose is to serve as an up-to-date reference to primary sources and to lay the groundwork for a comprehensive database of Pleistocene fossil sites.

Detailed summaries of previous work in the field have been provided by Boekschoten and Sondaar (1972), Reese (1974a, 1974b, 1975b, 1976), and Swiny (1988). Thus there is no need to preface the gazetteer with more than a brief outline of past research. The first ossiferous deposits on the island were explored in the late 17th century by a Dutch traveler (van Bruijn 1698) and in the mid-late 19th century by a freewheeling antiquarian and American consul in Larnaca (di Cesnola 1877), who gave interesting though largely impressionistic accounts of their

investigations. The merit of these romantic forays into the Pleistocene past of Cyprus lies mainly in that they seem to have attracted the scientific attention of Bate, a British paleontologist who proceeded to investigate 12 fossil localities (five at Cape Pyla and seven on the S slopes of the Pentadaktylos) over a period of eighteen months in 1901-1902. The results of her campaign, which was funded by the Royal Society, London, were published between 1902 and 1906, and they led to the generic definition of *Hippopotamus minutus* Blainville (now *Phanourios minutus* [Cuvier]) and *Elephas cypriotes* Bate (Bate 1903a, 1903b, 1903c, 1904a, 1904b, 1905a, 1905b, 1906; Forsyth Major 1902). Bate was also the first to note the paucity of mammalian fauna on the island and to provide a detailed inventory of living species (Bate 1903b, cf. Davis 1984a:148, Table 1; 1987:123, Table 5.2; Le Brun et al. 1987:308, Table 1; Spitzenberger 1978, 1979):

1.-7. Seven bat species.

8. One hedgehog species: "*Erinaceus auritus* Gmelin." (=*Hemiechinus auritus dorotheae* [Spitzenberger, 1978], Cypriot Long-Eared Hedgehog.)

9. One shrew species: "*Crocidura russula* Cypria." (=*Crocidura russula gueldenstaedti*/ *Crocidura cypria* Bate, White-Toothed Shrew [cf. Catzeflis et al. 1985].)

10. One fox species: *Vulpes vulpes* Linnaeus.

11. One rat species:"*Mus rattus* Linnaeus" (=*Rattus rattus* Linn., Brown Rat)

12. One mouse species: "*Mus musculus gentilis* Brants." (=*Mus musculus praetextus*, Syrian House Mouse.)

13. One mouse species: "*Acomys nesiotes* Bate." (=*Acomys nesiotes* Bate/ *Acomys dimidiatus*, Spiny Mouse.)

14. One hare species: "*Lepus cyprius* Barrett-Hamilton." (=*Lepus capensis*/ *Lepus europaeus cyprius*, Cypriot Hare.)

15. One wild sheep species: "*Ovis ophion* Blyth." (=*Ovis orientalis ophion*, Cypriot Mouflon [Valdez 1982:80-82].)

To this list, Spitzenberger has recently added one new rat species (*Rattus norvegicus*) and one new genus of shrew (*Suncus etruscus*) (1978), as well as five new bat species (1979), thus increasing the inventory of Recent mammals to 23 if *Dama mesopotamica* is included. On current evidence, the Pleistocene faunal assemblage is even smaller. Besides hippopotamus and elephant, it includes only two bat species as well as two rodents and a shrew, not yet identified at the species level (Boekschoten and Sondaar 1972:332). The murids and the soricid may belong to *Mus musculus*, *Acomys dimidiatus*, and *Crocidura russula*, respectively, or to their

ancestral species (Watson et al. 1977:247). Bate's claim for the presence (presumably contemporary with the hippo occupation) of a wild cat, *Genetta plesictoides*, in one of the hippopotamus caves (Bate 1903c, see #FOS-03K, infra) could not be confirmed through recent fluorine testing of her material. The demonstrable absence from Cyprus of carnivores and other large terrestrial mammals during the Pleistocene would mean that the island's hippopotamus and elephant population was not subject to selective pressures caused by predation and resource competition.

Following her pioneering work on Cyprus, Bate went on to study the Quaternary faunas of Palestine, Crete, and Malta, and for over 50 years there was no one to take up the slack. However, fortuitous discoveries continued to be made. The first modern guide to Cyprus (Gunnis 1936) contained references to four new fossil localities (#FOS-01N, FOS-11K, FOS-17K, and FOS-21F), almost certainly stirring the interest of amateur geologists, fossil hunters, and foreign scholars alike. With hindsight, most of this attention was unwelcome, for it led frequently to the removal of material and its transfer to public and private collections abroad. Until very recently, fossil bones were largely treated as geologic curios, and consequently they did not come under protective legislation of the kind that ensures the survival of archaeological sites.

Meanwhile, the activities of the Geological Survey Department were geared to more pressing matters than the systematic investigation and safeguarding of sites with Pleistocene vertebrate faunal remains. Though the Department employed a paleontologist, A. E. Cockbain, from 1957 to 1959, and maintained contact with A. J. Sutcliffe, Keeper of Paleontology at the British Museum (Natural History) in London, research focused on the biostratigraphy of Tertiary and older formations, and no new sites with Quaternary macrofossils in the sense used here were reported. In 1960-1964 the position of staff paleontologist remained vacant, and rock and fossil samples were routinely sent abroad for analysis — mainly to Cockbain at UBC, Vancouver, E. I. White at the BMNH, London, and S. Moshkovitz at The Hebrew University of Jerusalem. Most of this work was of micropaleontological nature and dealt with the identification of radiolaria and foraminifera; its significance for archaeology lies principally in its contribution to the chronostratigraphy of Pleistocene river and marine terrace deposits.

A Paleontology Section was set up for the Department in 1965 by an American U.N.S.F. expert, C. G. Allen, and staffed with the first Cypriot micropaleontologist, M. Mantis. During the next eleven years, the work of the paleontological laboratory consisted to a large extent of analyses

of borehole samples; yet Mantis, who was a keen collector, not only visited several of the known hippo sites (e.g., #FOS-21F, near Akanthou) but in 1967 also succeeded in locating one of his own where none had ever been found (#FOS-29P, near Kissonerga, SW Cyprus) (Mantis 1967, 1969). At the time, Mantis was apparently unaware that a collection of material from that site had already been donated to the AMNH in 1929 (see below, *SECTION A*).

The study of the fossil mammals of Cyprus received an important boost in 1969, when two Dutch paleontologists, Sondaar and Boekschoten, who had already contributed significantly to the advancement of island paleozoology elsewhere in the Mediterranean, spent three months relocating most of the sites known by then and also discovered a number of new ones, mostly in the north of Cyprus. The results of their fieldwork and anatomical studies of material in European collections were published three years later in a seminal paper (Boekschoten and Sondaar 1972). In it, the authors proposed a new genus for the Cypriot hippopotamus; namely, *Phanourios minor*, after a locality near Ayios Yeoryios (#FOS-16K) which Bate herself had failed to locate even though she had been told of its existence. Sondaar and Boekschoten returned to the Netherlands with a sizeable collection of bones from numerous sites which is now housed in the Institute of Geology of the Rijksuniversiteit at Utrecht.

Much in the same way that the investigations of the two Dutchmen built on Bate's scientific work, so did their article engender further research — this time by Reese, a young paleontology and archaeology student at Harvard University. Following fieldwork in the summers of 1973 and 1974, Reese spent several years tracing elephant and hippo material in foreign collections, for the first time including stateside institutions, and researching comparative material from other Mediterranean islands and Madagascar (Reese 1975b, 1975c, 1976). Unfortunately, almost all of this important work lingers in the obscurity of a series of unpublished papers (Reese 1974a, 1974b, 1974c, 1977, n.d.a, n.d.b, n.d.c, n.d.d). Reese, too, collected ample material at several sites, which is in the Museum of Comparative Zoology, Harvard.

The current phase of research into Pleistocene fossil sites began with the previously mentioned rediscovery of Akrotiri *Aetokremnos* in 1980. Since then, three further sites have been located in western Cyprus (#FOS-30P, FOS-31P, FOS-32P), and although no work is possible in the north of the island, it now appears that the distribution of fossil sites in the south is no less dense and hence that there is scope for further fieldwork. Some of the results of research carried

out during the compilation of the present gazetteer already indicate new evidence which is likely to allow the prediction of potential site locations in the future.

First, the topographic and geologic attributes of the overriding majority of recorded sites bear out a frequent association with aquatic microenvironments at the time of occupation, as well as with the calcarenites of the Pleistocene Athalassa Formation and the two youngest Pleistocene marine terrace deposits (Kyrenia Terrace and Koupia Terrace, or equivalents). As examples of aquatic site locations can be cited ancient littoral or coastal sites which continue to occupy such positions (all sites on the northern and southern seaboards), and former lacustrine and lagoonal sites which have been transformed into inland sites by a combination of recent eustatic and isostatic sea-level changes and climatic deterioration (all sites along the southern flank of the Pentadaktylos) (Ducloz 1968:129-136, 167; 1972:53). Littoral sites along the southern seaboard are almost certainly more abundant than the current picture indicates. However, a systematic search should take into account that the well-preserved sea caves of the Cape Pyla cluster (e.g., #FOS-25R, FOS-27R) possibly represent an atypical occurrence, and that many more ossiferous deposits are likely to exist in the less obtrusive form of erosion surfaces and sections belonging to collapsed caves/ rockshelters and to buried gullies (e.g., #FOS-28S, FOS-29P, FOS-30P).

Second, it now appears that linguistic information can be used to identify potential fossil sites. It has long been known that pygmy hippo bones, which to the untrained eye look deceptively human, have found their way into local lore as the presumed remains of dragons or saints (Reese 1975b, 1976, Sutcliffe 1985:29, 34). Since toponymies often form rich repositories of vernacular myths and rural wisdom, it is surprising that their value as a source of information has never been recognized for fossil sites in the same way as for archaeological sites. Although, as noted in the past (Stanley Price 1979c:86), Cypriot locality names are not always used and spelled consistently, ossiferous exposures are such rare and distinctive features of the village universe that they can be expected to have received unusual, and hence easily recognizable, place names in the days of superstition and tall tales. Thus there are toponyms such as *Dragontovounari* (#FOS-12K), *Spillios tou Dragos* (see comments for #7, *SECTION B*) and *Dhrakontia* (*SECTION B*, #15), whose reference to dragons makes them prime candidates for fossil localities — as a matter of fact, the first of these was confirmed as such in 1969. Potentially more significant, though, is the traditional attribution of fossil bones to a saint or saints by the name of *Phanourios* or various derivatives. *Ayios Phanourios*, as mentioned above, is a rich locality of the pygmy hippopotamus near the village of Ayios Yeoryios on the North Coast. By contrast, the second

fossil site found on the island (#FOS-27R), published by di Cesnola in 1877 as *Spilio Macaria* and by Bate in 1903 etc. as *Haghios Saronda*, is now referred to simply as *Ayii Saranda*, (Forty Saints, whose remains the faunal bones were thought to represent). The last is not a proper saint's name, and this itself is uncommon since religious toponyms almost invariably refer to specific saints (another exception to this rule is *Ayious* in the Vasilikos Valley, see **APPENDIX 1**, #R/059, supra). Even though the connection between the place names of the northern and the southern site is not obvious, it consists of the fact that in both cases the existence of fossil bones caused the localities to be named after an *unspecified* saint or saints. Since 'phanourios' means 'the one who appears/ has appeared,' and as there is no such saint in the Greek orthodox hagiography and no evidence for the use of this name prior to the 17th century (A. Papageorghiou, pers. comm. 1988), it seems probable that *Ayios Phanourios* is not a *proper* name like *Ayios Epiphanios*, whose etymology is evidently biblical, but a *generic* name formerly used to describe localities where ancient and human-looking bones appeared on the surface.

Archival and map research has confirmed that there is a positive correlation between the *Phanourios* toponym and Pleistocene macrofossil sites. The toponym occurs in several variations, which is hardly surprising in light of the pronounced variability of place names in general, mentioned previously. Its closest variant is *Ayios Phanoutis*, but there is also *Ayios Phanenton* and *Ayios Phanentos*, as well as *Ayii Phanendes*, *Ayii Phanentes*, and *Ayii Phanontes*. *Ayii Afentes*, once mentioned in connection with #FOS-29P (*SECTION A*, infra), undoubtedly is a corruption of *Ayii Phanentes*. The reason why the connection between ossiferous localities and these place names was never previously made must be sought once again in the variability of local toponyms. Prior to the commencement of cadastral surveying by the British Administration ca. 1918, toponyms were exclusively oral and could not be verified. This explains why most of Bate's sites have no place names but were merely given such descriptive tags as '3/4 of a mile west of Coutzaventis' (#FOS-08K), 'Western Cave' (#FOS-04K) and 'Dikomo Mandra' (#FOS-03K). The last, for instance, is situated in an area where most of the *mandres* of Dhikomo used to be concentrated, but cadastral information shows that there is a separate toponym for this locality. However, even cadastral plans fall far short of being complete toponymic inventories, due to a directive aimed at preventing their becoming cluttered with an excessive number of place names. As a result, surveyors were encouraged to arbitrarily select a set number of toponyms from exhaustive lists, which had been compiled in the field (and are now in possession of the Dept. of Lands and Surveys, Nicosia), for inclusion on the plans, and many more were thus omitted.

When it was discovered that the locality name of one of the most recently reported bone exposures (#FOS-30P) was *Ayii Phanendes*, a systematic search was begun with the aim of establishing

a) the toponyms of known sites which had previously been reported without proper place names,

b) whether or not reported place names of known sites 'masked' alternative *Ayios Phanourios* or derivative toponyms,

c) the existence of further localities in the island with one of these diagnostic toponyms.

Despite the fact that there is no really complete toponymy available for Cyprus at the time of writing (cf. Christodoulou and Konstantinidis 1987), and even though lack of time prevented a thorough examination of all 800 or so cadastral plans of the island, the preliminary results of these investigations are encouraging. As regards a), it was discovered that one of Bate's Pentadaktylos sites, 'Coutzaventis' (#FOS-08K) is at locality *Ayios Phanoutis*. As for b), a case of multiple toponymy was identified at another recent site, Kissonerga (#FOS-29P), where the name *Ayios Phanentos/ Ayii Phanentes* (or 'Ayii Afentes,' cf. Mantis 1967) was masked by the recently reported names *Klidhotos* (cf. Reese 1974a:7, 1977:8-10, n.d.d:2) and *Kleiotoudhes*. Concerning c), the existence was discovered of a locality named *Ayios Phanenton/ Ayii Phanontes* (alternative name: *Hazireti Omer Tekké*) on a coastal headland N of Ayios Epiktitos, E of Kyrenia. Descriptions of this place, which is the site of a small orthodox church and a mosque, strongly suggest that it features a cave with bone exposures (Goodwin 1984:382, 640; Gunnis 1936:198). Furthermore, it is quite possible that this, rather than Ayios Yeoryios *Ayios Phanourios* (#FOS-16K) near Trimithi, is the provenience of part of Gunther's collection in the BMNH which is said to come from "Vourna, Ayia Phanondas, Kyrenia district," as there is a locality named *Vourna* between the site and Ayios Epiktitos but not in the village lands of either Trimithi or Ayios Yeoryios (cf. Reese 1975a:3, 1977:4, n.d.d:1). Finally, the only other occurrence of the *Ayios Phanourios* toponym in Cyprus was discovered on the northern outskirts of Ayia Triadha, a village near Yialousa on the Karpas panhandle. That region is now inaccessible, and it was not possible to obtain ethnographic information on the origin of this place name, which — not surprisingly — seems to be associated with a small church. But in view of the preceding discussion, it is conceivable that an ossiferous site is present there, too. Particularly interesting in this respect is the find of the distal half of a pygmy hippopotamus metacarpus at the KCU settlement of Rizokarpaso *Cape Andreas Kastros* (see *SECTION B*, #9, infra). Since this bone is in stark

contrast to the remains of domesticates and deer that constitute the faunal assemblage at that site, it has been speculated that it represents a prehistoric collector's item (Cherry 1987:19, Davis 1985:27, 1987:124-125, 1989; Le Brun 1985a:74, Le Brun et al. 1987:308-309). This assumption implies that it would have had to be brought back from one of the Akanthou bone deposits, approximately 85 km WSW of the Cape. Ayia Triadha, on the other hand, is only about 37 km away, which considerably increases the likelihood of discovery in prehistoric times if there were fossil sites in the vicinity. By implication, material from such undiscovered localities on the panhandle may also have found its way to other nearby KCU and SCU settlements like #F/055 and #F/057 (see **APPENDIX 1**, supra).

A similarly strong positive correlation could not be established for fossil sites and toponyms belonging to the 'dragon' category. Although there is currently one confirmed association; i.e., *Dragontovounari* (#FOS-12K), as well as several more likely candidates, the long list of these toponyms provided in *SECTION C*, infra, demonstrates a frequency and geographic range that is almost certainly not indicative of the number and distribution of Pleistocene bone-bearing deposits. Unlike place names of the 'saint' variety (under which *Ayii Saranda* should probably also be subsumed), 'dragon' toponyms occur in every region of the island, from the lowest to the highest elevations and in every imaginable geologic context. This leads to the conclusion that they do not reflect the biogeography of the two Pleistocene mammals under discussion. Instead, they should be regarded as general references to faunal remains, couched in the popular dragon myth and hence often associated with caves, the mythical abode of such beasts. While faunal remains so referred to may be ancient (i.e., fossils), more often than not they belong to recognizably modern domesticates. In short, the crux of the matter is that while toponyms of the 'saint' category represent attempts to establish the identity of unfamiliar bones, those of the 'dragon' variety usually attempt to explain the cause of death of animals in a particular locality. It is only when such toponyms are encountered in the proper geographic and geologic context, possibly supported by other circumstantial evidence, that their predictive value increases and an investigation of the localities involved has a chance of yielding fossil sites. On their own, though, they should not be regarded as diagnostic place names.

In conclusion, the association of the 'Phanourios' toponyms — and, less conclusively, 'Ayii Saranda' — with hippopotamus and elephant remains which has been postulated should allow the prediction of further sites with Pleistocene mammalian fauna in future. It does not mean that

most, or even many, of these sites are bound to have such a place name — the evidence in hand, presented in the gazetteer below, already disproves this. Rather, the premise of the hypothesis formulated here is that only fossil sites were given the name of this saint in the past, and therefore the relevant toponyms are generic in nature and diagnostic of such sites. This can be tested by expanding archival research to cover all of southern Cyprus and by subsequently investigating places located in this way for the presence or absence of ossiferous exposures.

2. Notes on the Entry Format:

a) Site Identification: As in the case of early prehistoric sites (**APPENDIX 1**, supra), a standard system has been adopted, consisting of a catalog number designed to signal the fact that it represents an ossiferous site as opposed to an archaeological site, the name of the village in whose lands the site is found, and a toponym (with or without alternative). Due to the inadequate locational information which characterizes much of the previous fieldwork in this area, as well as the interchangeable use of Cypriot toponyms noted previously, it was unfortunately impossible to establish the precise location of each and every site. Where the data were insufficient toponyms could therefore not be verified, nor could accurate altimetric information be provided.

b) Map References: The current 1:50,000 topographical map series (GSGS 1973) is the sole base map used in the *Gazetteer of Fossil Sites* and in the remainder of this dissertation. As noted in the introduction to **APPENDIX 1**, supra, this map, which has now been in restricted circulation for several years, includes Cadastral Survey references directing the user via cadastral sheets to the 1:5000 topographical map series (TMC 1977) and ultimately to the cadastral plans. The six-digit coordinates are accurate to the nearest 100 meters unless the location of a site was not ascertainable (see above). For complete cartographic information, see **MAP REFERENCES CITED**, infra.

c) Location: A short description of the geographic setting is given. For more details, refer to **Observations**.

d) Site Type: Note the distinction between past and present condition, if applicable.

e) General Geology: A summary listing of principal geologic formations of the area surrounding a site is given. Base Map: GMC 1979.

f) Geologic Association: As precise a description as possible of site geomorphology and lithology, and of the stratigraphic association of the ossiferous deposit(s). Because many

sites included in the Gazetteer could not be visited, information provided under this rubric was frequently extracted from original reports.

g) Original Report: Refers to the year a site was discovered, not to the year of first publication.

h) Excavated: Self-explanatory.

i) References: Primary and pertinent secondary references are provided.

j) Condition: Self-explanatory.

k) Species Identified: Only terrestrial mammals are listed. See Introduction, supra.

l) Cultural Association: This section refers to incidences of bone beds in stratigraphic association with cultural remains, such as artifacts, or otherwise showing signs of contemporaneous human presence (cut marks, burning, etc.).

m) Material: As far as the material from a site could be traced to foreign collections, as complete as possible a list of institutions is provided, including the names of the collectors. Abbreviations are as follows (see also **ABBREVIATIONS** at the beginning of this dissertation):

AMNH	American Museum of Natural History, NYC.
BMNH	British Museum (Natural History), London.
CAARI	Cyprus American Archaeological Research Institute, Nicosia
CM	Cyprus Museum, Nicosia.
CS	Cyprus Survey, Dept. of Antiquities, Nicosia
EM	Episkopi Museum.
GSD	Geological Survey Department, Nicosia.
HLD	Hessisches Landesmuseum Darmstadt (Geologisch-Paläontologische & Mineralogische Abteilung).
HUJ	Dept. of Zoology, The Hebrew University of Jerusalem.
KCM	Kyrenia Castle Museum, Kyrenia (currently inaccessible).
MCZ	Museum of Comparative Zoology, Harvard U., Cambridge, MA.
MNH	Muséum d'Histoire Naturelle, Geneva.
PANS	Philadelphia Academy of Natural Sciences, Philadelphia, PA.
PCG	Natural History Collection, Pancyprian Gymnasium, Nicosia.
UPI	Uppsala Universitet, Paleontologiska Institutionen, Uppsala.

Utrecht Geologisch Instituut, Rijksuniversiteit Utrecht (collections by Sondaar/ Boekschoten and Nienhuis).

n) Observations: Summary remarks by previous workers and the author are provided in order to put the site into perspective. For further information, the reader should consult the primary and secondary sources listed under **References**, supra.

o) **Visited:** Fieldwork was conducted in 1987-1988 with the aim of checking all surviving sites currently accessible. Observations recorded during these visits have been incorporated in the entries. Owing to the continuing division of the island, however, none of the crucial northern localities could be visited.

SECTION A: MAIN ENTRIES:

NICOSIA DISTRICT:

FOS-01N Kythrea *Kephalovrysi* ca. 280 m

Map: WE446.031

Location: Inland, southern slopes of the Pentadaktylos.

Site Type: Open Air (buried deposit).

General Geology: S of site: Kythrea Formation <Middle Miocene> graywacke/ marl/ sandstone/ siltstone/ basal conglomerate, Lapithos Formation <Upper Cretaceous-Eocene> pelagic limestone; N of site: Hilarion Formation <Jurassic-Lower Cretaceous> recrystallized limestone; at site: Terrace deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: Pleistocene basin fill, ca. 8.50 m below surface.

Rept.: R. Gunnis 1934. Three exposed soil profiles reported by G. J. Boekschoten and P. Y. Sondaar, 1969.

Excav.: No.

Refs.: Gunnis 1936:308; Birot and de Vaumas 1962:35, Fig.10d, 36; Ducloz 1968:132-133, 1972:50-51; Boekschoten and Sondaar 1972:319-322, 332; Pl. II:3; Reese 1974a:11, 1977:13, 1988b:3, n.d.c:4; Swiny 1988.

Condition: Eroded; details unknown.

Species Identified: *Elephas* sp. (dwarf elephant), murid mouse (ID not reported), soricid (genus not identified).

Cultural Assn.: None.

Mat.: Utrecht.

Obs.: A single dwarf elephant tooth was found in the early 1930s by Gunnis near the Kephalovrysi spring. More systematic investigations by Boekschoten and Sondaar followed in 1969. Area, now inaccessible, is described as the largest of several Pleistocene basins in the Pentadaktylos that probably contained lakes. A single fragmentary pygmy elephant femur was found embedded in a 2.30-m-thick stratum of brownish gray-white chalk exposed in Profile 1 ("at the right side of the road to Halevga, directly opposite Kephalovrysi"), between -7.40 m and -9.70 m. The same exposures also yielded three of the rare pollen profiles

available for Cyprus (Bottema in Boekschoten and Sondaar 1972:320-322; see Held 1989a: Chpt. 1). This is one of the few fossil sites that have so far not produced any hippopotamus material (cf. Kyrenia, #FOS-18K, and Athna, #FOS-22F, infra).

Visited: No.

FOS-02N Kato Dheftera *Khrysospiliotissa* ca. 270 m

Map: ca. WD834.257

Location: Inland, riverine (?). Southern edge of Mesaoria near Troodos foothills.

Site Type: Open Air.

General Geology: Interface of fanglomerate <Pleistocene> and alluvium <Holocene>.

Geologic Assn.: In graywacke and conglomerate at the base of Ducloz's 'Kakkaristra Formation' (same age as Athalassa Formation).

Rept.: Ch. Ducloz, 1965.

Excav.: No.

Refs.: Ducloz 1965:35; Boekschoten and Sondaar 1972:324-325.

Condition: Unknown.

Species Identified: *Elephas*?/ Whale?

Cultural Assn.: None.

Mat.: MHN.

Obs.: Bones of a large mammal were reported by Ducloz in the mid-1960s and identified by G. de Beaumont as elephant bones. Boekschoten and Sondaar, however, mention a more recent (1971) communication with de Beaumont in which this identification is retracted and linked to another find, described as a whale vertebra, made "in finegrained sandstone, in a cliff on the left bank of the Pedios [sic], north of Kato Dheftera." In light of this aboutface, it would be tempting to pass off all long bones and other post-cranial material from this site as the ribs and other skeletal remains of a whale, were it not for the fact that Ducloz clearly mentions jaw-bone fragments. It is difficult to believe that the latter would have been mistaken for elephant bones if they belonged to a cetacean. Provided that the description of the site is correct, this locality lies in Kato Dheftera, not Aredhiou, lands. In this connection, it is noteworthy that the region between Dheftera and Aredhiou has yielded several whale bones, some housed in the Geologic Survey collection, and one vertebra from "Aredi" (Aredhiou?) presented in 1931 to the Museum for Natural History, Stockholm. Whale bones were also found in the vicinity of Politiko *Ayios Iraklidhios*, not far to the east (C. Xenophontos, pers. comm. 1988), and near Laxia. Also from the area of Aredhiou is a fossilized segment of a shaft bone (to be studied by D. S. Reese) whose original diameter must have been approx. 14 cm and which is in the CM collection (#1952/VI-6/7, R.R.2611). Not visited by Boekschoten and Sondaar.

Visited: No.

KYRENIA DISTRICT:

FOS-03K Kato Dhikomo *Vokolosspilios* ca. 260-300 m

Map: WE29?.03?

Location: Inland, southern slopes of the Pentadaktylos.

Site Type: Cave.

General Geology: Terrace deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: Limestone.

Rept.: D. M. A. Bate, 1902, as Dikomo [sic] *Mandra*.

Excav.: D. M. A. Bate, 1902.

Refs.: Bate 1903c, 1904a:325, 1905b:348, Boekschoten and Sondaar 1972:316-317, 326, 331-332; Reese 1974a:11, 1977:13, 1988b:2.

Condition: Cave entrance collapsed. Used as a *mandra* in historical times, present condition unknown.

Species Identified: *Phanourios minutus*, *Elephas cypriotes*, *Genetta plesictoides*.

Cultural Assn.: None.

Mat.: BMNH. Utrecht. MCZ (Reese Collection). KCM (Lady Loch Collection)? HLD. A. J. Legge Collection, London.

Obs.: On right bank of *Kipourissa* Creek, NNE of Kato Dhikomo. Visited in 1969 by Boekschoten and Sondaar, who identified this cave positively as *Mandres*, one of the principal excavation sites of Bate's campaign. Also visited by Reese in 1973. Cave is reported to measure ca. 14 m (depth) x10 m (height), with clearly visible pick marks and signs of ca. 1.75 m of floor deposit excavated by Bate. Well-preserved hippopotamus bones are reported above the present floor level at the rear of the cave and in a superficial deposit to the left of the entrance, where some specimen were collected by Boekschoten and Sondaar. Along with the hippopotamus remains, Bate reported the occurrence of a carnivore (represented by scant remains), *Genetta plesictoides*, which she associated with the Pleistocene (Bate 1903c). However, this hypothesis was subsequently rejected by Vaufrey (1929) and failed to be confirmed by recent fluorine testing of her material (Boekschoten and Sondaar 1972:332). Area no longer accessible.

Visited: No.

FOS-04K Pano Dhikomo *Onisha tou Paskhali Chiftlik* ca. 300 m

Map: ca. WE28?.05?

Location: Inland, southern slopes of the Pentadaktylos; at the base of a cliff.

Site Type: Past: Cave; Present: Shallow Cave/ Open Air?

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel; Kythrea Formation <Middle Miocene> graywacke/ marl/ sandstone/ siltstone/ basal conglomerate; Hilarion Formation <Jurassic-Lower Cretaceous> recrystallized limestone; Sykhari Formation <Upper Triassic> dolomitic limestone; all occur in the area.

Geologic Assn.: No data.

Rept.: D. M. A. Bate, 1902, as "Western Cave."

Excav.: No.

Refs.: Bate 1904a:325, 1905b:348; Boekschoten and Sondaar 1972:317; Reese 1974a:4-5, 1974c:6-7, 1975b:28, 1976:91-92, 1977:5-6, n.d.d:3-4.

Condition: Unknown (Used as a crypt after Bate's campaign?).

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: BMNH. MCZ (Reese Collection).

Obs.: Not visited by Boekschoten and Sondaar. Bate's notes refer to a single hippopotamus incisor which she removed from a fossiliferous deposit a short distance W of the Chiftlik. This may be Reese's "Suicide Cliff," a small fossiliferous cave he located in the area in 1974, whose entrance had been plastered shut, ostensibly to form a crypt (Reese loc. cit.). Area no longer accessible.

Visited: No.

FOS-05K Pano Dhikomo *Prophitis Elias* ca. 350 m

Map: WE273.054

Location: Inland, southern slopes of the Pentadaktylos.

Site Type: Cave.

General Geology: Hilarion Formation <Jurassic-Lower Cretaceous> recrystallized limestone.

Geologic Assn.: No data.

Rept.: D. M. A. Bate, 1902, as "Haghios Elias."

Excav.: D. M. A. Bate, 1902.

Refs.: Bate 1904a:325, 1905b:348; Boekschoten and Sondaar 1972:309, 317; Reese 1974b:5, 1974c:5, 1975b:27-28, 1976:91, 1977:13.

Condition: Part of cave formerly used as a chapel dedicated to St. Elias. Present condition unknown.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: BMNH (?). CS.738 (collection dated 1958).

Obs.: Approx. 2.25 km NW of Pano Dhikomo. Described by Bate as a small, narrow cave, whose entrance was used as a shrine. Notes mention removal of several hippopotamus teeth and jaw-bone fragments. Not visited by Boekschoten and Sondaar, but relocated in 1973 by Reese, who noted fossil bones in the floor to the right of the entrance (Reese 1975:27, 1976:91). Area no longer accessible.

Visited: No.

FOS-06K Pano Dhikomo *Imbohary* ca. 280 m

Map: WE29?.04?

Location: Inland, southern slopes of the Pentadaktylos.

Site Type: Cave.

General Geology: Interface of Kythrea Formation <Middle Miocene> graywacke/ marl/ sandstone/ siltstone/ basal conglomerate, and Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: No data.

Rept.: D. M. A. Bate, 1902, as "the Elephant Deposit."

Excav.: D. M. A. Bate, 1902.

Refs.: Bate 1904a:325, 1904b, 1905b; Boekschoten and Sondaar 1972:317-318, 331; Pl. VII:4; Reese 1974a:3-4, 1977:4-5, 1988b:1, n.d.c:2-3.

Condition: Cave entrance collapsed, possibly used as *mandra* in recent times; present condition unknown.

Species Identified: *Phanourios minutus*, *Elephas cypriotes*.

Cultural Assn.: None.

Mat.: BMNH.

Obs.: Site is reported by Bate to lie on the NW outskirts of Pano Dhikomo, near a garden named Imbohary (Imboahry?). Cave, ca. 19 m long, with constricted entrance, was investigated by Bate to a max. depth of approx. 1 m, with fossiliferous deposits encountered in floor and in front of entrance. Since all of her Cypriot elephant remains came from this excavation, this constitutes the type site for *Elephas cypriotes*. Dwarf elephant, however, was vastly outnumbered by pygmy hippopotamus in the assemblage. Not visited by Boekschoten and Sondaar; locality only by Reese in 1974. Area no longer accessible.

Visited: No.

FOS-07K Dhikomo *Anoyero* ca. 240-300 m

Map: WE32?.03?

Location: Inland, southern slopes of the Pentadaktylos.

Site Type: Cave.

General Geology: Hilarion Formation <Jurassic-Lower Cretaceous> recrystallized limestone; Sykhari Formation <Upper Triassic> dolomitic limestone; Kythrea Formation <Middle Miocene> graywacke/ marl, sandstone, siltstone, basal conglomerate; Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel; all in general area.

Geologic Assn.: No data.

Rept.: D. M. A. Bate, 1902, as "Anoyero Spelios."

Excav.: D. M. A. Bate, 1902?

Refs.: Bate 1904a:325, 1905b:348; Boekschoten and Sondaar 1972:318.

Condition: Unknown. Area no longer accessible.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: BMNH.

Obs.: Locality said to be near Argaki tou Pikri, ca. 3 km E of Dhikomo. Twin-chambered cave contained a small exposure of fossiliferous deposit in one place. Not visited by Boekschoten and Sondaar or found by Reese.

Visited: No.

FOS-08K Koutsovendis *Ayios Phanoutis* ca. 360 m

Map: WE370.023

Location: Inland, southern slopes of the Pentadaktylos.

Site Type: Past: Cave(?); Present: Open Air.

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel in vicinity of site, underlain and surrounded by Kythrea Formation <Middle Miocene> graywacke/ marl/ sandstone/ siltstone/ basal conglomerate.

Geologic Assn.: Karka Surface <Early Pleistocene> fossil talus/ breccia (see #FOS-10K, infra).

Rept.: D. M. A. Bate, 1902, as "Coutzaventis."

Excav.: D. M. A. Bate, 1902.

Refs.: Bate 1904a:325, 1905b:348; Ducloz 1968:167; Boekschoten and Sondaar 1972:318.

Condition: Destroyed by quarrying in the 1960s. Area no longer accessible.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: BMNH.

Obs.: Site formerly next to road to Vouno, ca. 1.2 km W of Koutsovendis, although Bate, somewhat ambiguously, reported it to be on the road to Kythrea, thus implying a location E of Koutsovendis. Bate collected several hippopotamus teeth and mandible fragments from two vertical exposures thought to represent the walls of a collapsed cave. Visited by Boekschoten and Sondaar.

Visited: No.

FOS-09K Koutsovendis *Asproyi* ca. 400 m

Map: ca. WE395.030

Location: Inland, southern slopes of Pentadaktylos.

Site Type: Cave.

General Geology: Kythrea Formation <Middle Miocene> graywacke/ marl/ sandstone/ siltstone/ basal conglomerate; N of site: Sykhari Formation <Upper Triassic> dolomitic limestone.

Geologic Assn.: Limestone.

Rept.: G. J. Boekschoten and P. Y. Sondaar, 1969, as *Asprogea*.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:318; Reese 1974a:12, 1977:14, n.d.d:4.

Condition: Formerly used as *mandra*; now destroyed.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: Utrecht.

Obs.: One of several small caves ca. 1.2 km E of Koutsovendis, N of road to Kythrea, probably quite close to #FOS-08K, supra. The description of this location also fits Bate's Koutsovendis site, even though Boekschoten and Sondaar's report leaves no doubt that the two sites are separate. Well-preserved hippopotamus bones among limestone fragments on cave bottom. Reese (loc. cit.) reported site destroyed by quarrying in early 1973. Area no longer accessible.

Visited: No.

FOS-10K Koutsovendis *Ayios Khrysostomos* ca. 420 m

Map: WE38?.03?

Location: Inland, southern slopes of Pentadaktylos.

Site Type: Cave.

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel, Ardana-Kalogrea Formation <Oligocene-Lower Miocene> breccia marl/ grit/ graywacke/ chalky marl, Hilarion Formation <Jurassic-Lower Cretaceous> recrystallized limestone; all in general area.

Geologic Assn.: Fossil talus consisting of angular fragments of marbles and dolomitic limestones cemented by a fine-grained pinkish matrix (Ducloz 1964:63).

Rept.: D. M. A. Bate, 1901, as "Haghios Chrysostomos."

Excav.: D. M. A. Bate, 1901.

Refs.: Forsyth Major 1902:107; Bate 1903c:121, 1904a:325, 1905b:348, 1906: 242; Woodward 1903:244; Vaufrey 1929:183; Ducloz 1964:63, 1968:166-167, 1972:53; Boekschoten and Sondaar 1972:318; Reese 1974b:1-2, 1974c:1-2, 1975b:26, 1976:89; Sondaar and Braber 1988:7-8; Swiny 1988.

Condition: Unknown.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: BMNH. PCG.

Obs.: Reports of fossil bones by van Bruijn (1698), Bergeat (1892:178-179), and Bate (loc. cit.), make this the earliest documented fossil locality in the island and may refer to the same or several fossiliferous caves in the vicinity of the Ayios Khrysostomos chapel, N of Koutsovendis. Bergeat reported a bone deposit 6 m long and 2 m deep W of the monastery, but none of these localities could be retraced by Ducloz in the mid-1960s or by Boekschoten and Sondaar in 1969. Material in the Natural Science Collection of the Pancyprian Gymnasium, Nicosia, shows signs of an extremely hard matrix, and this observation was confirmed by a recent visitor of the site (D. Kypris, pers. comm. 1988). According to Ducloz's chronostratigraphy for the region, the cave lies in an Early Pleistocene fossil talus that coats the southern escarpment of the Pentadaktylos and is associated with the so-called Karka Surface. Area no longer accessible.

Visited: No.

FOS-11K Ayia Irini *Pervolia* N ca. 60 m

Map: ca. VE966.065

Location: Coastal, approx. 2 km E of Morphou Bay.

Site Type: Past: Rockshelter? Present: Open Air.

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: Bone breccia between lower and middle of three strata of calcarenite.

Rept.: R. Gunnis, 1930, as "Ayia Irini."

Excav.: No.

Refs.: Gunnis 1936:189; Ingham 1959:7; Moore 1960:53; Ducloz 1964:, 1968:150-151, 1972:64; Boekschoten and Sondaar 1972:311, Fig. 2; 313; Reese 1974a:11, 1977:3, 1988b:3.

Condition: Eroded. Easy access.

Species Identified: *Phanourios minutus*, *Elephas* sp.

Cultural Assn.: None.

Mat.: Utrecht. BMNH (Gunther Collection, Sutcliffe Collection)? PCG.

Obs.: Boekschoten and Sondaar's description of this site fits a location on the N bank of the Palaeokastro Creek, approx. 1 km due N of Ayia Irini, but actually the locality lies on the N scarp of a large gully which skirts the N and W edges of the village. Because of its proximity to a settlement, the site began to attract visitors after being mentioned by Gunnis (1936). One of them was A. J. Sutcliffe, who examined it in 1958 (Ingham 1959:7). Brecciated hippopotamus bones are said to be exposed discontinuously over a length of approx. 30 m at the interface of a basal stratum of hard calcarenite and an intermediate, mollusc-bearing and hence probably marine, stratum of loose calcarenite that is said to form a very soft, sandy matrix (M. Christodoulou, D. Kypris, pers. comm. 1988). These two strata are capped by a 2-m thick, non-fossiliferous, stratum of calcarenite which may represent the roof of a former rockshelter. Although the stratification of these deposits is better documented than for most other fossil sites, the account of the two Dutch paleontologists is too equivocal to reconstruct a precise stratigraphy and date the bone breccia. One possible interpretation is that the uppermost stratum of calcarenite corresponds to the Ayios Epiktitos Terrace, which occurs at the same height as the site; i.e., 50 m asl, and has been dated to the early Mindel-Riss Interglacial/ Interpluvial of the Middle Pleistocene, ca. 300,000 BP (Ducloz 1968). In fact, Ducloz (loc. cit.) assigns the entire terrace deposit around Ayia Irini to his Ayios Epiktitos Formation. If, as Boekschoten and Sondaar have suggested, this capping formed the roof of a rockshelter used by the hippopotami, it would provide a terminus post quem for the occupation of the site and lead to the tentative conclusion that the fossils date from somewhere between the Middle Pleistocene and the deposition of the middle layer of foraminiferous calcarenite that covers them. Apart from the age of the different strata, the fact that the middle layer seems to have formed under marine conditions indicates that when the site was occupied it lay much closer to the shore than at present. An elephant vertebra was collected at this site by J. A. J. H. Nienhuis in 1971, while Boekschoten and Sondaar found only hippopotamus remains. Material in the British Museum (Natural History) presented by C. G. Gunther in 1919 (#M11754) (Reese 1974a:1-3, 1977:3-4, n.d.d:1) may have originated on this site, as may material in the Natural History Collection of the Pancyprian Gymnasium, labeled 'Ayia Irini.' By contrast, material given to the Cyprus Museum by Col. McIves Smith in 1937 (#CM.1937/V-27/4) and accessioned as 'pygmy hippopotamus bones' was found on examination to consist of several vertebrae and the mandibular ramus of a cetacean. Area no longer accessible.

Visited: No.

FOS-12K Ayia Irini *Dragontovounari* 22 m

Map: ca. VE942.116

Location: Littoral, on slope below a cliff; N shore of Morphou Bay.

Site Type: Past: Rockshelter; Present: Open Air.

General Geology: Athalassa Formation <Lower Pleistocene> biocalcarenite/ sand/ sandy marl.

Geologic Assn.: Athalassa Formation biocalcarenite.

Rept.: G. J. Boekschoten and P. Y. Sondaar, 1969.

Excav.: No.

Refs.: Boekschoten and Sondaar 1969:313-314; Reese 1974a:10-11, 1974b:5, 1974c:10, 1975b:28, 1976:91, 1977:3-4, 12-13, 1988b:4, n.d.c; Swiny 1988.

Condition: Unknown, yet reports describe an exposed littoral situation, from which can be inferred that the site is likely to have suffered at least some erosion through wind action and meteoric water. Easy access.

Species Identified: *Phanourios minutus*, *Elephas cypriotes*.

Cultural Assn.: None.

Mat.: Utrecht. MCZ (Reese Collection). BMNH (Gunnis Collection, #M13382, M13383).

Obs.: Site lies approximately 175 m inland of present shore at the foot of a SW-facing, 3-m-high cliff of hard biocalcarenite which crests a terraced slope. Quantities of hippopotamus remains were reported in an 11-m-long exposure of bone breccia and in loose chunks of breccia on slope immediately below. The information concerning the matrix is contradictory; it has been described as hard as well as soft. Boekschoten and Sondaar's contention that the site represents a former rockshelter cut into an ancient cliff face is supported by a slope profile (Boekschoten and Sondaar 1969:311, Fig. 3) which shows the presence of three marine terraces. The uppermost of these, forming the biocalcarenite roof of the hypothetical shelter, possibly represents the basal remnant of the Middle Pleistocene Ayios Epiktitos Terrace and, in lithological terms, may be attributed to the Athalassa Formation. The height of the middle terrace, 20 m asl, suggests that it corresponds to the Kyrenia Terrace, which became continental during the early Riss-Würm Interglacial/ Interpluvial (early Late Pleistocene), ca. 120,000 BP (Ducloz 1968), when the sea level is assumed to have dropped to +15 m. Since the fossiliferous deposit is located at the rear of this terrace, the date of its emergence provides a terminus post quem for the occupation of the site. The surface and cliff-face of the youngest marine terrace, the Koupia Terrace, are not readily apparent on the published slope profile, probably because these features have been obscured by recent colluvial and eolian deposits. Further material representing a minimum of 21 hippopotami was collected at the site in 1973 by Reese, including an elephant molar (Reese, loc. cit.) and 2 *Monodonta* and 2 *Patella* shells, and it is possible that some of Gunther's collection comes from this site instead of #FOS-11K, supra. Area no longer accessible.

Visited: No.

FOS-13K Kormakiti *Krommyon/Lighthouse* ca. 10 m

Map: VE929.17?

Location: Littoral, Cape Kormakiti.

Site Type: Cave.

General Geology: Alluvium <Holocene> silt/ sand/ gravel on tip of cape; Athalassa Formation <Lower Pleistocene> biocalcarenite/ sand/ sandy marl further inland.

Geologic Assn.: No data, but the general geology of the area is such that any fossiliferous cave must be cut into Athalassa biocalcarenite.

Rept.: G. Säve-Söderberg, 1930.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:314.

Condition: Unknown.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: UPI (mandibular and other cranial material, teeth, postcranial bones).

Obs.: Fossiliferous cave on N side of Cape Kormakiti, near lighthouse. Area visited by Reese in 1973 but not by Boekschoten and Sondaar. Area no longer accessible.

Visited: No.

FOS-14K Liveras *Mandres Virilas* 10-40 m

Map: VE95?.16?

Location: Littoral? North Coast.

Site Type: Cave.

General Geology: Athalassa Formation <Lower Pleistocene> biocalcarenite/ sand/ sandy marl.

Geologic Assn.: No data, presumably cut into Athalassa biocalcarenite.

Rept.: J. A. J. H. Nienhuis, 1971.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:314, 331-332; Reese 1974a:11, 1974c:11, 1977:13, 1988b:3, n.d.b:33.

Condition: Unknown. Used as a *mandra* in recent times.

Species Identified: *Phanourios minutus*, *Elephas* sp., murid mouse (ID not reported).

Cultural Assn.: None.

Mat.: Utrecht. MCZ (Reese Collection).

Obs.: Report mentions a large fossiliferous deposit at an unspecified locality N of the village, which would place it close to the sea. Quantities of hippopotamus remains and an elephant vertebra were collected by Nienhuis, who discovered the site, in the early 1970s and are now housed in Utrecht. Reese, who visited the site in 1973, detected evidence of water-sorting of the bones, which included two superimposed hippopotamus crania in the rear of the cave and were otherwise found to be well preserved (Reese n.d.b:33). Cf. *SECTION B*, #6, infra. Area no longer accessible.

Visited: No.

FOS-15K Liveras *Mandres Istavri* 10-40 m

Map: VE95?.16?

Location: Littoral? North Coast.

Site Type: Cave.

General Geology: Athalassa Formation <Lower Pleistocene> biocalcarenite/ sand/ sandy marl.

Geologic Assn.: No data.

Rept.: J. A. J. H. Nienhuis, 1971.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:314; Reese 1974c:11, n.d.b:33.

Condition: Unknown. Used as a *mandra* in recent times.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: Utrecht. MCZ (Reese Collection).

Obs.: The second Liveras site reported by Nienhuis in the early 1970s. That it is separate from #FOS-14K, supra, is quite clear from the brief reference which puts it ca. 100 m E of the former cave. Only a small number of fossil bones seems to have been observed at this site. Reese, who visited the site in 1973, detected evidence of water-sorting of the bones, which were otherwise found to be well preserved (Reese n.d.b:33). Area no longer accessible.

Visited: No.

FOS-16K Ayios Yeoryios *Ayios Phanourios* ca. 6 m

Map: WE239.119

Location: Littoral, North Coast.

Site Type: Open Air.

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: In laminated marine foraminiferous calcarenite on top of Koupia Terrace.

Rept.: D. M. A. Bate, 1902, re-reported R. Gunnis, 1930.

Excav.: No.

Refs.: Gunnis 1936:211-212; Knup in Ducloz 1968:156; Boekschoten and Sondaar 1972:314-315; Thurston 1971:170; Reese 1974a:11, 1974b:4-5, 1974c:5-6, 1975b:27, 1976:90-91, 1977:13, 1988b:3, n.d.c:4; Swiny 1988.

Condition: Visible bone beds show few signs of erosion. Easy access.

Species Identified: *Phanourios minutus*, *Elephas cypriotes*.

Cultural Assn.: None.

Mat.: No controlled collection.

Obs.: The site, which was reported to but not found by Bate during her campaign, lies a few meters above the sea below the modern chapel of Ayios Phanourios, a short distance NW of Ayios Yeoryios village. Fossil bones occur in patchy exposures over at least 10 m on a ledge which represents the top of the +5 m Koupia Terrace, corresponding to the late Riss-Würm Interglacial/Interpluvial. This association indicates a middle Late Pleistocene (ca. 80,000 BP) terminus post quem for the occupation of the site. Numerous hippopotamus bones have been observed, including mandibles, ribs, and longbones; as well as two elephant molars. Boekschoten and Sondaar, who were the first to provide an accurate description of the site, postulate that the stratigraphic context precludes the existence of a rockshelter, proposing instead that the bone material was deposited in an ancient creek bed. Area no longer accessible.

Visited: No.

FOS-17K Ayios Yeoryios *Trashas* ca. 10 m

Map: WE235.120

Location: Littoral, North Coast.

Site Type: No data.

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: No data.

Rept.: G. Säve-Söderberg, 1930.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:315; Reese 1988b:2.

Condition: Unknown.

Species Identified: *Elephas* sp.

Cultural Assn.: None.

Mat.: UPI. Several molar frags., #PMU M4570, M4571, M4750, M4751.

Obs.: Boekschoten and Sondaar mention the existence in a Swedish collection of a single, fragmented elephant molar from Trasha. Trashas Point is located approx. 400 m W of the Phanourios chapel (#FOS-16K, supra), and it is possible that this specimen comes from a second site in the vicinity of Ayios Yeoryios. Area no longer accessible.

Visited: No.

FOS-18K Kyrenia *Athkiaephendis* ca. 25m

Map: WE271.109

Location: Coastal, North Coast on Kyrenia Terrace.

Site Type: Past: No data; Present: Open Air (well).

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: Chalky-marly gravels of the Kyrenia Formation.

Rept.: C. Nicolaou for DAC, 1961.

Excav.: No.

Refs.: Bear 1962:8, Held 1989b, Reese 1977:13, 1988b:3.

Condition: Unknown.

Species Identified: *Elephas* sp.

Cultural Assn.: None.

Mat.: CM?/GSD?

Obs.: Site lies ca. 1.6 km W of Kyrenia immediately S of the coastal road and a short distance S of the Glykiotissa church, outside the W wall of a pump room belonging to the Severis carob stores. A single elephant tooth was found on the bottom of a 20 m deep well during cleaning, handed in to the Kyrenia Castle Museum by C. Nicolaou and soon afterwards delivered to the CM in Nicosia (Y. Cleanthis, pers. comm. 1988). No other faunal remains were observed in the well. This find was subsequently published as "...part of a cheek-tooth of a pygmy elephant (*Palaeoloxodon cypriotes* Bate) [which] was found in a well near Kyrenia." (Bear 1962:8.) To whom we owe the identification of this elephant molar is difficult to ascertain, since the Geological Survey was without resident paleontologist in 1961; possibly it was sent to either E. I. White at the BMNH, London, or A.E. Cockbain at the University of British Columbia, Vancouver. In either case it would have been returned to Cyprus, for it was last seen in the CM collection by its discoverer in 1965 (C. Nicolaou, pers. comm. 1988). Current efforts to establish its whereabouts, however, have so far remained unsuccessful since neither CM nor CS records show a relevant entry. The failure to relocate the Kyrenia molar (described as being ca. 18 cm in length and 14 cm high) is particularly regrettable in light of its unusual size and deep stratigraphic association, near the basal, *Strombus*-bearing marine deposits of the Kyrenia Terrace formation (Ducloz 1968:153-154, 1972:66-67) which may predate the Koupia-Terrace fossil exposure at nearby Ayios Yeoryios *Ayios Phanourios* by 30,000 years or more. Thus there is slender yet compatible phylogenetic and geochronological evidence suggesting that the Kyrenia molar may represent a species ancestral to the dwarfed *Elephas cypriotes*, similar to the remains from Athna and Xylophagou (#FOS-22F, *SECTION B*, #14, infra). Area no longer accessible.

Visited: No.

FOS-19K Trapeza ca. 200 m?

Map: WE42?.07?

Location: Coastal, northern slopes of Pentadaktylos.

Site Type: Cave.

General Geology: Ardana-Kalogrea Formation <Oligocene-Lower Miocene> breccia marl/ grit/ graywacke/ chalky marl above village, Kythrea Formation <Middle Miocene> graywacke/ marl/ sandstone/ siltstone/ basal conglomerate E, W, and S of village; Terrace Deposit <Pleistocene> calcarenite/sand/gravel in lower coastal plain N of village.

Geologic Assn.: No data.

Rept.: D. M. A. Bate, 1901/2.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:316.

Condition: Unknown.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: BMNH.

Obs.: Bate obtained a collection of hippopotamus bones from the villagers of Trapeza, E of Kyrenia, yet failed to establish their provenience or confirm the existence of a fossil site in the area. Boekschoten and Sondaar note that the bones delivered to Bate can no longer be identified among the Kyrenia Range material in the British Museum (Natural History). Area no longer accessible.

Visited: No.

FAMAGUSTA DISTRICT:

FOS-21F Akanthou *Arkhangelos Mikhail/Argakin tou Stalou* 14 m

Map: WE666.173

Location: Littoral, North Coast.

Site Type: Open Air.

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: Foraminiferous calcarenite, probably representing the eroded edge of the Kyrenia Terrace.

Rept.: R. Gunnis, 1930, as "Akanthou."

Excav.: No.

Refs.: Gunnis 1936:150; Knup in Ducloz 1968:156; Boekschoten and Sondaar 1972:312, Fig. 5; 315, 331; Plate I:2, Plate II:1, Plate III:1/2/4, Plate IV:3; Reese 1974a:11, 1977:6-8, Figs. 2-4; 1988b:3; n.d.c:4; Faure et al. 1983:183, Figs. 2, 6, 9, 18.

Condition: Unknown, yet reports describe an exposed littoral situation, from which can be inferred that the site is likely to have suffered at least some erosion through wind action and meteoric water. Easy access.

Species Identified: *Phanourios minutus*, *Elephas cypriotes*.

Cultural Assn.: None.

Mat.: Utrecht. HUJ (Haas Collection).

Obs.: Available descriptions of this site fit a locality on the N bank of the Stalos Creek, approx. 0.8 km SW of the Arkhangelos Mikhail chapel and ca. 70 m inland from the shore. Boekschoten and Sondaar have reported a fossil-rich bone bed ca. 20 m long and 0.75 m thick, containing quantities of hippopotamus remains and an elephant premolar or lower first molar. This stratum, which appears to have formed in an ancient gully, consists of fairly soft, fine-grained calcarenite and is overlain by a calcarenite/ sand beach deposit ca. 3 m thick. Under the bonebed is a stratum of laminated shelly calcarenite which may represent the dip surface of the Kyrenia Terrace. This correlation is not contradicted by the fact that at +14 m asl the site is considerably lower than the +20-25 m elevation of this

terrace in Ducloz's typical Klepini sequence (Ducloz 1968), because other researchers have noted that as a result of differential post-orogenic uplift, the heights of the younger marine terraces decline towards the Karpas panhandle, where the Kyrenia Terrace corresponds to the 12-m contour (Dreghorn 1978:32, 211-212). It is therefore reasonable to postulate a terminus post quem for the occupation of this site that corresponds to the age of this terrace; i.e., the early Riss-Würm Interglacial/Interpluvial of the early Late Pleistocene, ca. 120,000 BP. Some material collected by G. Haas for The Hebrew University of Jerusalem in 1950. Not visited by Reese. Area no longer accessible.

Visited: No.

FOS-21F Akanthou *Vourna* 15 m

Map: WE698.188

Location: Coastal, North Coast.

Site Type: Cave.

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: No data, possibly same as #FOS-21F, supra.

Rept.: R. A. Reyment, 1971, as *Afrodision*.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:315-316, Held 1989b, Reese 1974a:5-7, 11; 1974b:6-7, 1977:6-8, 13, Figs. 2-4; 1988b:3; n.d.c:4; Swiny 1988.

Condition: Part of roof collapsed. Used as a *mandra* in recent times.

Species Identified: *Phanourios minutus*, *Elephas cypriotes*.

Cultural Assn.: Possible, but remains to be verified. D. S. Reese (1974a:7, cf. 1977:8) reported chipped stone tools "in *poor* association (though *certainly* associated)" with fossil bones in superficial levels (emphasis added). See APPENDIX 1, #F.48 (F/376), supra).

Mat.: UPI? MCZ (Reese Collection, Gardiner Collection?). GSD (Mantis Collection).

Obs.: Reyment observed bone breccia just outside the cave, to the right of the entrance. Reese (1974a:6-7, 1977:8) has commented on marked differences in the degree of permineralization of the bones, based on his observation of in situ material. Efforts to establish precise location of this site met with little success until recently, and there was some confusion between it and #FOS-20F, supra. Boekschoten and Sondaar's report clearly puts this site *west* of the village of Akanthou, whereas #FOS-20F and any other littoral site would have to be described as being *north*, *northwest*, or *northeast* of it. Any site accurately referred to as 'west' of the village could be expected to lie some distance from the shore, a conclusion supported by the description of the locality as being ca. 300 m up (i.e., inland) from the top of the coastal slope (Boekschoten and Sondaar 1972:315). A western location is, however, contradicted by the statement that the site is adjacent to *Aphrodision/ Neraidhes*, a fairly large locality due N of Akanthou near the sea. Nevertheless, the physical characteristics of this site (a cave) are clearly distinct from those of the preceding entry (an open-air gully), leaving little doubt that two entirely separate fossil occurrences have been recorded in the vicinity of Akanthou. The same conclusion was reached by Reese, who in 1973 paid several visits to the cave site ('Afrodision') but did not relocate the littoral site ('Akanthou') (Reese 1974a:5-6, 1977:7). Unlike Reese, however, the present author is inclined to believe, as did Boekschoten and Sondaar, that Gunnis's (1936:150) mention of a fossil site at "Akanthou" in fact refers to the Stalos Creek site on the coast and not to the cave site. In 1988 the author and D. S. Reese finally succeeded in establishing the precise location of the latter with the help of a former inhabitant of Akanthou. Contrary to Reyment's directions (Boekschoten and Sondaar, loc. cit.), it is to be found in a gully formed by a stream *northeast* of the village (i.e., *east* of

Afrodision), ca. 200 m inland from the coast. Therefore it lies ca. 1.2 km E of the aceramic site at *Arkosyko* (**APPENDIX 1**, #F/050, see below) and approx. 0.8 km SW of the Ayios Mikhalos chapel. Situated in the W scarp of the gully, the cave lies in Plot #26 (Cad. Plan #VI:45 E.1). In summary, the *Afrodision/Neraidhes* locality and the KCU site at *Arkosyko* are situated *between* the two Akanthou fossil sites. It is possible that the publication of Gunnis's book alerted J. S. Gardiner to the presence of fossil deposits near Akanthou, who in late 1937 or 1938 collected material from the cave site rather than the Stalos Creek site (Reese 1974a:6). This material is now in the Museum of Comparative Zoology, Harvard, as are specimens collected by Reese in 1973. The latter also cites the fragment of an elephant molar collected in 1973 by M. Mantis for the Geological Survey Department, Cyprus (Reese 1974a:11, n.d.c:4), as well as his fortuitous discovery in the same year of an upper canine and three incisors (all polished) in a store in Famagusta, said to come from this site (Reese 1974b:6-7). Besides the elephant molar fragment, the material collected by Mantis (now in the GSD) consists of hippopotamus remains (1 proximal scapula, 1 proximal radius, and 1 unfused metapodial [identification by D. S. Reese, August 1988]). In summary, the occurrence of these stray finds, as well as ethnographic analogy with other villages with fossil sites on the island, strongly suggest that the existence of the cave deposit was locally known long before Rayment's 1971 report. As a matter of fact, such knowledge seems to date back to early prehistoric times, for Stanley Price collected a hitherto unreported fossil bone on the surface of the nearby KCU site of *Arkosyko* (see above) and a hippopotamus metacarpal has been identified in the faunal assemblage of the KCU settlement at Rizokarpaso *Cape Andreas Kastros* (**APPENDIX 1**, #F/056) (see *SECTION B*, infra). The *Arkosyko* fossil bone consists of a completely permineralized, modified, shaft bone fragment possibly belonging to a Pleistocene mammal and likely to have been collected by the site's KCU occupants at *Vourna*. The fragment represents a ca. 1/3- segment of original limb bone, measuring 85 mm long, 15 mm (max.) thick, and 36.5 mm along the chord, with a man-made groove 29 mm from one end. Although species identification is impossible, the size of the original bone is possibly too large for a pygmy hippopotamus and may therefore belong to a dwarf elephant (D. S. Reese, pers. comm. 1988). Area no longer accessible.

Visited: No.

FOS-22F Athna ca. 45 m

Map: WD71?.79?

Location: Inland, ca. 13.5 km NW of Cape Pyla.

Site Type: Open Air?

General Geology: Athalassa Formation <Lower Pleistocene> biocalcarenite/ sand/ sandy marl, near village, surrounded by Fanglomerate <Pleistocene> gravels/ sands/ silts.

Geologic Assn.: No data.

Rept.: G. J. Boekschoten and P. Y. Sondaar, 1969.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:321, 331-332; Plate VII:5, Reese 1974a:9-10, 1977:11-12, 1988b:2; n.d.c:3-4.

Condition: Unknown.

Species Identified: *Elephas* sp.

Cultural Assn.: None.

Mat.: BMNH.

Obs.: Seven molar frags. sold by G. B. Palma to the British Museum (Natural History) in 1925 are said to come from this village. Ethnographic information gathered by Reese in 1973 indicated the existence of a fossil deposit in a field near the village,

found accidentally at a depth of ca. 10-13 m by villagers digging a well in the 1920s (Reese 1974a:9-10, n.d.c:3-4). Interestingly, the Athna elephant molars (#M12609-12612) are larger than molars of *Elephas cypriotes* and hence seem to indicate the presence of a yet unidentified larger dwarf elephant in the fossil record of Cyprus (Boekschoten and Sondaar 1972:331-332, see remarks for #FOS-18K, supra, and *SECTION B*, #14, infra). It is probable, though by no means certain, that the teeth presented to the British Museum come from the site later reported to Reese, which was said to contain ample post-cranial material as well. Whether or not hippopotamus remains were among the bones discovered by the locals has not been established, yet in light of the usual preponderance of hippopotamus over elephant in the Cypriot assemblages, this may well have been the case. However, if the elephant remains represented an early stage in the evolution of *Elephas cypriotes* they could not possibly be associated with *Phanourios minutus*, so that any hippopotamus remains from the site could be expected to differ phylogenetically from the latter species. Area no longer accessible.

Visited: No.

LARNACA DISTRICT:

FOS-23R Xylophagou *Spilia tou Kokkinokremmou* 1 m

Map: WD770.681

Location: Littoral, in sea cliff; Cape Pyla.

Site Type: Cave.

General Geology: Koronia Formation <late Middle-Upper Miocene> reefs/ bioherms/ biostroms.

Geologic Assn.: Kyrenia Terrace reef limestone.

Rept.: D. M. A. Bate, 1901, as Red Cliff Cave.

Excav.: D. M. A. Bate, 1901.

Refs.: Bate 1904a:324, 1905b:347; Boekschoten and Sondaar 1972:323-324; Reese 1974a:8-9, Fig. 1; 1974b:3; 1977:10-11; n.d.d.

Condition: Some sea-water erosion.

Species Identified: *Phanourios minutus*, two bat species.

Cultural Assn.: None.

Mat.: BMNH, Utrecht.

Obs.: The first cave (from W to E) in the Cape Pyla Cluster. Existence of brecciated bone deposit on cave bottom was first reported by Bate and confirmed 68 years later by Boekschoten and Sondaar, who collected some hippopotamus remains. These authors cite evidence for the submergence of the cave after the deposition of the bones (Boekschoten and Sondaar 1972:324); however, their correlation of this transgression with the formation of the marine terrace above the cave requires re-examination. At an elevation of +15 m, this terrace probably represents the Kyrenia Terrace on the Southern Seaboard (Pantazis 1967) and can thus be dated to the early Riss-Würm Interglacial/Interpluvial of the early Late Pleistocene, ca. 120,000 BP. Since the Pleistocene marine terraces of Cyprus are the result of post-orogenic uplift and not of eustatic sea-level change, the cave could only have been occupied after the emergence of the terrace above it, so that the latter provides not a terminus ante quem but a terminus post quem for the site. Considering that the cave is now only a few feet above sea level, it is likely to have been affected by short-term Quaternary oscillations following the deposition of the bone breccia.

Visited: No.

FOS-24R Xylophagou *Mavrospilia* ca. 5 m

Map: WD781.674

Location: Littoral, in sea cliff; Cape Pyla.

Site Type: Cave.

General Geology: Koronia Formation <late Middle-Upper Miocene> reefs/ bioherms/ biostroms.

Geologic Assn.: Kyrenia Terrace reef limestone.

Rept.: Bate 1901? G. J. Boekschoten and P. Y. Sondaar, 1969.

Excav.: ?

Refs.: Boekschoten and Sondaar 1972:323, Fig. 7; 324; Reese 1974a:8-9; Fig. 1; 1974b:4; 1977:10-11; n.d.d.

Condition: Cave intact; moderately difficult access.

Species Identified: No data.

Cultural Assn.: None.

Mat.: No data.

Obs.: According to local informants, the second cave (from W to E) in the Cape Pyla Cluster, not the third as indicated by Boekschoten and Sondaar (1972:323, Fig. 7). Geochronological context as noted for #FOS-23R, supra. Boekschoten and Sondaar reportedly found no fossil material and only traces of the cave's former infilling. This cave could not be positively identified. If it is the larger of two adjacent caves near a conspicuous offshore rock, it has two entrances, a large rock outcrop dividing the chamber, no signs of fossiliferous deposits or former excavations and is inhabited by fruit bats (*Rousettus aegyptiacus*, see Spitzenberger [1979:440-449]).

Visited: 2/7/88.

FOS-25R Xylophagou *Spilia tis Englezou* ca. 5m

Map: WD787.673

Location: Littoral, in sea cliff; Cape Pyla.

Site Type: Cave.

General Geology: Koronia Formation <late Middle-Upper Miocene> reefs/ bioherms/ biostroms.

Geologic Assn.: Kyrenia Terrace reef limestone.

Rept.: D. M. A. Bate, 1901.

Excav.: D. M. A. Bate, 1901.

Refs.: Bate 1904a:324, 1905b:347; Boekschoten and Sondaar 1972:323-324; Reese 1974a:8-9; Fig. 1; 1974b:4; 1977:10-11; n.d.d; Swiny 1988.

Condition: Signs of recreational use by locals. Easy access.

Species Identified: *Phanourios minutus*.

Cultural Assn.: Likely, pending confirmation.

Mat.: BMNH, Utrecht, CAARI.

Obs.: The third cave (from W to E) in the Cape Pyla Cluster, not the second as indicated by Boekschoten and Sondaar (see above). Geochronological context as noted for #FOS-23R, supra. This may be Bate's "Small Anonymous Cave" or "Great Anonymous Cave," since the current name (Cave of the Englishwoman) evidently came into use after her excavation. The cave is much bigger than it appears from outside its constricted, bulkhead-like mouth, whose sill is 5.34 m above present sea level. The single chamber angles into the cliff at 300°. Its max. depth is 13.15 m, and its width measures 4 m at the narrowest point, about 5 m from the entrance, and 6.70 m at the rear, where a short, 4 m deep, narrow tunnel

branches off at 230°. At the narrowest point of the cave, the floor rises abruptly to +1.60 m, and together with clearly visible pick marks this shows that Bate's workmen removed most of the front half of the original cave floor, which must have sloped down gently to the sill at the entrance. The latter was enlarged in recent times, and thus the sill was originally higher than at present, probably only slightly below the original floor surface in the rear of the cave. The back of the cave, including its original floor, is devoid of fossils or pick marks, although there is an area of soft soil where digging seems to have taken place recently. The fossil exposures are most visible at and near the cave entrance. Some of the bones are soft and porous, others as hard as the matrix in which they are embedded. Mainly post-cranial material was observed, in one instance associated with a marine mollusc, *Monodonta turbinata*, of which two more were found on the bottom of the cave (all in bone breccia). The most intriguing feature at this site is the occurrence of charcoal inclusions in a 2x1.7 m slab of heavily concreted matrix which rests on the original cave floor directly above the scarp dug by Bate's workmen, and of two pieces of chert (one of which is worked) mixed in with quantities of small fragments of burnt hippo bone in a disturbed area directly inside the entrance. Further investigations are required to establish whether these evidence a cultural association of the hippopotamus remains or simply represent contamination from recent campfires and other intrusive activities.

Visited: 2/7/88, 7/19/88.

FOS-26R Xylophagou *Spilios Nikoladjis* ca. 5 m

Map: WD787.673

Location: Littoral, in sea cliff; Cape Pyla.

Site Type: Cave.

General Geology: Koronia Formation <late Middle-Upper Miocene> reefs/ bioherms/ biostroms.

Geologic Assn.: Kyrenia Terrace reef limestone.

Rept.: D. M. A. Bate, 1901.

Excav.: D. M. A. Bate, 1901.

Refs.: Bate 1904a:324, 1905b:347; Boekschoten and Sondaar 1972:323, Fig. 7; 324; Reese 1974a:8-9; Fig. 1; 1974b:4; 1977:10-11; n.d.d.

Condition: Unknown.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: BMNH, Utrecht.

Obs.: The fourth cave (from W to E) in the Cape Pyla Cluster, only a short distance (ca. 50 m) E of #FOS-25R, supra (cf. Boekschoten and Sondaar 1972:323:Fig. 7). Geochronological context as noted for #FOS-23R, supra. This may be Bate's "Small Anonymous Cave" or "Great Anonymous Cave" (cf. #FOS-25, supra); the current name was first cited by Boekschoten and Sondaar (loc. cit.). Some of the fossiliferous deposit excavated by Bate survives, and Boekschoten and Sondaar collected two hippopotamus bones.

Visited: 2/7/88.

FOS-28R Xylophagou *Ayii Saranda* ca. 4-5 m

Map: WD802.679

Location: Littoral, in sea cliff; Cape Pyla.

Site Type: Cave.

General Geology: Koronia Formation <late Middle-Upper Miocene> reefs/ bioherms/ biostroms.

Geologic Assn.: Kyrenia Terrace reef limestone.

Rept.: L. P. di Cesnola, 1873/74, as "Spilia Macaria"; D. M. A. Bate, 1901, as "Haghios Saronda."

Excav.: L. P. di Cesnola, 1873/74; D. M. A. Bate, 1901.

Refs.: di Cesnola 1877:182-183; Bate 1904a:324, 1905b:347-348, 1906:241; Gunnis 1936:465; Boekschoten and Sondaar 1972:308; 323, Fig. 7; 324, 332; Reese 1974a:8-9; Fig. 1; 1974b:2-3, 1974c:4, 1975b:26-27, 1976:90, 1977:10-11; n.d.d; Goodwin 1984:1523; Swiny 1988.

Condition: Unknown. Easy access.

Species Identified: *Phanourios minutus*, murid mice (2 species, ID not reported).

Cultural Assn.: None.

Mat.: BMNH, Utrecht.

Obs.: The fifth cave (from W to E) in the Cape Pyla Cluster, separated by the others by a considerable distance. Geochronological context as noted for #FOS-23R, supra. This locality has been renowned for its fossil remains since the mid-1800s, and it was their folkloric prominence that attracted di Cesnola's attention. The cave is one of the largest found at the Cape, measuring up to 35 m in depth. The chamber is L-shaped and can be reached through two entrances at the top of a short slope down to sea level. Bone breccia is exposed near the entrances and in the SW wall, and as at *Spilia tis Englezou*, the matrix is extremely hard. In contrast to the latter, however, the *Ayii Saranda* matrix does not appear to contain charcoal inclusions. According to Bate (1906:241), the deposit was originally in excess of 2 m thick. The two Dutch paleontologists collected hippopotamus teeth, as well as rodent remains that may be recent, and the site was also visited by Reese in 1974. Besides *Ayii Saranda*, di Cesnola also reported a fossiliferous cave W of the Liopetri estuary, near the ruined church of Ayios Yeoryios at the eastern end of the Cape (cf. Reese 1974a:9; Fig. 1; 1974b:4; 1977:10-11; n.d.d:2). This site, which may be Bate's "Haghios Jannos" site (1904a:324, 1905b:347), has not been relocated since (see *SECTION B*, infra).

Visited: 11/28/88.

LIMASSOL DISTRICT:

FOS-28S Akrotiri *Aetokremnos* 40 m

Map: VD992.256

Location: Littoral, on scree-covered talus below sea-cliff; Akrotiri Peninsula.

Site Type: Past: Rockshelter; Present: Open Air.

General Geology: Athalassa Formation <Lower Pleistocene> biocalcarenite/ sand/ sandy marl along southern edge of peninsula and in outcrop between Cape Zevgari and Akrotiri village; Alluvium <Holocene> silt/ sand/ gravel on remainder of peninsula.

Geologic Assn.: Unstratified colluvium on biocalcarenite bedrock slope below 70-m sea cliff.

Rept.: D. J. Nixon, 1971, as *Lamnies* (discovered 1961); hippopotamus bones and several 'flints.' Rediscovered B. L. Pile, 1980, and reported as 'Site E.'

Excav.: A. H. Simmons for Desert Research Institute, University of Nevada System, 1987-88.

Refs.: CM File #195/36/9-10; *Archaeology* 41(6) (1988):85; *ARDA 1987* (1988):42-43; Heywood 1982:167-168; Held 1983:219-233, 1986:6-10, 1989a, 1989b; Reese 1988b:4, 1989:26-29; Simmons 1988a, 1988b, 1988c, 1989; Simmons et al. 1989; Swiny 1988.

Condition: Roof of shelter collapsed. Very exposed and rapidly eroding. Limited access.

Species Identified: *Phanourios minutus*, *Elephas cypriotes*.

Cultural Assn.: Clear stratigraphic association of hippopotamus bones with chipped stone artifacts and burned shell midden deposit.

Mat.: CS.1849. EM. CAARI. Material in CS consists of 1 1/2 trays. 1/2 tray contains 6-7 hippo bones, including complete tibia (1) and chunk of breccia with pelvis frag. (1). These almost certainly represent the Nixon collection, although the 'flints' mentioned in his report (see above) are missing. Second tray contains three large chunks of breccia, each containing many hippopotamus bones. Two of the pieces of breccia consist of a very red, crumbly matrix, whereas the third consists of extremely hard, concreted gray/white matrix. Neither is typical of the Akrotiri matrix, and as none of the bones appear burnt the connection of this material with Site E remains to be verified. The breccia is accompanied by an unsigned, undated label reading "small hippopotamus jaw with teeth and maxillar molar a.s.o., perhaps Pleistocene time."

Obs.: Trial excavations have established the presence of a cultural rockshelter deposit containing large quantities of non-fossilized bones of pygmy hippopotamus, first identified in the Nixon collection by the late K. P. Oakley (BMNH). The faunal material, which occurs in stratified soft matrices of either ashy or sandy soil, was encountered in an unusually good state of preservation. Most (in excess of 95%) of the over 100,000 bones excavated to date from the midden deposit belong to 120+ individuals of *Phanourios minutus*, with all body parts and all age groups from fetal to gerontic present. Articulated pieces, broken limb bones, and definite cutmarks are very rare, whereas a differential spatial distribution of different skeletal parts and varying degrees of burning are distinctive features of the assemblage. Considered together with the distribution of artifacts and features, this evidence militates against a natural die site, a 'hippo jump,' and post-depositional transformation processes that could have radically altered the taphonomy of the site. Ca. 40 bones representing at least 3 subadult individuals of *Elephas cypriotes* have also been recovered, and the excavated avifauna comprises several species (identification pending), ranging from dove to two goose species and a large bustard the size of *Otis tarda*. Remains of 2 reptiles (grass snake and large viper) are also present. A dwarf elephant milk molar, adult molar frag., and radius/ulna, as well a bone of a bustard were found on the scree-covered surface below the original bone bed exposures among an erosion scatter of hippopotamus remains and lithics. The molluscan assemblage consists of several marine species: gastropods (top shell [*Monodonta turbinata* Born], limpet [*Patella* sp.], cone shell [*Conus mediterraneus*], dove shell [*Columbella rustica*] and one scaphopod (tusk shell [*Dentalium dentalis*]) have so far been recognized. Further aquatic fauna is represented by small numbers of sea urchins, crabs, fish (Gray Mullet?), and turtle. Numerous bones and many of the top shells show signs of burning, and the latter are frequently cracked. The site has already produced a consistent series of ^{14}C determinations and seems to represent a 9th-millennium BC rockshelter camp with evidence for the human exploitation of aquatic resources and of a remnant population of terrestrial Pleistocene island fauna. For additional info., see **APPENDIX 1**, #S/354, supra.

Visited: 2/17/82, etc.

PAPHOS DISTRICT:

FOS-29P Kissonerga *Kleiotoudhes/Ayios Phanentos* ca. 50 m

Map: VD449.546

Location: Coastal, on right bank of Apis R., ca. 700 m from shore.

Site Type: Past: Rockshelter/Cave?; Present: Open Air.

General Geology: Mamonia Complex serpentinite <age uncertain> at site; Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel surrounding the igneous Mamonia rock.

Geologic Assn.: Ancient sea cliff in serpentinite.

Rept.: I. C. Peristanis, 1929; re-reported M. Mantis, 1967.

Excav.: No.

Refs.: Boekschoten and Sondaar 1972:325-326; Plate IV:1; 331; Goodwin 1984:314-315; Lapierre and Parrot 1972; Mantis 1967, 1969; Philippou 1949:11; Reese 1974a:1, 7-8, 11; 1977:8-10, 13; 1988b:3; n.d.c:4; n.d.d:2-3; Robertson 1981:140; Steele 1972.

Condition: Destroyed by recent terracing.

Species Identified: *Phanourios minutus*, *Elephas* sp.

Cultural Assn.: None.

Mat.: AMNH (Peristanis Collection). KCM (Lady Loch Collection). GSD (Mantis Collection). MCZ (Reese Collection, Gardiner Collection?). PANS (Richards and White Collection, #15363). Utrecht.

Obs.: Site was first reported by Peristanis, then rediscovered by M. Mantis in the 1960s. Peristanis' collection (#A.M.22660) was unknown until discovered accidentally in the American Museum of Natural History by Reese. Although Peristanis' description of the site (quoted in Reese 1974a:7-8, n.d.d:2) differs in some details from observations made by Mantis and Boekschoten and Sondaar, who visited the site in 1969, there is sufficient concurrence on the general location to place it ca. 500 m ENE of the EP settlement at Kissonerga *Mylouthkia* (see APPENDIX 1, #P/084, supra). While Peristanis mentions extensive fossil exposures both on the surface of the cliff and in at least one cave, Boekschoten and Sondaar, as well as Mantis (see below), describe a more localized bone bed, ca. 1 m thick and 25 m long, which is nevertheless said to be very rich. Cranial and post-cranial hippopotamus remains have been observed, in some instances articulated (not noticed by other researchers such as Richards, White, and Reese); and among the material collected by the Dutch paleontologists is a dwarf elephant ulna. The material collected by Mantis (in the GSD) consists exclusively of hippopotamus (1 astragalus, 1 upper canine, 2 proximal femurs, 1 molar frag., 1 subadult mandible frag., and 1 upper jaw frag. [identification by D. S. Reese, August 1988]). A recent, careful search of the locality failed to turn up the bone bed, and it appears that the site has been completely destroyed by banana plantations since 1974.

Because the only detailed report on this site, written by M. Mantis in 1967, was never published, it is here quoted in full:

"PRELIMINARY REPORT ON AN OSSIFEROUS BED NEAR KISSONERGA, PAPHOS DISTRICT.

"*INTRODUCTION.*

"About 3/4 of a mile northwest of Kissonerga village, in the Paphos District, there is a low terrace known as Potima. It is surrounded by small cliffs to the east and by the sea to the west.

"An ossiferous bed, known as Ayii Afentes [sic] occurs in the middle of the cliffs, about two hundred metres away from the road to Peyia at Potima locality. A small path leads to the ossiferous bed from the bridge (Fig. 1). Although this bed has been known to the local people for many years it has not been reported by previous workers. People believe that the bones belonged to Saints named Ayii Afentes [sic].

"The locality was visited on the 26th and 27th of August 1967 for the purpose of sampling.

"*PREVIOUS WORK.*

"Only the work of BATE (1903a, 1903b, 1904b, 1905) is known which deals with ossiferous beds (caves) from other areas of the island. BATE collected material from some caves near Cape Pyla (Larnaca District) and from the 'Ayios Chrysostomos' monastery area. She reports three species of mammals.

"1. *Elephas cypriotes* BATE, 1903

"2. *Genetta plesictoides* BATE, 1903

"3. *Hippopotamus mimutus* [sic] BLAINV, ?

"It is recorded that the deposits containing the mammals are of Pleistocene age.

"*PRESENT WORK.*

"The ossiferous bed is 120-130 feet above sea level and is contained within a 10 foot thick section of fanglomerate, in the middle of the cliff. This section is capped by red soil. A large number of bones have been collected. Among them there are teeth, ribs, and femur of various sizes. One Molar tooth and three to four teeth supposed to be canine-teeth were found. The canine-teeth are very similar to those of *Hippopotamus minutus BLAINV.* (BATE 1903).

"It is obvious that several species are present and it is expected that the material collected includes new species.

"*COMMENTS.*

"We should like to undertake a project to study and search for other ossiferous localities as well as those mentioned by Miss Bate. This will be of great value advancing our understanding of the Pleistocene Period in Cyprus. We hope to be able to obtain such results to enable us to amend the palaeogeography of the island during Pleistocene age.

"A rich collection of mammalian remains of the Pleistocene age from various localities of the island will enable us to obtain reliable identification of species living in that period. Also we might be able to present the geographic distribution of mammalian species in Cyprus.

(Signed)

M. Mantis.

"4th September, 1967.

/CAV"

(M. Mantis resigned from the Geological Survey in 1976 and died in 1978.)

Visited: (Locality only) 7/17/88.

FOS-30P Kato Arodhes *Ayii Phanendes* ca. 1 m

Map: VD379.661

Location: Littoral, on West Coast below Peyia Forest.

Site Type: Past: Rockshelter/Cave; Present: Open Air.

General Geology: Terrace Deposit <Pleistocene> calcarenite/ sand/ gravel.

Geologic Assn.: In calcarenite floor (?) of former cave.

Rept.: D. Michaelides, 1985?

Excav.: No.

Refs.: Swiny 1988.

Condition: Eroding; in splash zone.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: No collection.

Obs.: On beach, ca. 200 m NW of ruined Ayii Phanendes chapel as marked on topographic map (GSGS 1973) and Argakin tis Trypimenis, 2.7 km SW of Lara Peninsula trigonometric point. No vestiges of chapel, and site is difficult to locate. Fossilized hippopotamus bones, including two mandibles, molars, and postcranial material. J. S. Gardiner's "Paphos" material could alternately come from this site (cf. #FOS-30, supra).

Visited: 7/17/88, 10/23/88 (locality only); 8/12/89.

FOS-31P Emba *Ayios Yeoryios* ca. 160 m

Map: VD480.526

Location: Inland, in higher topography of Ktima Lowlands.

Site Type: Open Air.

General Geology: Mamonia Complex serpentinite <age uncertain>, surrounded by Terrace Deposit <Pleistocene> calcarenite/sand/gravel.

Geologic Assn.: Weathered limestone capping alluvial terrace deposit of rounded igneous boulders, gravels and sands.

Rept.: S. O. Held, D. S. Reese, and S. Swiny, 1988.

Excav.: No.

Refs.: Held 1989b.

Condition: Intact, in uncultivated area.

Species Identified: *Phanourios minutus*, *Elephas cypriotes*.

Cultural Assn.: None.

Mat.: GSD (Xenophontos Collection).

Obs.: Site lies approx. 0.8 km NE of village center on N edge of ca. 20-m-wide gully cut by Kephalovrysos Creek. Geochronological correlation with local marine terrace sequence requires detailed examination, but elevational comparison with Turner's (1971:198) general and Sophocleus' (1978:55) Mavrokolymbos-Kissonerga data clearly shows that it lies on a high Early Quaternary land formation and could thus date from any time during the Pleistocene. Horizontal exposure of fossiliferous limestone bedrock directely above, but not in, escarpment; area of ca. 8x4 m. Identifiable bones include hippopotamus longbones, vertebrae, a pelvis frag., numerous molars, canines, and a mandible; as well as an elephant molar.

Visited: 8/31/88, 10/23/88.

FOS-32P Emba *Ayia Phaneromeni* ca. 150 m

Map: VD477.526

Location: Inland, in higher topography of Ktima Lowlands.

Site Type: Open Air.

General Geology: Mamonia Complex serpentinite <age uncertain>, surrounded by Terrace Deposit <Pleistocene> calcarenite/sand/gravel.

Geologic Assn.: Alluvial terrace deposit of rounded igneous boulders, gravels and sands.

Rept.: S. O. Held, D. S. Reese, and S. Swiny, 1988.

Excav.: No.

Refs.: Held 1989b.

Condition: Overgrown and disturbed by building debris and other signs of human activity.

Species Identified: *Phanourios minutus*.

Cultural Assn.: None.

Mat.: No collection.

Obs.: Ca. 300 m W and downstream of #FOS-31P, directly below the chapel of Ayia Phaneromeni on the northern edge of the village, several fossilized hippopotamus bones were observed in N bank of the same creek. The extent of this exposure is obscured by vegetation both in the creek bed and above it, as well as by a small concrete shrine built into the side of the gully. It is worth noting that in contrast to the previous entry, the bones at this site are found at the base of the side of the gully and in the bedrock that slopes down to the present creek channel, although both exposures occur in close proximity and on the same side of the gully. In conjunction with the fluvial nature of the deposits, it is therefore possible that either this exposure or both represent material redeposited from further upstream prior to fossilization.

Visited: 8/31/88, 10/23/88.

SECTION B: LIST OF ISOLATED FINDS AND UNAUTHENTICATED DEPOSITS:

1. Akanthou *Arkosyko*

Source: Stanley Price Survey, 1971-1972.

Subject: A single fossil bone was recognized by N. P. Stanley Price in the surface scatter at this KCU site. See *GEPS* (Stanley Price 1979c) #F.1, *GEPS Supplement* (APPENDIX 1, supra) #F/050, and *SECTION A*, #FOS-21F.

Reference(s): Stanley Price, "Comments on Pleistocene dwarfism in Mediterranean" (correspondence with D. S. Reese, dated April 27, 1974, on file, CAARI, Nicosia); Held 1989b.

Comments: Probably an early prehistoric collectible, picked up by the occupants of the site at one of the two fossil deposits in the vicinity. Cf. #FOS-21F, supra; **APPENDIX 1**, #F/376, supra; and Rizokarpaso *Cape Andreas Kastros* entry, infra.

2. Ayia Irini

Source: a) C. G. Gunther Collection, presented to the British Museum (Natural History) in 1919.
b) Col. McIves Smith Collection, presented to the Cyprus Museum in 1937.
c) Naturhistoriska Riksmuseet (Dept. of Palaeozoology), Stockholm.

Subject: a) Some of the hippopotamus material collected by Gunther (#M11754) is labeled as coming from "Ayia Irini, Kyrenia district," some from "near Ayia Irini, Kyrenia district."
b) Fragments of so-called hippopotamus bones "from Ayia Irini bone deposits" are housed in the Cyprus Museum (#CM.1937/V-27/4, XXII-18). On examination, this material turned out to belong to a cetacean.
c) In the Dept. of Palaeozoology of the Swedish Museum of Natural History, three crates that had remained unopened since 1944 were found in 1989 to contain fossil material from Cyprus, labeled "Ayia Irini, Loc. 5" and donated by the Swedish Crown Prince in 1931.

Reference(s): a) Reese 1974a:1, 2-3; 1977:3-4; n.d.d:1.

Comments: Given the scant information which accompanied these finds, it is impossible to establish their exact provenience. They could have been made at either of the two known Ayia Irini sites (#FOS-11K and #FOS-12K) described above, or a third locality could conceivably be involved. What is notable, however, is that while McIves Smith's investigations may have been prompted by the publication of Gunnis's travelogue in the previous year, Gunther's material at least proves that the area was known for its fossil deposits long before. The adjunct "Locality 5" to the provenance of the material in Sweden suggests that several different fossil beds exist in the Ayia Irini area.

3. *Ayia Napa Area/Streambed Near Famagusta* (Famagusta District)

Source: J. Stanley Gardiner, in a letter to Thomas Barbour, Director, Museum of Comparative Zoology, Harvard, dated February 14, 1938 (Houghton Library, Harvard U.).

Subject: Gardiner, at the beginning of his research into fossil sites in 1937-1938, apparently found quantities of hippopotamus remains in a streambed "near" (S of?) Famagusta, where he was lodging at the time. Several crania are mentioned. Material sent to MCZ in early 1939 (#6907, #6908?).

Reference(s): Reese 1974a:1, 9; 1977:14; n.d.d:3.

Comments: Some of the MCZ material collected by Gardiner may come from one of the Cape Pyla caves, but his description of the streambed deposit matches none of these and is likely to refer to a new site in the Famagusta-Ayia Napa region. Interestingly, there are several, so far uninvestigated, oral claims of fossil discoveries in the Ayia Napa/Cape Greco area, including a report of material collected at Cape Greco (caves?) by a Dr. Wilkinson during WW II (Reese 1977:11; N. P. Stanley Price, pers. comm. 1988). As noted in Held (1989a: Chpt. 6, *Section B*), supra, the coast at Cape Greco thus makes a promising target for future fieldwork.

4. Kapouti (Kalokhorio) *Kephalovrysos* (Nicosia District)

Source: M. Mantis.

Subject: GSD fossil material includes a proximal metapodial of *Phanourios minutus* collected on March 6, 1967, by Mantis at Kapouti *Kephalovrysos* (identification by D. S. Reese, August 1988).

Reference(s): None.

Comments: Provided Mantis' report is correct, this constitutes a new fossil site in a region of the western Mesaoria where no Pleistocene bone beds were previously recorded. The locality *Kephalovrysos* is in flat terrain approx. 1.8 km due N of the Kapouti (Kalokhorio) village; it coincides with a MC settlement and cemeteries (Catling 1963:157, #71-73, 80-81).

5. Krini (Kyrenia District)

Source: C. G. Gunther Collection, presented to the British Museum (Natural History) in 1919.

Subject: Some of the hippopotamus material (#M11754) is labeled as coming from a cave near Krini, Kyrenia District.

Reference(s): Reese 1974a:1, 2-3; 1977:4; n.d.d:1.

Comments: Krini is a village on the lower south slopes of the Pentadaktylos, ca. 3 km WSW of Aghirda. The fact that it lies some distance *west* of the latter is important, because all of Bate's sites are *east* of Aghirda; i.e., in the direction of Dhikomo and Kythrea. The environs of Krini and its nearest neighbors, Keumurju and Pileri, are dotted with caves and rockshelters, one of which has yielded early prehistoric artifacts (see *GEPS* [Stanley Price 1979c] #K.38, *GEPS Supplement*

[**APPENDIX 1**, supra] #K/142). Taken together, this provides some tenuous circumstantial evidence for the existence of a new fossiliferous cave never investigated by Bate, Boekschoten and Sondaar, or Reese.

6. **"Lichades"** (Kyrenia District)

Source: D. S. Reese.

Subject: Reese makes passing mention of a cave "...in northwestern Cyprus north of the village of Lichades.." where he discovered hippopotamus (?) material which he observed to have been redeposited by water.

Reference(s): Reese n.d.b:33.

Comments: No such village exists. This mention refers to two crania and other hippopotamus bones found by Reese at Liveras *Mandres Virilas* (#FOS-14K, supra) (D. S. Reese, pers. comm. 1988).

7. **Liveras *Kolymbi Mandres*** (Kyrenia District)

Source: G. J. Boekschoten and P. Y. Sondaar.

Subject: Report of fossil site(s) separate from confirmed Liveras/Kormakiti localities #FOS-13K, FOS-14K, and FOS-15K.

Reference(s): Boekschoten and Sondaar 1972:314.

Comments: Reported as being ca. 0.5 km W of Liveras, near folds called *Kolymbi Mandres*. Little more is known about this site, and the area is no longer accessible. Similarly, only passing reference is made by the Dutch paleontologists to a fossiliferous cave called *Spillios tou Dragos*, said to exist W of Kormakiti village but not visited by them. Goodwin (1984) lists no such toponym for Kormakiti, and it is therefore impossible to confirm the existence of a fifth fossil site in the Liveras-Kormakiti region. According to local informants, however, this is an alternative toponym for the fossil site at Ayia Irini *Dragontovounari* (#FOS-12K, supra) (D. S. Reese, pers. comm. 1988).

8. **Pera** (Nicosia District)

Source: M. Mantis.

Subject: In the late 1960s Mantis penned a little-known article in Greek on Pleistocene fossil sites in which an ossiferous locality at Pera (near Politiko) is mentioned.

Reference(s): Mantis 1969:89.

Comments: No site with Pleistocene terrestrial mammals has ever been reported in this region, near the northern Troodos piedmont, and research failed to produce a diagnostic toponym that would have strengthened Mantis' claim (cf. Introduction, supra). Nevertheless, since Mantis was a trained paleontologist, it must be assumed that his reference is reliable, and there is a suggestive toponym in the lands of the neighboring village of Kambia (see *SECTION C*, infra).

9. **Rizokarpaso *Cape Andreas Kastros*** (Famagusta District)

Source: Excavation of KCU settlement by A. Le Brun for CNRS. See *GEPS* (Stanley Price 1979c) #F.25, and *GEPS Supplement* (**APPENDIX 1**, supra) #F/056.

Subject: A single Pleistocene mammal bone (pygmy hippopotamus metacarpal) was recently (1982/84) identified in the site's faunal assemblage.

Reference(s): Davis 1985:27, 1987:124-125, 1989; Held 1989b; Le Brun 1985a:74; Le Brun et al. 1987:308-309.

Comments: Presence of a Pleistocene mammal in an overwhelmingly domesticated assemblage is anomalous and has given rise to speculations about the original provenience of the find. The argument that it came from a living animal and thus

proves the survival of hippopotami into the early Holocene is contradicted by the complete absence of further remains of this species in the excavated deposits of the settlement. On the other hand, the alternative explanation that it represents an early prehistoric collectors' item is weakened by the great distance to known fossil deposits nearest to the Karpas panhandle, at Akanthou (ca. 85 km, cf. #FOS-20F and #FOS-21F, supra). However, if there is a yet undiscovered fossil site at Ayia Triadha, as has been suggested in the Introduction, above, it would almost halve the distance involved and consequently go a considerable way towards supporting the 'prehistoric chance find' argument.

10. **Trimithi** (Kyrenia District)

Source: C. G. Gunther Collection, presented to the British Museum (Natural History) in 1919.

Subject: Some of the hippopotamus material (#M11754) is labeled as being from "Trimithi, Ayia Phanondas, Kyrenia district."

Reference(s): Reese 1974a:1, 2-3, 1977:4; n.d.d:1.

Comments: Trimithi is a village on the N slopes of the Pentadaktylos, ca. 2.5 km inland and above the Ayios Yeoryios *Ayios Phanourios* site (#FOS-16K, supra). The proximity of Gunther's reference to the latter and the possible corruption of 'Phanourios' into 'Phanondas' might be taken to mean that Gunther collected at *Ayios Phanourios* long before that site was reported by Gunnis (1936:211-212).

11. **Vouno** (Kyrenia District)

Source: R. Gunnis, *Historic Cyprus*.

Subject: R. Gunnis used the name of this village in his account of van Bruijn's early investigations.

Reference(s): Gunnis 1936:464, Reese 1974b:2.

Comments: Gunnis's reference should not be taken too literally, in view of the fact that de Bruijn's site (or sites) has never been positively identified. The villages of Vouno, Sykhari, and Koutsovendis are all situated below Ayios Khrysostomos Monastery and have been used interchangeably in descriptions of the area explored by the Dutchman.

12. **Vourna** (Kyrenia District)

Source: C. G. Gunther Collection, presented to the British Museum (Natural History) in 1919.

Subject: Some of the hippopotamus material (#M11754) is labeled as being from "Vourna, Ayia Phanondas, Kyrenia district."

Reference(s): Reese 1974a:1, 2-3, 1977:4; n.d.d:1.

Comments: This reference is considered by Reese (loc. cit.) to be "evidently" near the one dealing with 'Trimithi' (supra), in which case the same comments would apply. According to this researcher, he has it on the authority of a local informant that a place by this name (meaning 'trough'/'gully'/'hole', not "large grinding stone") exists west of the *Ayios Phanourios* chapel (Reese 1974a:3). This claim was contradicted by an examination of the relevant cadastral plans and the *Complete Gazetteer of Cyprus* (Christodoulou and Konstantinidis 1987), none of which lists such a place name (or, for that matter, 'Vournes') for Trimithi or Ayios Yeoryios lands. It follows that without solid evidence for the proximity of Gunther's 'Trimithi' and 'Vourna' findspots, his description of the latter could equally be applied to the potential fossil cave near Ayios Epiktitos (cf. Introduction, supra).

13. Xylophagou *Ayios Yeoryios* (Larnaca District)

Source: di Cesnola, *Cyprus: Its Ancient Cities, Tombs, and Temples.*

Subject: Reese was the first to point out that di Cesnola's account of his explorations in the Xylophagou-Ormidhia-Cape Pyla area between 1872 and 1875 clearly mentions two separate fossiliferous caves, only one of which, *Ayii Saranda*, has received attention in the recent literature.

Reference(s): Reese 1974a:9, and Fig. 1; 1974b:4; 1977:10-11; n.d.d.

Comments: A short distance W of the ruined settlement and church of Ayios Yeoryios on the Liopetri estuary, di Cesnola claims to have investigated a bone-bearing cave that he described as being of easier access than Ayii Saranda. Relocated by Bate, but not since. Inquiries with local inhabitants about the existence of such a site failed to produce any information. Area visited 7/19/88. Cf. *SECTION A*, #F0S-27R, supra.

14. Xylophagou (near) (Larnaca District)

Source: C. Nonis.

Subject: Elephant tusk in private collection in Xylophagou.

Reference(s): Held 1989b.

Comments: A previously unknown elephant tusk was discovered by D. S. Reese, S. Swiny, and the author in the private collection of Cosmas Nonis in Xylophagou in 1988. This tusk, which had reportedly been dug up (and broken in one place) by a front loader in a small gravel quarry somewhere SW of the village ten years earlier, is covered by a thick crust of sandy matrix. Although the latter would have to be removed in order to undertake a detailed study, preliminary measurements (940 mm outer curve, 690 mm inner curve, 72mm max. diameter) prove this specimen to be considerably larger than tusks of the Cypriot dwarf elephant and somewhat larger than the two smallest elephant tusks found in a Late Minoan I context at the Palace of Zakro on Crete, yet smaller than the tusks from the 18th century BC palace at Alalakh in N Syria and from Iron Age contexts at Nimrud in Iraq (Reese 1985:399-400, 1988a, and pers. comm. 1988). The depth below the present surface at which the Xylophagou specimen was found reportedly exceeds 3 m. Although this is less than the reported depths of the Kyrenia molar and the Athna molars (#FOS-18K and #FOS-22F, supra), this find adds another piece of corroborative evidence to the presence of an osteologically and geochronologically distinct assemblage of fossil elephant on Cyprus.

15. Yeri ?*Dhrakontia* (Nicosia District)

Source: M. Mantis.

Subject: In the late 1960s Mantis penned a little-known article in Greek on Pleistocene fossil sites in which an ossiferous locality at Yeri (SE of Nicosia) is mentioned.

Reference(s): Mantis 1969:89.

Comments: No site with Pleistocene terrestrial mammals has ever been reported in this region, the central Mesaoria, but research has established the existence of a suggestive toponym in the lands of this village; i.e. *Dhrakontia* (cf. Introduction, supra). It is also the name of a creek which passes through the locality ca. 1.5-2 km NW of the village, and it is quite likely that Mantis' report, which is presumably reliable, refers to a bone exposure in the scarp of the lowest river terrace. However, a search of the area failed to turn up a bone exposure. Locality visited 6/19/88.

SECTION C: LIST OF DIAGNOSTIC AND SUGGESTIVE TOPONYMS:

(N.B.: Sites mentioned in Sections A and B are not included. Due to the limitations of the toponymic sources used, the following lists should not be considered complete.)

a) Saint Phanourios Group:

Village	Cad. Sheet	District	Toponym	UTM Grid Ref.
Galini	XVIII	NIC	PHANOUTIN	VD79?.88?
Yerasa	XLVIII	LIS	PHANOUTIN	VD000.000
Karmi	XII	KYR	AYII PHANONTES	WE000.000

b) Ayii Saranta Group:

Village	Cad. Sheet	District	Toponym	UTM Grid Ref.
?????	XXXI	NIC	AYII SARANDA	WD000.000
Ayia Napa	XLII	FAM	AYII SARANDA	WD000.000
Ayia Triadha	III	FAM	AYII SARANTAE	XE12?.36?
Ayios Therapon	XLVII	LIS	AYII SARANDA	VD000.000
Layia	XLIX	LAC	AYII SARANTA	WD22?.57?
Linou	XXVIII	NIC	AYII SARANDA	VD90?.81?
Linou	XXVIII	NIC	AYII SARANDA	VD91?.82?
Lyso	XXXV	PAS	AYII SARANDA	VD56?.74?
Lyso	XXXV	PAS	AYII SARANTA	VD54?.74?
Paralimni	XLII	FAM	AYII SARANTA	WD94?.74?
Phasoula	LII	PAS	AYII SARANTA	VD65?.46?
Pyroi	XXXI	NIC	AYII SARANTA	WD000.000
Tala	XLV	PAS	AYII SARANTA	VD47?.55?
Trakhypedhoula	XLVI	PAS	SARANTAS	VD000.000
Tymbou	XXXI	NIC	AYII SARANTA	WD46?.85?
Tymbou	XXXI	NIC	AYII SARANTA	WD46?.86?
Yialousa	III	FAM	AYII SARANDA	XE11?.35?

c) Dragon Group:

Village	Cad. Sheet	District	Toponym	UTM Grid Ref.
Alambra	XXXIX	NIC	DHRAKONTOSPILIOS	WD000.000
Anaryta	L???	PAS	DHRAKONTIA	VD56?.43?
Asgata	LV	LIS	PHRAKTI TOU DHRAKOUNIOU	WD000.000
Athienou	XXI	NIC	DHRAKONGIA	WD51?.79?
Ayia Marina	XXIX	NIC	DHRAKONTIA	WD03?.81?
Ayia Marina	XXIX	NIC	DHRAKONTIA	WD03?.82?
Ayia Marina	XXIX	NIC	DHRAKONTIA	WD04?.81?
Ay. Epiktitos	XII	KYR	DHRAKONTOTRYPA	WE35?.08?
Ay. Sozomenos	XXXI	NIC	DHRAKONTOSPILIOS	WD000.000
Ay. Sozomenos	XXXI	NIC	DHRAKONTIA	WD41?.81?
Ay. Therapon	LIII	LIS	DHRAKONTIA	VD88?.49?
Dhali	XXX	NIC	DHRAKONTOSPILIOS	WD37?.80?
Dhali	XXX	NIC	DHRAKONTOSPILIOS	WD38?.80?
Ephtakomi	VII	FAM	DHRAKONTAS	WE93?.23?
Galini	XVIII	NIC	SPILIA TOU DHRAKOU	VD000.000
Goudhi	XXXV	PAS	DHRAKONTOSPILIOS	VD000.000
Kalavasos	LV	LAC	DHRAKONTIES	WD28?.46?
Kalogrea	XIII	KYR	DHRAKONTAS	WE56?.10?
Kambia	XXXIX	NIC	DHRAKONTOSPILIOS	WD20?.71?
Kandou	LIII	LIS	DHRAKONTOPETRA	VD92?.42?
Kandou	LIII	LIS	DHRAKONTOPETRES	VD92?.43?

Karmi	XII	KYR	DHRAKOS	WE000.000
Karpasha	XI	KYR	DHRAKONTAS	WE06?.05?
Kholi	XXXV	PAS	DHRAKONTOSPILIOS	VD51?.71?
Kophinou	XLIX	LAC	DHRAKONTIES	WD38?.55?
Korovia	III	FAM	DHRAKONERA	XE15?.31?
Kouklia	LII	PAS	TERA-DHRAKONTOSPILIOS	VD000.000
Lapithos	XI	KYR	(VRYSI TOU)DHRAKONTAS	WE16?.19?
Laxia	XXX	NIC	DHRAKONGIA	WD35?.85?
Lemithou	XXXVII	LIS	DHRAKONTES	VD82?.68?
Louroujina	XL	NIC	DHRAKONKIA	WD44?.75?
Louroujina	XL	NIC	SHISTRA TOU DHRAKOU	WD000.000
Nikitas	XIX	NIC	DHRAKOS TIS PETRAS	VD000.000
Omodhos	XLVII	LIS	DHRAKOS	VD000.000
Orounda	XXIX	NIC	DHRAKONTIA	WD03?.82?
Orounda	XXIX	NIC	DHRAKONTIA	WD04?.81?
Orounda	XXIX	NIC	DHRAKONTIA	WD04?.82?
Pakhyammos	XVIII	NIC	DHRAKOI	VD000.000
Paralimni	XLII	FAM	DHRAKOS	WD94?.73?
Paralimni	XLII	FAM	DHRAKOS	WD94?.74?
Pedhoulas	XXXVII	NIC	DHRAKONTAS	VD82?.69?
Peristerona	XXXV	PAS	DHRAKONTAS	VD53?.72?
Pitargou	XLV	PAS	SPILIOS TOU DHRAKOU	VD59?.54?
Platanistasa	XXXVIII	NIC	DHRAKONTOROTSOS	WD03?.67?
Polemi	XLV	PAS	DHRAKONTOROTSOS	VD55?.61?
Polemidhia	LIII	LIS	DHRAKONTOPETRA	VD000.000
Pomos	XVII	PAS	DHRAKOI	VD57?.89?
Potami	XLV	PAS	DHRAKONTOROTSOS	VD56?.61?
Psematismenos	LV	LAC	DHRAKONTIA	WD31?.46?
Psematismenos	LV	LAC	DHRAKONTIES	WD30?.46?
Pyrgos	XVIII	NIC	DHRAKONTAS	VD000.000
Pyroi	XXXI	NIC	KAFKALLA TIS DHRAKONTIAS	WD000.000
Rizokarpaso	IV	FAM	DHRAKONTAS	XE000.000
Sotira	XLII	FAM	DHRAKONTES	WD84?.73?
Souni-Zanaja	LIII	LIS	DHRAKONTOPETRA	VD000.000
Steni	XXXV	PAS	DHRAKONTAS	VD000.000
Stroumbi	XLV	PAS	DHRAKONTOROTSOS	VD000.000
Sysklipos	XI	KYR	DHRAKONTES	WE14?.05?
Tembria	XXVIII	NIC	DHRAKOS	VD000.000
Tokhni	LV	LAC	DHRAKONKIES	WD000.000
Trakhypedhoula	XLVI	PAS	DHRAKOS	VD000.000
Vizakia	XXIX	NIC	DHAKOUDHIA	WD01?.80?
Yeri	XXX	NIC	DHRAKONTIA	WD36?.86?

APPENDIX 3
TABLES AND GRAPHS FOR CHAPTER 3

1. Reduction

SAMPLE A			
	Minor Sites	Major Sites	T
NIC	23	22	45
KYA	61	27	88
FAM	37	8	45
LAC	14	16	30
LIS	26	7	33
PAS	57	15	72
T	218	95	313
n=313			

Isolated Minor Sites	
NIC	16
KYA	16
FAM	16
LAC	2
LIS	12
PAS	19
T	81

2. Reduction

SAMPLE B					
	Clustered Minor Sites	Clustered Major Sites	T	Isolated Major Sites	T
NIC	7	15	22	7	29
KYA	45	22	67	5	72
FAM	21	3	24	5	29
LAC	12	16	28	-	28
LIS	14	3	17	4	21
PAS	38	11	49	4	53
T	137	70	207	25	232
n=232					

Sites with Architecture	
NIC	10
KYA	11
FAM	4
LAC	6
LIS	2
PAS	4
T	37

SAMPLE C	
	Major Sites
NIC	22
KYA	27
FAM	8
LAC	16
LIS	7
PAS	15
n=95	

3. Reduction

4. Reduction

SAMPLE D			
	HC Sites	Isolated Major Sites	T
NIC	10	7	17
KYA	18	5	23
FAM	5	5	10
LAC	12	-	12
LIS	5	4	9
PAS	15	4	19
T	65	25	90
n=90			

Table 12: Concordance of Site Samples in Reduction Sequence.

Table 13: Altimetric Distribution of Major and Minor Sites (n=313).

District	Altitudinal zones (masl)								
	0-99(1)	100-199(2)	200-299(3)	300-399(4)	400-599(5)	600-799(6)	800-999(7)	1000+(8)	Total
Nicosia	8	14	10	8	4	-	1	-	45
Percentage	2.56	4.47	3.19	2.56	1.28	-	0.32	-	14.38
Kyrenia	31	19	16	12	8	2	-	-	88
Percentage	9.90	6.07	5.11	3.83	2.56	0.64	-	-	28.12
Famagusta	32*	9	4	-	-	-	-	-	45
Percentage	10.22	2.88	1.28	-	-	-	-	-	14.38
Larnaca	19	7	4	-	-	-	-	-	30
Percentage	6.07	2.24	1.28	-	-	-	-	-	9.58
Limassol	12	-	3	9	3	2	3	1	33
Percentage	3.83	-	0.96	2.88	0.96	0.64	0.96	0.32	10.54
Paphos	33	8	11	7	9	4	-	-	72
Percentage	10.54	2.56	3.51	2.24	2.88	1.28	-	-	23.00
Total/Zone	135	57	48	36	24	8	4	1	313
Percentage	43.13	18.21	15.34	11.50	7.67	2.56	1.28	0.32	100

*1 site (findspot) in Zone 1, Rizokarpaso-Aphendrika, is below sea level.

Zonal site decrements: 1-2:57.78%, 2-3:15.79%, 3-4:25%, 4-5:33.33%, 5-6:66.67%, 6-7:50%, 7-8: 75%

Percentage of District:

Nicosia	17.78	31.11	22.22	17.78	8.89	-	2.22	-	100
Kyrenia	35.23	21.59	18.18	13.64	9.09	2.27	-	-	100
Famagusta	71.11	20.00	8.89	-	-	-	-	-	100
Larnaca	63.33	23.23	13.33	-	-	-	-	-	100
Limassol	36.36	-	9.09	27.27	9.09	6.06	9.09	3.03	100
Paphos	45.83	11.11	15.28	9.72	12.50	5.56	-	-	100
$\bar{x}$	44.94	17.84	14.50	11.40	6.60	2.32	1.89	0.51	100

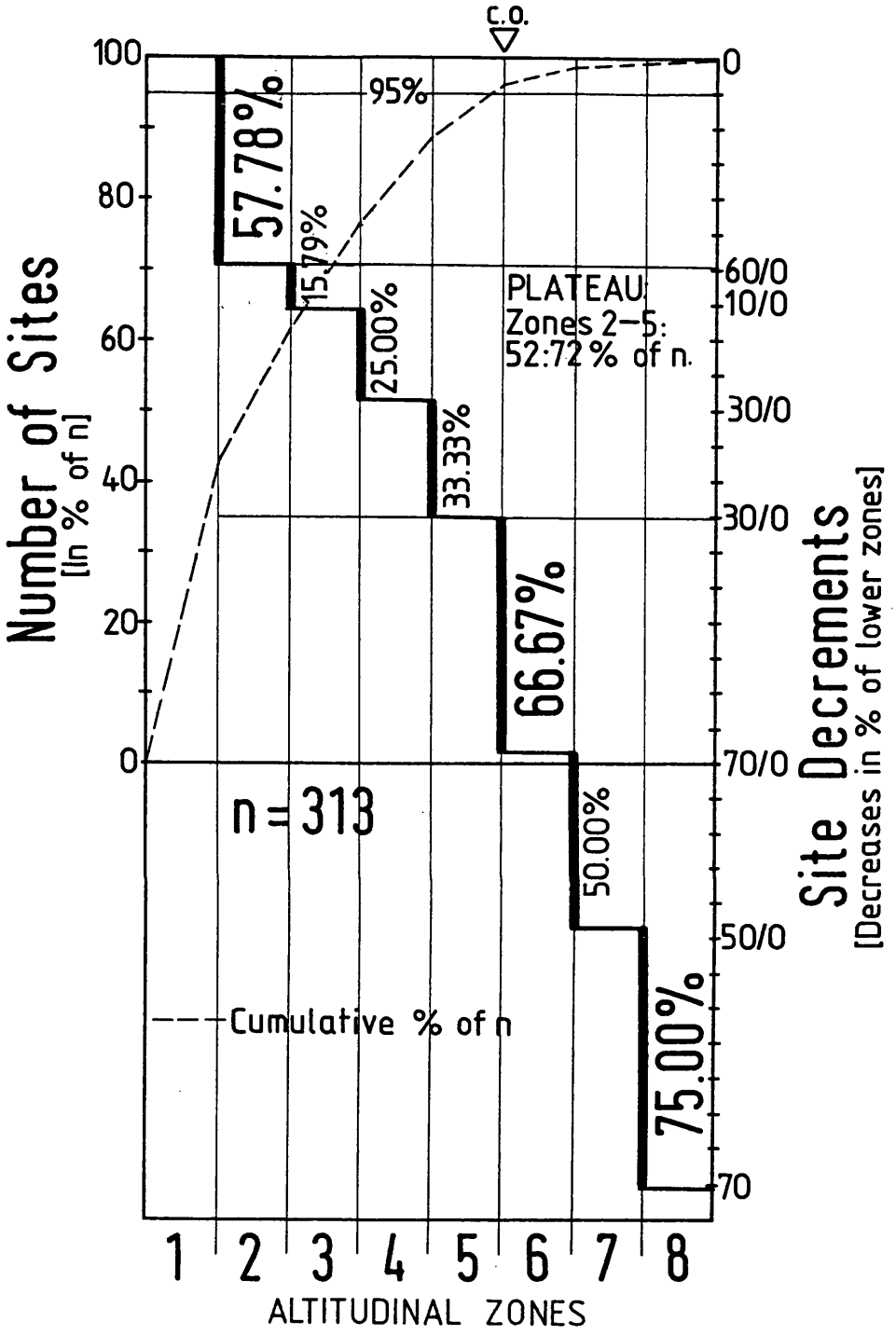


Fig. 23: Altimetric Distribution of Major and Minor Sites (cf. Table 13). Shown as the progressive reduction of the number of sites per zone with increasing altitude (='zonal site decrements'). The statistically most significant range of altitude is represented by the 'plateau', which is formed either by the single zone or by the combination of *contiguous zones with relatively small intervening decrements* that possesses the overall majority of sites. The curve indicates the cumulative increase of sites from the lowest to the highest zone. Zones with a combined total of 5 ± 2% of all sites or less are considered insignificant for the analysis, as shown by the 'cutoff point' ('c.o.'), which lies at the first major decrement after the curve reaches 95 ± 2%.

Table 14: Altimetric Distribution of Major Sites and Site Clusters (n=232).

District	Altitudinal zones (masl)							
	0-99(1)	100-199(2)	200-299(3)	300-399(4)	400-599(5)	600-799(6)	800-999(7)	Total
Nicosia	5	12	3	6	3	-	-	29
Percentage	2.16	5.17	1.29	2.59	1.29	-	-	12.50
Kyrenia	25	18	13	8	6	2	-	72
Percentage	10.78	7.76	5.60	3.45	2.59	0.86	-	31.03
Famagusta	22	7	-	-	-	-	-	29
Percnetage	9.48	3.02	-	-	-	-	-	12.50
Larnaca	17	7	4	-	-	-	-	28
Percentage	7.33	3.02	1.72	-	-	-	-	12.07
Limassol	9	-	2	7	-	-	3	21
Percentage	3.88	-	0.86	3.02	-	-	1.29	9.05
Paphos	26	8	8	3	5	3	-	53
Percentage	11.21	3.45	3.45	1.29	2.16	1.29	-	22.84
Total/Zone	104	52	30	24	14	5	3	232
Percentage	44.83	22.41	12.93	10.34	6.03	2.16	1.29	100
Zonal site decrements: 1-2:50%, 2-3:42.31%, 3-4:20%, 4-5:41.67%, 5-6:64.29%, 6-7:40%								
Percentage of District:								
Nicosia	17.24	41.38	10.35	20.69	10.35	-	-	100
Kyrenia	34.72	25.00	18.06	11.11	8.33	2.78	-	100
Famagusta	75.86	24.14	-	-	-	-	-	100
Larnaca	60.71	25.00	14.29	-	-	-	-	100
Limassol	42.86	-	9.52	33.33	-	-	14.29	100
Paphos	49.06	15.09	15.09	5.66	9.43	5.66	-	100
$\bar{x}$	46.74	21.77	11.22	11.80	4.69	1.41	2.38	100

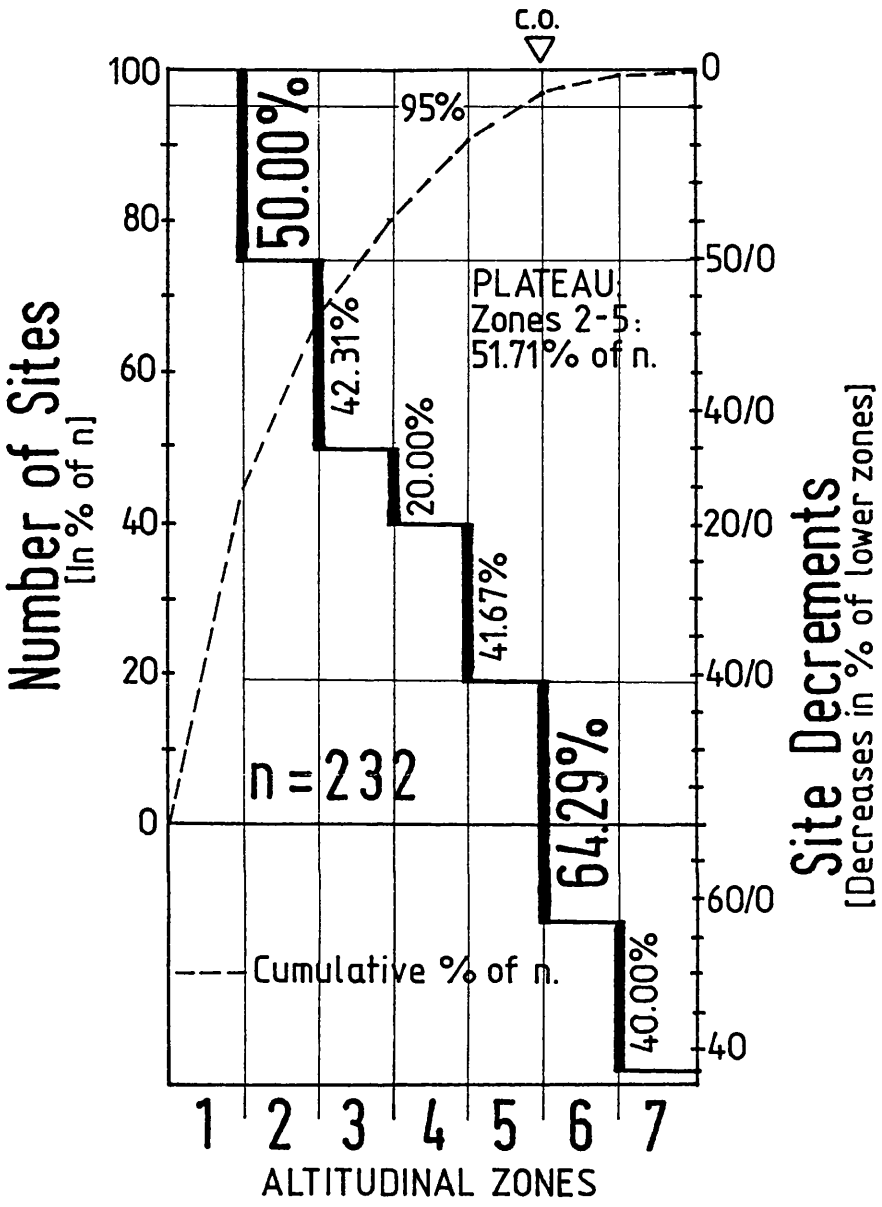


Fig. 24: Altimetric Distribution of Major Sites and Site Clusters (cf. Table 14). Shown as the progressive reduction of the number of sites per zone with increasing altitude (='zonal site decrements'). The statistically most significant range of altitude is represented by the 'plateau', which is formed either by the single zone or by the combination of *contiguous zones with relatively small intervening decrements* that possesses the overall majority of sites. The curve indicates the cumulative increase of sites from the lowest to the highest zone. Zones with a combined total of 5 ± 2% of all sites or less are considered insignificant for the analysis, as shown by the 'cutoff point' ('c.o.'), which lies at the first major decrement after the curve reaches 95 ± 2%.

Table 15: Altimetric Distribution of Major Sites (n=95).

District	Altitudinal zones (masl)							
	0-99(1)	100-199(2)	200-299(3)	300-399(4)	400-599(5)	600-799(6)	800-999(7)	Total
Nicosia	4	10	2	4	2	-	-	22
Percentage	4.21	10.53	2.11	4.21	2.11	-	-	23.16
Kyrenia	8	8	6	4	1	-	-	27
Percentage	8.42	8.42	6.32	4.21	1.05	-	-	28.42
Famagusta	8	-	-	-	-	-	-	8
Percentage	8.42	-	-	-	-	-	-	8.42
Larnaca	13	2	1	-	-	-	-	16
Percentage	13.68	2.11	1.05	-	-	-	-	16.84
Limassol	4	-	1	2	-	-	-	7
Percentage	4.21	-	1.05	2.11	-	-	-	7.37
Paphos	8	2	3	1	1	-	-	15
Percentage	8.42	2.11	3.16	1.05	1.05	-	-	15.79
Total/Zone	45	22	13	11	4	-	-	95
Percentage	47.37	23.16	13.68	11.58	4.21	-	-	100
Zonal site decrements: 1-2:51.11%,2-3:40.91%, 3-4: 15.39%, 4-5: 63.63%								
Percentage of district:								
Nicosia	18.18	45.46	9.09	18.18	9.09	-	-	100
Kyrenia	29.63	29.63	22.22	14.82	3.70	-	-	100
Famagusta	100.00	-	-	-	-	-	-	100
Larnaca	81.25	12.50	6.25	-	-	-	-	100
Limassol	57.14	-	14.29	28.57	-	-	-	100
Paphos	53.33	13.33	20.00	6.67	6.67	-	-	100
$\bar{x}$	56.59	16.82	11.98	11.37	3.24	-	-	100

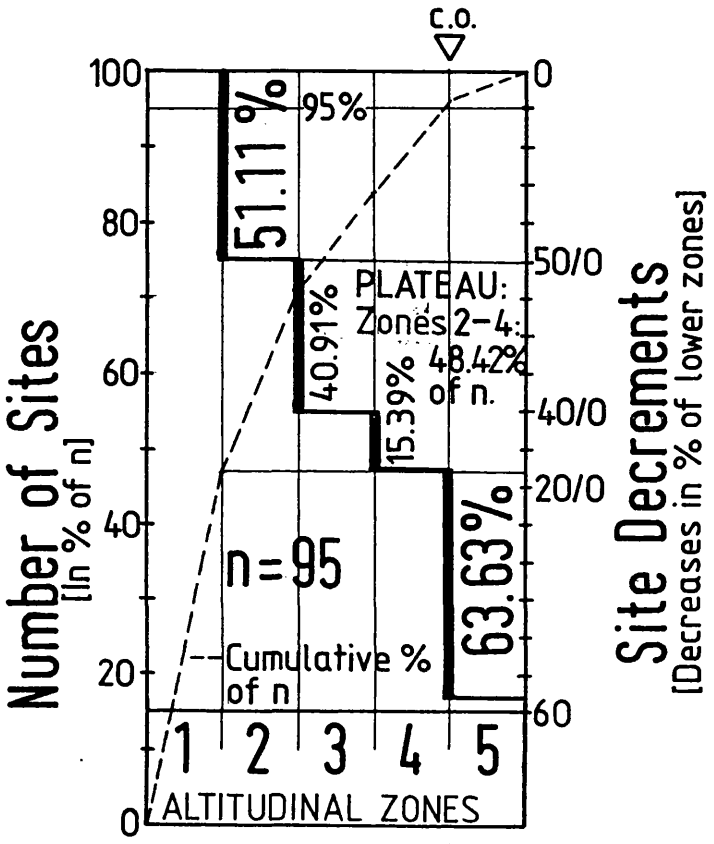


Fig. 25: Altimetric Distribution of Major Sites (cf. Table 15). Shown as the progressive reduction of the number of sites per zone with increasing altitude (='zonal site decrements'). The statistically most significant range of altitude is represented by the 'plateau', which is formed either by the single zone or by the combination of *contiguous zones with relatively small intervening decrements* that possesses the overall majority of sites. The curve indicates the cumulative increase of sites from the lowest to the highest zone. Zones with a combined total of 5 ± 2% of all sites or less are considered insignificant for the analysis, as shown by the 'cutoff point' ('c.o.'), which lies at the first major decrement after the curve reaches 95 ± 2%.

Table 16: Altimetric Distribution of Major Sites and HC Sites (n=90).

District	Altitudinal zones (masl)							
	0-99(1)	100-199(2)	200-299(3)	300-399(4)	400-599(5)	600-799(6)	800-999(7)	Total
Nicosia	3	7	2	3	2	-	-	17
Percentage	3.33	7.78	2.22	3.33	2.22	-	-	18.89
Kyrenia	7	8	4	3	1	-	-	23
Percentage	7.78	8.89	4.44	3.33	1.11	-	-	25.56
Famagusta	8	2	-	-	-	-	-	10
Percentage	8.89	2.22	-	-	-	-	-	11.11
Larnaca	10	1	1	-	-	-	-	12
Percentage	11.11	1.11	1.11	-	-	-	-	13.33
Limassol	2	1	1	4	-	-	1	9
Percentage	2.22	1.11	1.11	4.44	-	-	1.11	10.00
Paphos	13	1	3	1	1	-	-	19
Percentage	14.44	1.11	3.33	1.11	1.11	-	-	21.11
Total/Zone	43	20	11	11	4	-	1	90
Percentage	47.78	22.22	12.22	12.22	4.44	-	1.11	100
Zonal site decrements: 1-2:53.49%, 2-3:45%, 3-4:0%, 4-5:63.64%, 5-6:100%, 6-7:--.								
Percentage of District:								
Nicosia	17.65	41.18	11.76	17.65	11.76	-	-	100
Kyrenia	30.43	34.78	17.39	13.04	4.35	-	-	100
Famagusta	80.00	20.00	-	-	-	-	-	100
Larnaca	83.33	8.33	8.33	-	-	-	-	100
Limassol	22.22	11.11	11.11	44.44	-	-	11.11	100
Paphos	68.42	5.26	15.79	5.26	5.26	-	-	100
$\bar{x}$	50.34	20.11	10.73	13.40	3.56	-	1.85	100

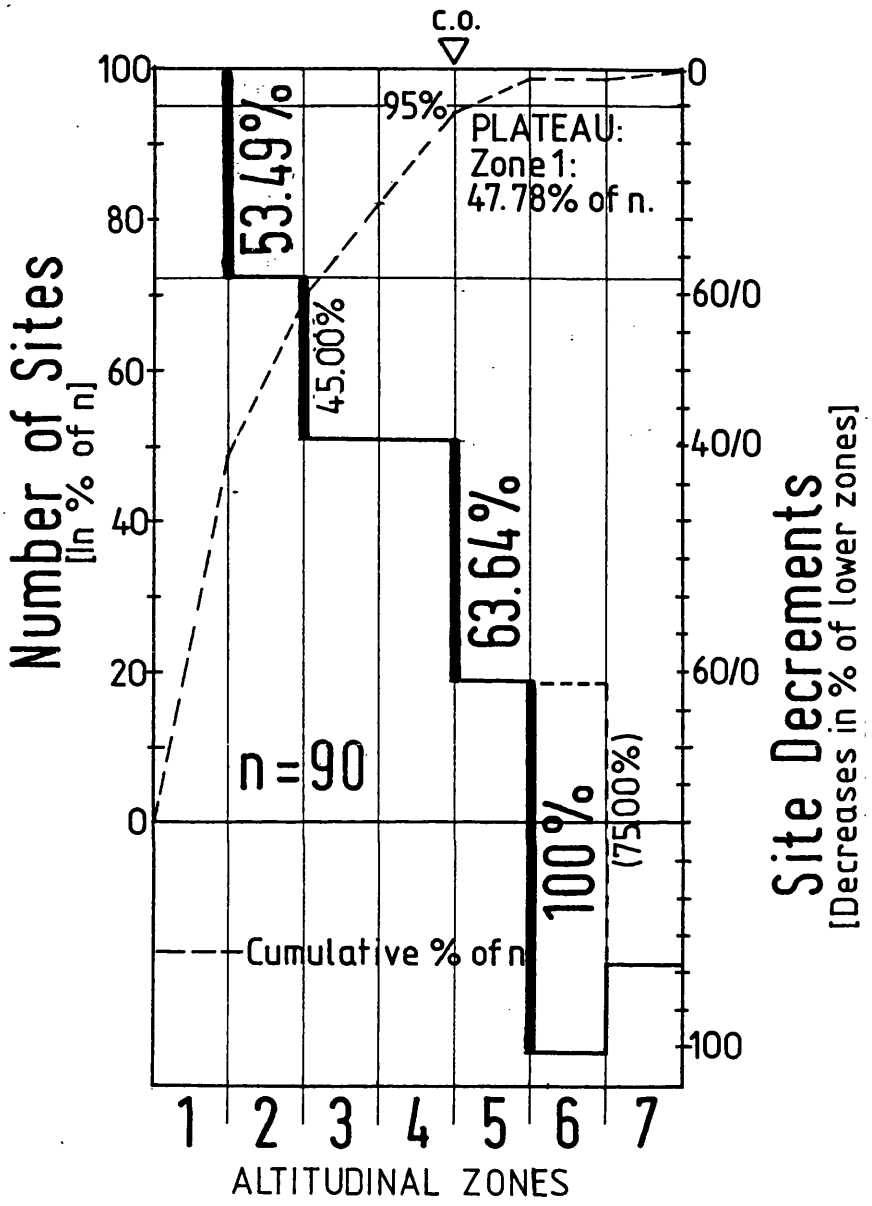


Fig. 26: Altimetric Distribution of Major Sites and HC Sites (cf. Table 16). Shown as the progressive reduction of the number of sites per zone with increasing altitude (= 'zonal site decrements'). The statistically most significant range of altitude is represented by the 'plateau', which is formed either by the single zone or by the combination of *contiguous zones with relatively small intervening decrements* that possesses the overall majority of sites. The curve indicates the cumulative increase of sites from the lowest to the highest zone. Zones with a combined total of 5 ± 2% of all sites or less are considered insignificant for the analysis, as shown by the 'cutoff point' ('c.o.'), which lies at the first major decrement after the curve reaches 95 ± 2%.

TABLE 17: Topographic Distribution of Sites:[a]

Sample (n)	Terrain Types: Mountains	Hills	Rolling+Irreg. Plains	Nearly Level Plains	Total
A:	134	83	91	4	312[b]
%	42.95	26.60	29.17	1.28	100
B:	99	63	69	1	232
%	42.67	27.16	29.74	0.43	100
C:	32	30	32	1	95
%	33.68	31.58	33.68	1.06	100
D:	33	24	32	1	90
%	36.67	26.67	35.56	1.11	100
$\bar{x}$	74.50	50	56	1.75	182.2
%	40.88	27.43	30.73	0.96	100
Increment:		+12%			
Decrement:	-32.89%		-96.88%		

[a] Terrain types adopted from Thrower (1960) (LFMC 1960).
[b] Excluding Rizokarpaso-Aphendrika, which is below sea level.

TABLE 18: Areas of Terrain Types (Approximate):[a]

Unit	Mountains	Hills	Rolling+Irreg. Plains	Nearly Level Plains	Total
km^2	4162.95	925.10	3330.36	832.59	9251
%	45	10	36	9	100

[a] Types and percentages adopted from Thrower (1960) (LFMC 1960).

TABLE 19: Terrain Types and Site Densities (=relative topographic site distribution):[a]

Sample (n)	Terrain Types: Mountains	Hills	Rolling+Irreg. Plains	Nearly Level Plains	n
A:	0.0322[b]	0.0897	0.0273	0.0048	312[c]
B:	0.0238	0.0681	0.0207	0.0012	232
C:	0.0077	0.0324	0.0096	0.0012	95
D:	0.0079	0.0259	0.0096	0.0012	90
$\bar{x}$	0.0179	0.0540	0.0168	0.0021	182.2
Increment:	+201.68%				
Decrement:		-68.89%	-86.62%		

[a] Based on data shown in Tables 17 and 18
[b] Site Density: Sites/km^2.
[c] Excluding Rizokarpaso-Aphendrika, which is below sea level.

Tables 17-19: Macrotopographic Variability of Site Distribution.

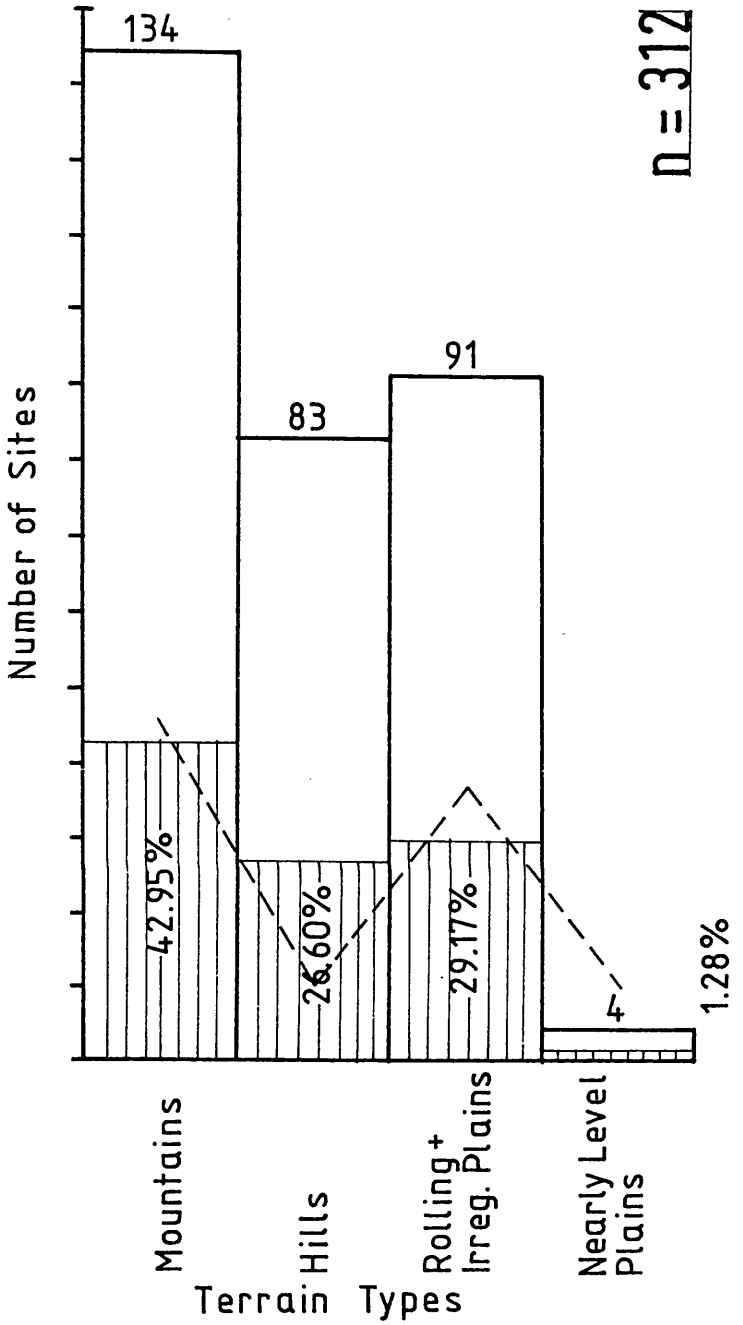


Fig. 27: Macrotopographic Distribution of Major and Minor Sites (cf. Table 17). *N* excludes Rizokarpaso *Aphendrika*. Stippled line shows proportions of terrain types in percent of total land area (cf. Table 18).

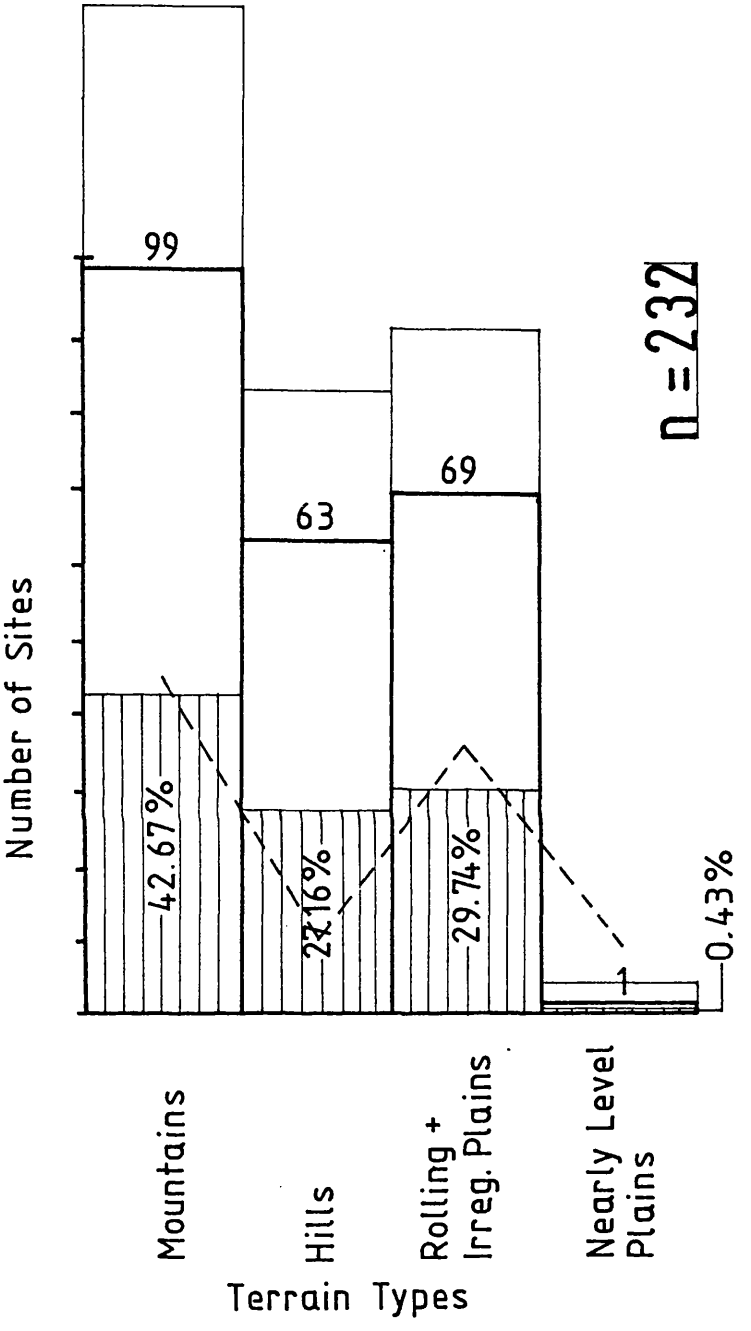


Fig. 28: Macrotopographic Distribution of Major Sites and Site Clusters (cf. Table 17). Thin lines show previous sample for comparison. Stippled line shows proportions of terrain types in percent of total land area (cf. Table 18).

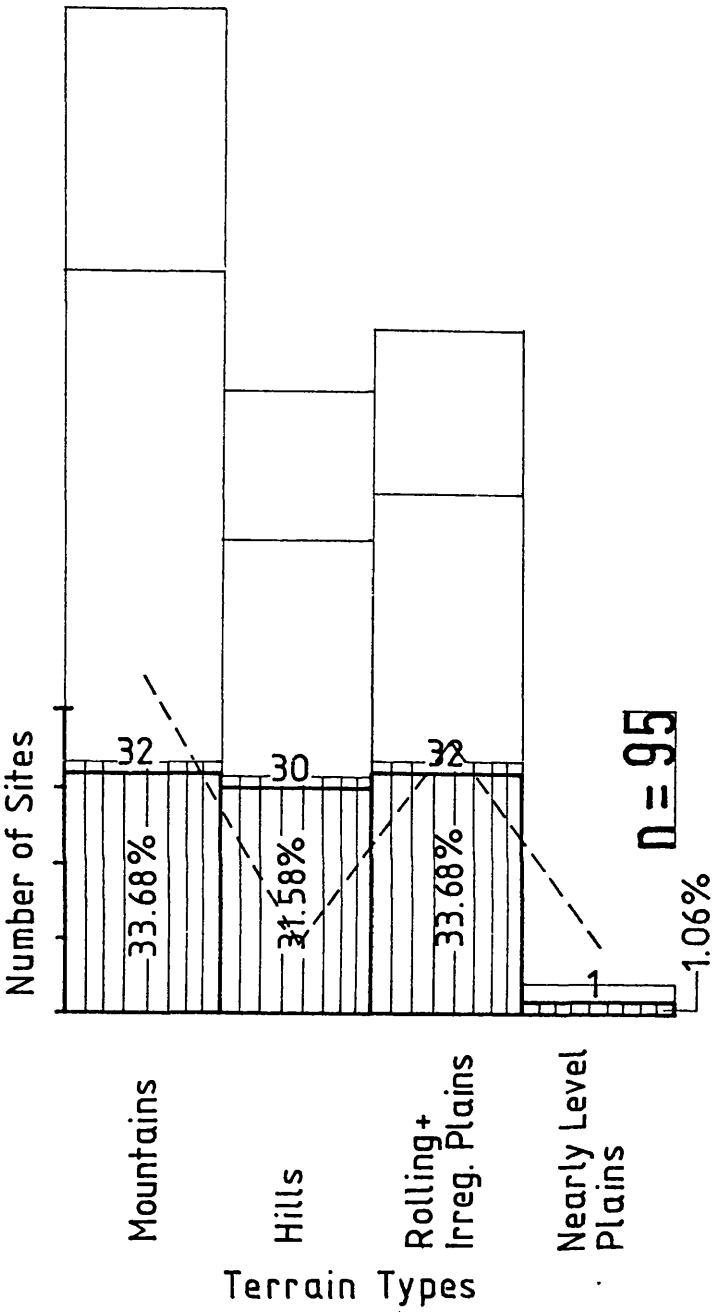


Fig. 29: Macrotopographic Distribution of Major Sites (cf. Table 17). Thin lines show previous samples for comparison. Stippled line shows proportions of terrain types in percent of total land area (cf. Table 18).

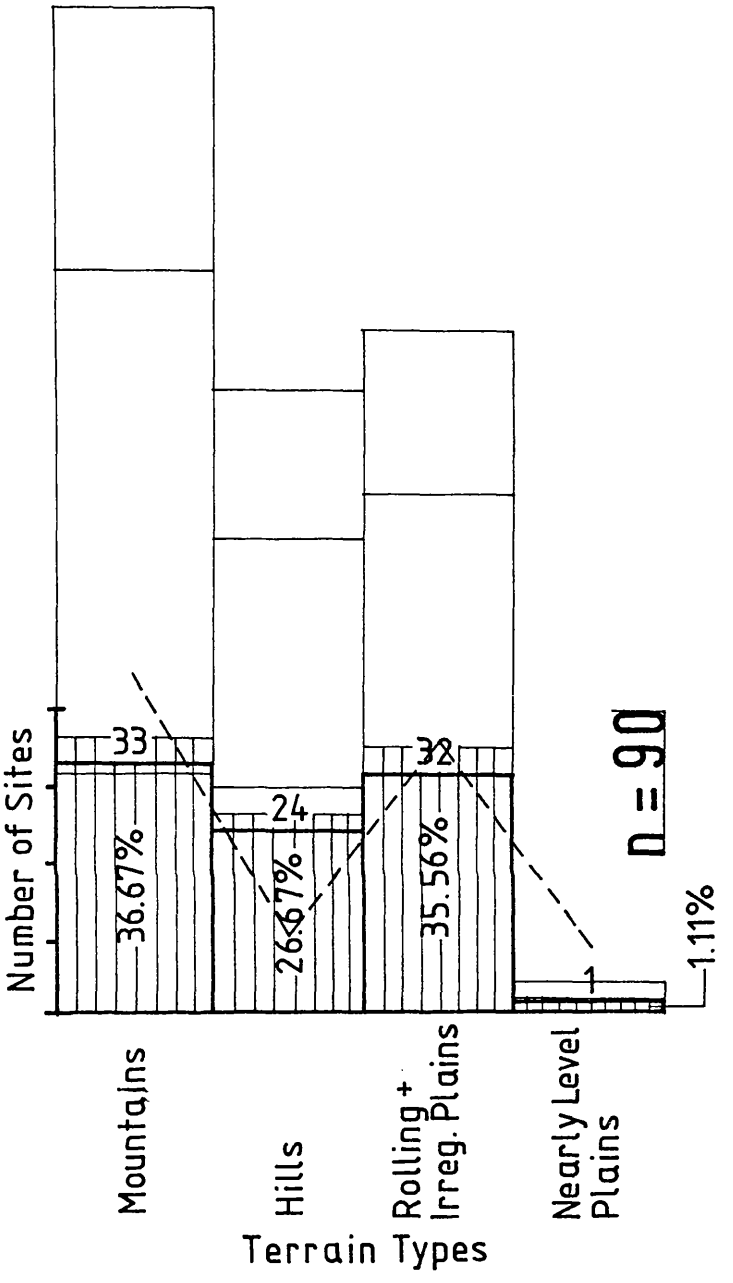


Fig. 30: Macrotopographic Distribution of Major Sites and HC Sites (cf. Table 17). Thin lines show previous samples for comparison. Stippled line shows proportions of terrain types in percent of total land area (cf. Table 18).

Table 20: Hyetographic Distribution of Major and Minor Sites (n=313).

District	Precipitation zones (mm)[a]							
	200-300	300-400	400-500	500-600	600-700	700-800	800-1200	Total/District
Nicosia	2	28	13	1	1	-	-	45
Percentage	0.64	8.95	4.15	0.32	0.32	-	-	14.38
Kyrenia	-	-	23	65	-	-	-	88
Percentage	-	-	7.35	20.77	-	-	-	28.12
Famagusta	-	7	14	24	-	-	-	45
Percentage	-	2.24	4.47	7.67	-	-	-	14.38
Larnaca	-	10	20	-	-	-	-	30
Percentage	-	3.19	6.39	-	-	-	-	9.58
Limassol	-	-	15	10	4	4	-	33
Percentage	-	-	4.79	3.19	1.28	1.28	-	10.54
Paphos	-	-	39	13	20	-	-	72
Percentage	-	-	12.46	4.15	6.39	-	-	23.00
Total/Zone	2	45	124	113	25	4	-	313
Percentage	0.64	14.38	39.62	36.10	7.99	1.28	-	100
Increment:		+2150%	+175.56%					
Decrement:				-8.87%	-77.88%	-84%	-100%	

[a]Based on modern annual rainfall averages, 1941-70 (vid. AAPMC 1972).

Percentage of District:

Nicosia	4.44	62.22	28.89	2.22	2.22	-	-	100
Kyrenia	-	-	26.14	73.86	-	-	-	100
Famagusta	-	15.56	31.11	53.33	-	-	-	100
Larnaca	-	33.33	66.67	-	-	-	-	100
Limassol	-	-	45.45	30.30	12.12	12.12	-	100
Paphos	-	-	54.17	18.06	27.78	-	-	100
$\bar{x}$	0.74	18.52	42.07	29.63	7.02	2.02	-	100

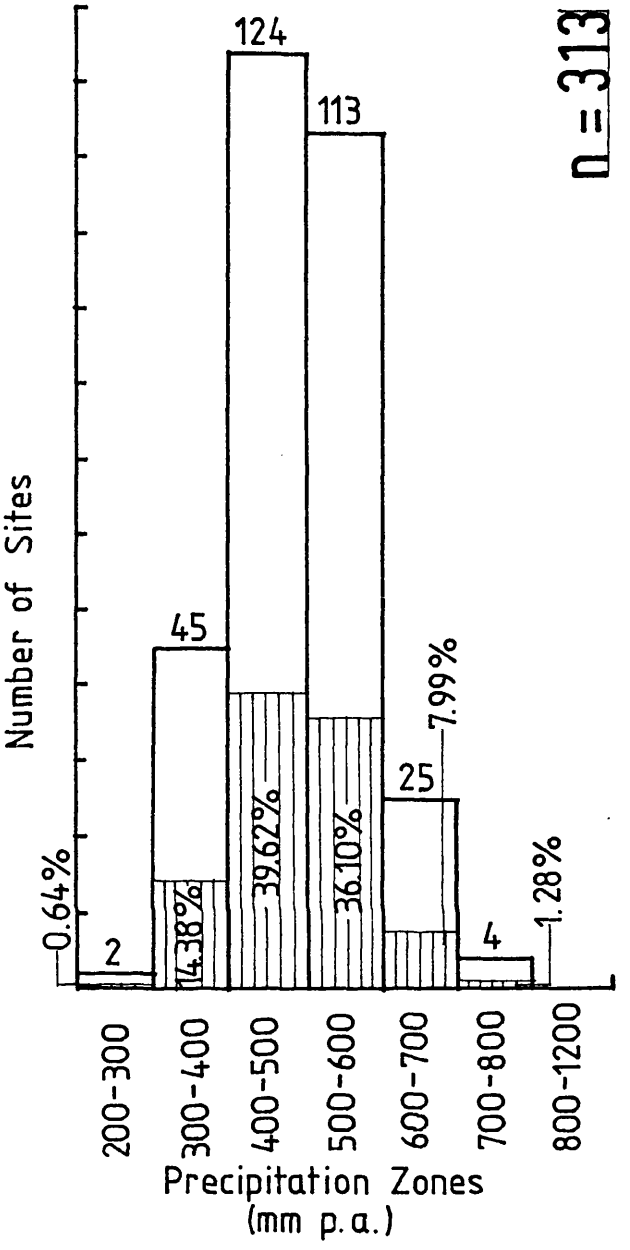


Fig. 31: Hyetographic Distribution of Major and Minor Sites (cf. Table 20).

Table 21: Hyetographic Distribution of Major Sites and Site Clusters (n=232).

District	Precipitation zones (mm)[a]							
	200-300	300-400	400-500	500-600	600-700	700-800	800-1200	Total/District
Nicosia	1	20	7	1	-	-	-	29
Percentage	0.43	8.62	3.02	0.43	-	-	-	12.50
Kyrenia	-	-	17	55	-	-	-	72
Percentage	-	-	7.33	23.71	-	-	-	31.03
Famagusta	-	2	8	19	-	-	-	29
Percentage	-	0.86	3.45	8.19	-	-	-	12.50
Larnaca	-	8	20	-	-	-	-	28
Percentage	-	3.45	8.62	-	-	-	-	12.07
Limassol	-	-	11	7	-	3	-	21
Percentage	-	-	4.74	3.02	-	1.29	-	9.05
Paphos	-	-	31	11	11	-	-	53
Percentage	-	-	13.36	4.74	4.74	-	-	22.84
Total/Zone	1	30	94	93	11	3	-	232
Percentage	0.43	12.93	40.52	40.09	4.74	1.29	-	100
Increment:		+2900%	+213.33%					
Decrement:				-1.06%	-88.17%	-72.73%	-100%	

[a]Based on modern annual rainfall averages, 1941-70 (vid. AAPMC 1972).

Percentage of District:

Nicosia	3.45	68.97	24.14	3.45	-	-	-	100
Kyrenia	-	-	23.61	76.39	-	-	-	100
Famagusta	-	6.90	27.59	65.52	-	-	-	100
Larnaca	-	28.57	71.43	-	-	-	-	100
Limassol	-	-	52.38	33.33	-	14.29	-	100
Paphos	-	-	58.49	20.75	20.75	-	-	100
$\bar{x}$	0.58	17.41	42.94	33.24	3.46	2.38	-	100

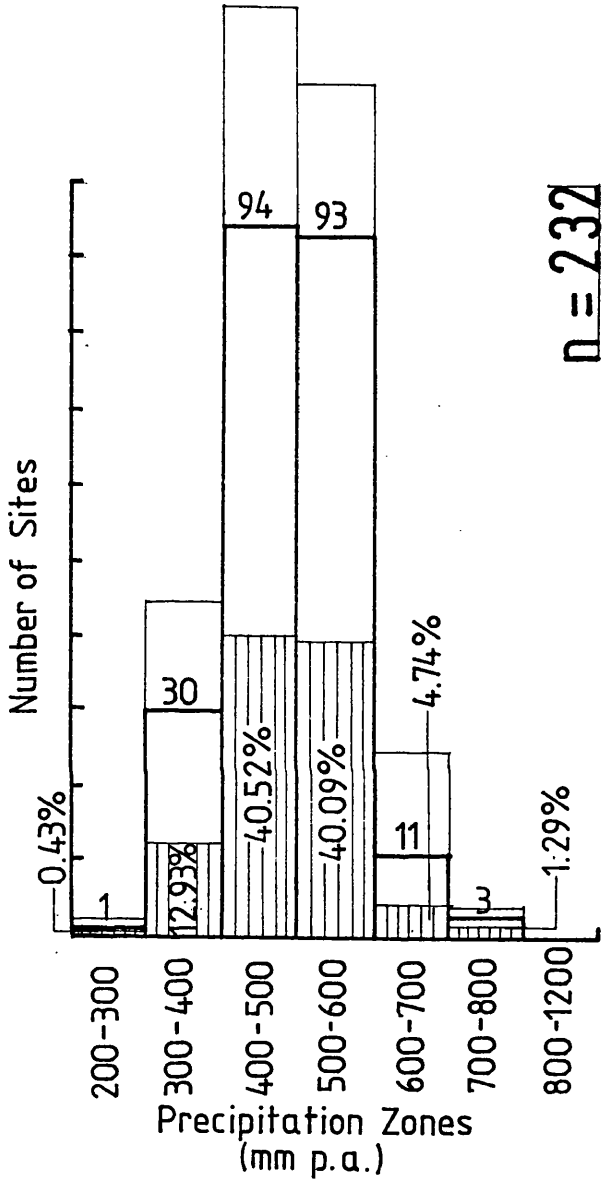


Fig. 32: Hyetographic Distribution of Major Sites and Site Clusters (cf. Table 21). Thin lines show previous sample for comparison.

Table 22: Hyetographic Distribution of Major Sites (n=95).

District	Precipitation zones (mm)[a]							
	200-300	300-400	400-500	500-600	600-700	700-800	800-1200	Total/District
Nicosia	1	16	5	-	-	-	-	22
Percentage	1.05	16.84	5.26	-	-	-	-	23.16
Kyrenia	-	-	11	16	-	-	-	27
Percentage	-	-	11.58	16.84	-	-	-	28.42
Famagusta	-	2	3	3	-	-	-	8
Percentage	-	2.11	3.16	3.16	-	-	-	8.42
Larnaca	-	5	11	-	-	-	-	16
Percentage	-	5.26	11.58	-	-	-	-	16.84
Limassol	-	-	6	1	-	-	-	7
Percentage	-	-	6.32	1.05	-	-	-	7.37
Paphos	-	-	9	2	4	-	-	15
Percentage	-	-	9.47	2.11	4.21	-	-	15.79
Total/Zone	1	23	45	22	4	-	-	95
Percentage	1.05	24.21	47.37	23.16	4.21	-	-	100
Increment:		+2200%	+95.65%					
Decrement:				-51.11%	-81.82%	-100%		

[a]Based on modern annual rainfall averages, 1941-70 (vid. AAPMC 1972).

Percentage of District:

Nicosia	4.55	72.73	22.73	-	-	-	-	100
Kyrenia	-	-	40.74	59.26	-	-	-	100
Famagusta	-	25.00	37.50	37.50	-	-	-	100
Larnaca	-	31.25	68.75	-	-	-	-	100
Limassol	-	-	85.71	14.29	-	-	-	100
Paphos	-	-	60.00	13.33	26.67	-	-	100
$\bar{x}$	0.76	21.50	52.57	20.73	4.45	-	-	100

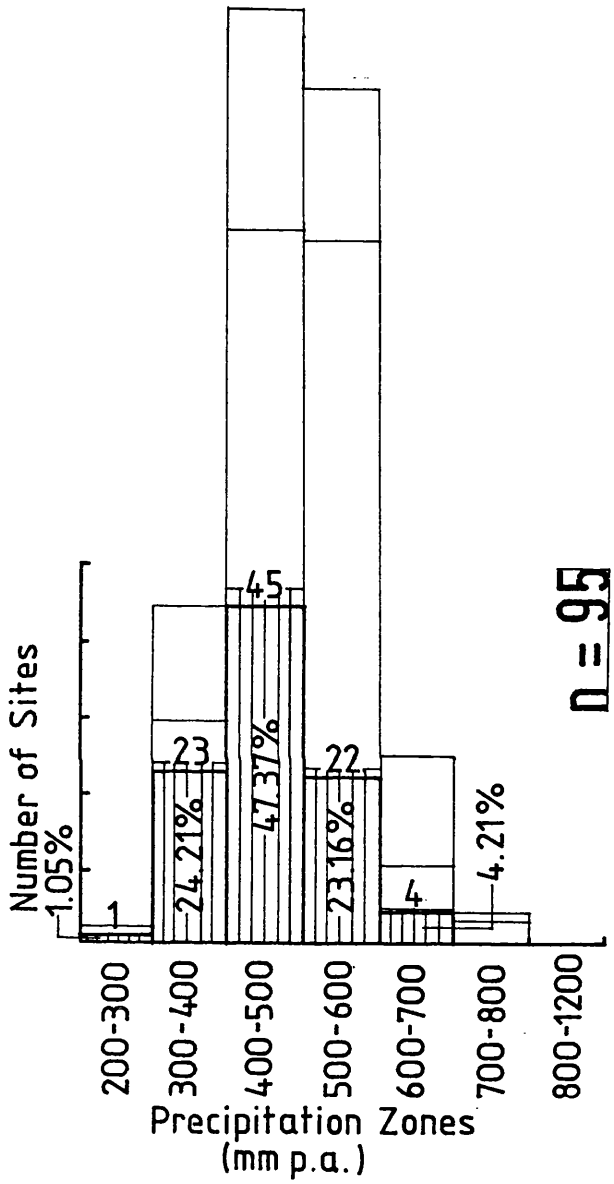


Fig. 33: Hyetographic Distribution of Major Sites (cf. Table 22). Thin lines show previous samples for comparison.

Table 23: Hyetographic Distribution of Major Sites and HC Sites(n=90).

District	Precipitation zones (mm)[a]							
	200-300	300-400	400-500	500-600	600-700	700-800	800-1200	Total/District
Nicosia	1	13	3	-	-	-	-	17
Percentage	1.11	14.44	3.33	-	-	-	-	18.89
Kyrenia	-	-	8	15	-	-	-	23
Percentage	-	-	8.89	16.67	-	-	-	25.56
Famagusta	-	2	4	4	-	-	-	10
Percentage	-	2.22	4.44	4.44	-	-	-	11.11
Larnaca	-	4	8	-	-	-	-	12
Percentage	-	4.44	8.89	-	-	-	-	13.33
Limassol	-	-	5	3	-	1	-	9
Percentage	-	-	5.56	3.33	-	1.11	-	10.00
Paphos	-	-	12	3	4	-	-	19
Percentage	-	-	13.33	3.33	4.44	-	-	21.11
Total/Zone	1	19	40	25	4	1	-	90
Percentage	1.11	21.11	44.44	27.78	4.44	1.11	-	100
Increment:		+1800%	+110.53%					
Decrement:				-37.50%	-84%	-75%	-100%	

[a]Based on modern annual rainfall averages, 1941-70 (vid. AAPMC 1972).

Percentage of District:

Nicosia	5.88	76.47	17.65	-	-	-	-	100
Kyrenia	-	-	34.78	65.22	-	-	-	100
Famagusta	-	20.00	40.00	40.00	-	-	-	100
Larnaca	-	33.33	66.67	-	-	-	-	100
Limassol	-	-	55.56	33.33	-	11.11	-	100
Paphos	-	-	63.16	15.79	21.05	-	-	100
$\bar{x}$	0.98	21.63	46.30	25.72	3.51	1.85	-	100

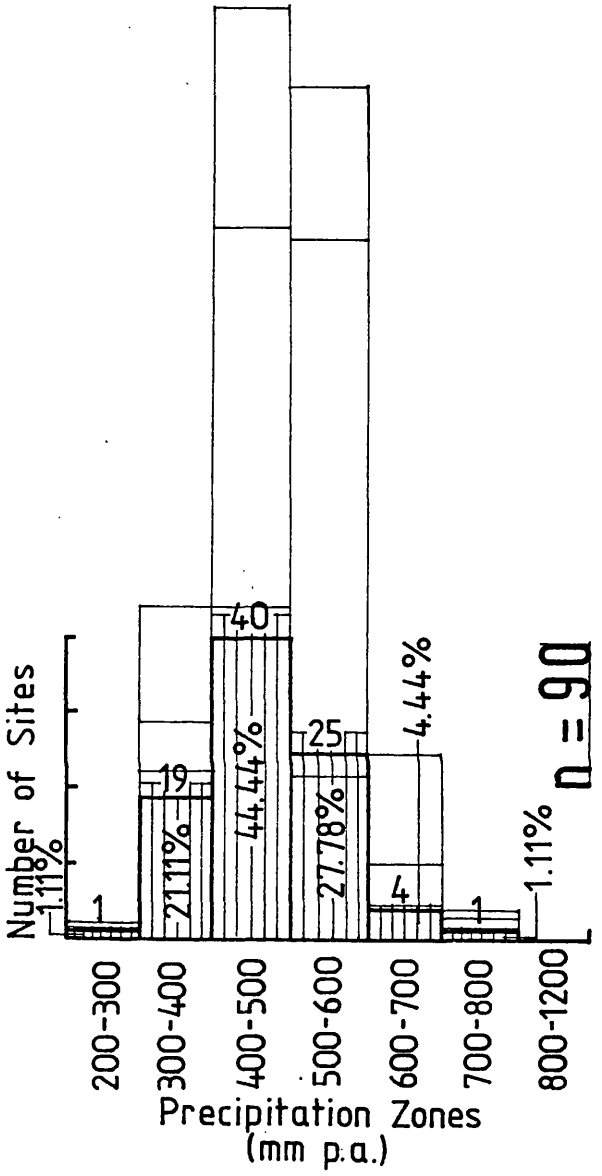


Fig. 34: Hyetographic Distribution of Major Sites and HC Sites (cf. Table 23). Thin lines show previous sample for comparison.

Soil Quality Grade and Soil Type	District NIC	KYA	FAM	LAC	LIS	PAS	Total/Type	Change
GRADE A SOILS:								
Terra Rossa (immat./deep)	2	47	21	7	6	19	102	
Percentage	0.64	15.02	6.71	2.24	1.92	6.07	32.59	
Red Earths	8	-	-	-	-	-	8	
Percentage	2.56	-	-	-	-	-	2.56	
Brown Earths (deep)	1	-	-	-	-	-	1	
Percentage	0.32	-	-	-	-	-	0.32	
Alluvial Soils(non-sal.)	14	-	-	4	1	6	25	
Percentage	4.47	-	-	1.28	0.32	1.92	7.99	
Total Grade A	25	47	21	11	7	25	136	
Percentage	7.99	15.02	6.71	3.51	2.24	7.99	43.45	*A-B* +18.38%
GRADE B SOILS:								
Terra Rossa (shallow)	2	10	5	2	-	1	20	
Percentage	0.64	3.19	1.60	0.64	-	0.32	6.39	
Brown Earths (shallow)	7	-	-	-	-	7	14	
Percentage	2.24	-	-	-	-	2.24	4.47	
Xerorendzinas	9	30	7	12	8	3	69	
Percentage	2.88	9.58	2.24	3.83	2.56	0.96	22.04	
CRS[a] (shallow-deep)	2	-	-	5	15	30	52	
Percentage	0.64	-	-	1.60	4.79	9.58	16.61	
SRS[b] (deep)	-	-	-	-	3	3	6	
Percentage	-	-	-	-	0.96	0.96	1.92	
Total Grade B	20	40	12	19	26	44	161	
Percentage	6.39	12.78	3.83	6.07	8.31	14.06	51.44	*B-C* -90.06%
GRADE C SOILS:								
Shallow Rendzinas[c]	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
CRS (rocky)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
SRS (shallow)	-	-	-	-	-	2	2	
Percentage	-	-	-	-	-	0.64	0.64	
Kafkalla	-	1	12	-	-	1	14	
Percentage	-	0.32	3.83	-	-	0.32	4.47	
Alluvial Soils(sal./marshy)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
Total Grade C	-	1	12	-	-	3	16	
Percentage	-	0.32	3.83	-	-	0.96	5.11	
Total/District	45	88	45	30	33	72	313	
Percentage	14.38	28.12	14.38	9.58	10.54	23.00	100	

[a]Calcareous Raw Soils [b]Silicate Raw Soils [c]With hard limestone outcrops

Table 24: Edaphic Distribution of Major and Minor Sites (n=313).

Table 25: Edaphic Distribution (n=313): Percentage of District.

Soil Quality Grade and Soil Type	District NIC	KYA	FAM	LAC	LIS	PAS	$\bar{x}$
Terra Rossa (imm./deep)	4.44	53.41	46.67	23.33	18.18	26.39	28.74
Red Earths	17.78	-	-	-	-	-	2.96
Brown Earths (deep)	2.22	-	-	-	-	-	0.37
Alluvial Soils(non-sal.)	31.11	-	-	13.33	3.03	8.33	9.30
Total Grade A	55.55	53.41	46.67	36.67	21.21	34.72	41.37
Terra Rossa (shallow)	4.44	11.36	11.11	6.67	-	1.39	5.83
Brown Earths (shallow)	15.56	-	-	-	-	9.72	4.21
Xerorendzinas	20.00	34.09	15.56	40.00	24.24	4.17	23.01
CRS (shallow-deep)	4.44	-	-	16.67	45.45	41.67	18.04
SRS (deep)	-	-	-	-	9.09	4.17	2.21
Total Grade B	44.45	45.45	26.67	63.33	78.79	61.11	53.30
SRS (shallow)	-	-	-	-	-	2.78	0.46
Kafkalla	-	1.14	26.67	-	-	1.39	4.87
Total Grade C	-	1.14	26.67	-	-	4.17	5.33
Total/District	100	100	100	100	100	100	100

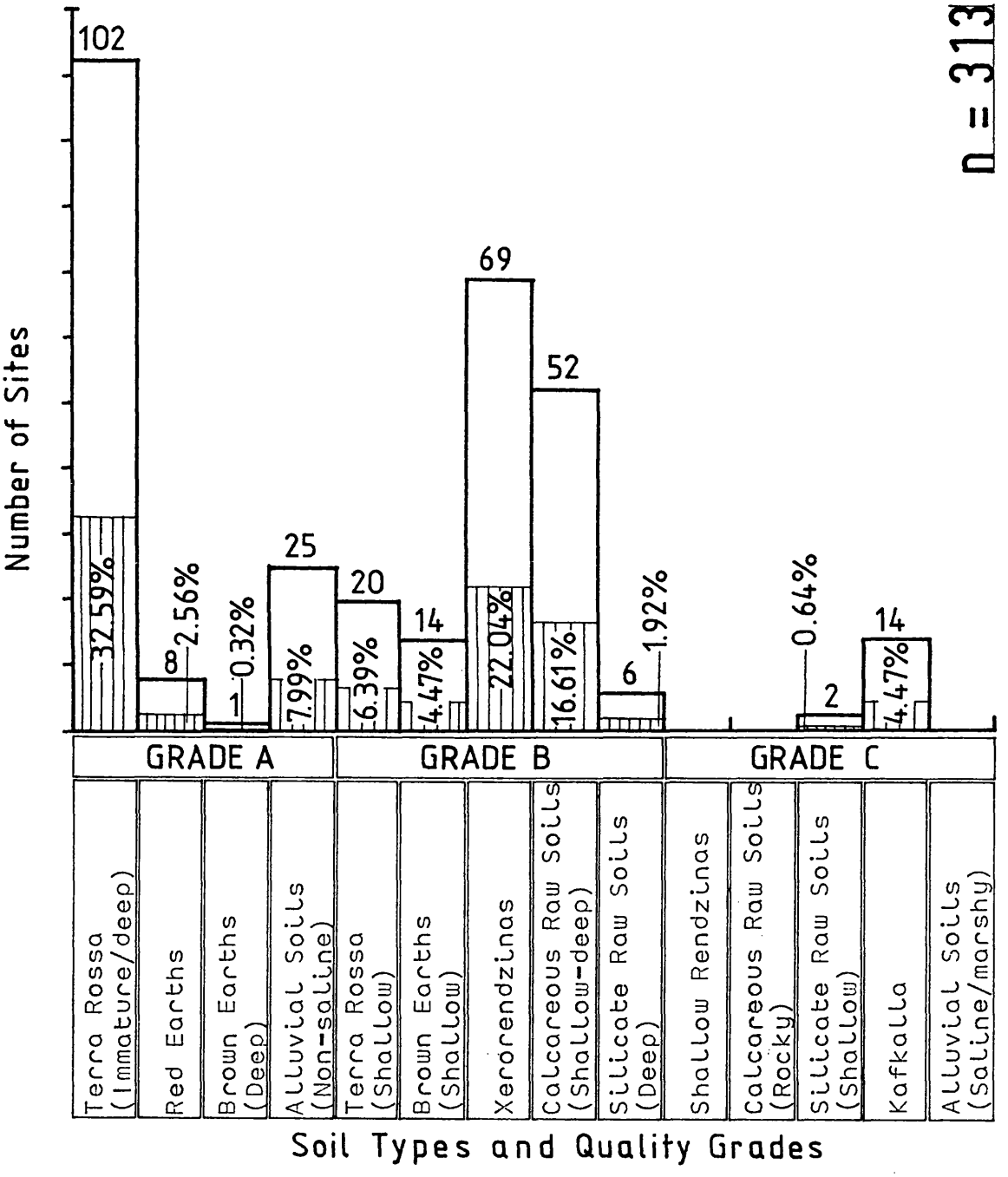


Fig. 35: Edaphic Distribution of Major and Minor Sites (cf. Tables 24-25).

Soil Quality Grade and Soil Type	District NIC	KYA	FAM	LAC	LIS	PAS	Total/Type	Change
GRADE A SOILS:								
Terra Rossa (imm./deep)	1	40	12	5	1	14	73	
Percentage	0.43	17.24	5.17	2.16	0.43	6.03	31.47	
Red Earths	4	-	-	-	-	-	4	
Percentage	1.72	-	-	-	-	-	1.72	
Brown Earths (deep)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
Alluvial Soils(non-sal.)	10	-	-	4	1	3	18	
Percentage	4.31	-	-	1.72	0.43	1.29	7.76	
Total Grade A	15	40	12	9	2	17	95	
Percentage	6.47	17.24	5.17	3.88	0.86	7.33	40.95	*A-B* +29.47%
GRADE B SOILS:								
Terra Rossa (shallow)	2	5	3	2	-	1	13	
Percentage	0.86	2.16	1.29	0.86	-	0.43	5.60	
Brown Earths (shallow)	5	-	-	-	-	7	12	
Percentage	2.16	-	-	-	-	3.02	5.17	
Xerorendzinas	6	27	2	12	5	2	54	
Percentage	2.59	11.64	0.86	5.17	2.16	0.86	23.23	
CRS[a] (shallow-deep)	1	-	-	5	12	21	39	
Percentage	0.43	-	-	2.16	5.17	9.05	16.81	
SRS[b] (deep)	-	-	-	-	2	3	5	
Percentage	-	-	-	-	0.86	1.29	2.16	
Total Grade B	14	32	5	19	19	34	123	
Percentage	6.03	13.79	2.16	8.19	8.19	14.66	53.02	*B-C* -88.62%
GRADE C SOILS:								
Shallow Rendzinas[c]	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
CRS (rocky)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
SRS (shallow)	-	-	-	-	-	2	2	
Percentage	-	-	-	-	-	0.86	0.86	
Kafkalla	-	-	12	-	-	-	12	
Percentage	-	-	5.17	-	-	-	5.17	
Alluvial Soils(sal./marshy)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
Total Grade C	-	-	12	-	-	2	14	
Percentage	-	-	5.17	-	-	0.86	6.03	
Total/District	29	72	29	28	21	53	232	
Percentage	12.50	31.03	12.50	12.07	9.05	22.84	100	

[a]Calcareous Raw Soils [b]Silicate Raw Soils [c]With hard limestone outcrops

Table 26: Edaphic Distribution of Major Sites and Site Clusters (n=232).

Table 27: Edaphic Distribution (n=232): Percentage of District.

Soil Quality Grade and Soil Type	District NIC	KYA	FAM	LAC	LIS	PAS	$\bar{x}$
Terra Rossa (immat./deep)	3.45	55.56	41.38	17.86	4.76	26.42	24.91
Red Earths	13.79	-	-	-	-	-	2.30
Brown Earths (deep)	-	-	-	-	-	-	-
Alluvial Soils(non-sal.)	34.48	-	-	14.29	4.76	5.66	9.91
Total Grade A	51.72	55.56	41.38	32.15	9.52	32.08	37.07
Terra Rossa (shallow)	6.90	6.94	10.34	7.14	-	1.89	5.57
Brown Earths (shallow)	17.24	-	-	-	-	13.21	5.08
Xerorendzinas	20.69	37.50	6.90	42.86	23.81	3.77	22.59
CRS (shallow-deep)	3.45	-	-	17.86	57.14	39.62	19.68
SRS (deep)	-	-	-	-	9.52	5.66	2.53
Total Grade B	48.28	44.44	17.24	67.85	90.47	64.15	55.41
SRS (shallow)	-	-	-	-	-	3.77	0.63
Kafkalla	-	-	41.38	-	-	-	6.90
Total Grade C	-	-	41.38	-	-	3.77	7.53
Total/District	100	100	100	100	100	100	100

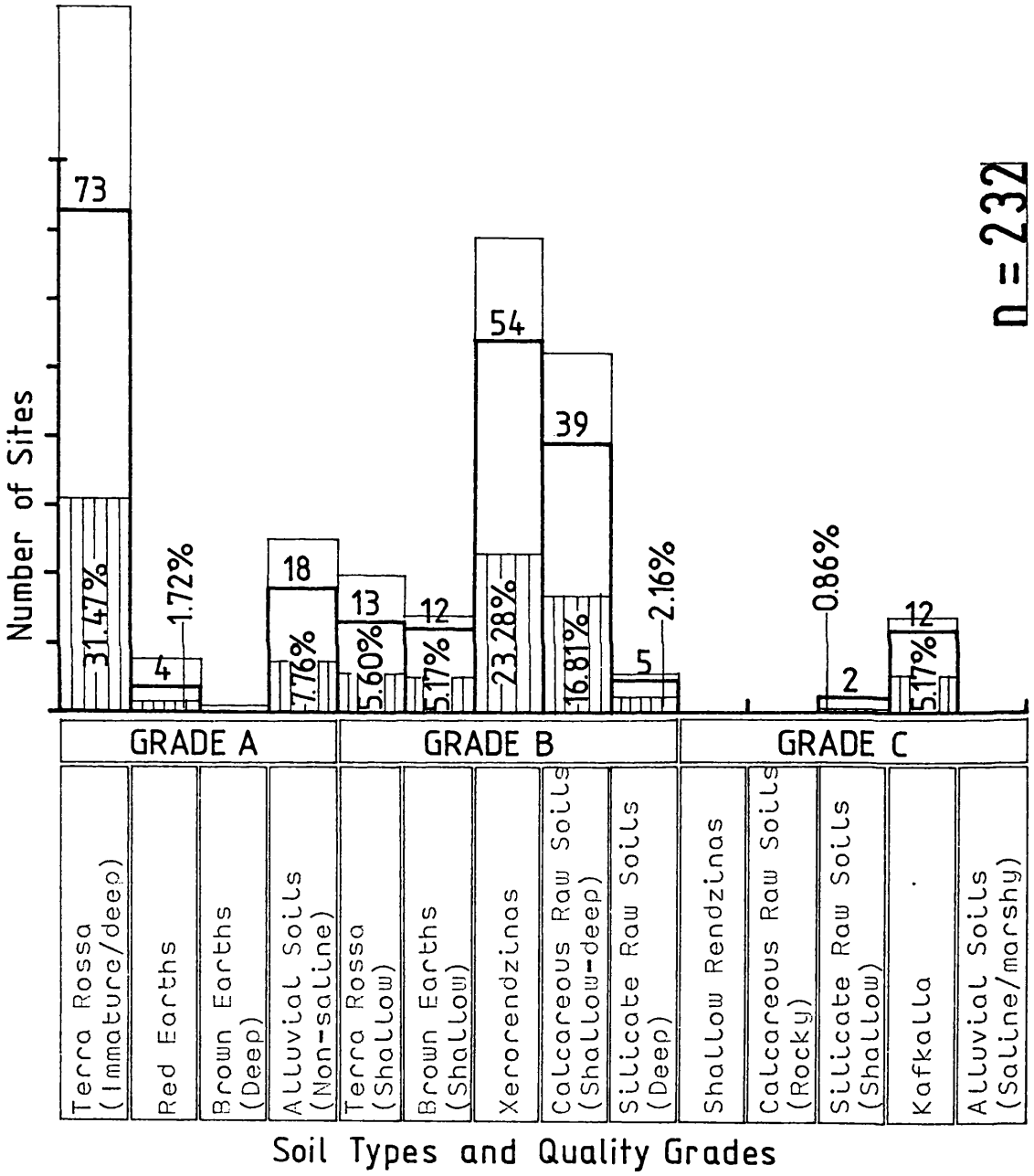


Fig. 36: Edaphic Distribution of Major Sites and Site Clusters (cf. Tables 26-27). Thin lines show previous sample for comparison.

Soil Quality Grade and Soil Type	District NIC	KYA	FAM	LAC	LIS	PAS	Total/Type	Change
GRADE A SOILS:								
Terra Rossa (immat./deep)	1	14	3	4	1	3	26	
Percentage	1.05	14.74	3.16	4.21	1.05	3.16	27.37	
Red Earths	3	-	-	-	-	-	3	
Percentage	3.16	-	-	-	-	-	3.16	
Brown Earths (deep)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
Alluvial Soils(non-sal.)	8	-	-	3	1	2	14	
Percentage	8.42	-	-	3.16	1.05	2.11	14.74	
Total Grade A	12	14	3	7	2	5	43	
Percentage	12.63	14.74	3.16	7.37	2.11	5.26	45.26	*A-B* +16.28%
GRADE B SOILS:								
Terra Rossa (shallow)	1	1	3	1	-	1	7	
Percentage	1.05	1.05	3.16	1.05	-	1.05	7.37	
Brown Earths (shallow)	3	-	-	-	-	-	3	
Percentage	3.16	-	-	-	-	-	3.16	
Xerorendzinas	5	12	-	8	2	-	27	
Percentage	5.26	12.63	-	8.42	2.11	-	28.42	
CRS[a] (shallow-deep)	1	-	-	-	2	8	11	
Percentage	1.05	-	-	-	2.11	8.42	11.58	
SRS[b] (deep)	-	-	-	-	1	1	2	
Percentage	-	-	-	-	1.05	1.05	2.11	
Total Grade B	10	13	3	9	5	10	50	
Percentage	10.53	13.68	3.16	9.47	5.26	10.53	52.63	*B-C* -96%
GRADE C SOILS:								
Shallow Rendzinas[c]	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
CRS (rocky)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
SRS (shallow)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
Kafkalla	-	-	2	-	-	-	2	
Percentage	-	-	2.11	-	-	-	2.11	
Total Grade C	-	-	2	-	-	-	2	
Percentage	-	-	2.11	-	-	-	2.11	
Total/District	22	27	8	16	7	15	95	
Percentage	23.16	28.42	8.42	16.84	7.37	15.79	100	

[a]Calcareous Raw Soils [b]Silicate Raw Soils [c]With hard limestone outcrops

Table 28: Edaphic Distribution of Major Sites (n=95).

Table 29: Edaphic Distribution (n=95): Percentage of District.

Soil Quality Grade and Soil Type	District NIC	KYA	FAM	LAC	LIS	PAS	$\bar{x}$
Terra Rossa (immat./deep)	4.55	51.85	37.50	25.00	14.29	20.00	25.53
Red Earths	13.64	-	-	-	-	-	2.27
Brown Earths (deep)	-	-	-	-	-	-	-
Alluvial Soils(non-sal.)	36.36	-	-	18.75	14.29	13.33	13.79
Total Grade A	54.55	51.85	37.50	43.75	28.57	33.33	41.59
Terra Rossa (shallow)	4.55	3.70	37.50	6.25	-	6.67	9.78
Brown Earths (shallow)	13.64	-	-	-	-	-	2.27
Xerorendzinas	22.73	44.44	-	50.00	28.57	-	24.29
CRS (shallow-deep)	4.55	-	-	-	28.57	43.33	14.41
SRS (deep)	-	-	-	-	14.29	6.67	3.49
Total Grade B	45.45	48.15	37.50	56.25	71.43	66.67	54.24
SRS (shallow)	-	-	-	-	-	-	-
Kafkalla	-	-	25.00	-	-	-	4.17
Total Grade C	-	-	25.00	-	-	-	4.17
Total/District	100	100	100	100	100	100	100

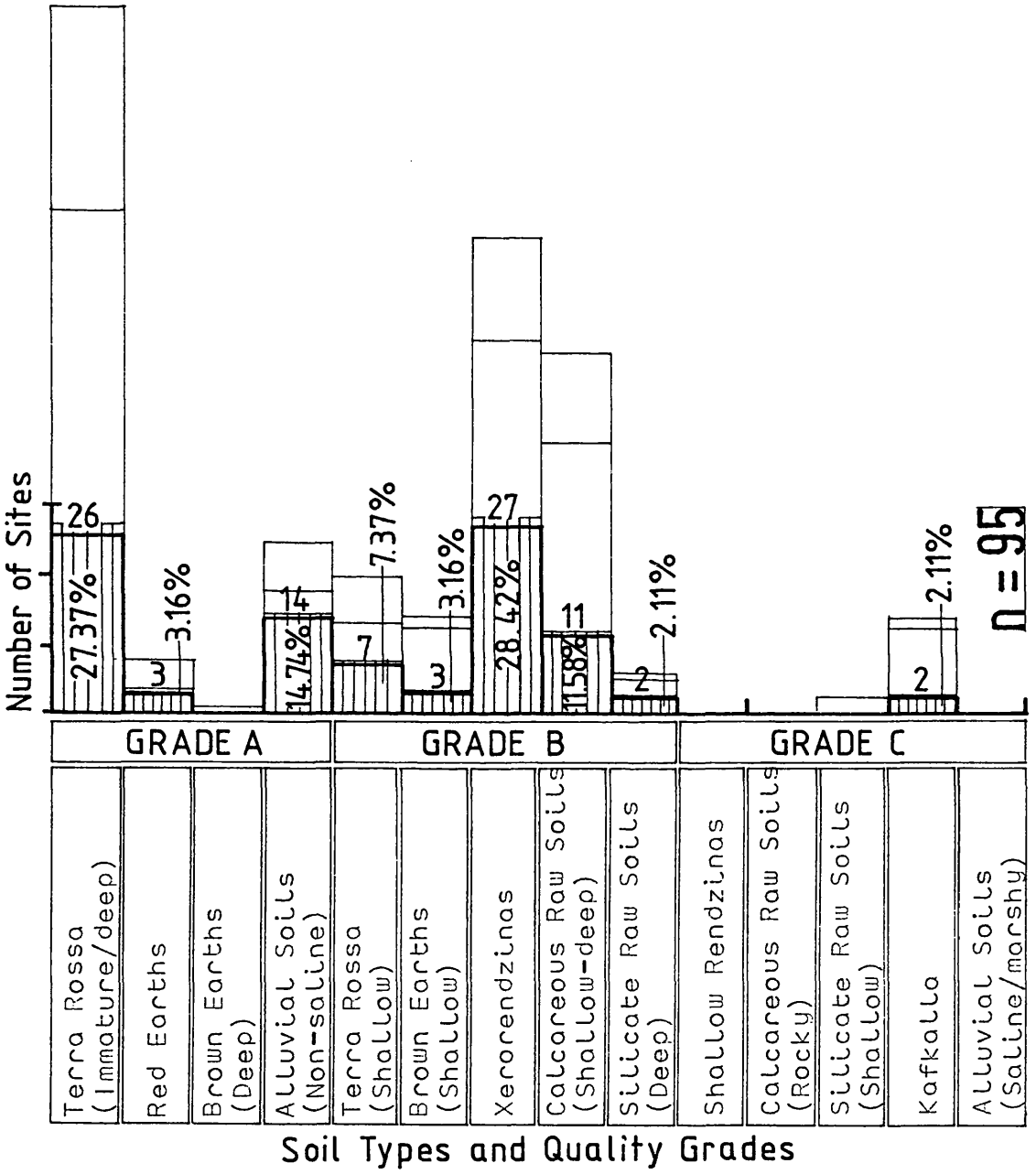


Fig. 37: Edaphic Distribution of Major Sites (cf. Tables 28-29). Thin lines show previous samples for comparison.

Soil Quality Grade and Soil Type	District NIC	KYA	FAM	LAC	LIS	PAS	Total/Type	Change
GRADE A SOILS:								
Terra Rossa (immat./deep)	1	12	5	3	1	5	27	
Percentage	1.11	13.33	5.56	3.33	1.11	5.56	30.00	
Red Earths	2	-	-	-	-	-	2	
Percentage	2.22	-	-	-	-	-	2.22	
Brown Earths (deep)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
Alluvial Soils(non-sal.)	5	-	-	3	-	2	10	
Percentage	5.56	-	-	3.33	-	2.22	11.11	
Total Grade A	8	12	5	6	1	7	39	
Percentage	8.89	13.33	5.56	6.67	1.11	7.78	43.33	*A-B* +25.64%
GRADE B SOILS:								
Terra Rossa (shallow)	1	-	3	1	-	1	6	
Percentage	1.11	-	3.33	1.11	-	1.11	6.67	
Brown Earths (shallow)	3	-	-	-	-	1	4	
Percentage	3.33	-	-	-	-	1.11	4.44	
Xerorendzinas	4	11	-	5	2	-	22	
Percentage	4.44	12.22	-	5.56	2.22	-	24.44	
CRS[a] (shallow-deep)	1	-	-	-	5	8	14	
Percentage	1.11	-	-	-	5.56	8.89	15.56	
SRS[b] (deep)	-	-	-	-	1	2	3	
Percentage	-	-	-	-	1.11	2.22	3.33	
Total Grade B	9	11	3	6	8	12	49	
Percentage	10.00	12.22	3.33	6.67	8.89	13.33	54.44	*B-C* -95.92%
GRADE C SOILS:								
Shallow Rendzinas[c]	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
CRS (rocky)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
SRS (shallow)	-	-	-	-	-	-	-	
Percentage	-	-	-	-	-	-	-	
Kafkalla	-	-	2	-	-	-	2	
Percentage	-	-	2.22	-	-	-	2.22	
Total Grade C	-	-	2	-	-	-	2	
Percentage	-	-	2.22	-	-	-	2.22	
Total/District	17	23	10	12	9	19	90	
Percentage	18.89	25.56	11.11	13.33	10.00	21.11	100	

[a]Calcareous Raw Soils [b]Silicate Raw Soils [c]With hard limestone outcrops

Table 30: Edaphic Distribution of Major Sites and HC Sites (n=90).

Table 31: Edaphic Distribution (n=90): Percentage of District.

Soil Quality Grade and Soil Type	District NIC	KYA	FAM	LAC	LIS	PAS	$\bar{x}$
Terra Rossa (immat./deep)	5.88	52.17	50.00	25.00	11.11	26.32	28.41
Red Earths	11.76	-	-	-	-	-	1.96
Brown Earths (deep)	-	-	-	-	-	-	-
Alluvial Soils(non-sal.)	29.41	-	-	25.00	-	10.53	10.82
Total Grade A	47.06	52.17	50.00	50.00	11.11	36.84	41.19
Terra Rossa (shallow)	5.88	-	30.00	8.33	-	5.26	8.25
Brown Earths (shallow)	17.65	-	-	-	-	5.26	3.82
Xerorendzinas	23.53	47.83	-	41.67	22.22	-	22.54
CRS (shallow-deep)	5.88	-	-	-	55.56	42.11	17.26
SRS (deep)	-	-	-	-	11.11	10.53	3.61
Total Grade B	52.94	47.83	30.00	50.00	88.89	63.16	55.47
SRS (shallow)	-	-	-	-	-	-	-
Kafkalla	-	-	20.00	-	-	-	3.33
Total Grade C	-	-	20.00	-	-	-	3.33
Total/District	100	100	100	100	100	100	100

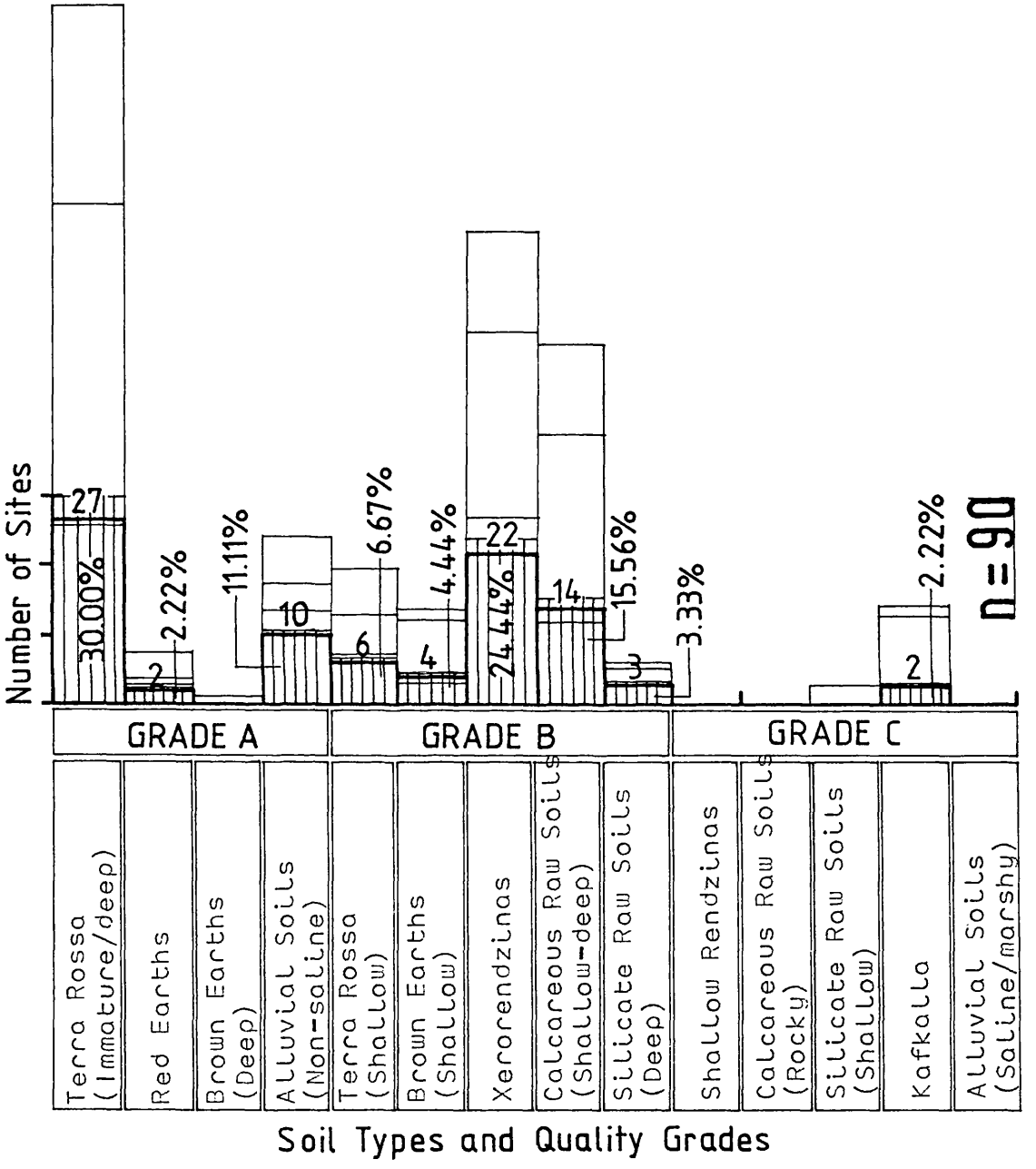


Fig. 38: Edaphic Distribution of Major Sites and HC Sites (cf. Tables 30-31). Thin lines show previous samples for comparison.

Soil Type (Grade)	Sample A (n=313)	B (n=232)	C (n=95)	D (n=90)	$\bar{x}$
1. Terra Rossa (A) (Immature/deep)	102	73	26	27	57
Percentage	32.59	31.47	27.37	30.00	30.36
2. Xerorendzinas (B)	69	54	27	22	43
Percentage	22.04	23.28	28.42	24.44	25.55
Total 1+2	171	127	53	49	100
Percentage	54.63	54.74	55.79	54.44	54.90
3. CRS (B) (Shallow-deep)	52	39	11	14	29
Percentage	16.61	16.81	11.58	15.56	15.14
4. Alluvial Soils (A) (Non-saline)	25	18	14	10	16.75
Percentage	7.99	7.76	14.74	11.11	10.40
Total 3+4	77	57	25	24	45.75
Percentage	24.60	24.57	26.32	26.67	25.54
Total 1-4	248	184	78	73	145.75
Percentage	79.23	79.31	82.11	81.11	80.44
5. Terra Rossa (B) (Shallow)	20	13	7	6	11.50
Percentage	6.39	5.60	7.37	6.67	6.51
6. Brown Earths (B) (Shallow)	14	12	3	4	8.25
Percentage	4.47	5.17	3.16	4.44	4.31
7. Red Earths (A)	8	4	3	2	4.25
Percentage	2.56	1.72	3.16	2.22	2.42
8. SRS (B) (Deep)	6	5	2	3	4
Percentage	1.92	2.16	2.11	3.33	2.38
Total 5-8	48	34	15	15	28
Percentage	15.34	14.66	15.80	16.67	15.62
Total 3-8	125	91	40	39	73.75
Percentage	39.94	39.22	42.12	43.33	41.15
Total 1-8	296	218	93	88	173.75
Percentage	94.57	93.97	97.91	97.78	96.06
Minor Soil Types (9. Deep Brown Earths, A) (10. Shallow SRS, C) (11. Kafkalla, C)	17	14	2	2	8.75
Percentage	5.43	6.03	2.09	2.22	3.94
Total/Sample	313	232	95	90	182.50

Table 32: Total and Average Number of Sites per Soil Type in Descending Order of Magnitude (all samples).

District	Land suitability zones[a] I	II	III	IV	V	Total
Nicosia	11	18	8	1	7	45
Percentage	3.51	5.75	2.56	0.32	2.24	14.38
Kyrenia	51	-	13	13	11	88
Percentage	16.29	-	4.15	4.15	3.51	28.12
Famagusta	7	4	9	5	20	45
Percentage	2.24	1.28	2.88	1.60	6.39	14.38
Larnaca	7	17	2	4	-	30
Percentage	2.24	5.43	0.64	1.28	-	9.58
Limassol	7	11	6	8	1	33
Percentage	2.24	3.51	1.92	2.56	0.32	10.53
Paphos	6	25	12	25	4	72
Percentage	1.92	7.99	3.83	7.99	1.28	23.00
Total/Zone	89	75	50	56	43	313
Percentage	28.43	23.96	15.97	17.89	13.74	100
Increment:				+12%		
Decrement:		-15.73%	-33.33%		-23.21%	
Percentage of District:						
Nicosia	24.44	40.00	17.78	2.22	15.56	100
Kyrenia	57.95	-	14.77	14.77	12.50	100
Famagusta	15.56	8.89	20.00	11.11	44.44	100
Larnaca	23.33	56.67	6.67	13.33	-	100
Limassol	21.21	33.33	18.18	24.24	3.03	100
Paphos	8.33	34.72	16.67	34.72	5.56	100
$\bar{x}$	25.14	28.94	15.68	16.73	13.52	100

[a]Based on LSMC 1961:
I: Slight or no limitations (topographic, geomorphic, edaphic); suitable for all irrigated and rainfed crops.
II: Slight to moderate limitations; suitable for all irrigated crops except citrus and for all rainfed crops.
III: Serious limitations; suitable for all irrigated and rainfed crops except tree crops.
IV: Severe limitations; unsuitable for irrigated crops except shallow-rooted legumes and fodder crops; moderately suitable for rainfed crops except tree crops.
V: Unsuitable for irrigated agriculture and generally unsuitable for dry farming, with localized suitability for grazing.

Table 33: Agronomic Distribution of Major and Minor Sites (n=313).

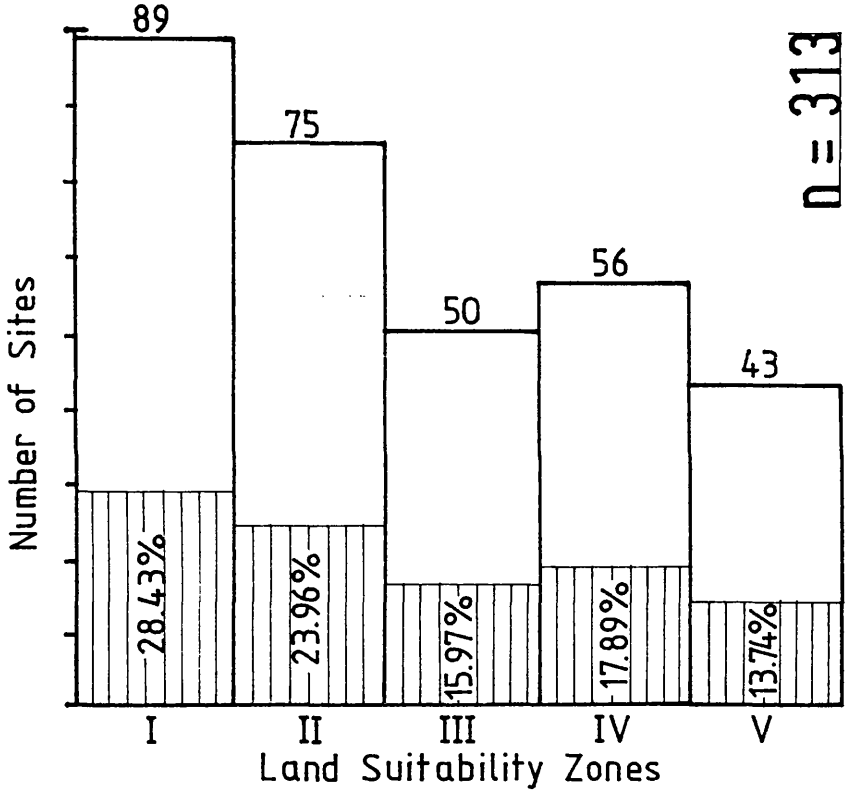


Fig. 39: Agronomic Distribution of Major and Minor Sites (cf. Table 33).

District	Land suitability zones[a]					
	I	II	III	IV	V	Total
Nicosia	8	10	5	1	5	29
Percentage	3.45	4.31	2.16	0.43	2.16	12.50
Kyrenia	47	-	9	8	8	72
Percentage	20.26	-	3.88	3.45	3.45	31.03
Famagusta	5	2	5	2	15	29
Percentage	2.16	0.86	2.16	0.86	6.47	12.50
Larnaca	7	15	2	4	-	28
Percentage	3.02	6.47	0.86	1.72	-	12.07
Limassol	4	7	2	8	-	21
Percentage	1.72	3.02	0.86	3.45	-	9.05
Paphos	6	15	6	23	3	53
Percentage	2.59	6.47	2.59	9.91	1.29	22.84
Total/Zone	77	49	29	46	31	232
Percentage	33.19	21.12	12.50	19.83	13.36	100
Increment:			+58.62%			
Decrement:	-36.36%	-40.82%		-32.61%		
Percentage of District:						
Nicosia	27.59	34.48	17.24	3.45	17.24	100
Kyrenia	65.28	-	12.50	11.11	11.11	100
Famagusta	17.24	6.90	17.24	6.90	51.72	100
Larnaca	25.00	53.57	7.14	14.29	-	100
Limassol	19.05	33.33	9.52	38.10	-	100
Paphos	11.32	28.30	11.32	43.40	5.66	100
$\bar{x}$	27.58	26.10	12.49	19.54	14.29	100

[a]Based on LSMC 1961:
I: Slight or no limitations (topographic, geomorphic, edaphic); suitable for all irrigated and rainfed crops.
II: Slight to moderate limitations; suitable for all irrigated crops except citrus and for all rainfed crops.
III: Serious limitations; suitable for all irrigated and rainfed crops except tree crops.
IV: Severe limitations; unsuitable for irrigated crops except shallow-rooted legumes and fodder crops; moderately suitable for rainfed crops except tree crops.
V: Unsuitable for irrigated agriculture and generally unsuitable for dry farming, with localized suitability for grazing.

Table 34: Agronomic Distribution of Major Sites and Site Clusters (n=232).

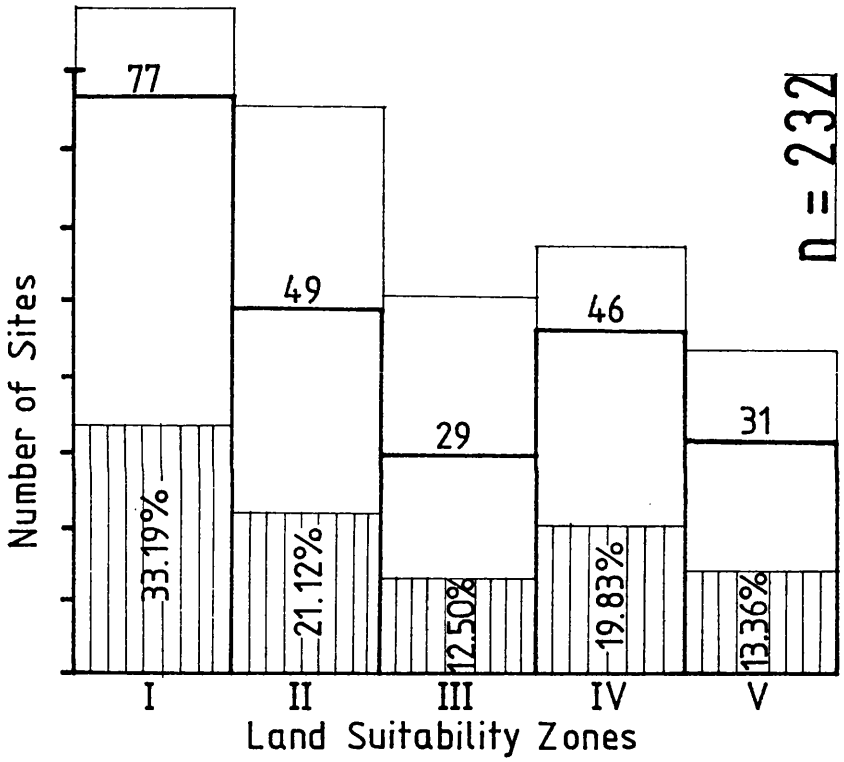


Fig. 40: Agronomic Distribution of Major Sites and Site Clusters (cf. Table 34). Thin lines show previous sample for comparison.

District	Land suitability zones[a]					
	I	II	III	IV	V	Total
Nicosia	7	8	4	1	2	22
Percentage	7.37	8.42	4.21	1.05	2.11	23.16
Kyrenia	16	-	4	3	4	27
Percentage	16.84	-	4.21	3.16	4.21	28.42
Famagusta	3	-	-	2	3	8
Percentage	3.16	-	-	2.11	3.16	8.42
Larnaca	5	9	1	1	-	16
Percentage	5.26	9.47	1.05	1.05	-	16.84
Limassol	2	3	2	-	-	7
Percentage	2.11	3.16	2.11	-	-	7.37
Paphos	1	4	1	9	-	15
Percentage	1.05	4.21	1.05	9.47	-	15.79
Total/Zone	34	24	12	16	9	95
Percentage	35.79	25.26	12.63	16.84	9.47	100
Increment:			+33.33%			
Decrement:	-29.41%	-50%		-56.25%		
Percentage of District:						
Nicosia	31.82	36.36	18.18	4.55	9.09	100
Kyrenia	59.26	-	14.81	11.11	14.81	100
Famagusta	37.50	-	-	25.00	37.50	100
Larnaca	31.25	56.25	6.25	6.25	-	100
Limassol	28.57	42.86	28.57	-	-	100
Paphos	6.67	26.67	6.67	60.00	-	100
$\bar{x}$	32.51	27.02	12.41	17.82	10.23	100

[a]Based on LSMC 1961:
I: Slight or no limitations (topographic, geomorphic, edaphic): suitable for all irrigated and rainfed crops.
II: Slight to moderate limitations; suitable for all irrigated crops except citrus and for all rainfed crops.
III: Serious limitations; suitable for all irrigated and rainfed crops except tree crops.
IV: Severe limitations; unsuitable for irrigated crops except shallow-rooted legumes and fodder crops; moderately suitable for rainfed crops except tree crops.
V: Unsuitable for irrigated agriculture and generally unsuitable for dry farming, with localized suitability for grazing.

Table 35: Agronomic Distribution of Major Sites (n=95).

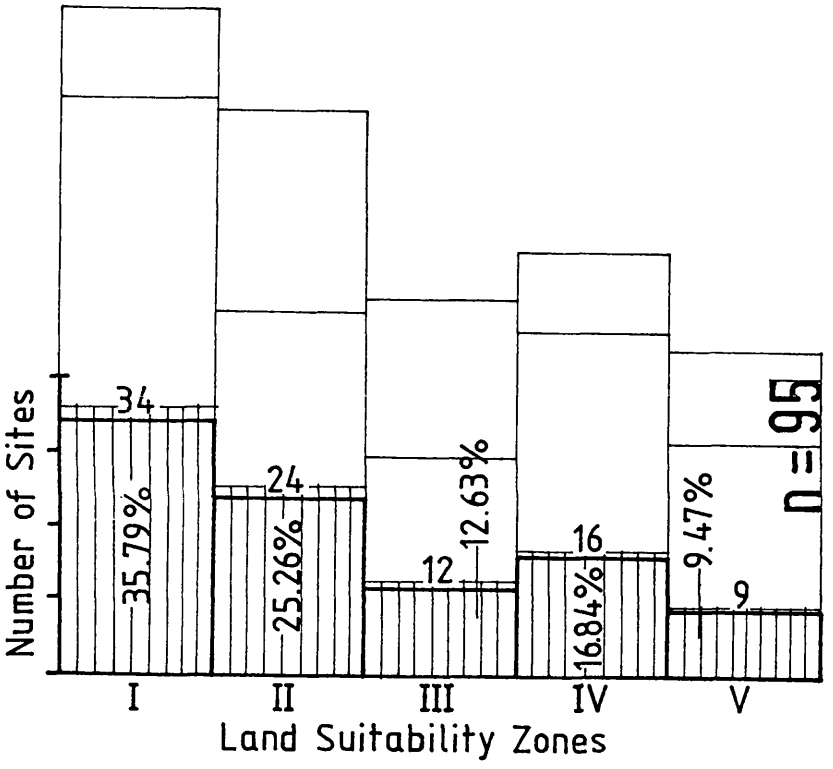


Fig. 41: Agronomic Distribution of Major Sites (cf. Table 35). Thin lines show previous samples for comparison.

District	Land suitability zones[a] I	II	III	IV	V	Total
Nicosia	6	5	3	1	2	17
Percentage	6.67	5.56	3.33	1.11	2.22	18.89
Kyrenia	14	-	2	4	3	23
Percentage	15.56	-	2.22	4.44	3.33	25.56
Famagusta	4	-	1	2	3	10
Percentage	4.44	-	1.11	2.22	3.33	11.11
Larnaca	3	7	1	1	-	12
Percentage	3.33	7.78	1.11	1.11	-	13.33
Limassol	2	4	2	1	-	9
Percentage	2.22	4.44	2.22	1.11	-	10.00
Paphos	3	6	1	9	-	19
Percentage	3.33	6.67	1.11	10.00	-	21.11
Total/Zone	32	22	10	18	8	90
Percentage	35.56	24.44	11.11	20.00	8.89	100
Increment:			+80%			
Decrement:	431.25%	-54.55%		-55.56%		
Percentage of District:						
Nicosia	35.29	29.41	17.65	5.88	11.76	100
Kyrenia	60.87	-	8.70	17.39	13.04	100
Famagusta	40.00	-	10.00	20.00	30.00	100
Larnaca	25.00	58.33	8.33	8.33	-	100
Limassol	22.22	44.44	22.22	11.11	-	100
Paphos	15.79	31.58	5.26	47.37	-	100
$\bar{x}$	33.20	27.29	12.03	18.35	9.13	100

[a]Based on LSMC 1961:
I: Slight or no limitations (topographic, geomorphic, edaphic); suitable for all irrigated and rainfed crops.
II: Slight to moderate limitations; suitable for all irrigated crops except citrus and for all rainfed crops.
III: Serious limitations; suitable for all irrigated and rainfed crops except tree crops.
IV: Severe limitations; unsuitable for irrigated crops except shallow-rooted legumes and fodder crops; moderately suitable for rainfed crops except tree crops.
V: Unsuitable for irrigated agriculture and generally unsuitable for dry farming, with localized suitability for grazing.

Table 36: Agronomic Distribution of Major Sites and HC Sites (n=90).

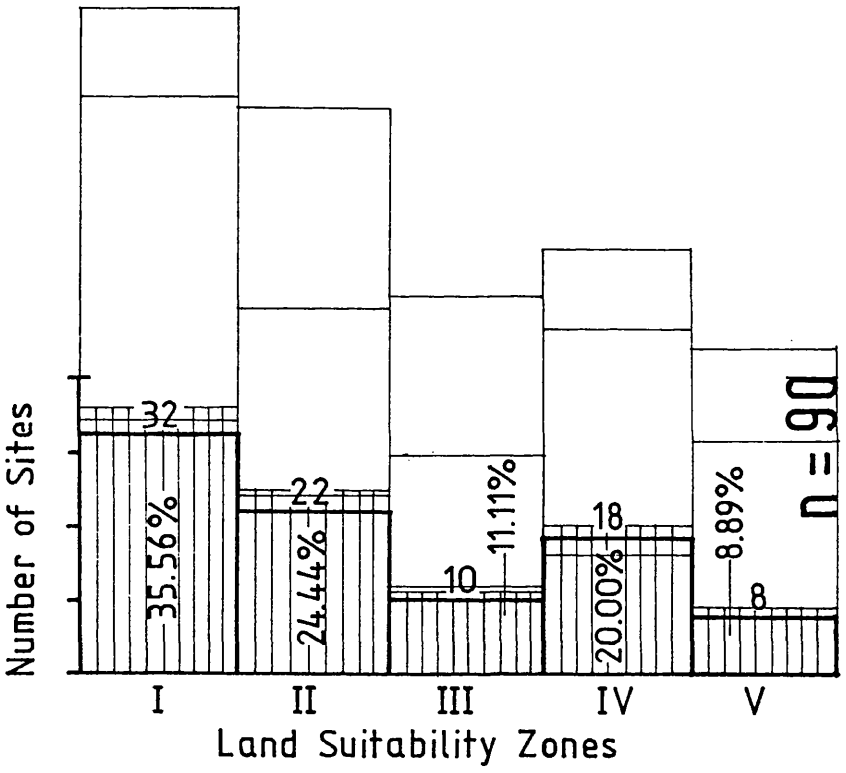


Fig. 42: Agronomic Distribution of Major Sites and HC Sites (cf. Table 36). Thin line show previous samples for comparison.

Table 37: Biogeographic Distribution of Major and Minor Sites (n=313).

District	Ecozones[a]										
	3	4	5	7	8	9	10	11	12	13	Total
Nicosia	-	12	-	3	-	-	29	-	-	1	45
Percentage	-	3.83	-	0.96	-	-	9.27	-	-	0.32	14.38
Kyrenia	-	-	-	70	-	14	4	-	-	-	88
Percentage	-	-	-	22.36	-	4.47	1.28	-	-	-	28.12
Famagusta	-	-	-	3	-	41	1	-	-	-	45
Percentage	-	-	-	0.96	-	13.10	0.32	-	-	-	14.38
Larnaca	-	-	-	-	22	-	-	8	-	-	30
Percentage	-	-	-	-	7.03	-	-	2.56	-	-	9.58
Limassol	-	-	5	-	25	2	-	-	-	1	33
Percentage	-	-	1.60	-	7.99	0.64	-	-	-	0.32	10.54
Paphos	-	9	25	-	15	23	-	-	-	-	72
Percentage	-	2.88	7.99	-	4.79	7.35	-	-	-	-	23.00
Total/Zone	-	21	30	76	62	80	34	8	-	2	313
Percentage	-	6.71	9.58	24.28	19.81	25.56	10.86	2.56	-	0.64	100
[a]Cf. Jones et al. 1958											
Percentage of district:											
Nicosia	-	26.67	-	6.67	-	-	64.44	-	-	2.22	100
Kyrenia	-	-	-	79.55	-	15.91	4.55	-	-	-	100
Famagusta	-	-	-	6.67	-	91.11	2.22	-	-	-	100
Larnaca	-	-	-	-	73.33	-	-	26.67	-	-	100
Limassol	-	-	15.15	-	75.76	6.06	-	-	-	3.03	100
Paphos	-	12.50	34.72	-	20.83	31.94	-	-	-	-	100
$\bar{x}$	-	6.53	8.31	15.48	28.32	24.17	11.87	4.44	-	0.88	100

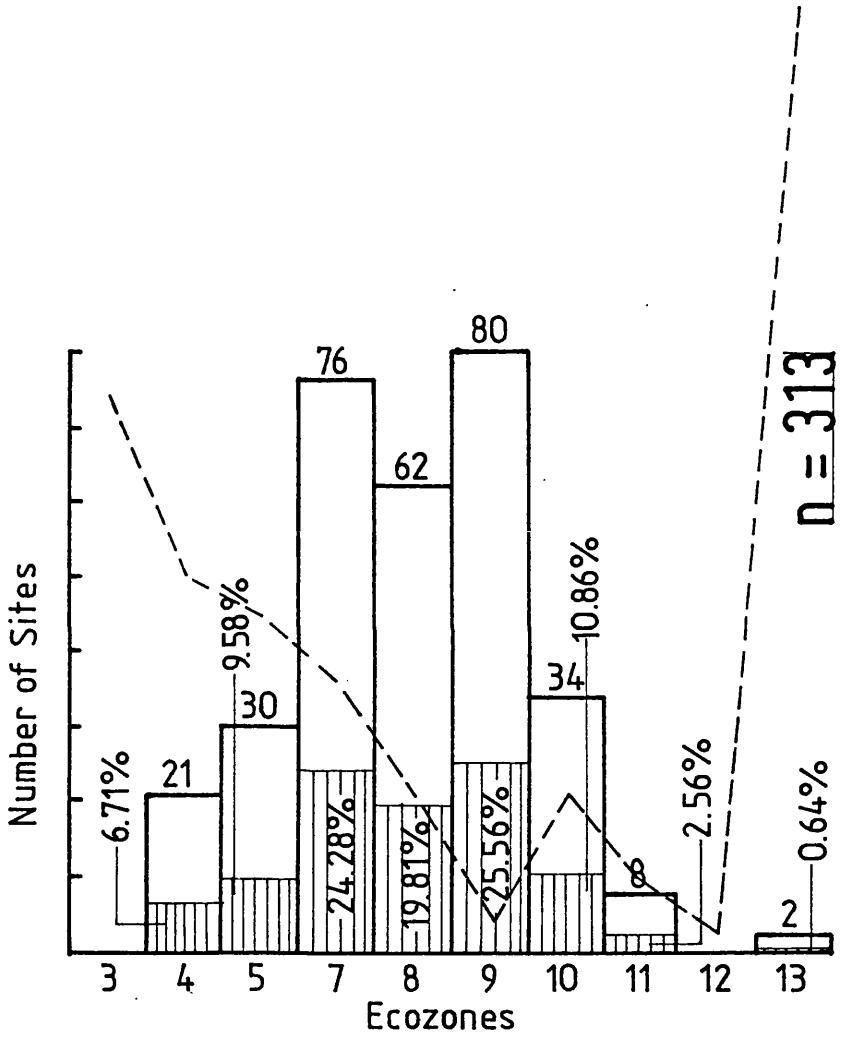


Fig. 43: Biogeographic Distribution of Major and Minor Sites (cf. Table 37). Stippled line indicates relative and absolute mean altitudes of ecozones. (To find absolute means, calibrate y-axis in intervals of 100 m asl and draw abscissa intersecting curve at column center.)

Table 38: Biogeographic Distribution of Major Sites and Site Clusters (n=232).

District	Ecozones[a]										
	3	4	5	7	8	9	10	11	12	13	Total
Nicosia	-	7	-	2	-	-	20	-	-	-	29
Percentage	-	3.02	-	0.86	-	-	8.62	-	-	-	12.50
Kyrenia	-	-	-	59	-	10	3	-	-	-	72
Percentage	-	-	-	25.43	-	4.31	1.29	-	-	-	31.03
Famagusta	-	-	-	-	-	29	-	-	-	-	29
Percentage	-	-	-	-	-	12.50	-	-	-	-	12.50
Larnaca	-	-	-	-	22	-	-	6	-	-	28
Percentage	-	-	-	-	9.48	-	-	2.59	-	-	12.07
Limassol	-	-	3	-	16	2	-	-	-	-	21
Percentage	-	-	1.29	-	6.90	0.86	-	-	-	-	9.05
Paphos	-	8	12	-	14	19	-	-	-	-	53
Percentage	-	3.45	5.17	-	6.03	8.19	-	-	-	-	22.84
Total/Zone	-	15	15	61	52	60	23	6	-	-	232
Percentage	-	6.47	6.47	26.29	22.41	25.86	9.91	2.59	-	-	100

[a] Cf. Jones et al. 1958

Percentage of district:

Nicosia	-	24.14	-	6.90	-	-	68.97	-	-	-	100
Kyrenia	-	-	-	81.94	-	13.89	4.17	-	-	-	100
Famagusta	-	-	-	-	-	100.00	-	-	-	-	100
Larnaca	-	-	-	-	78.57	-	-	21.43	-	-	100
Limassol	-	-	14.29	-	76.19	9.52	-	-	-	-	100
Paphos	-	15.09	22.64	-	26.42	35.85	-	-	-	-	100
$\bar{x}$	-	6.54	6.15	14.81	30.20	26.54	12.19	3.57	-	-	100

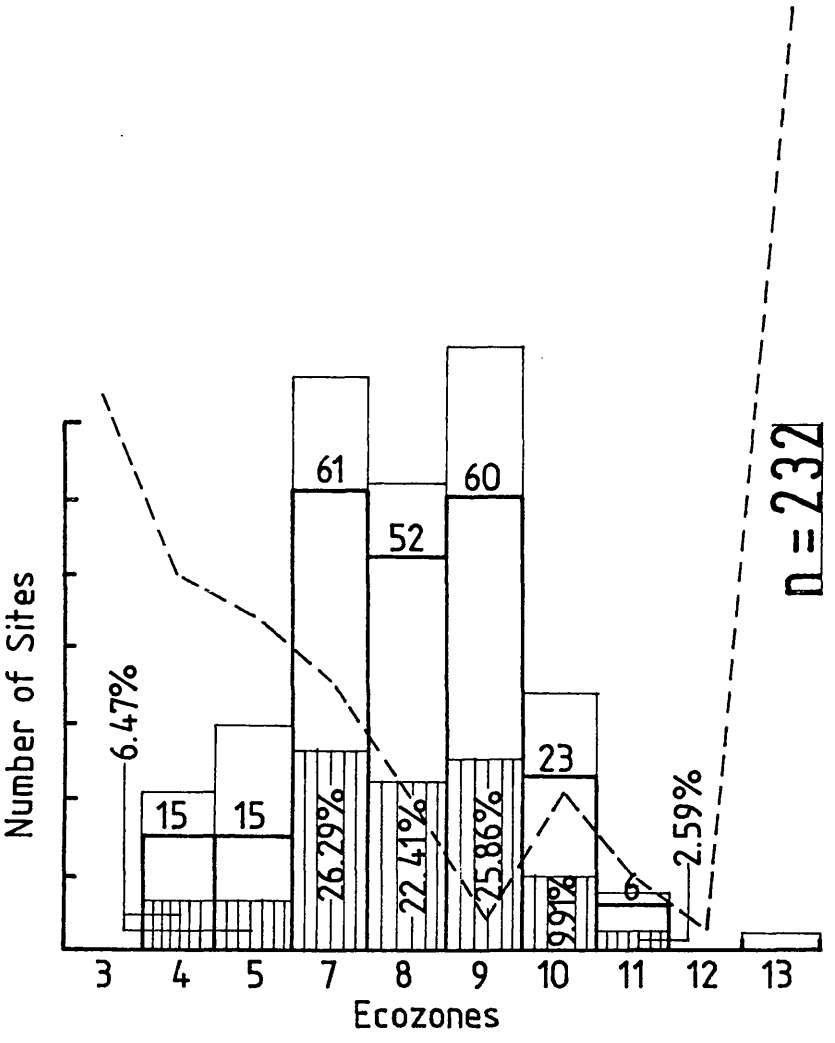


Fig. 44: Biogeographic Distribution of Major Sites and Site Clusters (cf. Table 38). Thin line shows previous sample for comparison. Stippled line indicates relative and absolute mean altitudes of ecozones. (To find absolute means, calibrate y-axis in intervals of 100 m asl and draw abscissa intersecting curve at column center.)

Table 39: Biogeographic Distribution of Major Sites (n=95).

District	Ecozones[a]									
	3	4	5	7	8	9	10	11	12	13	Total
Nicosia	-	5	-	1	-	-	16	-	-	-	22
Percentage	-	5.26	-	1.05	-	-	16.84	-	-	-	23.16
Kyrenia	-	-	-	19	-	5	3	-	-	-	27
Percentage	-	-	-	20.00	-	5.26	3.16	-	-	-	28.42
Famagusta	-	-	-	-	-	8	-	-	-	-	8
Percentage	-	-	-	-	-	8.42	-	-	-	-	8.42
Larnaca	-	-	-	-	12	-	-	4	-	-	16
Percentage	-	-	-	-	12.63	-	-	4.21	-	-	16.84
Limassol	-	-	-	-	6	1	-	-	-	-	7
Percentage	-	-	-	-	6.32	1.05	-	-	-	-	7.37
Paphos	-	1	3	-	4	7	-	-	-	-	15
Percentage	-	1.05	3.16	-	4.21	7.37	-	-	-	-	15.79
Total/Zone	-	6	3	20	22	21	19	4	-	-	95
Percentage	-	6.32	3.16	21.05	23.16	22.11	20.00	4.21	-	-	100
[a]Cf. Jones et al. 1958											
Percentage of district:											
Nicosia	-	22.73	-	4.55	-	-	72.73	-	-	-	100
Kyrenia	-	-	-	70.37	-	18.52	11.11	-	-	-	100
Famagusta	-	-	-	-	-	100.00	-	-	-	-	100
Larnaca	-	-	-	-	75.00	-	-	25.00	-	-	100
Limassol	-	-	-	-	85.71	14.29	-	-	-	-	100
Paphos	-	6.67	20.00	-	26.67	46.67	-	-	-	-	100
$\bar{x}$	-	4.90	3.33	12.49	31.23	29.91	13.97	4.17	-	-	100

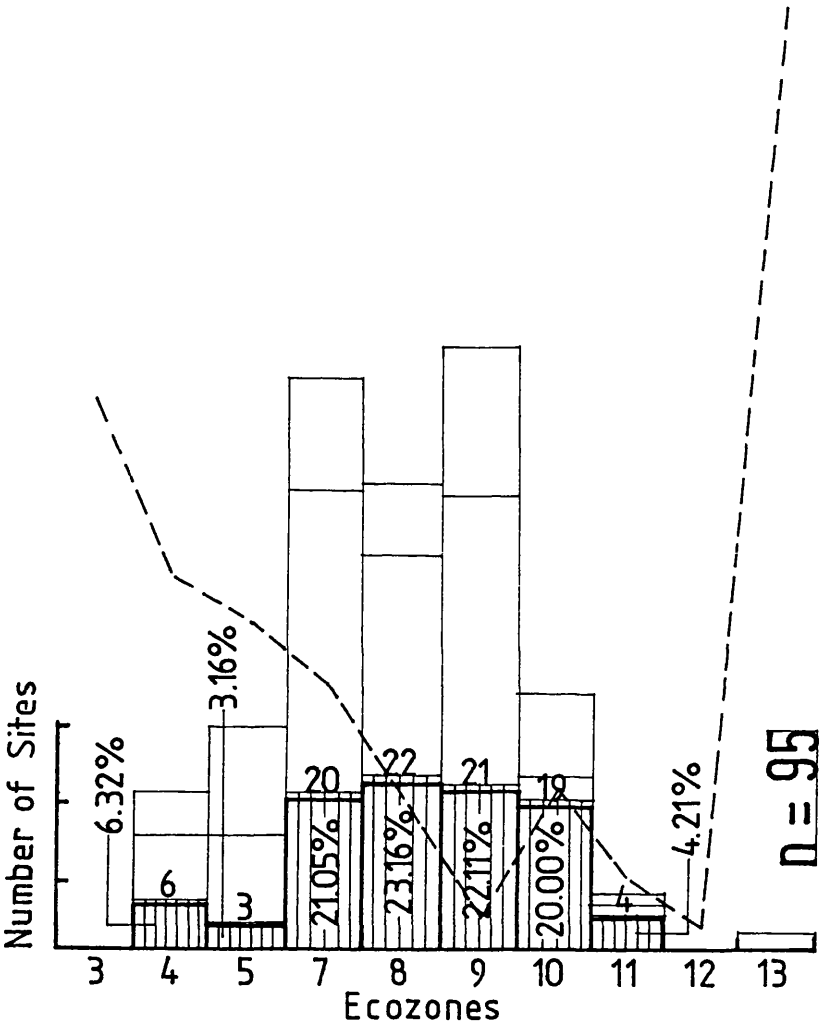


Fig. 45: Biogeographic Distribution of Major Sites (cf. Table 39). Thin line shows previous samples for comparison. Stippled line indicates relative and absolute mean altitudes of ecozones. (To find absolute means, calibrate y-axis in intervals of 100 m asl and draw abscissa intersecting curve at column center.)

Table 40: Biogeographic Distribution of Major Sites and HC Sites (n=90).

District	Ecozones[a]									
	3	4	5	7	8	9	10	11	12	13	Total
Nicosia	-	5	-	1	-	-	11	-	-	-	17
Percentage	-	5.56	-	1.11	-	-	12.22	-	-	-	18.89
Kyrenia	-	-	-	17	-	5	1	-	-	-	23
Percentage	-	-	-	18.89	-	5.56	1.11	-	-	-	25.56
Famagusta	-	-	-	-	-	10	-	-	-	-	10
Percentage	-	-	-	-	-	11.11	-	-	-	-	11.11
Larnaca	-	-	-	-	8	-	-	4	-	-	12
Percentage	-	-	-	-	8.89	-	-	4.44	-	-	13.13
Limassol	-	-	1	-	7	1	-	-	-	-	9
Percentage	-	-	1.11	-	7.78	1.11	-	-	-	-	10.00
Paphos	-	2	3	-	5	9	-	-	-	-	19
Percentage	-	2.22	3.33	-	5.56	10.00	-	-	-	-	21.11
Total/Zone	-	7	4	18	20	25	12	4	-	-	90
Percentage	-	7.78	4.44	20.00	22.22	27.78	13.13	4.44	-	-	100
[a]Cf. Jones et al. 1958											
Percentage of district:											
Nicosia	-	29.41	-	5.88	-	-	64.71	-	-	-	100
Kyrenia	-	-	-	73.91	-	21.74	4.35	-	-	-	100
Famagusta	-	-	-	-	-	100.00	-	-	-	-	100
Larnaca	-	-	-	-	66.67	-	-	33.33	-	-	100
Limassol	-	-	11.11	-	77.78	11.11	-	-	-	-	100
Paphos	-	10.53	15.79	-	26.32	47.37	-	-	-	-	100
$\bar{x}$	-	6.66	4.48	13.30	28.46	30.04	11.51	5.56	-	-	100

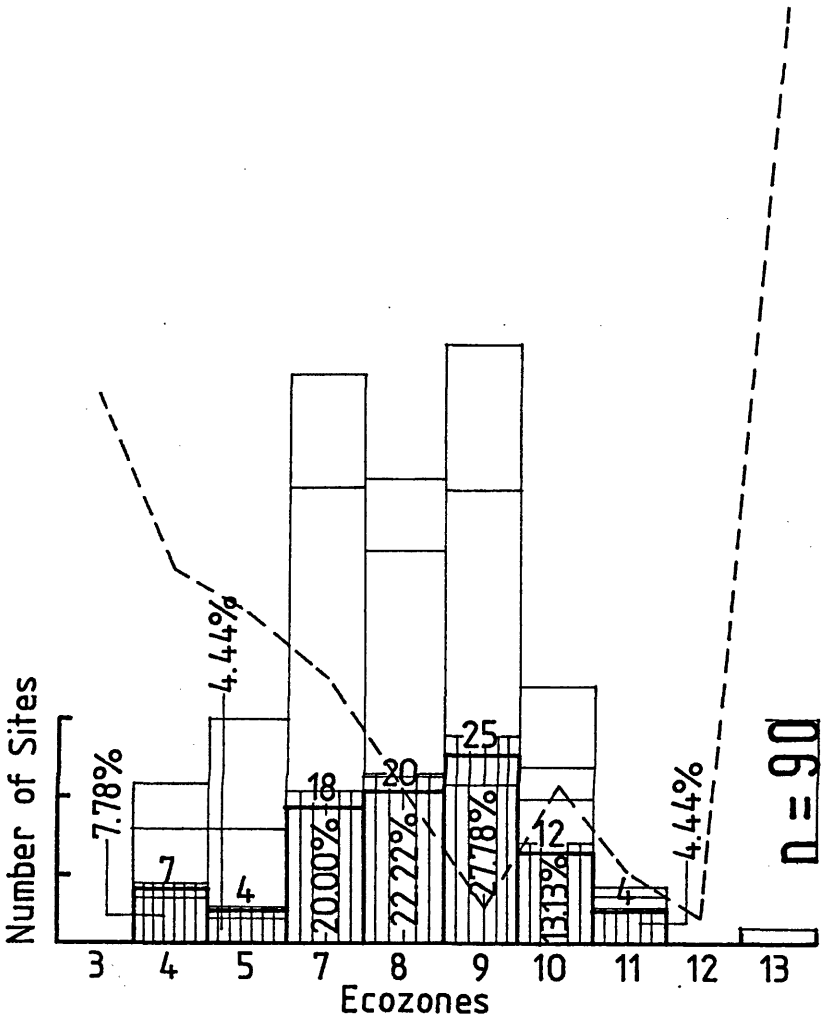


Fig. 46: Biogeographic Distribution of Major Sites and HC Sites (cf. Table 40). Thin line shows previous samples for comparison. Stippled line indicates relative and absolute mean altitudes of ecozones. (To find absolute means, calibrate y-axis in intervals of 100 m asl and draw abscissa intersecting curve at column center.)

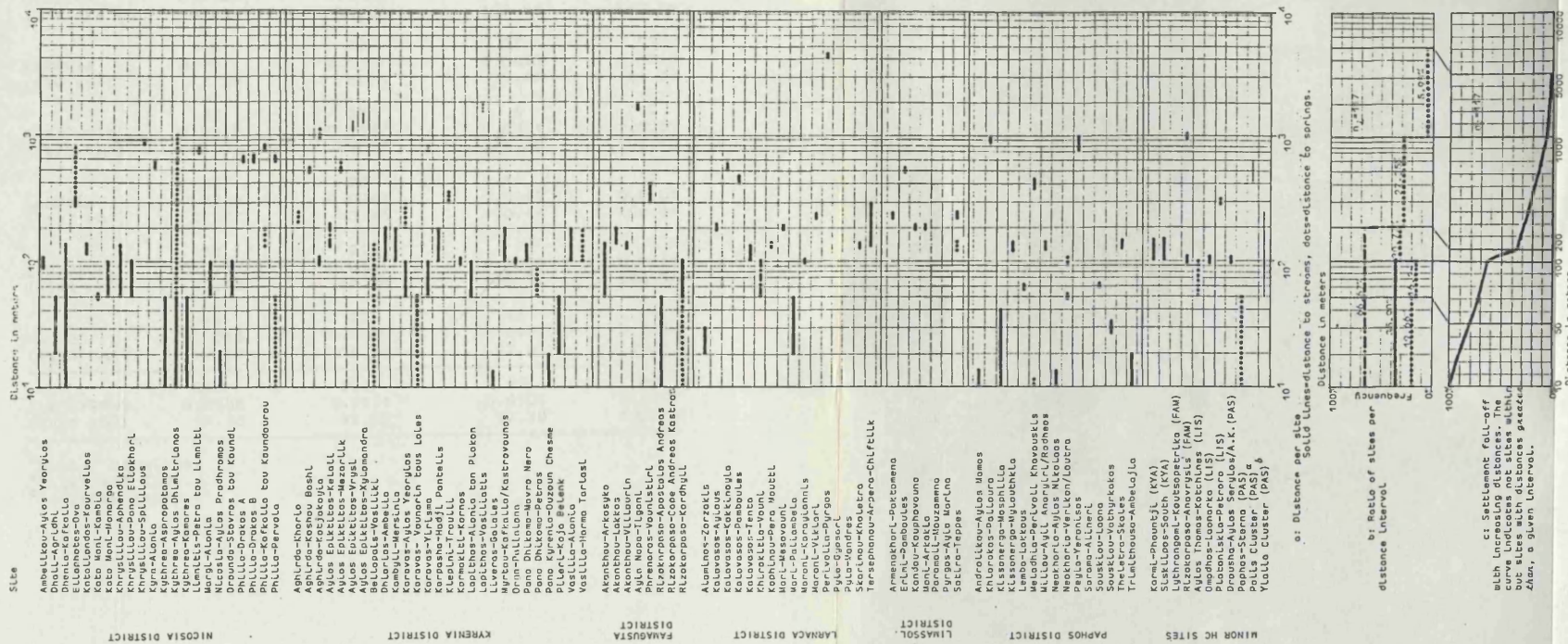


Fig. 47: Hydrographic Distribution of Major Sites and HC Sites (n=95+11): Distance to Nearest Source of Surface Water. Measurements for sites in Fig. 47a for which no reliable data were available are entered as thin lines. Percentage calculations in Figs. 47a+b are based on theoretical n_i instead of the actual n because some sites overlapping distance intervals were counted twice.

District	Sample A	B	C	D
NICOSIA (2727 km^2)	45[a]	29	22	17
	0.0165[b]	0.0106	0.0081	0.0062
	60.60[c]	94.04	123.96	160.41
KYRENIA (639 km^2)	88	72	27	23
	0.1377	0.1127	0.0423	0.0360
	7.26	8.88	23.67	27.78
FAMAGUSTA (1971 km^2)	45	29	8	10
	0.0228	0.0147	0.0041	0.0051
	43.80	67.97	246.38	197.10
LARNACA (1127 km^2)	30	28	16	12
	0.0266	0.0248	0.0142	0.0106
	37.57	40.25	70.44	93.91
LIMASSOL (1391 km^2)	33	21	7	9
	0.0237	0.0151	0.0050	0.0065
	42.15	66.24	198.71	154.56
PAPHOS (1396 km^2)	72	53	15	19
	0.0516	0.0380	0.0107	0.0136
	19.39	26.34	93.07	73.47
ALL CYPRUS (9251 km2)	313	232	95	90
	0.0338	0.0251	0.0103	0.0097
	29.56	39.88	97.38	102.79

[a]Number of sites.
[b]Sites/km^2 (SD).
[c]km^2/site (ASA).

Table 41: Cumulative Site Densities (all samples).

District and Period	Number of Sites[a] (n=232)	SD[b] (site/km^2)	ASA[c] (km^2/site)
NICOSIA: 2727 km^2			
Khirokitia Culture	5^{max}	0.0018	545.40
	3^{min}	0.0011	909.00
Sotira Culture	6^{max}	0.0022	454.50
	4^{min}	0.0015	681.75
Erimi Culture	20^{max}	0.0073	136.35
	12^{min}	0.0044	227.25
KYRENIA: 639 km^2			
Khirokitia Culture	20^{max}	0.0313	31.95
	4^{min}	0.0063	159.75
Sotira Culture	24^{max}	0.0376	26.63
	6^{min}	0.0094	106.50
Erimi Culture	60^{max}	0.0939	10.65
	18^{min}	0.0282	35.50
FAMAGUSTA: 1971 km^2			
Khirokitia Culture	18^{max}	0.0091	109.50
	7^{min}	0.0036	281.57
Sotira Culture	11^{max}	0.0056	179.18
	0^{min}	0.0000	--
Erimi Culture	11^{max}	0.0056	179.18
	0^{min}	0.0000	--
LARNACA: 1127 km^2			
Khirokitia Culture	8^{max}	0.0071	140.88
	6^{min}	0.0053	187.83
Sotira Culture	13^{max}	0.0115	86.69
	7^{min}	0.0062	161.00
Erimi Culture	23^{max}	0.0204	49.00
	7^{min}	0.0062	161.00
LIMASSOL: 1391 km^2			
Khirokitia Culture	1^{min}	0.0014	695.50
Sotira Culture	14^{max}	0.0101	99.36
	5^{min}	0.0036	278.20
Erimi Culture	15^{max}	0.0108	92.73
	2^{min}	0.0014	695.50
PAPHOS: 1396 km^2			
Khirokitia Culture	4^{min}	0.0029	349.00
Sotira Culture	1^{min}	0.0007	1396.00
Erimi Culture	53^{max}	0.0380	26.34
	24^{min}	0.0172	58.17
ALL CYPRUS: 9251 km^2			
Khirokitia Culture	57^{max}	0.0062	162.30
	25^{min}	0.0027	370.04
Sotira Culture	69^{max}	0.0075	134.07
	23^{min}	0.0025	402.22
Erimi Culture	182^{max}	0.0197	50.83
	63^{min}	0.0068	146.84

[a] Sites possessing two temporal components are counted separately for each.
[b] SD=Site Density.
[c] ASA=Average Site Area (average area of land per site per District)
n^{max}: includes unconfirmed (probable or possible) member sites.
n^{min}: includes positively identified member sites only.

Table 42: Major Sites and Site Clusters (n=232): Site Densities in Isotropic Plains.

District and Period	Number of Sites[a] (n=95)	SD[b] (site/km^2)	ASA[c] (km^2/site)
NICOSIA: 2727 km^2			
Khirokitia Culture	3^{min}	0.0011	909.00
Sotira Culture	6^{max}	0.0022	454.50
	4^{min}	0.0015	681.75
Erimi Culture	15^{max}	0.0055	181.80
	11^{min}	0.0040	247.91
KYRENIA: 639 km^2			
Khirokitia Culture	5^{max}	0.0078	127.80
	4^{min}	0.0063	159.75
Sotira Culture	10^{max}	0.0156	63.90
	6^{min}	0.0094	106.50
Erimi Culture	17^{max}	0.0266	37.59
	13^{min}	0.0203	49.15
FAMAGUSTA: 1971 km^2			
Khirokitia Culture	6^{max}	0.0030	328.50
	5^{min}	0.0025	394.20
Sotira Culture	2^{max}	0.0010	985.50
	0^{min}	0.0000	--
Erimi Culture	2^{max}	0.0010	985.50
	0^{min}	0.0000	--
LARNACA: 1127 km^2			
Khirokitia Culture	4^{min}	0.0035	281.75
Sotira Culture	7^{min}	0.0062	161.00
Erimi Culture	11^{max}	0.0098	102.45
	6^{min}	0.0053	187.83
LIMASSOL: 1391 km^2			
Khirokitia Culture	2^{min}	0.0014	695.50
Sotira Culture	4^{max}	0.0029	347.75
	3^{min}	0.0022	463.67
Erimi Culture	3^{max}	0.0022	463.67
	1^{min}	0.0007	1391.00
PAPHOS: 1396 km^2			
Khirokitia Culture	3^{min}	0.0022	465.33
Sotira Culture	1^{min}	0.0007	1396.00
Erimi Culture	15^{min}	0.0107	93.07
ALL CYPRUS: 9251 km^2			
Khirokitia Culture	23^{max}	0.0025	402.22
	20^{min}	0.0022	462.55
Sotira Culture	30^{max}	0.0032	308.36
	21^{min}	0.0023	440.52
Erimi Culture	63^{max}	0.0068	146.84
	46^{min}	0.0050	201.11

[a] Sites possessing two temporal components are counted separately for each.
[b] SD=Site Density.
[c] ASA=Average Site Area (average area of land per site per District).
n^{max}: includes unconfirmed (probable or possible) member sites.
n^{min}: includes positively identified member sites only.

Table 43: Major Sites (n=95): Site Densities in Isotropic Plains.

District and Period	Number of Sites[a] (n=90)	SD[b] (site/km^2)	ASA[c] (km^2/site)
NICOSIA: 2727 km^2			
Khirokitia Culture	3^{min}	0.0011	909.00
Sotira Culture	5^{min}	0.0018	545.40
Erimi Culture	9^{max}	0.0033	303.00
	8^{min}	0.0029	340.88
KYRENIA: 639 km^2			
Khirokitia Culture	4^{max}	0.0063	159.75
	3^{min}	0.0047	213.00
Sotira Culture	11^{max}	0.0172	58.09
	5^{min}	0.0078	127.80
Erimi Culture	14^{max}	0.0219	45.64
	9^{min}	0.0141	71.00
FAMAGUSTA: 1971 km^2			
Khirokitia Culture	7^{max}	0.0036	281.57
	5^{min}	0.0025	394.20
Sotira Culture	4^{max}	0.0020	492.75
	0^{min}	0.0000	--
Erimi Culture	4^{max}	0.0020	492.75
	0^{min}	0.0000	--
LARNACA: 1127 km^2			
Khirokitia Culture	3^{min}	0.0027	375.67
Sotira Culture	4^{min}	0.0035	281.75
Erimi Culture	5^{min}	0.0044	225.40
LIMASSOL: 1391 km^2			
Khirokitia Culture	2^{min}	0.0014	695.50
Sotira Culture	6^{max}	0 0044	231.83
	3^{min}	0.0022	463.67
Erimi Culture	5^{max}	0.0036	278.20
	1^{min}	0.0007	1391.00
PAPHOS: 1396 km^2			
Khirokitia Culture	3^{min}	0.0022	465.33
Sotira Culture	1^{min}	0.0007	1396.00
Erimi Culture	15^{max}	0.0107	93.07
	14^{min}	0.0100	99.71
ALL CYPRUS:9251 km^2			
Khirokitia Culture	22^{max}	0.00 24	420.50
	18^{min}	0.00 19	513.94
Sotira Culture	31^{max}	0.00 33	298.42
	18^{min}	0.00 19	513.94
Erimi Culture	52^{max}	0.0056	177.90
	37^{min}	0.0040	250.03

[a] Sites possessing two temporal components are counted separately for each.
[b] SD=Site Density.
[c] ASA=Average Site Area (average area of land per site per District)
n^{max}: includes unconfirmed (probable or possible) member sites.
n^{min}: includes positively identified member sites only.

Table 44: Major Sites and HC Sites (n=90): Site Densities in Isotropic Plains.

Region	km^2	Percentage
NICOSIA DISTRICT		
Overall	2727.00	100
Above 600 masl	658.00	24.13
Below 600 masl	2069.00	75.87
KYRENIA DISTRICT		
Overall	639.00	100
Above 600 masl	47.00	7.36
Below 600 masl	592.00	92.64
FAMAGUSTA DISTRICT		
Overall	1971.00	100
Above 600 masl	24.00	1.22
Below 600 masl	1947.00	98.78
LARNACA DISTRICT		
Overall	1127.00	100
Above 600 masl	62.00	5.50
Below 600 masl	1065.00	94.50
LIMASSOL DISTRICT		
Overall	1391.00	100
Above 600 masl	473.00	34
Below 600 masl	918.00	66
PAPHOS DISTRICT		
Overall	1396.00	100
Above 600 masl	248.00	17.77
Below 600 masl	1148.00	82.23
ALL CYPRUS		
Overall	9251.00	100
Above 600 masl	1512.00	16.34
Below 600 masl	7739.00	83.66

Table 45: Areas of Land Above/Below 600 m asl.

Region	km^2	Percentage
NICOSIA DISTRICT		
Overall	2727.00	100
Above 400 masl	945.00	34.65
Below 400 masl	1782.00	65.35
KYRENIA DISTRICT		
Overall	639.00	100
Above 400 masl	102.00	15.96
Below 400 masl	537.00	84.04
FAMAGUSTA DISTRICT		
Overall	1971.00	100
Above 400 masl	58.00	2.94
Below 400 masl	1913.00	97.06
LARNACA DISTRICT		
Overall	1127.00	100
Above 400 masl	130.00	11.54
Below 400 masl	997.00	88.46
LIMASSOL DISTRICT		
Overall	1391.00	100
Above 400 masl	725.00	52.12
Below 400 masl	666.00	47.88
PAPHOS DISTRICT		
Overall	1396.00	100
Above 400 masl	559.00	40.04
Below 400 masl	837.00	59.96
ALL CYPRUS		
Overall	9251.00	100
Above 400 masl	2519.00	27.23
Below 400 masl	6732.00	72.77

Table 46: Areas of Land Above/Below 400 m asl.

District and Period	Number of Sites[a] (n=232)	SD (site/km²)	ASA (km²/site)	SD Increase[b] (Percentage)	ASA Decrease[b] (Percentage)
NICOSIA: 2069 km²					
Khirokitia Culture	5 max	0.0024	413.80	33.33	24.13
	3 min	0.0014	689.67	27.27	24.13
Sotira Culture	6 max	0.0029	344.83	31.82	24.13
	4 min	0.0019	517.25	26.67	24.13
Erimi Culture	20 max	0.0097	103.45	32.88	24.13
	12 min	0.0058	172.42	31.82	24.13
KYRENIA: 592 km²					
Khirokitia Culture	20 max	0.0338	29.60	4.79	7.36
	4 min[c]	0.0068	148.00	7.94	7.36
Sotira Culture	23 max	0.0389	25.74	3.46	3.34
	6 min[d]	0.0101	98.67	7.45	7.35
Erimi Culture	58 max	0.0980	10.21	4.37	4.13
	18 min	0.0304	32.89	6.29	7.35
FAMAGUSTA: 1947 km²					
Khirokitia Culture	18 max	0.0092[j]	108.17	1.10[j]	1.22
	7 min	0.0036[j]	278.14	1.23[j]	1.22
Sotira Culture	11 max	0.0056[j]	177.00	1.23[j]	1.22
	0 min	0.0000[j]	--	--	--
Erimi Culture	11 max	0.0056[j]	177.00	1.23[j]	1.22
	0 min	0.0000	--	--	--
LARNACA: 1065 km²					
Khirokitia Culture	8 max	0.0075	133.13	5.63	5.50
	6 min	0.0056	177.50	5.66	5.50
Sotira Culture	13 max	0.0122	81.92	6.09	5.50
	7 min	0.0066	152.14	6.45	5.50
Erimi Culture	23 max	0.0216	46.30	5.88	5.51
	7 min	0.0066	152.14	6.45	5.50
LIMASSOL: 918 km²					
Khirokitia Culture	2 min[e]	0.0022	459.00	57.14	34.00
Sotira Culture eee	11 max[f]	0.0120	83.46	18.81	16.00
	4 min[g]	0.0044	229.50	22.22	17.51
Erimi Culture	13 max	0.0142	70.62	31.28	23.84
	2 min	0.0022	459.00	57.14	34.00
PAPHOS: 1148 km²					
Khirokitia Culture	4 min	0.0035	287.00	20.69	17.76
Sotira Culture	1 min[h]	0.0009	1148.00	28.57	17.76
Erimi Culture	50 max[i]	0.0436	22.96	14.74	12.83
	23 min	0.0200	49.91	16.28	14.20
ALL CYPRUS: 7739 km²					
Khirokitia Culture	56 max	0.0072	138.20	16.13	14.85
	25 min	0.0032	309.56	18.52	16.34
Sotira Culture	65 max	0.0084	119.06	12.00	11.20
	22 min	0.0028	351.77	12.00	12.54
Erimi Culture	175 max	0.0226	44.22	14.74	13.00
	62 min	0.0080	124.82	17.65	15.00

[a] Sites possessing two temporal components are counted separately for each.

[b] Cf. SD and ASA values in Table 42.

[c] Excluding Karmi-St. Hilarion (Karmi Cluster).

[d] Excluding Pilleri-Profitis Elias Pyrgos (Pilleri Cluster) and Karmi-St. Hilarion (Karmi Cluster).

[e] Excluding Omodhos Cluster.

[f] Excluding Omodhos I.

[g] Excluding Omodhos-Laonarka and Omodhos II.

[h] Excluding Kathikas, Drousha and Inia-Lefki (Drousha Cluster).

[i] Excluding Kathikas.

[j] Values beyond four decimals were computed but are not shown in the SD column.

Table 47: Major Sites and Site Clusters: Site Densities in Areas Below 600 m asl.

District and Period	Number of Sites[a] (n=95)	SD (site/km^2)	ASA (km^2/site)	SD Increase[b] (Percentage)	ASA Decrease[b] (Percentage)
NICOSIA: 1786 km^2					
Khirokitia Culture	2[c]	0.0011[g]	891.00	2.03[g]	1.98
Sotira Culture	5[max][d]	0.0028	356.40	27.27	21.58
	3[min]	0.0017	594.00	13.33	12.87
Erimi Culture	15[max]	0.0084	118.80	52.73	34.65
	11[min]	0.0062	162.00	55.00	34.65
KYRENIA: 537 km^2					
Khirokitia Culture	5[max]	0.0093	107.40	19.23	15.96
	4[min]	0.0074	134.25	17.46	15.96
Sotira Culture	10[max]	0.0186	53.70	19.23	15.96
	6[min][e]	0.0112	89.50	19.15	15.96
Erimi Culture	16[max][e]	0.0298	33.56	12.03	10.72
	12[min]	0.0223	44.75	9.85	8.95
FAMAGUSTA: 1913 km^2					
Khirokitia Culture	6[max]	0.0031	318.83	3.33	2.94
	5[min]	0.0026	382.60	4.00	2.94
Sotira Culture	2[max]	0.0010[g]	956.50	3.32[g]	2.94
	0[min]	0.0000	--	--	--
Erimi Culture	2[max]	0.0010[g]	956.50	3.32[g]	2.94
	0[min]	0.0000	--	--	--
LARNACA: 997 km^2					
Khirokitia Culture	4	0.0040	249.25	14.29	11.54
Sotira Culture	7	0.0070	142.43	12.90	11.54
Erimi Culture	11[max]	0.0110	90.64	12.25	11.54
	6[min]	0.0060	166.17	13.21	11.54
LIMASSOL: 666 km^2					
Khirokitia Culture	2[min]	0.0030	333.00	114.29	52.12
Sotira Culture	4[max]	0.0060	166.50	106.90	52.12
	3[min]	0.0045	222.00	104.55	52.12
Erimi Culture	3[max]	0.0045	222.00	104.55	52.12
	1[min]	0.0015	666.00	114.29	52.12
PAPHOS: 837 km^2					
Khirokitia Culture	3[min]	0.0036	279.00	63.64	40.04
Sotira Culture	1[min]	0.0028	837.00	71.43	40.04
Erimi Culture	14[f]	0.0167	59.79	56.08	35.76
ALL CYPRUS: 6732 km^2					
Khirokitia Culture e	24[max]	0.0036	280.50	44.00	30.26
	19[min]	0.0028	354.32	27.27	23.40
Sotira Culture	29[max]	0.0043	232.14	34.38	24.72
	21[min]	0.0031	320.57	34.78	27.23
Erimi Culture	61[max]	0.0091	110.36	33.82	24.84
	44[min]	0.0065	153.00	30.00	23.92

[a] Sites possessing two temporal components are counted separately for each.

[b] Cf. SD and ASA values in Table 43.

[c] Excluding Katallondas-Kourvellos.

[d] Excluding Eliophotes-Ova.

[e] Excluding Aghirda-Kotjakaya.

[f] Excluding Meladhia-Khavouskis.

[g] Values beyond four decimals were computed but are not shown in the SD column.

Table 48: Major Sites: Site Densities in Areas Below 400 m asl.

District and Period	Number of Sites[a] (n=90)	SD (site/km^2)	ASA (km^2/site)	SD Increase[b] (Percentage)	ASA Decrease[b] (Percentage)
NICOSIA: 1786 km^2					
Khirokitia Culture	2[c]	0.0011	891.00	2.03	1.98
Sotira Culture	4[d]	0.0022	446.50	22.22	18.13
Erimi Culture	9^{max}	0.0050	198.44	51.52	34.51
	8^{min}	0.0045	223.25	55.17	34.51
KYRENIA: 537 km^2					
Khirokitia Culture	4^{max}	0.0074	134.25	17.46	15.96
	3^{min}	0.0056	179.00	19.15	15.96
Sotira Culture	11^{max}	0.0205	48.82	19.19	15.96
	5^{min}	0.0093	107.40	19.23	15.96
Erimi Culture	14^{max}	0.0261	38.36	19.19	15.96
	9^{min}	0.0168	59.67	19.15	15.96
FAMAGUSTA: 1913 km^2					
Khirokitia Culture	7^{max}	0.0037	273.29	2.78	2.94
	5^{min}	0.0026	382.60	4.00	2.94
Sotira Culture	4^{max}	0.0021	478.25	5.00	2.94
	0^{min}	0.0000	--	--	--
Erimi Culture	4^{max}	0.0021	478.25	5.00	2.94
	0^{min}	0.0000	--	--	--
LARNACA: 997 km^2					
Khirokitia Culture	3	0.0030	332.33	11.11	11.54
Sotira Culture	4	0.0040	249.25	14.29	11.54
Erimi Culture	5	0.0050	199.40	13.64	11.54
LIMASSOL: 666 km^2					
Khirokitia Culture	2^{min}	0.0030	333.00	114.29	52.12
Sotira Culture	6^{max}	0.0090	111.00	104.55	52.12
	3^{min}	0.0045	222.00	104.55	52.12
Erimi Culture	5^{max}	0.0075	133.20	108.33	52.12
	1^{min}	0.0015	666.00	114.29	52.12
PAPHOS: 837 km^2					
Khirokitia Culture	3^{min}	0.0036	279.00	63.64	40.04
Sotira Culture	1^{min}[e]	0.0012	837.00	71.43	40.04
Erimi Culture	14^{max}[e]	0.0167	59.79	56.08	35.76
	13^{min}	0.0155	64.39	55.00	35.42
ALL CYPRUS: 6732 km^2					
Khirokitia Culture	21^{max}	0.0031	320.57	29.17	23.76
	17^{min}	0.0025	396.00	31.58	22.95
Sotira Culture	30^{max}	0.0045[f]	224.40	36.36[f]	24.80
	13^{min}	0.0019[f]	517.85	- 0.75[f]	- 0.76
Erimi Culture	54^{max}	0.0076	132.00	35.71	25.80
	36^{min}	0.0053	187.00	32.50	25.21

[a] Sites possessing two temporal components are counted separately for each.

[b] Cf. SD and ASA values in Table 44.

[c] Excluding Katallondas-Kourvellos.

[d] Excluding Eliophotes-Ova.

[e] Excluding Meladhia-Khavouskis.

[f] Values beyond four decimals were computed but are not shown in the SD column.

Table 49: Major Sites and HC Sites: Site Densities in Areas Below 400 m asl.

SD Variation[a]						ASA Variation[b]					
			Percentage						Percentage		
Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$
NIC:											
1) 0.0015	±0.0005	0.0010	107.14	±20.83	63.99	344.84	68.97	206.91	50.00	16.67	33.34
		0.0005			43.16		-103.45	120.70		-25.00	13.00
2) 0.0078	0.0029	0.0054	410.53	100.00	255.27	413.80	172.41	293.11	80.00	50.00	65.00
3) 0.0083	0.0034	0.0059	592.86	141.67	367.26	586.22	241.38	413.80	85.00	58.33	71.67
4) 0.0081	0.0032	0.0057	501.70	120.84	311.27	500.01	206.90	353.46	82.50	54.17	68.34
KYA:											
1) 0.0321	0.0033	0.0177	472.06	48.53	260.29	122.26	49.33	85.80	82.61	33.33	57.97
-0.0237		-0.0102	-70.12		-10.80	-69.07		-9.87	-233.34		-100.01
2) 0.0879	-0.0085	0.0397	870.30	-21.85	424.23	88.46	-7.15	40.66	89.65	-27.78	30.94
3) 0.0912	-0.0034	0.0439	1341.18	-10.06	665.56	137.79	-3.29	67.25	93.10	-11.11	40.99
4) 0.0896	-0.0060	0.0418	1105.74	-15.96	544.90	113.13	-5.22	53.96	91.38	-19.45	35.97
FAM:											
1) -0.0092	0.0020	-0.0036	dp	55.56	-22.22	dp	104.14	-782.36	dp	36.36	-281.82
2) ±0.0056	0.0000	±0.0028	rc	00.00	--	rc	000.00	--	rc	00.00	--
			dp		-50.00	dp		-885.00	dp		-500.00
3) -0.0092	0.0020	-0.0036	dp	55.56	-22.22	dp	104.14	-782.36	dp	36.36	-281.82
4) -0.0018	0.0010	-0.0004	dp	27.78	-36.11	dp	52.07	-833.68	dp	18.18	-390.91
-0.0074		-0.0034									
LAC:											
1) 0.0066	0.0010	0.0038	117.86	17.86	67.86	95.58	25.36	60.47	53.85	14.29	34.07
	-0.0009	0.0029		-12.00	52.93		-19.01	38.29		-14.28	19.79
2) 0.0150	0.0000	0.0075	227.27	00.00	113.64	105.84	000.00	52.92	69.57	00.00	34.79
-0.0056		-0.0028	-45.90		-22.95	-70.22		-35.11	-85.72		-42.86
3) 0.0160	0.0010	0.0085	285.71	17.86	151.79	131.20	25.36	78.28	73.92	14.29	44.11
	-0.0009	0.0076		-12.00	136.86		-19.01	56.10		-14.28	29.82
4) 0.0155	±0.0005	0.0080	256.49	8.93	132.71	118.52	12.68	65.60	71.75	7.15	39.45
0.0052		0.0024	119.91	-6.00	56.96	30.49	-9.51	10.49	-5.90	-7.14	-6.52
LIS:											
1) 0.0098	0.0022	0.0060	445.45	100.00	272.72	375.54	229.50	302.52	81.82	50.00	65.91
2) ±0.0098	±0.0022	±0.0060	222.73	18.33	120.53	158.88	12.84	85.86	69.23	15.38	42.31
			81.67	-50.00	-65.84	-375.54	-229.50	-302.52	-449.96	-100.00	-274.98
3) 0.0120	0.0000	0.0060	545.45	00.00	272.73	388.38	000.00	194.19	84.61	00.00	42.31
4) 0.0109	0.0000	0.0005	330.30	00.00	165.15	273.60	000.00	194.19	79.48	000.00	42.31
-0.0055	-0.0011	-0.0033	- 71.43	- 33.33	- 52.38	-306.00	-91.80	-198.90	-200.00	-25.00	-112.50
PAS:											
1) -0.0026	--	--	- 74.28	--	--	- 861.00	--	--	-300.00	--	--
2) 0.0427	0.0191	0.0109	4740.44	2122.22	3431.33	1125.04	1098.09	1111.56	98.00	95.65	96.82
3) 0.0401	0.0165	0.0283	1145.71	471.43	808.57	264.04	237.09	250.56	92.00	82.61	87.31
4) 0.0414	0.0178	0.0296	1881.82	809.09	1345.46	694.54	667.59	681.06	96.80	93.04	94.02
ALL CYPRUS:											
1) 0.0057	0.0001	0.0029	219.23	3.85	111.54	266.03	18.43	142.23	68.75	4.76	36.76
-0.0039		-0.0019	-59.09		-27.62	-216.77		-99.17	-142.85		-69.05
2) 0.0199	-0.0003	0.0098	737.04	-3.61	366.72	324.30	-3.90	160.20	88.00	-3.23	42.39
3) 0.0200	0.0014	0.0107	769.23	21.21	395.22	342.73	26.93	184.83	88.57	17.75	53.16
4) 0.0200	0.0006	0.0103	753.14	8.80	380.97	333.52	11.52	172.52	88.29	7.26	47.78

[a] Represents increase, except where figures are negative.
[b] Represents decrease, except where figures are negative.
Cases of bivariation (i.e. both increase and decrease possible) are indicated by pairs of figures or by ± preceding common values.
Comparative chronological segmentation:
1) Khirokitia Culture-Sotira Culture
2) Sotira Culture-Erimi Culture
3) Khirokitia Culture-Erimi Culture
4) Early Formative-Late Formative (based on KCU/SCU average)
Non-numerical variations:
c=colonization
dp=depopulation
rc=recolonization

Data based on SD and ASA values shown in Table 47, *supra*.

Table 50: Major Sites and Site Clusters: Temporal Variation of Site Densities in Areas Below 600 m asl.

	SD Variation[a]					ASA Variation[b]					
				Percentage					Percentage		
	Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$
NIC:												
1)	0.0017	0.0006	0.0012	154.44	54.55	104.55	534.60	297.00	415.80	60.00	33.33	46.67
2)	0.0067	0.0034	0.0051	394.12	121.43	257.78	475.20	194.40	334.80	80.00	54.55	67.28
3)	0.0073	0.0051	0.0062	663.64	463.64	563.64	772.20	729.00	750.60	86.67	81.82	84.25
4)	0.0070	0.0043	0.0057	528.88	292.54	410.71	623.70	461.70	542.70	83.34	68.19	75.77
KYA:												
1)	0.0112	0.0019	0.0066	151.35	20.43	85.89	80.55	17.90	49.23	60.00	16.67	38.34
2)	0.0186	0.0037	0.0112	166.07	19.89	92.98	55.94	8.95	32.45	62.50	16.67	39.59
3)	0.0224	0.0130	0.0177	302.70	139.78	221.24	100.69	62.65	81.67	75.00	58.33	66.67
4)	0.0205	0.0084	0.0145	234.39	79.84	157.11	78.32	35.80	57.06	68.75	37.50	53.13
FAM:												
1)	-0.0031	-0.0016	-0.0024	dp	-61.54	-80.77	dp	-573.90	-1084.04	dp	-150.00	-325.01
2)	±0.0010	0.0000	±0.0005	rc	00.00	--	rc	000.00	--	rc	00.00	--
				dp		-50.00	dp		-956.50	dp		-100.00
3)	-0.0031	-0.0016	-0.0024	dp	-61.54	-80.77	dp	-573.90	-1084.04	dp	-150.00	-325.01
4)	-0.0011	-0.0008	-0.0010	dp	-30.77	-65.39	dp	-286.95	-1020.27	dp	-75.00	-181.25
	-0.0021		-0.0015									
LAC:												
1)	0.0030	0.0030	0.0030	75.00	75.00	75.00	106.82	106.82	106.82	42.86	42.86	42.86
2)	0.0040	-0.0010	0.0015	57.14	-14.29	21.43	51.79	-23.74	14.03	36.36	-16.67	9.85
3)	0.0070	0.0020	0.0045	175.00	50.00	112.50	158.61	83.08	120.85	63.64	33.33	48.49
4)	0.0055	0.0005	0.0030	116.07	17.86	66.97	105.20	29.67	67.44	50.00	8.33	29.17
LIS:												
1)	0.0030	0.0015	0.0028	100.00	50.00	75.00	167.00	111.00	139.00	50.15	33.33	41.74
2)	-0.0045	0.0000	-0.0023	-75.00	00.00	-37.50	-499.50	000.00	-249.75	-300.00	00.00	-150.00
3)	0.0015	-0.0015	0.0000	50.00	-50.00	00.00	-333.00	111.00	-111.00	-100.00	-33.33	-33.33
4)	±0.0023	0.0007	0.0015	100.00	18.42	59.21	222.00	194.25	208.13	50.00	46.67	48.34
		-0.0008	-0.0016	-60.53	-34.78	-47.65	-249.75	-222.00	-235.88	-60.00	-50.00	-55.00
PAS:												
1)	-0.0024	--	--	-66.66	--	--	-558.00	--	--	-200.00	--	--
2)	0.0155	--	--	1291.66	--	--	777.21	--	--	92.85	--	--
3)	0.0131	--	--	363.89	--	--	219.21	--	--	78.57	--	--
4)	0.0143	--	--	595.83	--	--	498.21	--	--	89.28	--	--
ALL CYPRUS:												
1)	0.0020	0.0001	0.0011	90.91	3.70	47.31	208.37	19.68	113.88	46.43	5.26	25.85
2)	0.0063	0.0023	0.0043	225.00	54.76	139.88	243.96	87.43	165.70	68.85	36.36	52.61
3)	0.0069	0.0038	0.0054	313.64	140.74	227.19	338.44	221.00	279.72	75.41	59.09	67.25
4)	0.0066	0.0031	0.0049	269.32	97.75	183.54	291.20	154.22	222.71	72.13	47.73	59.93

[a] Represents increase, except where figures are negative.
[b] Represents decrease, except where figures are negative.
Cases of bivariation (i.e. both increase and decrease possible) are indicated by pairs of figures or by ± preceding common values.
Comparative chronological segmentation:
1) Khirokitia Culture-Sotira Culture
2) Sotira Culture-Erimi Culture
3) Khirokitia-Culture-Erimi Culture
4) Early Formative-Late Formative (based on KCU/SCU average)
Non-numerical variations:
c=colonization
dp=depopulation
rc=recolonization

Data based on SD and ASA values shown in Table 48 , *supra*.

Table 51: Major Sites: Temporal Variation of Site Densities in Areas Below 400 m asl.

	SD Variation[a]						ASA Variation[b]					
				Percentage						Percentage		
	Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$	Max.	Min.	$\bar{x}$
NIC:												
1)	0.0011	0.0011	0.0011	100.00	100.00	100.00	444.50	444.50	444.50	49.89	49.89	49.89
2)	0.0028	0.0023	0.0026	127.27	104.55	115.91	248.06	223.25	235.66	55.56	50.00	52.78
3)	0.0039	0.0034	0.0037	354.55	309.09	331.82	692.56	667.75	680.16	77.73	74.95	76.34
4)	0.0034	0.0029	0.0032	240.91	206.82	223.87	470.31	445.50	457.91	66.65	62.48	64.56
KYA:												
1)	0.0149	0.0019	0.0084	266.07	25.68	145.88	130.18	26.85	78.52	72.73	20.00	46.37
2)	0.0168	-0.0037	0.0066	180.65	-18.05	81.30	69.04	-10.85	29.10	64.28	-22.22	21.03
3)	0.0205	0.0094	0.0150	366.07	127.03	246.55	140.64	74.58	107.61	78.57	55.55	67.06
4)	0.0187	0.0029	0.0108	273.36	54.49	163.93	104.84	31.87	68.36	71.43	16.67	44.05
FAM:												
1)	-0.0037	-0.0005	-0.0021	dp	-19.23	-59.62	dp	-95.65	-867.68	dp	-25.00	-312.49
2)	-0.0021	0.0000	-0.0011	dp	00.00	-50.00	dp	000.00	-717.38	dp	00.00	-150.00
3)	-0.0037	-0.0005	-0.0021	dp	-19.23	-59.62	dp	-95.65	-867.68	dp	-25.00	-312.49
4)	-0.0029	-0.0003	-0.0016	dp	-9.62	-54.81	dp	-47.83	-792.53	dp	-13.00	-231.25
LAC:												
1)	0.0010	0.0010	0.0010	33.33	33.33	33.33	83.08	83.08	83.08	25.00	25.00	25.00
2)	0.0010	0.0010	0.0010	25.00	25.00	25.00	49.85	49.85	49.85	20.00	20.00	20.00
3)	0.0020	0.0020	0.0020	66.67	66.67	66.67	132.93	132.93	132.93	40.00	40.00	40.00
4)	0.0015	0.0015	0.0015	45.84	45.84	45.84	91.39	91.39	91.39	30.00	30.00	30.00
LIS:												
1)	0.0060	0.0015	0.0038	200.00	50.00	125.00	222.00	11100	165.50	66.66	33.33	49.99
2)	-0.0075	0.0030	-0.0023	83.33	66.67	-16.66	-555.00	88.80	-233.10	-500.00	40.00	-230.00
		-0.0015	-0.0045		-16.67	-50.00		-22.20	-288.60		-20.00	-260.00
3)	0.0045	-0.0015	0.0015	150.00	-50.00	50.00	199.80	33300	266.40	60.00	-100.00	-20.00
4)	-0.0043	-0.0038	-0.0002	-75.00	100.00	12.50	-444.00	88.80	-177.60	-200.00	40.00	-80.00
PAS:												
1)	-0.034	--	--	-66.66	--	--	-558.00	--	--	-200.00	--	--
2)	0.0155	0.0143	0.0149	1291.66	1191.66	1241.66	777.21	772.61	774.91	92.85	92.58	92.71
3)	0.0131	0.0119	0.0125	363.89	330.55	347.22	219.21	214.61	216.91	78.57	76.92	77.75
4)	0.0143	0.0131	0.0137	595.83	545.83	560.83	498.41	492.61	495.51	89.32	88.46	88.89
ALL CYPRUS:												
1)	0.0024	-0.0001	0.0012	126.32	-5.26	60.53	285.71	-43.15	121.28	55.17	-8.33	46.84
2)	0.0058	0.0020	0.0039	322.22	46.51	184.37	429.00	45.14	237.07	76.47	19.45	47.96
3)	0.0057	0.0028	0.0043	300.00	112.00	206.00	385.85	209.00	297.43	74.51	52.78	63.65
4)	0.0058	0.0024	0.0041	311.11	79.26	195.19	407.43	127.07	267.25	75.49	36.12	55.81

[a] Represents increase, except where figures are negative.
[b] Represents decrease, except where figures are negative.
Cases of bivariation (i.e. both increase and decrease possible) are indicated by pairs of figures or by ± preceding common values.
Comparative chronological segmentation:
1) Khirokitia Culture-Sotira Culture
2) Sotira Culture-Erimi Culture
3) Khirokitia Culture-Erimi Culture
4) Early Formative-Late Formative (based on KCU/SCU average)
Non-numerical variations:
c=colonization
dp=depopulation
rc=recolonization

Data based on SD and ASA values shown in Table 49 , *supra*.

Table 52: Major Sites and HC Sites: Temporal Variation of Site Densities in Areas Below 400 m asl.

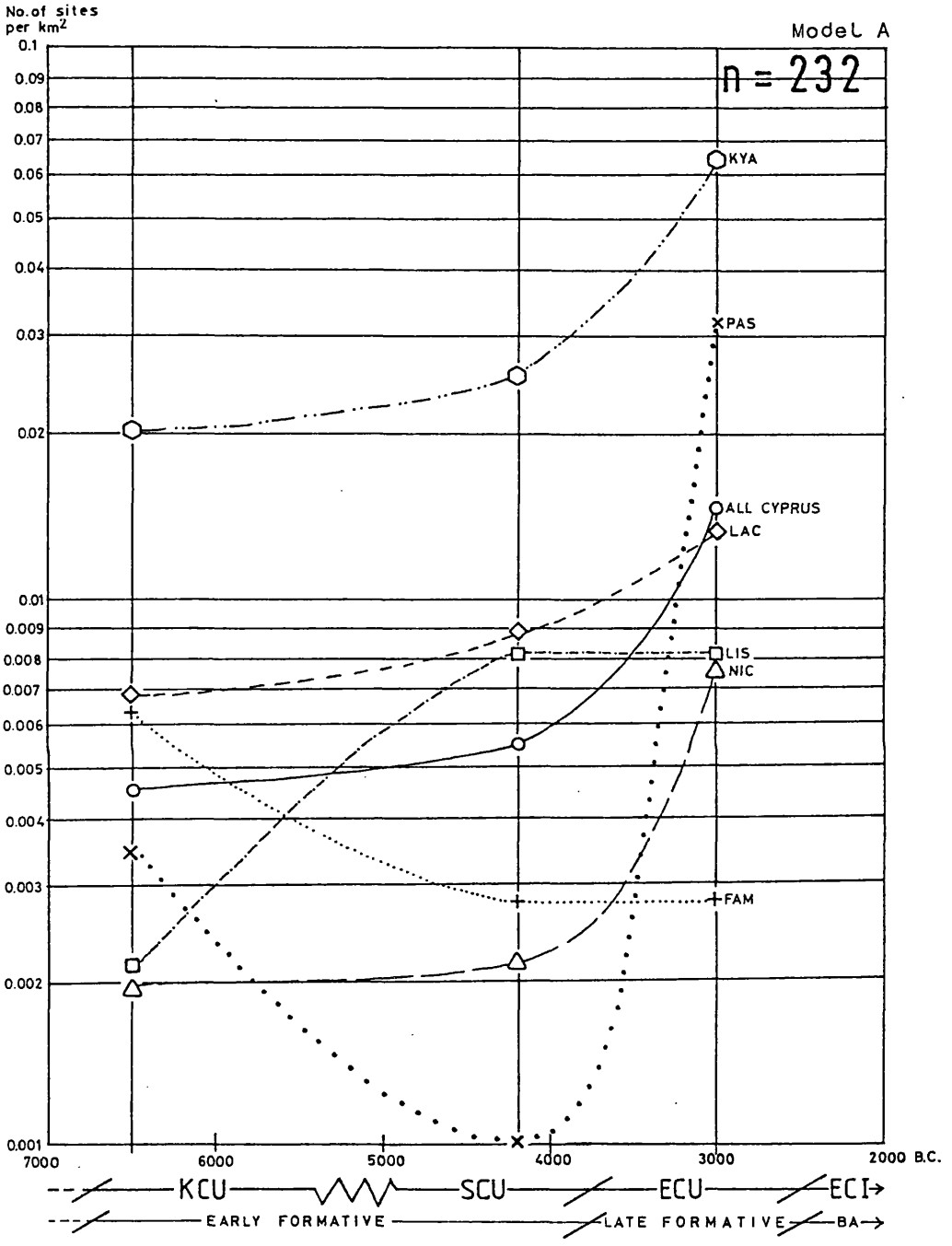


Fig. 48: Density Growth Rates for Major Sites and Site Clusters per District, assuming continuous increase in population in the 6th m.BC. Densities are minimax averages (cf. Table 47).

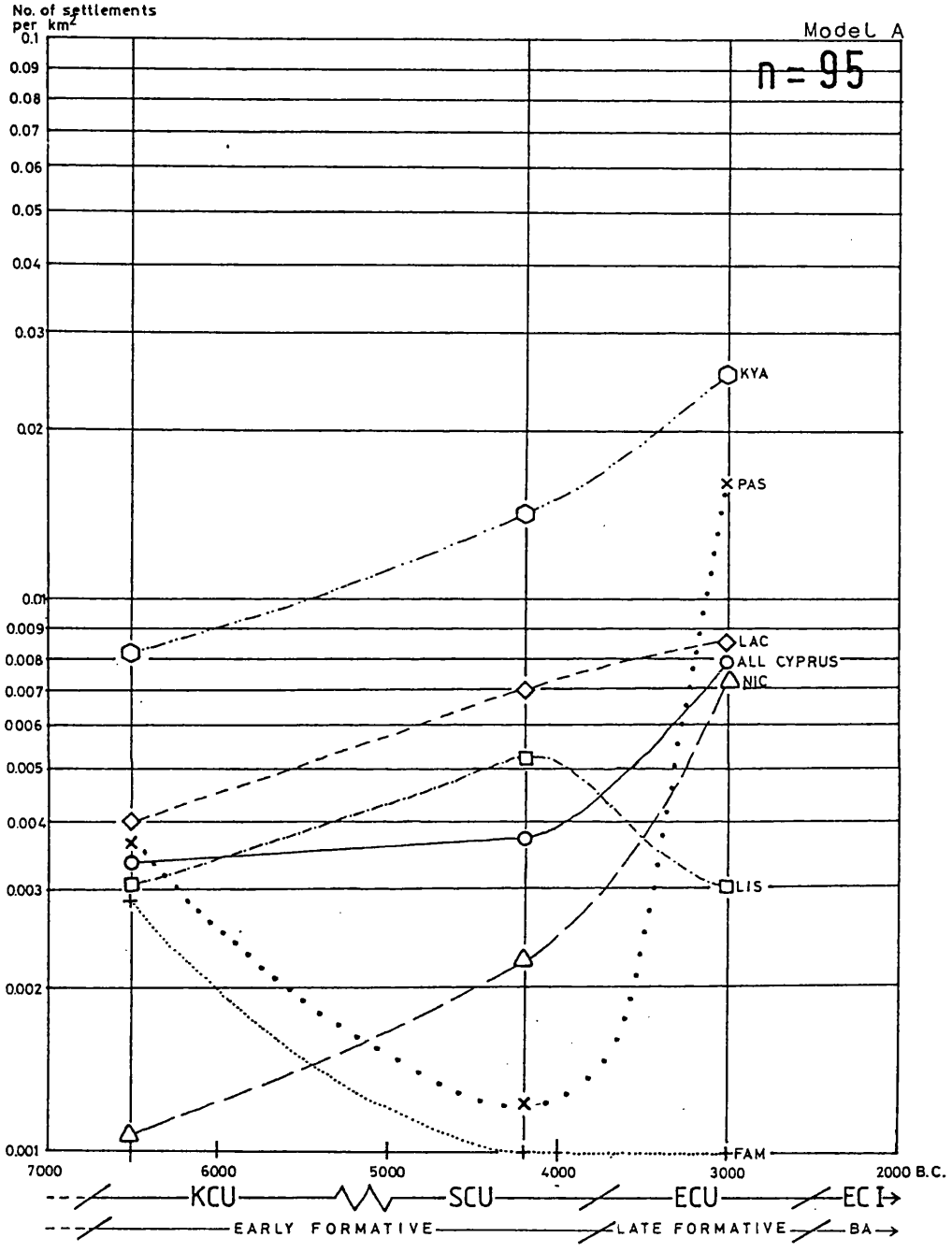


Fig. 49: Density Growth Rates for Major Sites per District, assuming continuous increase in population in the 6th m.BC. Densities are minimax averages (cf. Table 48).

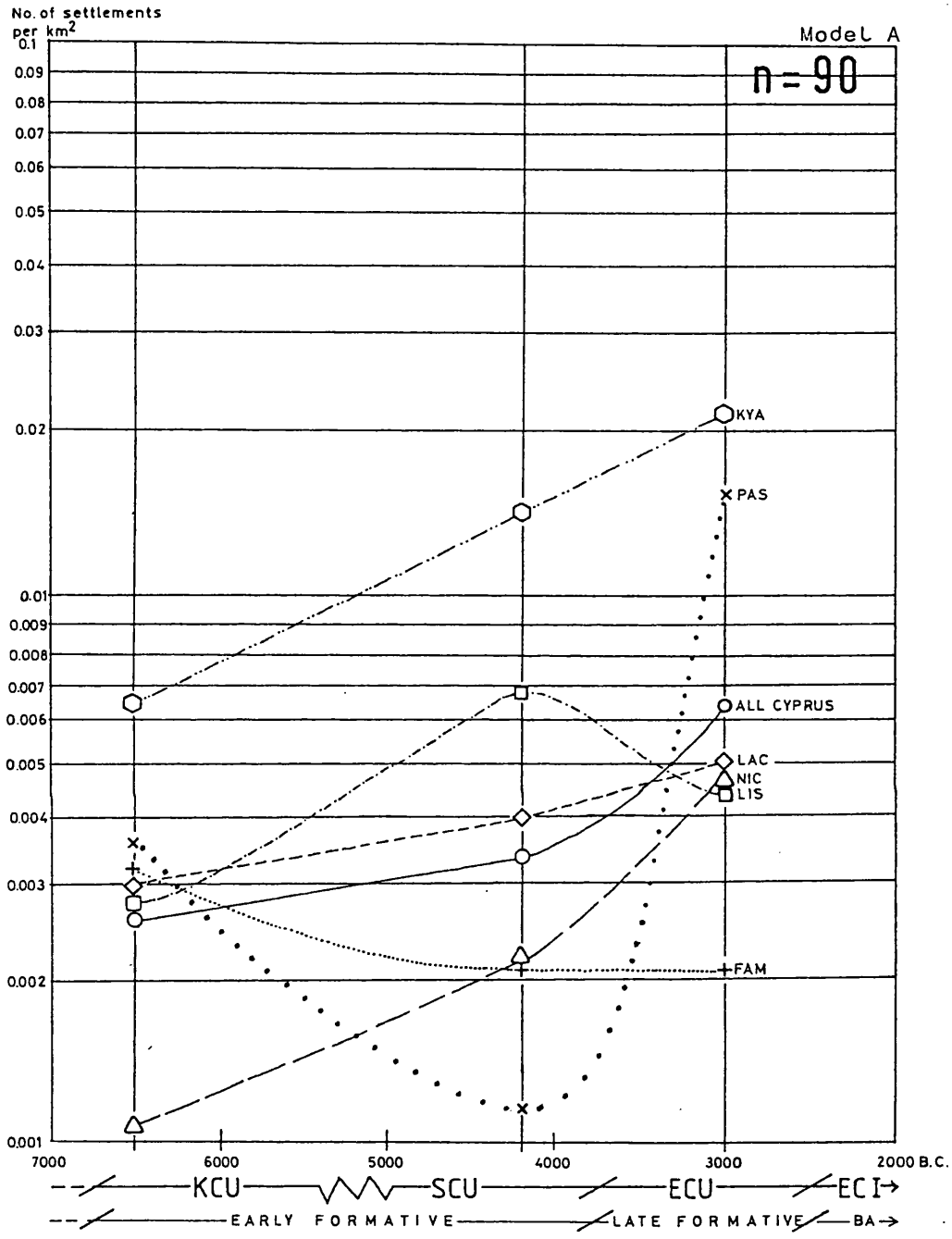


Fig. 50: Density Growth Rates for Major Sites and HC Sites per District, assuming continuous increase in population in the 6th m.BC. Densities are minimax averages (cf. Table 49).

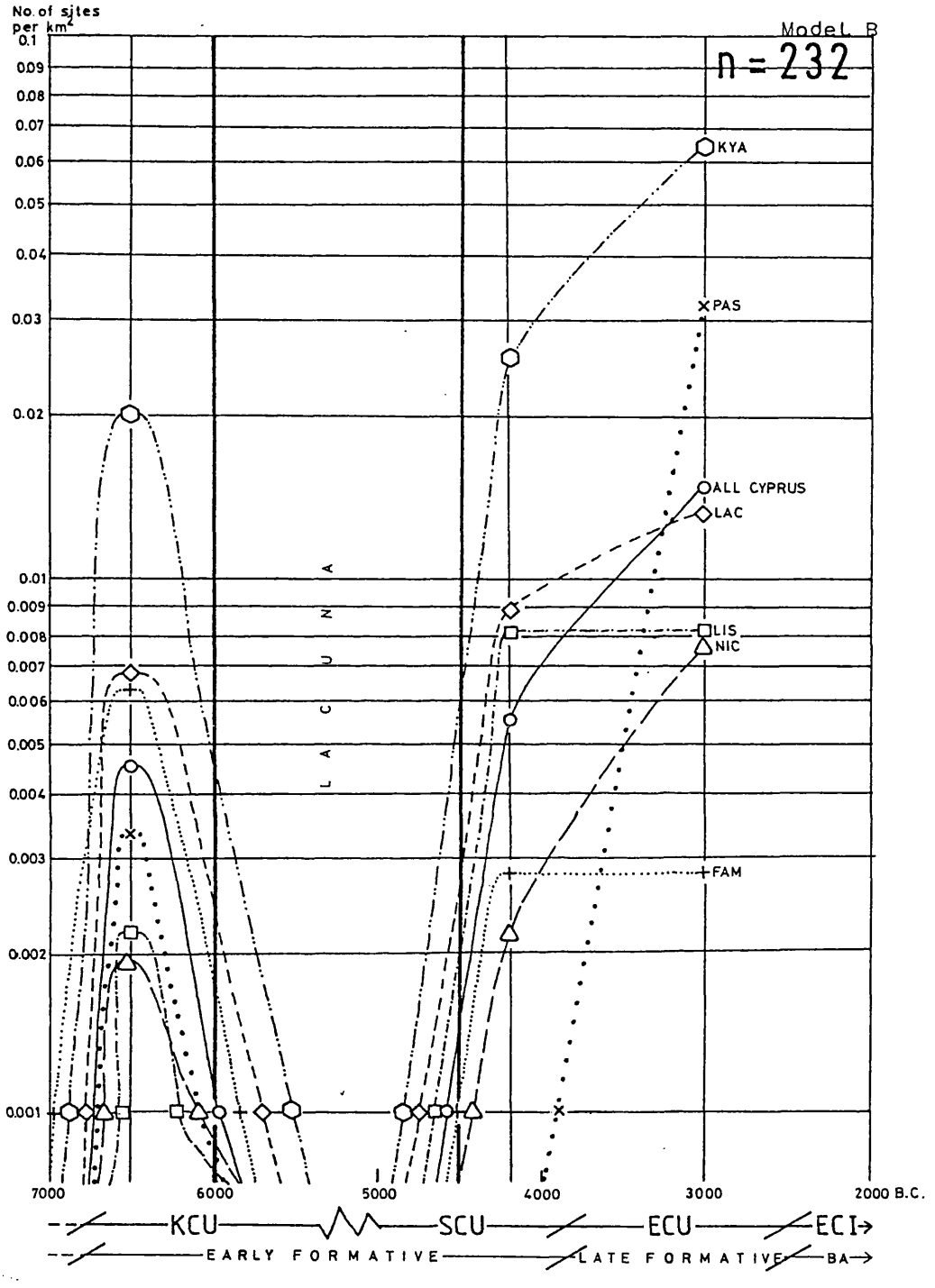


Fig. 51: Density Growth Rates for Major Sites and Site Clusters per District, assuming population extinction in the 6th m.BC. Densities are minimax averages (cf. Table 47).

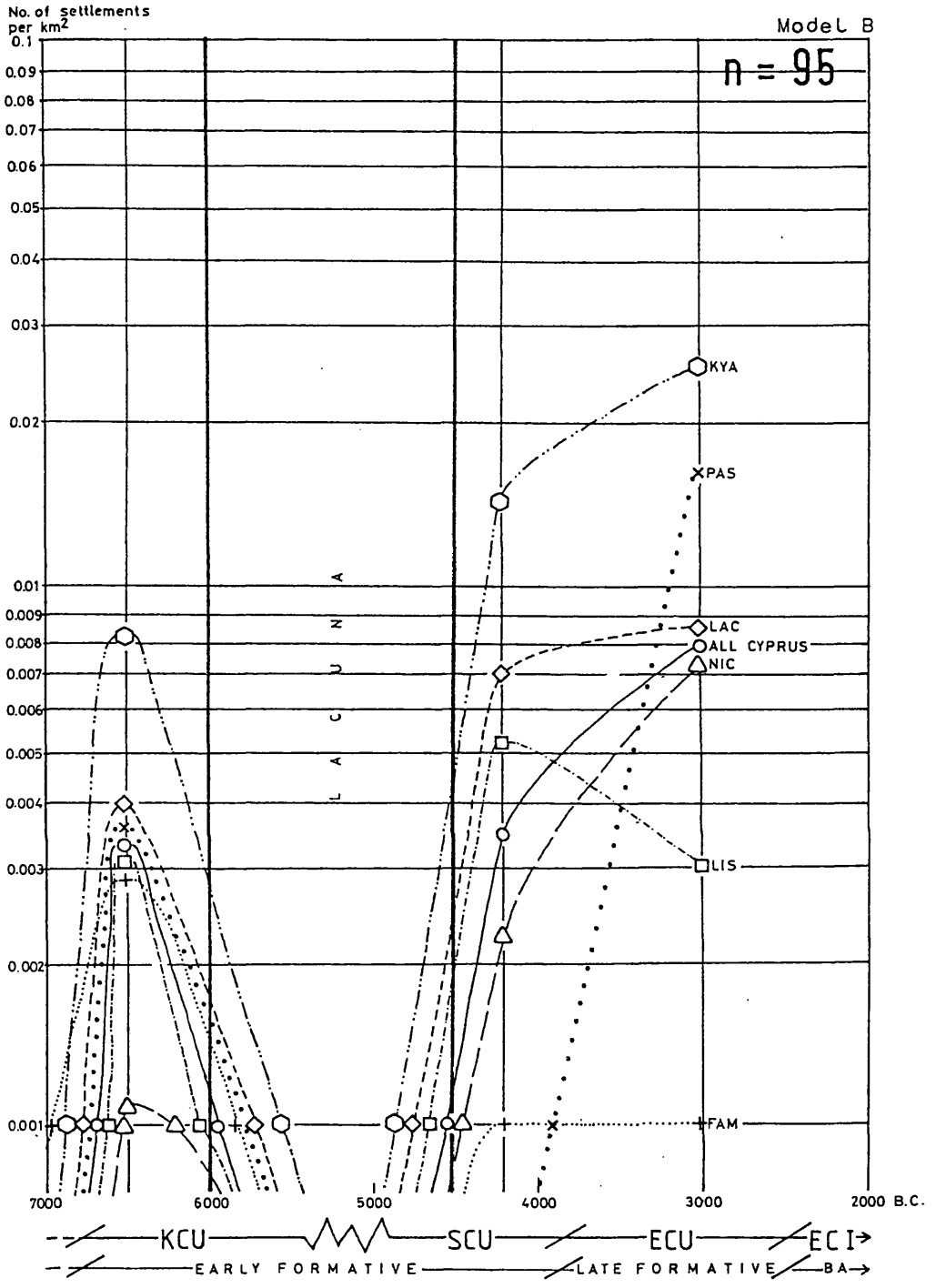


Fig. 52: Density Growth Rates for Major Sites per District, assuming population extinction in the 6th m.BC. Densities are minimax averages (cf. Table 48).

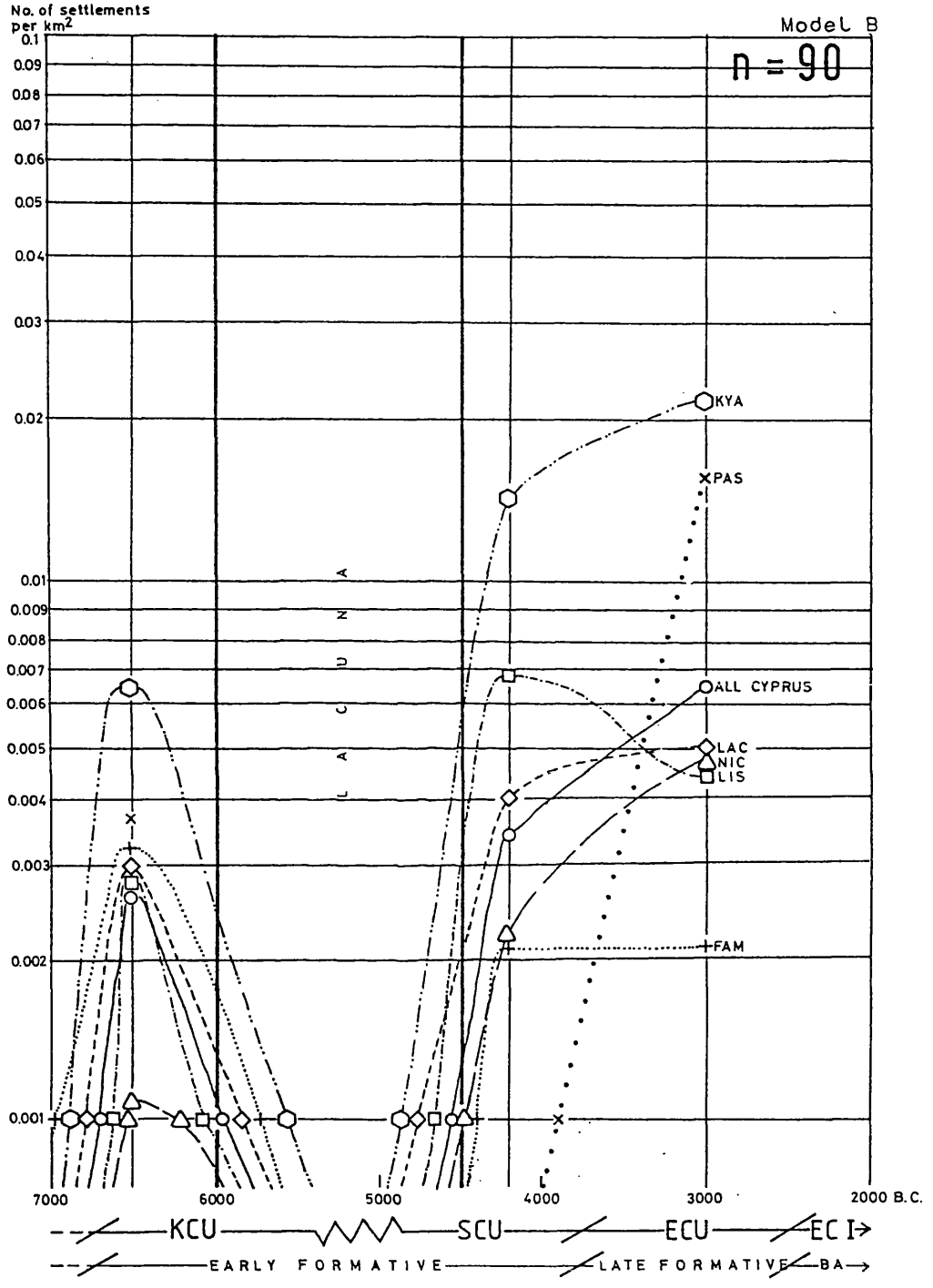


Fig. 53: Density Growth Rates for Major Sites and HC Sites per District, assuming population extinction in the 6th m.BC. Densities are minimax averages (cf. Table 49).

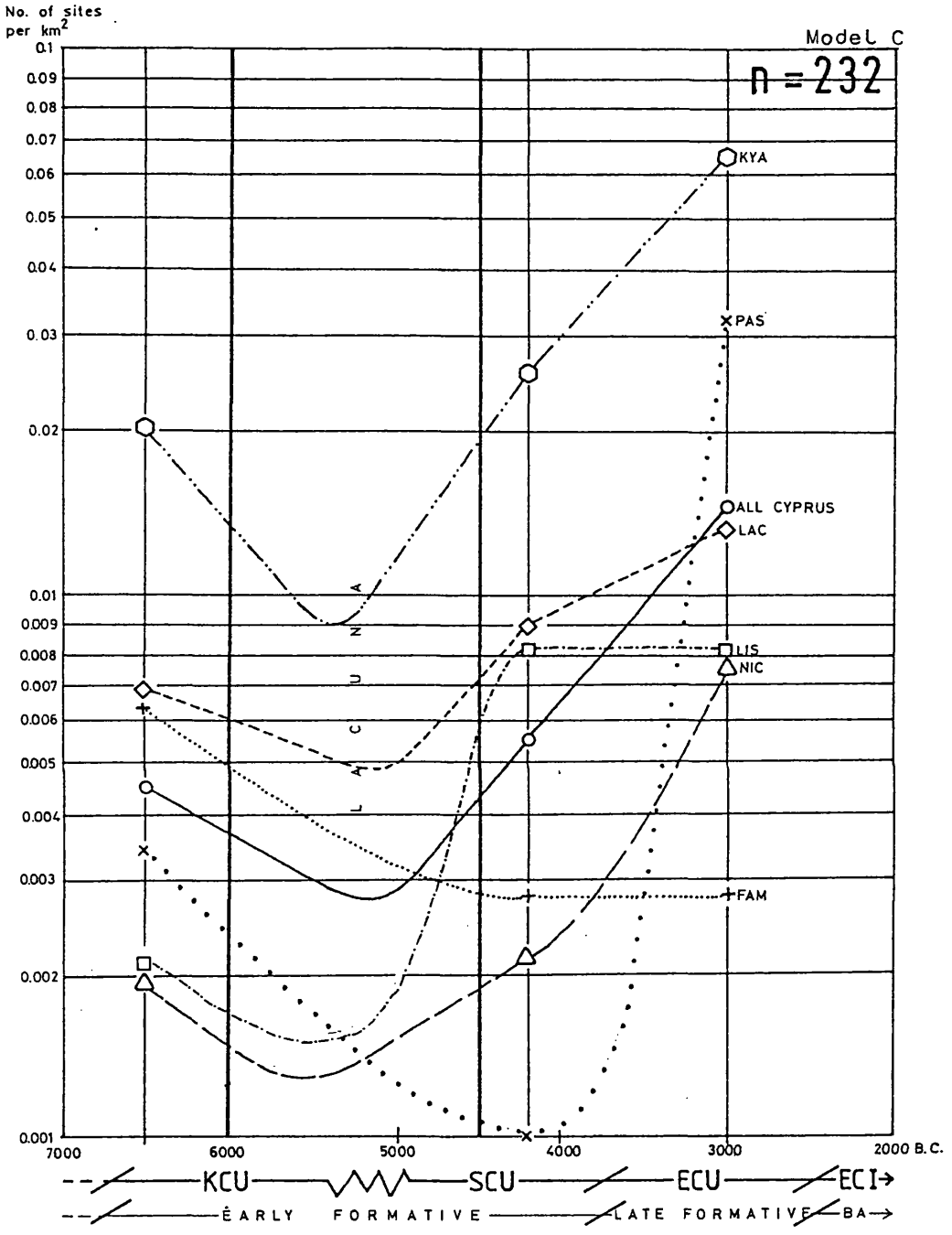


Fig. 54: Density Growth Rates for Major Sites and Site Clusters per District, assuming cultural involution in the 6th m.BC. Densities are minimax averages (cf. Table 47).

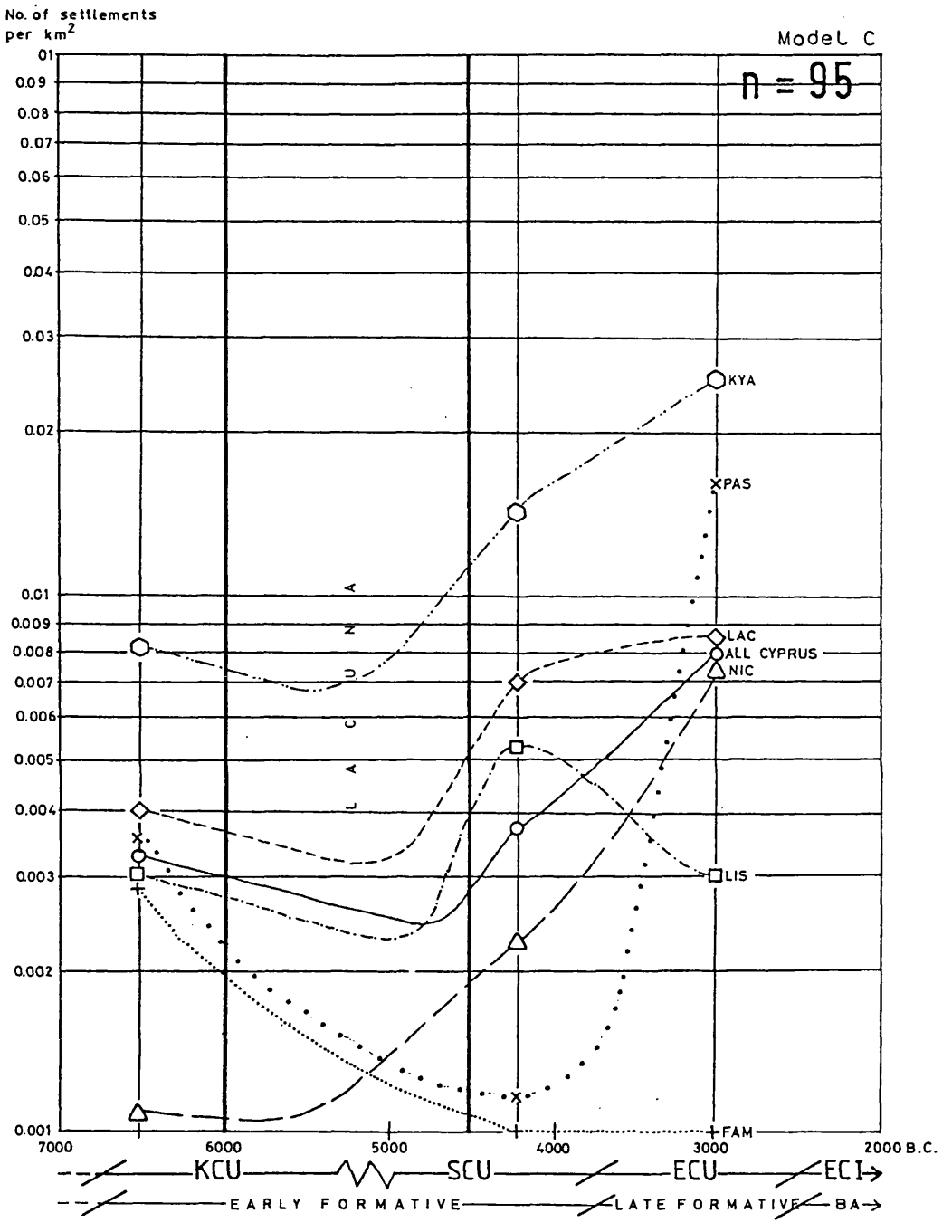


Fig. 55: Density Growth Rates for Major Sites per District, assuming cultural involution in the 6th m.BC. Densities are minimax averages (cf. Table 48).

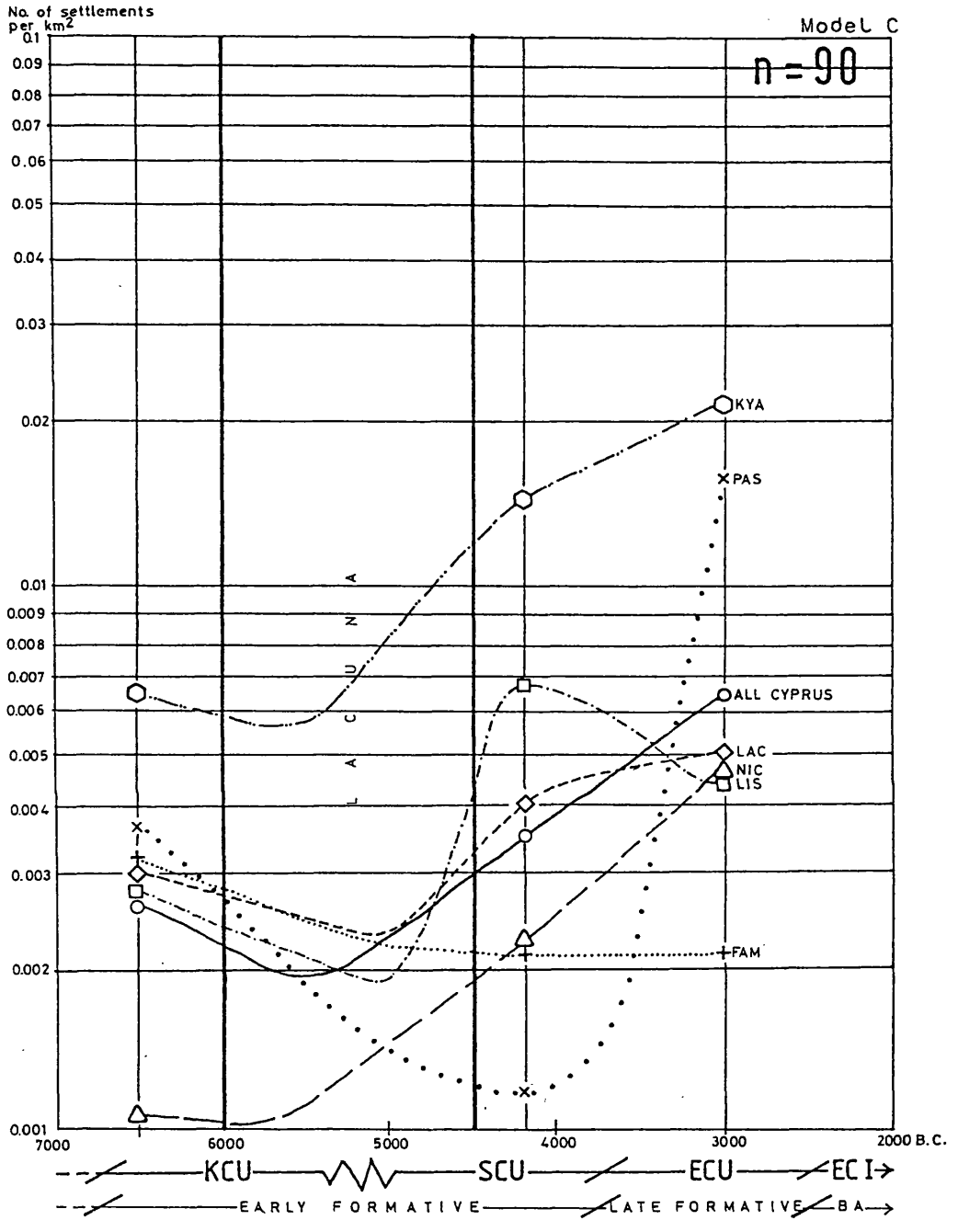
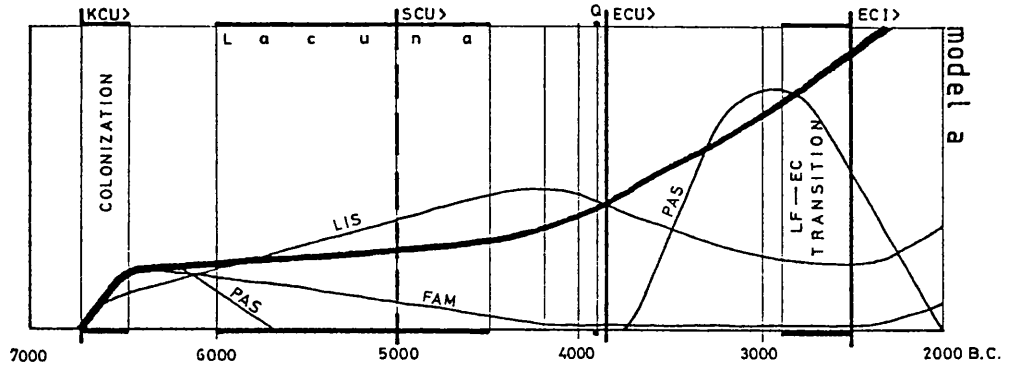
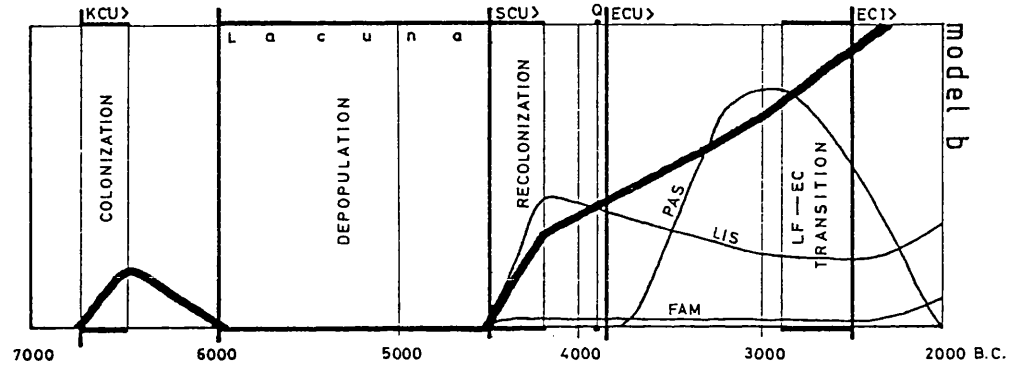


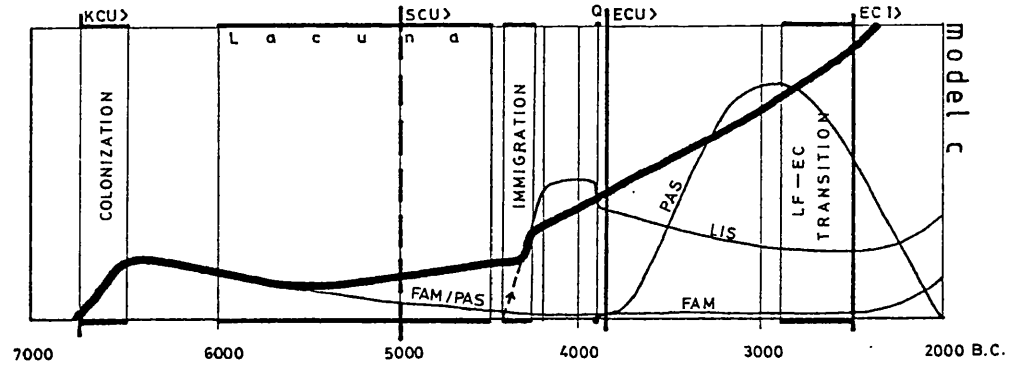
Fig. 56: Density Growth Rates for Major Sites and HC Sites per District, assuming cultural involution in the 6th m.BC. Densities are minimax averages (cf. Table 49).



a) Colonization-Continuous Increase



b) Colonization-Extinction-Recolonization-Continuous Increase



c) Colonization-Decline-Recovery-Booster Immigration-Continuous Increase

Fig. 57: Three General Models of Population Growth During the Early Prehistoric Period. Thin curves show discrepant regional variations. Q=hypothetical earthquake(s).

APPENDIX 4
^{14}C CALIBRATION TABLES AND GRAPHS
(Early Prehistoric-Late Prehistoric Periods)

File Statistics

Total no of EP/LP files (=determinations):		119	[EP:110, LP:9]
No of files calculated:		98	[EP:89, LP:9]
No of non-calculable files[1]:		19	[EP:19, LP:0]
File set akrotiri.dat [S/354] (13 files)			
File set tenta.dat [R/062] (5 files)			
File set ayious.dat [R/059] (1 file)			
No of non-applicable files[2]:		2	[EP:2, LP:0]
File set troulli.dat [K/037] (2 files)			
No of calculable file sets (=sites):		19	[EP:15, LP:4]
No of marine samples[3]:		5	[EP:5, LP:0]
Files calculated:	0		
Non-calculable files:	5		
No of atmospheric samples (decadal dataset)[4]:		10	[EP:2, LP:8]
Files calculated:	10		
Non-calculable files:	0		
No of atmospheric samples (bi-decadal dataset)[5]:		102	[EP:102, LP:0]
Files calculated:	88		
Non-calculable files:	14		

List Files

Akrotiri [S/354]	akrotiri.dat	aa[#].txt	aa[#].plt	aa[#].prb
No of calculable files:2	No of non-calculable files:13			
Tenta [R/062]	tenta.dat	kt[#].txt	kt[#].plt	kt[#].prb
No of calculable files:17	No of non-calculable files:5			
Agridhi [K/002]	agridhi.dat	da[#].txt	da[#].plt	da[#].prb
No of calculable files:5	No of non-calculable files:0			
Cape Andreas [F/056]	kastros.dat	cak[#].txt	cak[#].plt	cak[#].prb
No of calculable files:5	No of non-calculable files:0			
Khirokitia [R/063]	khirokit.dat	khv[#].txt	khv[#].plt	khv[#].prb
No of calculable files:15	No of non-calculable files:0			
Vasilikos [R/382]	vasiliko.dat	kvs[#].txt	kvs[#].plt	kvs[#].prb
No of calculable files:1	No of non-calculable files:0			
A.E.Vrysi [K/028]	vrysi.dat	aev[#].txt	aev[#].plt	aev[#].prb
No of calculable files:17	No of non-calculable files:0			
Sotira [S/080]	teppes.dat	sot[#].txt	sot[#].plt	sot[#].prb
No of calculable files:2	No of non-calculable files:0			
Philia [K/019]	dhrakos.dat	pda[#].txt	pda[#].plt	pda[#].prb
No of calculable files:1	No of non-calculable files:0			
Pamboules [R/061]	kpamboul.dat	kpam[#].txt	kpam[#].plt	kpam[#].prb
No of calculable files:1	No of non-calculable files:0			
Lemba [P/085]	lemba.dat	ll[#].txt	ll[#].plt	ll[#].prb
No of calculable files:9	No of non-calculable files:0			
Mylouthkia [P/084]	mylouth.dat	kmyl[#].txt	kmyl[#].plt	kmyl[#].prb

No of calculable files:6	No of non-calculable files:0			
Ayious [R/059]	ayious.dat	ka[#].txt	ka[#].plt	ka[#].prb
No of calculable files:4	No of non-calculable files:1			
Erimi [S/075]	erimi.dat	erp[#].txt	erp[#].plt	erp[#].prb
No of calculable files:3	No of non-calculable files:0			
Panayia [No ID]	panayia.dat	kp[#].txt	kp[#].plt	kp[#].prb
No of calculable files:1	No of non-calculable files:0			
Mosphilia [P/083]	mosphil.dat	kmos[#].txt	kmos[#].plt	kmos[#].prb
No of calculable files:1	No of non-calculable files:0			
Phaneromeni [No ID]	episkopi.dat	eph[#].txt	eph[#].plt	eph[#].prb
No of calculable files:5	No of non-calculable files:0			
Ambelikou [No ID]	ambeliko.dat	aal[#].txt	aal[#].plt	aal[#].prb
No of calculable files:1	No of non-calculable files:0			
Alambra [No ID]	alambra.dat	alm[#].txt	alm[#].plt	alm[#].prb
No of calculable files:2	No of non-calculable files:0			

[1] Determinations beyond currently available high-precision curves; i.e., ^{14}C age >8200 BP (date >7210 cal BC) for atmospheric bi-decadal radiocarbon age dataset ATM20.14C, or ^{14}C age >8580 BP (date >7190 cal BC) for marine-model bi-decadal radiocarbon age dataset MARINE.14C.
[2] Determinations made by chronometric methods other that ^{14}C dating.
[3] Dataset: MARINE.14C (bi-decadal).
[4] Dataset: ATM10.14C (decadal).
[5] Dataset: ATM20.14C (bi-decadal).

Input Information:

Conventional radiocarbon age (yrs BP). Verified or assumed isotopic correction ($^{13}C/^{12}C$ ratio) by issuing lab.

5568 (Libby) half-life.

Standard Deviation: 1 Sigma=unaltered lab quoted error (no error multiplier).

Output Information:

Calibrated age (yrs cal BP), calibrated date and age ranges (yrs cal BC) in numerical and graphic (top graph) form, probability distribution of one sigma and two sigma age ranges in numerical and graphic (bottom graph) form.

Reference for CALIB/DISPLAY: Stuiver and Reimer (1986).

Directions for Use:

The following tables and graphs represent the first application of the new high-precision ^{14}C calibration curves (as embodied in the Proceedings of the 12th International Conference on Radiocarbon Dating, Trondheim 1985, see Kra and Stuiver 1986) to currently available radiocarbon measurements from prehistoric sites in Cyprus.

Previous calibration tables by Ralph et al. (1972), Clark (1975), and Klein et al. (1982) have been, and continue to be, adopted in the Cypriot context on numerous occasions (Burleigh 1981, Coleman n.d., Peltenburg 1981b, 1982a, 1985a, n.d.a, Todd 1982b, 1987, Toumazou 1987), but in line with international convention they have now been superseded and should no longer be used by archaeologists.

However, increasing refinement has also rendered the interpretation of calibrated measurements more complex, requiring users to carefully assess technical and statistical parameters before assigning a certain degree of confidence to a particular calendar date. Not only should the data be approached with a working knowledge of the problems inherent in ^{14}C dating and dendrochronological calibration (e.g., Browman 1981, Mook and Waterbolk 1985, Pearson 1987) such as the connection between curve wiggles, multiple intercepts for T (^{14}C age) and 1 and 2 sigma, and the resulting band-widths, but users should be equally aware of factors affecting the accuracy of raw dates that constitute the Cypriot data base.

Apart from possible contamination, for which the reader should turn to information in the excavators' reports and the relevant issues of *Radiocarbon*, three such factors are: a) the lack of information concerning systematic errors of laboratories that have analyzed Cypriot samples (hence all the ages below had to be run without error multipliers); b) uncertainty regarding the ^{13}C correction (isotopic fractionation) of some of the Cypriot samples and the known omission of this correction in the case of all samples from Kalavasos *Tenta* (Todd 1987:177, n.1); and c) the recent announcement of a systematic error in British Museum measurements from BM-1700 through BM-2315 (Tite et al. 1987), which affects determinations for Ayios Epiktitos *Vrysi*, Kalavasos *Ayious*, Lemba *Lakkous*, and Kissonerga *Mosphilia*.

Each conventional age (BP), its calibrated age (cal BP), calendar date (cal BC) and calibrated sigma ranges are listed together with the probability distribution of the sample's true age. Terrestrial samples up ca. 8100 BP were calculated on the basis of a bi-decadal dataset (ATM20.14C), representing a dendrochronological plot of 20-ring blocks, while a more detailed decadal dataset (ATM10.14C) correponding to 10-ring blocks was utilized for samples up to ca. 3950 BP. Except for a few ages whose sigma ranges are beyond the limits of their respective datasets, each table is followed by two graphs providing a diagrammatic picture of the sample's age range (upper graph) and probability distribution (lower graph).

Method A: Radiocarbon age ranges can be calibrated from the intercepts of the radiocarbon age ± 1 or 2 times the standard deviation (sigma, or 'SD') of the age in the same manner as

radiocarbon ages; i.e., by plotting a calibration curve on an x-y axis and drawing the horizontal and vertical intercept(s) (see Mook and Waterbolk 1985:18-19, Fig.5a-d). The standard deviation of the calibration curve itself must be included for a proper deviation of a range of intercepts with the calibration curve (due to the asymmetrical uncertainty that results it is incorrect to quote a calibrated date with ± the original sigma, see Mook and Waterbolk 1985:21, Fig.6). Sigma on the printouts which follow represents the combined standard deviation (1 sigma=$\sqrt{\{}$[sample standard deviation]^2+[curve standard deviation]$^2\}$) used for the radiocarbon age range conversion.

Method B: An alternative approach is to calculate the probability distribution around the radiocarbon age as a function of time. The age ranges containing 68.3% and 95.4% of the area under the Gaussian distribution curve are the one and two sigma ranges, respectively. The relative areas provide a quick-reference estimate of the importance of each age range.

In the graphs, the 1 sigma ranges are marked by thin vertical lines and the 2 sigma ranges by thick vertical lines. Two age ranges that fall on the same location are marked by double vertical lines. Calibrated ages are marked by a lower-case 'o' or, if more than one cal age coincide, by a capital 'O.' If a 2 sigma range falls on the same location as a cal age, the 2 sigma line is marked above and below. In some unusual cases where a 2 sigma range, a 1 sigma range, and a cal age all coincide, only the cal age and 1 sigma range are marked.

For the probability distribution plots, the probability levels corresponding to the age ranges containing 68.3% and 95.4% of the area under the curve are marked 'pl.'The 2 sigma ranges of Method B are marked the same as above. The 1 sigma ranges extend to the 68.3% probability level.

The graphs should be used in conjunction with the tables since the character representation of the ages is only approximate.

Key to Symbols (after Sample ID in tables):

♦ BM samples affected by yet-to-be-determined systematic error.

ſ BM samples corrected for systematic error (sample ID + suffix 'r').

♥ Sample not ^{13}C-corrected.

* Marine sample, corrected for Med. Delta R value -690 yr.

```
Site ID: S/345 akrotiri   1.00
beta-3412            6310.0  160.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aa3412.txt
Plot file: aa3412.plt

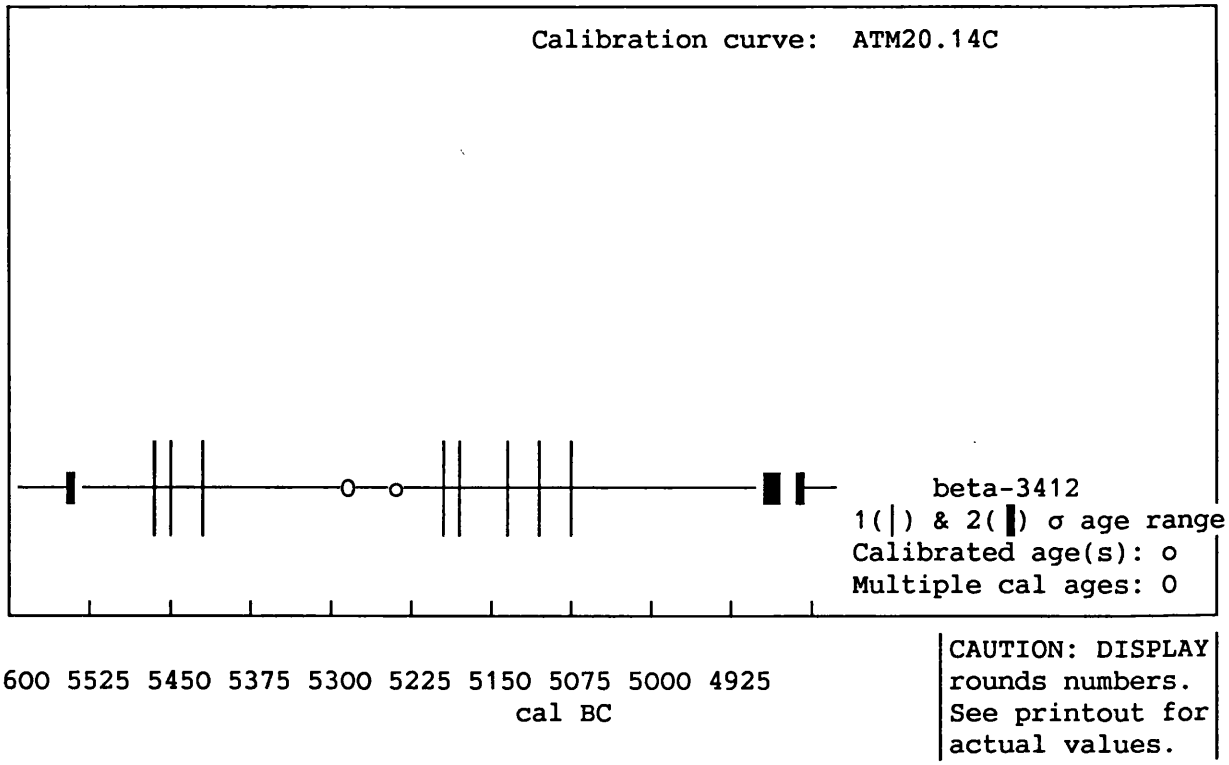

beta-3412♥
 Radiocarbon Age BP  6310.0  ±160.0†                          Reference(s)
  Calibrated age(s) cal BC  5292, 5286, 5241              (20 yr. average of
                    cal BP  7241, 7235, 7190               LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
    one Sigma**   cal BC 5465-5446(7414-7395) 5420-5200(7369-7149)
                         5174-5137(7123-7086) 5109-5076(7058-7025)
    two Sigma**   cal BC 5540-4900(7489-6849) 4873-4863(6822-6812)

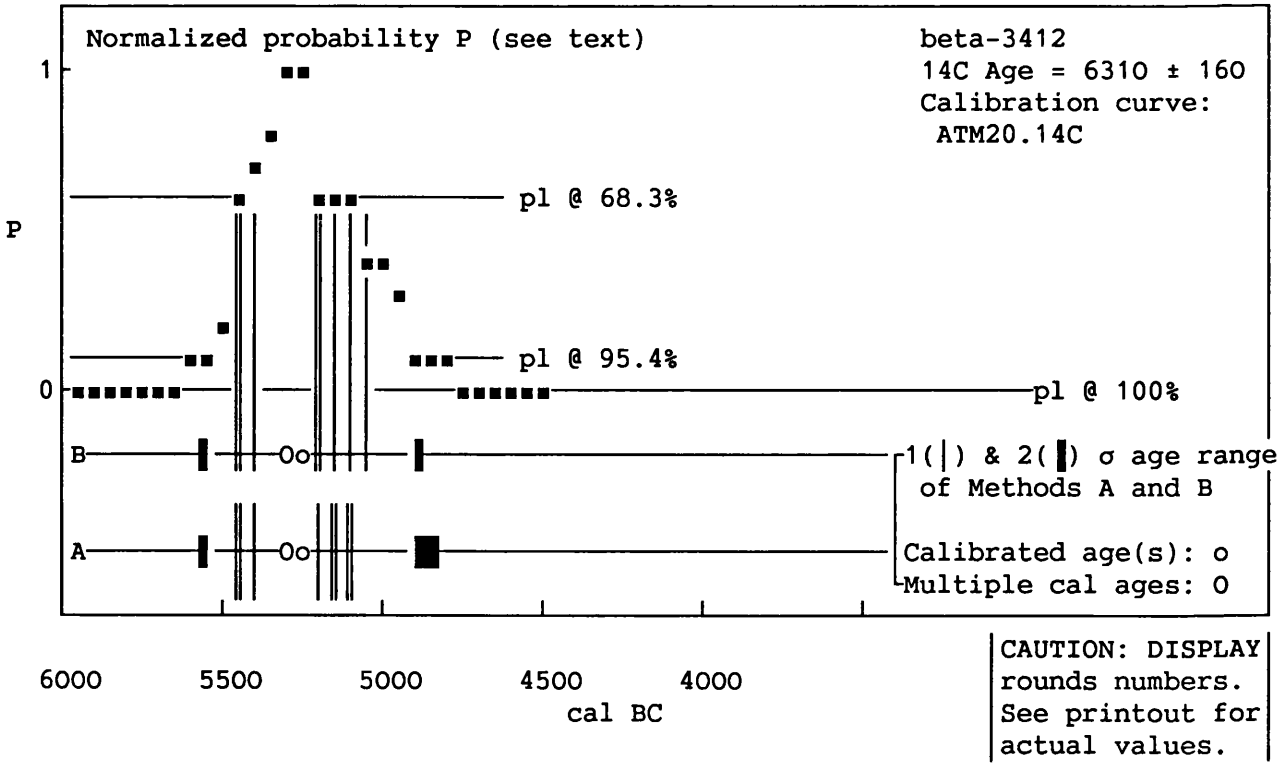
    Summary of above –
    minimum of cal age ranges (cal ages) maximum of cal age ranges:
       one sigma   cal BC 5465 ( 5292, 5286, 5241) 5076
                   cal BP 7414 ( 7241, 7235, 7190) 7025
       two sigma   cal BC 5540 ( 5292, 5286, 5241) 4863
                   cal BP 7489 ( 7241, 7235, 7190) 6812

 cal AD/BC age ranges (cal ages as above) from probability distribution
   (Method B):
  % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                    probability distribution
    68.3 (one sigma)   cal BC 5471-5441(7420-7390)              .07
                              5420-5200(7369-7149)              .72
                              5176-5135(7125-7084)              .10
                              5116-5072(7065-7021)              .10
    95.4 (two sigma)   cal BC 5550-4900(7499-6849)             1.00


References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
beta-3412
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
5600 5525 5450 5375 5300 5225 5150 5075 5000 4925
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
beta-3412
14C Age = 6310 ± 160
Calibration curve:
ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6000 5500 5000 4500 4000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: S/354 akrotiri 1.00
pta-3435 3700.0 60.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: aa3435.txt
Plot file: aa3435.plt

pta-3435
Radiocarbon Age BP 3700.0 ± 60.0† Reference(s)
Calibrated age(s) cal BC 2133, 2067, 2047 (Pearson and Stuiver)
cal BP 4082, 4016, 3996
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 2195-2156(4144-4105) 2147-2031(4096-3980)
two Sigma** cal BC 2290-1930(4239-3879)

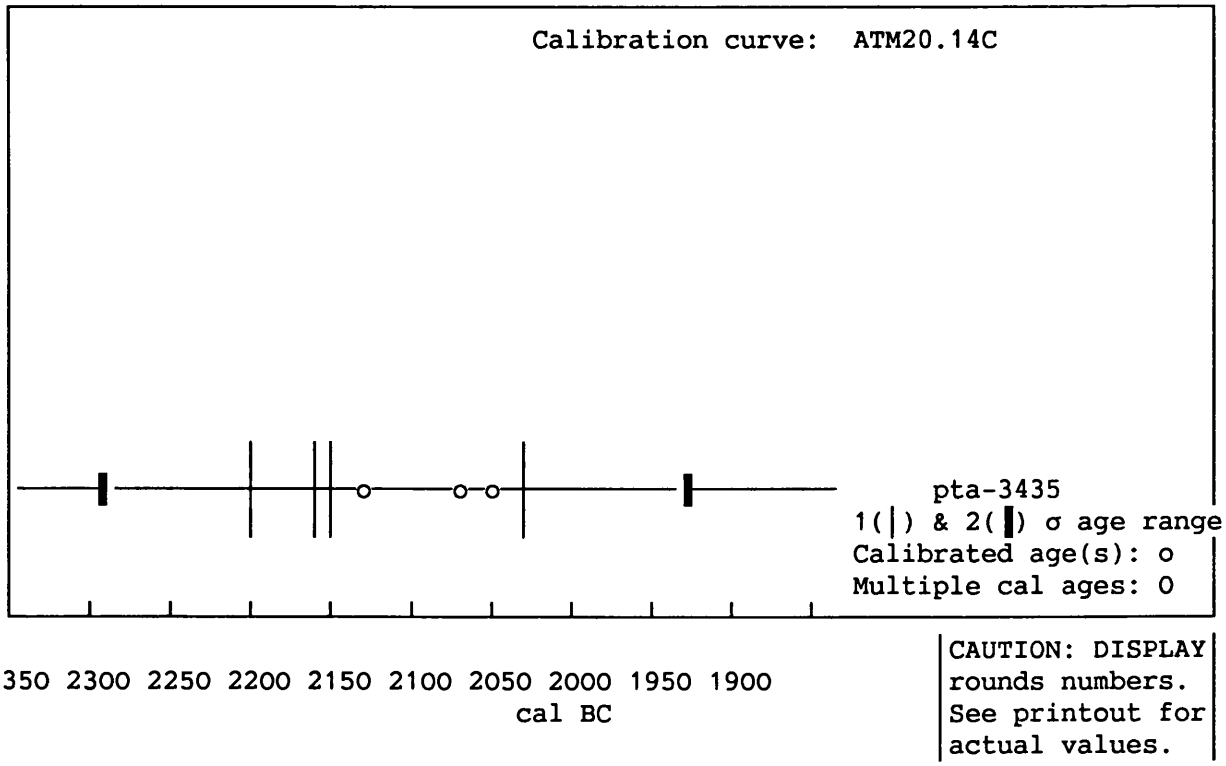
Summary of above –
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 2195 (2133, 2067, 2047) 2031
cal BP 4144 (4082, 4016, 3996) 3980
two sigma cal BC 2290 (2133, 2067, 2047) 1930
cal BP 4239 (4082, 4016, 3996) 3879

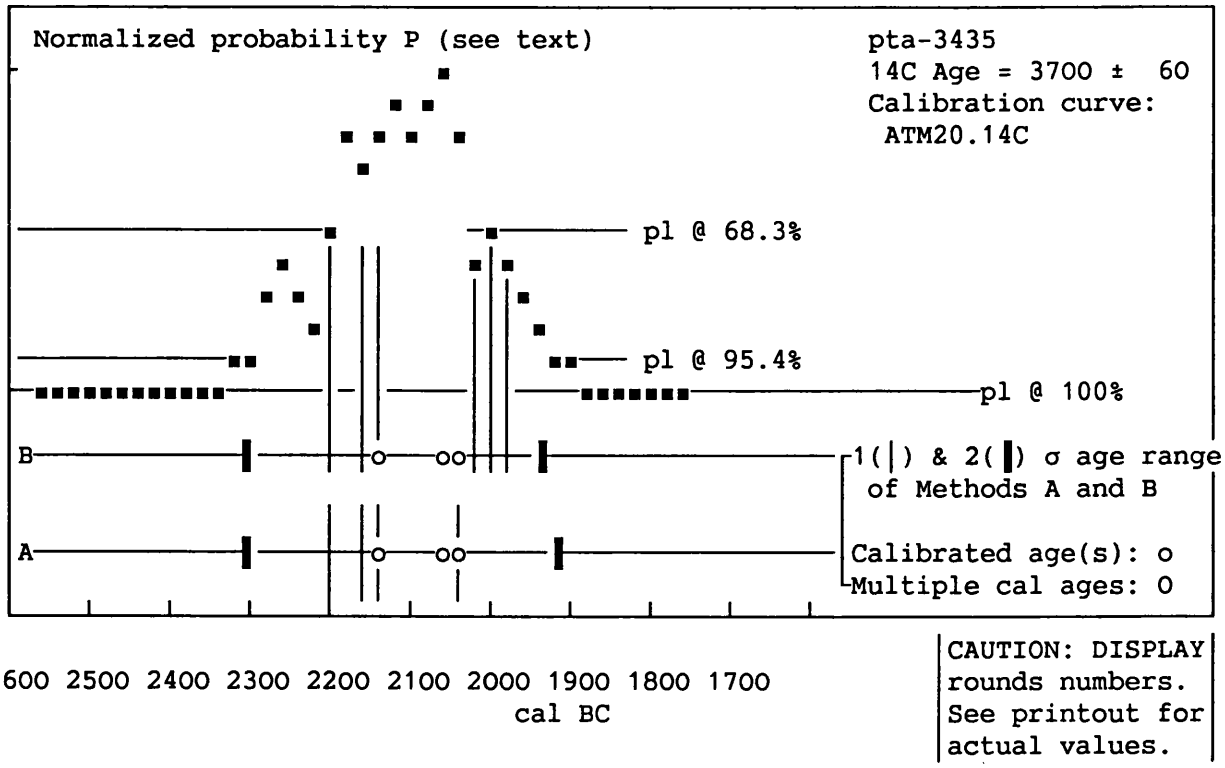
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 2198-2152(4147-4101)	.23
	2149-2027(4098-3976)	.74
	1994-1987(3943-3936)	.03
95.4 (two sigma)	cal BC 2291-1932(4240-3881)	1.00

References for datasets [and intervals] used:
Pearson, GW and Stuiver, M, 1986, Radiocarbon, 28, 839-862.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
pta-3435
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2350 2300 2250 2200 2150 2100 2050 2000 1950 1900
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
pta-3435
14C Age = 3700 ± 60
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2600 2500 2400 2300 2200 2100 2000 1900 1800 1700
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2974 8020.0 90.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2974.txt
Plot file: kt2974.plt

p-2974♥
Radiocarbon Age BP 8020.0 ± 90.0† Reference(s)
Calibrated age(s) cal BC 7039 (20 yr. average of
cal BP 8988 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma BEYOND CALCULABLE RANGE
two Sigma BEYOND CALCULABLE RANGE

cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	BEYOND CALCULABLE RANGE	
95.4 (two sigma)	BEYOND CALCULABLE RANGE	

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14

Site ID: R/062 tenta 1.00
p-2973 8010.0 360.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2973.txt
Plot file: kt2973.plt

p-2973♥
Radiocarbon Age BP 8010.0 ±360.0† Reference(s)
Calibrated age(s) cal BC 7036 (20 yr. average of
cal BP 8985 LSB,SKBF,KRBSMSB,
and LLDF)

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma BEYOND CALCULABLE RANGE
two Sigma BEYOND CALCULABLE RANGE

cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	BEYOND CALCULABLE RANGE	
95.4 (two sigma)	BEYOND CALCULABLE RANGE	

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14

Site ID: R/062 tenta 1.00
p-2782 7600.0 100.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2782.txt
Plot file: kt2782.plt

p-2782♥
Radiocarbon Age BP 7600.0 ±100.0† Reference(s)
Calibrated age(s) cal BC 6441 (20 yr. average of
cal BP 8390 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6555-6536(8504-8485) 6490-6380(8439-8329)
6313-6299(8262-8248) 6282-6262(8231-8211)
two Sigma** cal BC 6672-6663(8621-8612) 6630-6179(8579-8128)

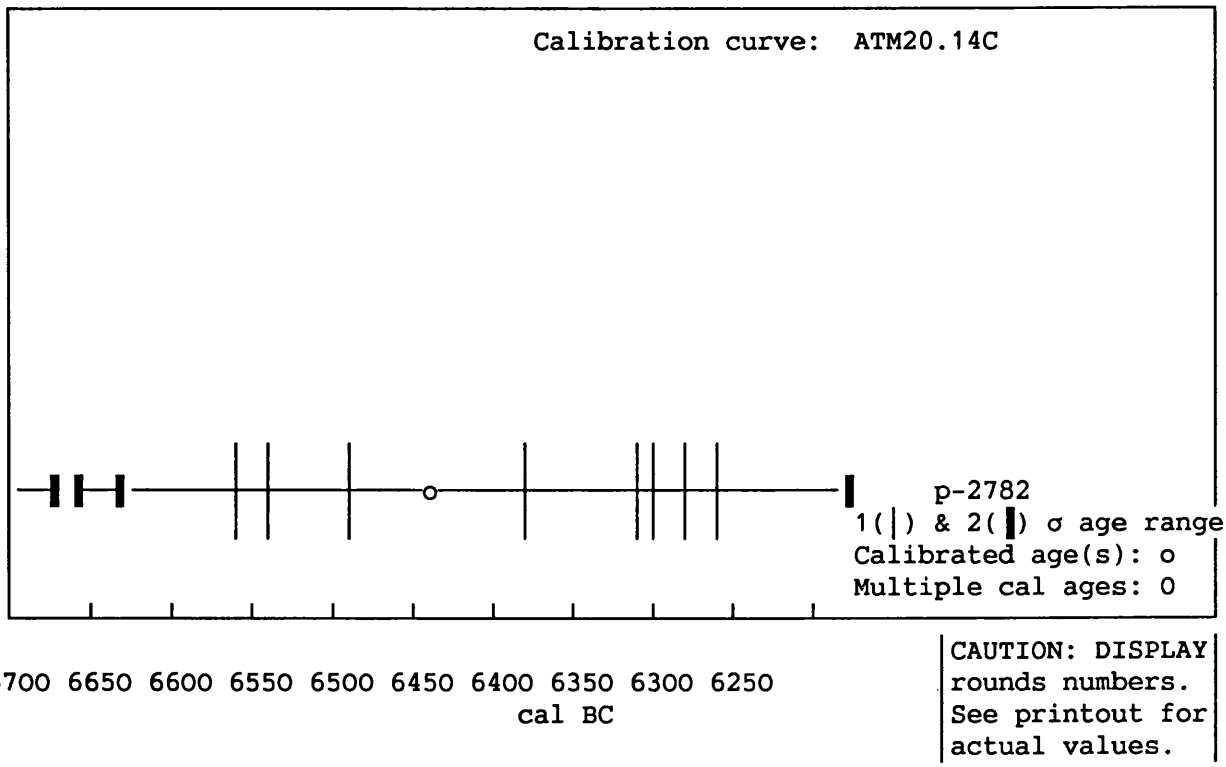
Summary of above –
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6555 (6441) 6262
cal BP 8504 (8390) 8211
two sigma cal BC 6672 (6441) 6179
cal BP 8621 (8390) 8128

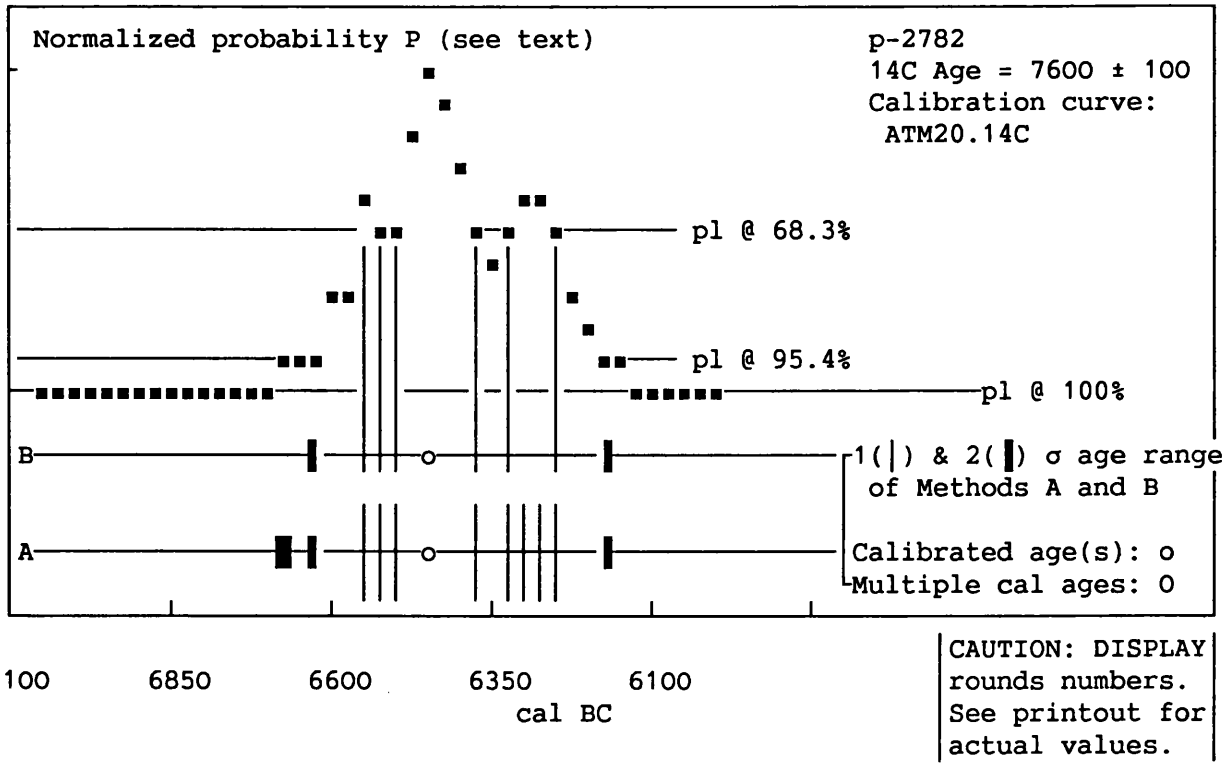
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6560-6520(8509-8469)	.15
	6500-6380(8449-8329)	.58
	6321-6245(8270-8194)	.27
95.4 (two sigma)	cal BC 6630-6180(8579-8129)	.99

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2782
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6700 6650 6600 6550 6500 6450 6400 6350 6300 6250
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2782
14C Age = 7600 ± 100
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6850 6600 6350 6100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2555 7430.0 90.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2555.txt
Plot file: kt2555.plt

p-2555♥

Radiocarbon Age BP	7430.0 ± 90.0†		Reference(s)
Calibrated age(s)	cal BC	6226, 6191, 6190	(20 yr. average of
	cal BP	8175, 8140, 8139	LSB,SKBF,KRBSMSB, and LLDF)

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6410-6140(8359-8089)
two Sigma** cal BC 6450-6090(8399-8039)

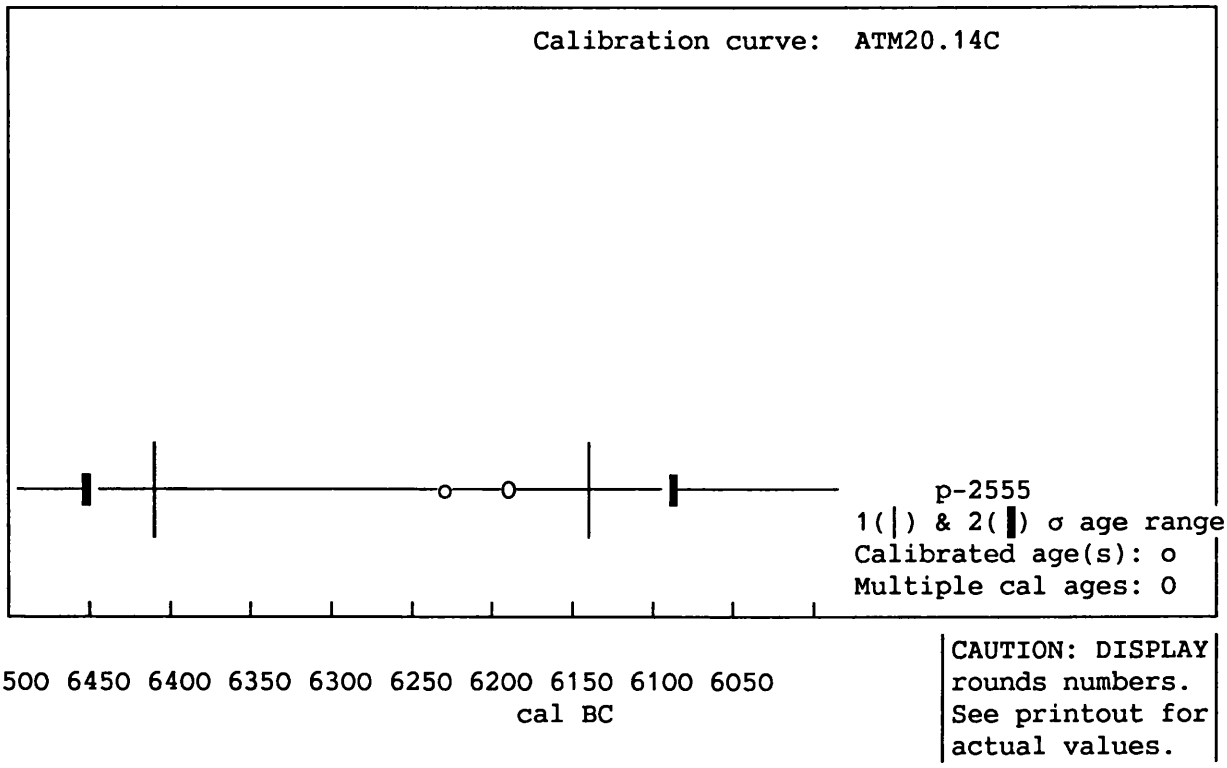
Summary of above –
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6410 (6226, 6191, 6190) 6140
cal BP 8359 (8175, 8140, 8139) 8089
two sigma cal BC 6450 (6226, 6191, 6190) 6090
cal BP 8399 (8175, 8140, 8139) 8039

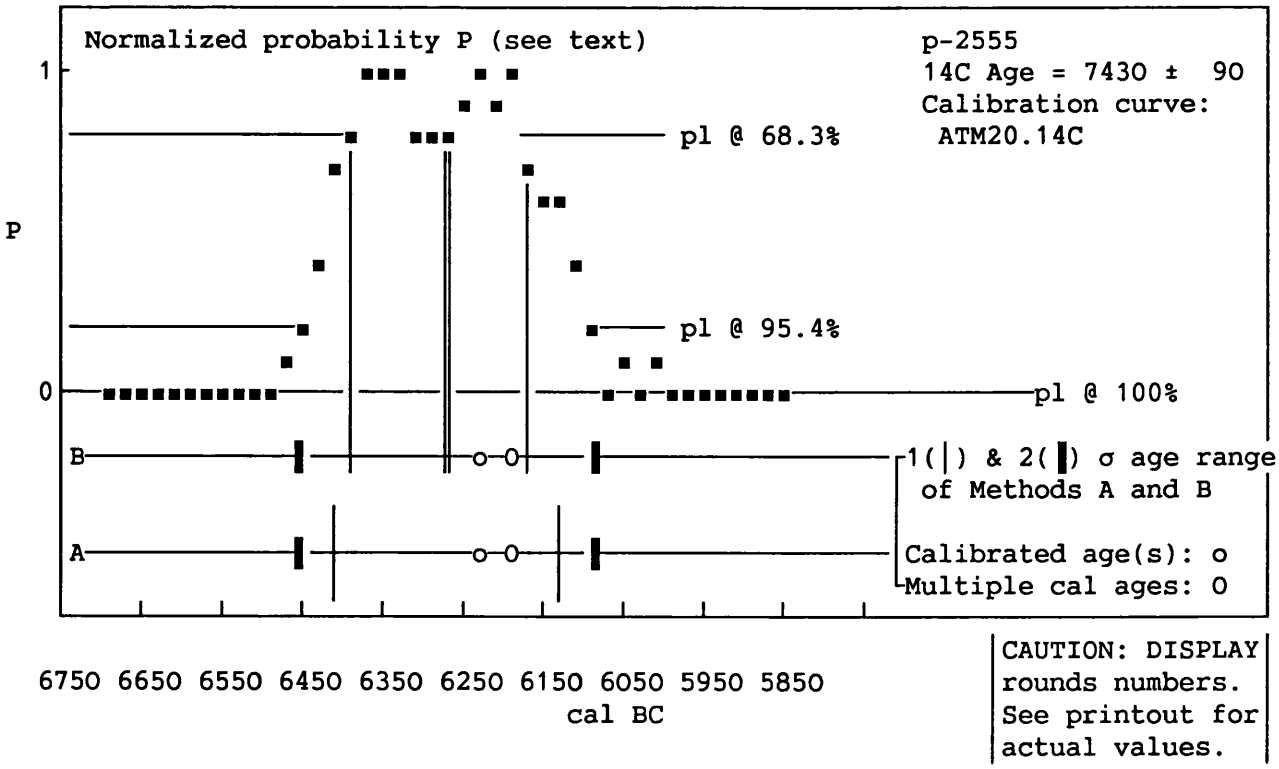
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6387-6272(8336-8221)	.54
	6269-6175(8218-8124)	.46
95.4 (two sigma)	cal BC 6440-6100(8389-8049)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2555
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6500 6450 6400 6350 6300 6250 6200 6150 6100 6050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2555
14C Age = 7430 ± 90
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6750 6650 6550 6450 6350 6250 6150 6050 5950 5850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2978 7400.0 260.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2978.txt
Plot file: kt2978.plt

p-2978♥
Radiocarbon Age BP 7400.0 ±260.0† Reference(s)
Calibrated age(s) cal BC 6217, 6202, 6183 (20 yr. average of
cal BP 8166, 8151, 8132 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6470-5990(8419-7939)
two Sigma** cal BC 6780-5730(8729-7679)

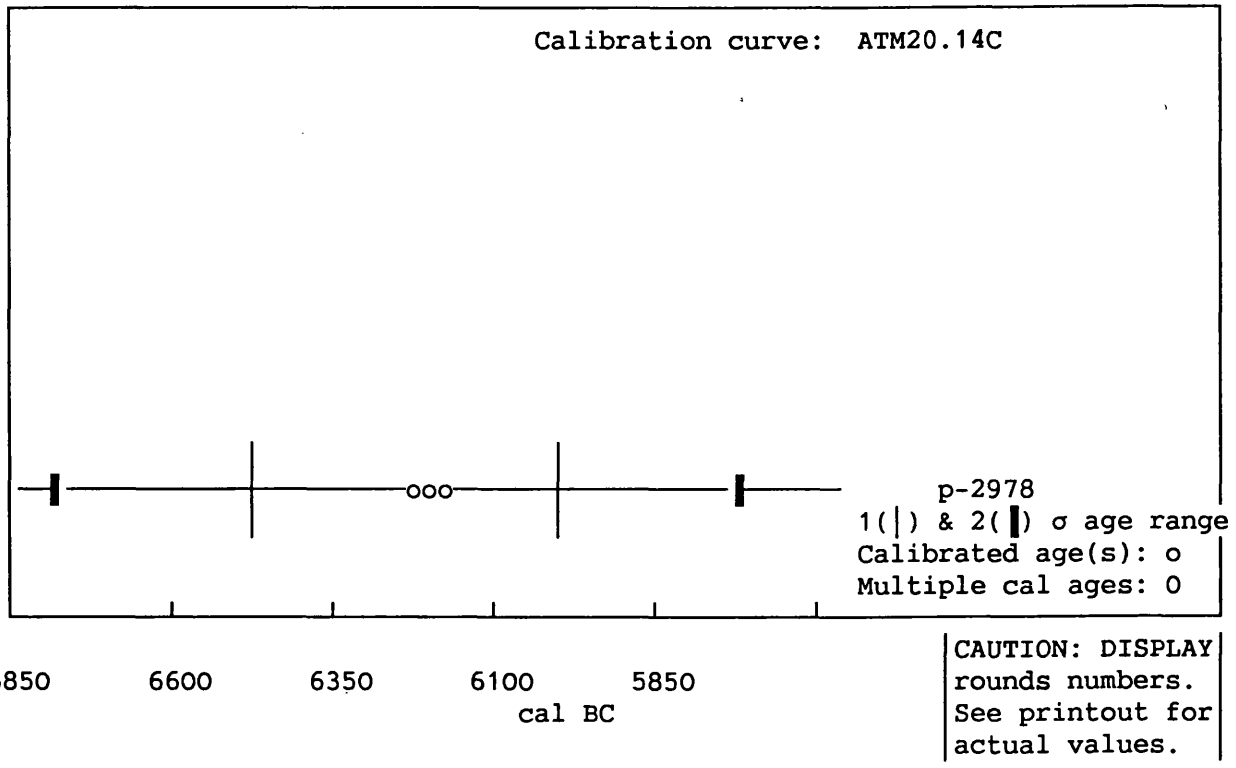
Summary of above –
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6470 (6217, 6202, 6183) 5990
cal BP 8419 (8166, 8151, 8132) 7939
two sigma cal BC 6780 (6217, 6202, 6183) 5730
cal BP 8729 (8166, 8151, 8132) 7679

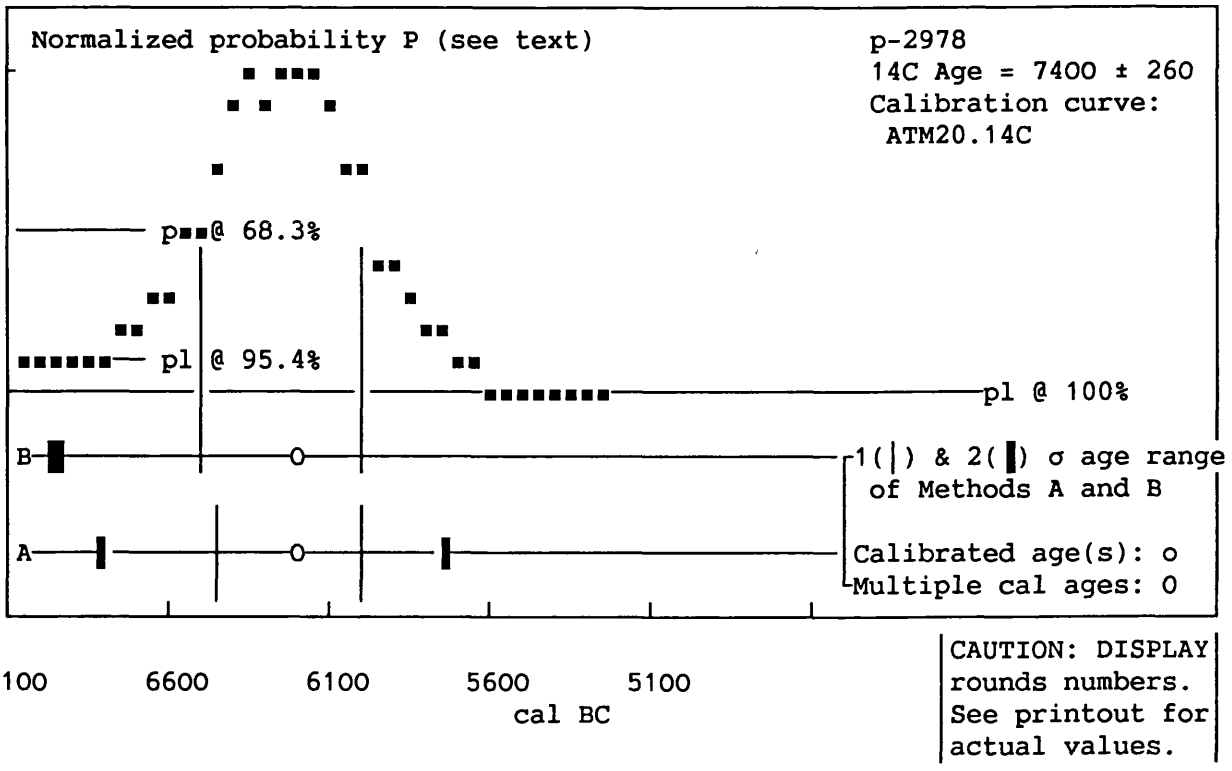
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6480-5980(8429-7929)	.99
95.4 (two sigma)	cal BC 6954-6943(8903-8892)	.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2978
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6850
6600
6350
6100
5850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2978
14C Age = 7400 ± 260
Calibration curve:
ATM20.14C
1
P
0
p@ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100
6600
6100
5600
5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2784 7380.0 100.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2784.txt
Plot file: kt2784.plt

p-2784♥
Radiocarbon Age BP 7380.0 ±100.0† Reference(s)
Calibrated age(s) cal BC 6210, 6179 (20 yr. average of
cal BP 8159, 8128 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6385-6313(8334-8262) 6298-6283(8247-8232)
6260-6100(8209-8049)
two Sigma** cal BC 6440-6070(8389-8019) 6067-6037(8016-7986)
6024-5995(7973-7944)

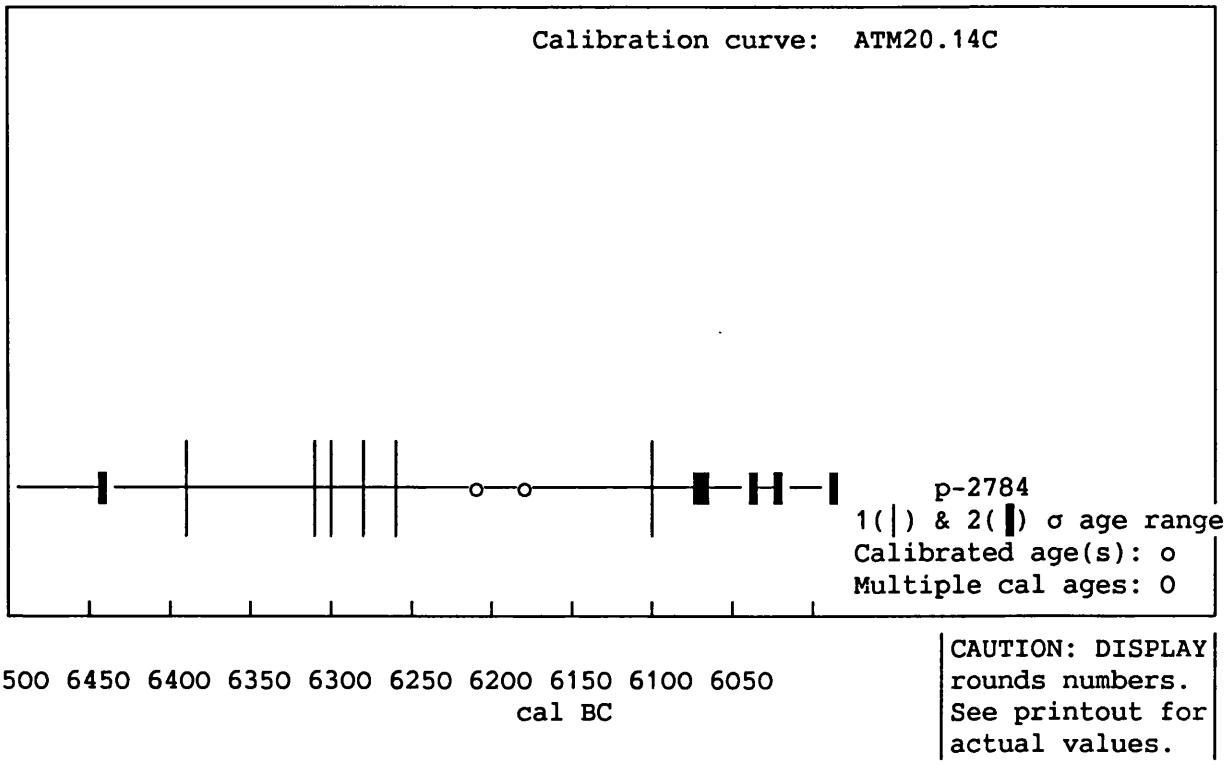
Summary of above –
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6385 (6210, 6179) 6100
cal BP 8334 (8159, 8128) 8049
two sigma cal BC 6440 (6210, 6179) 5995
cal BP 8389 (8159, 8128) 7944

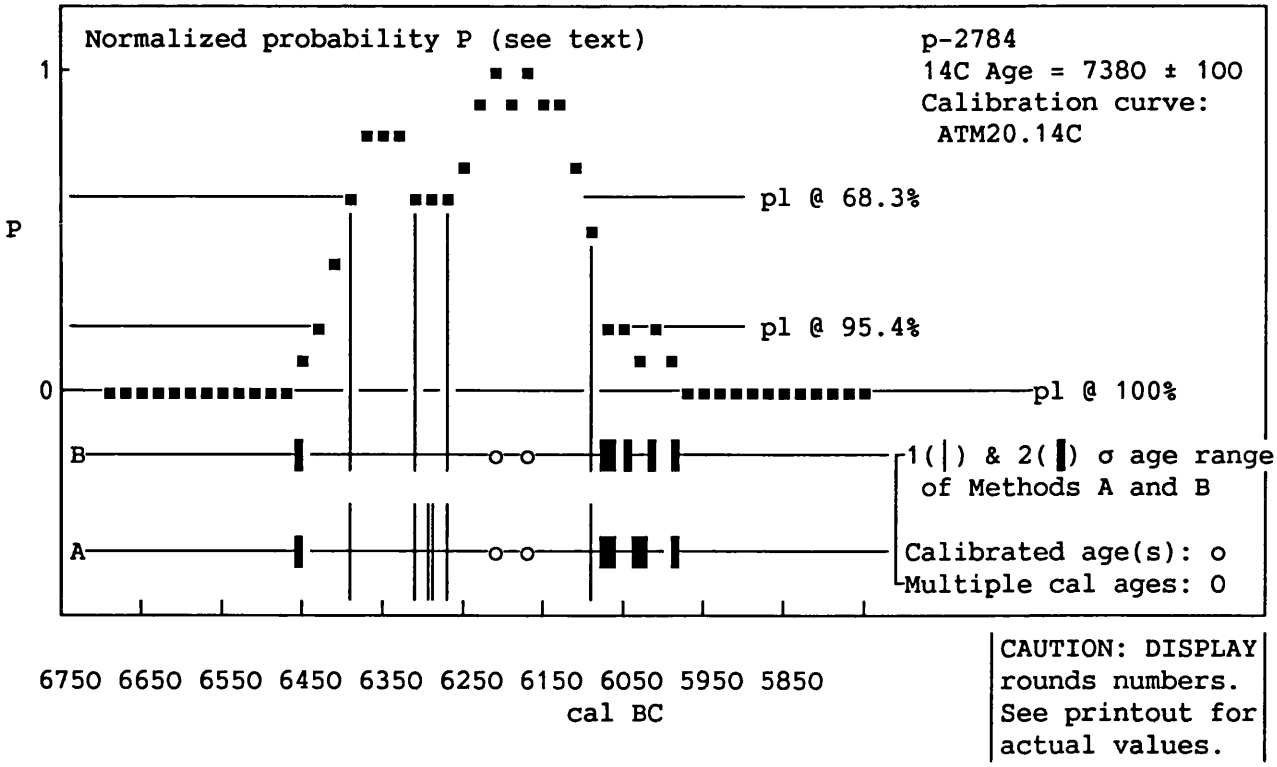
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6383-6315(8332-8264)	.28
	6260-6100(8209-8049)	.71
95.4 (two sigma)	cal BC 6440-6080(8389-8029)	.97
	6060-6042(8009-7991)	.02
	6019-6000(7968-7949)	.02

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2784
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6500 6450 6400 6350 6300 6250 6200 6150 6100 6050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2784
14C Age = 7380 ± 100
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6750 6650 6550 6450 6350 6250 6150 6050 5950 5850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2552 7250.0 100.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2552.text
Plot file: kt2552.plt

p-2552♥
Radiocarbon Age BP 7250.0 ±100.0† Reference(s)
Calibrated age(s) cal BC 6090 (20 yr. average of
cal BP 8039 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6170-6030(8119-7979) 6029-5988(7978-7937)
two Sigma** cal BC 6377-6321(8326-8270) 6240-5960(8189-7909)
5904-5885(7853-7834)

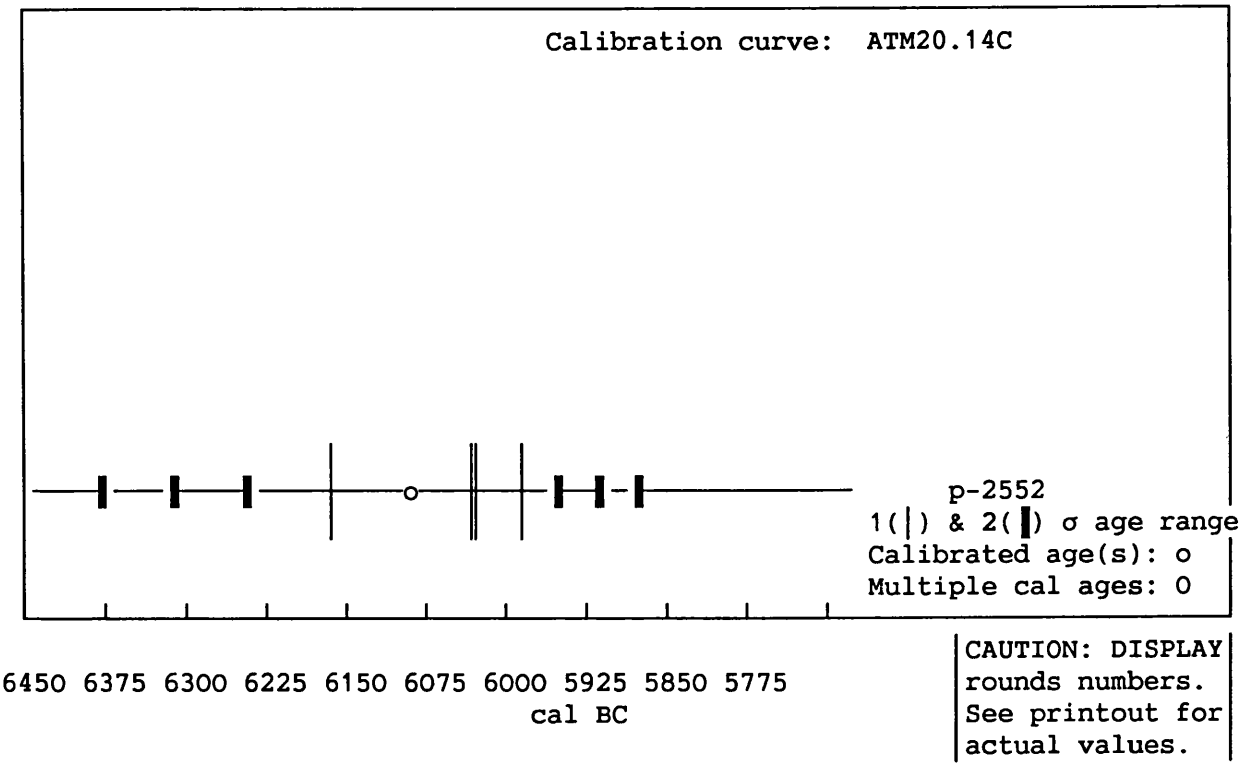
Summary of above –
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6170 (6090) 5988
cal BP 8119 (8039) 7937
two sigma cal BC 6377 (6090) 5885
cal BP 8326 (8039) 7834

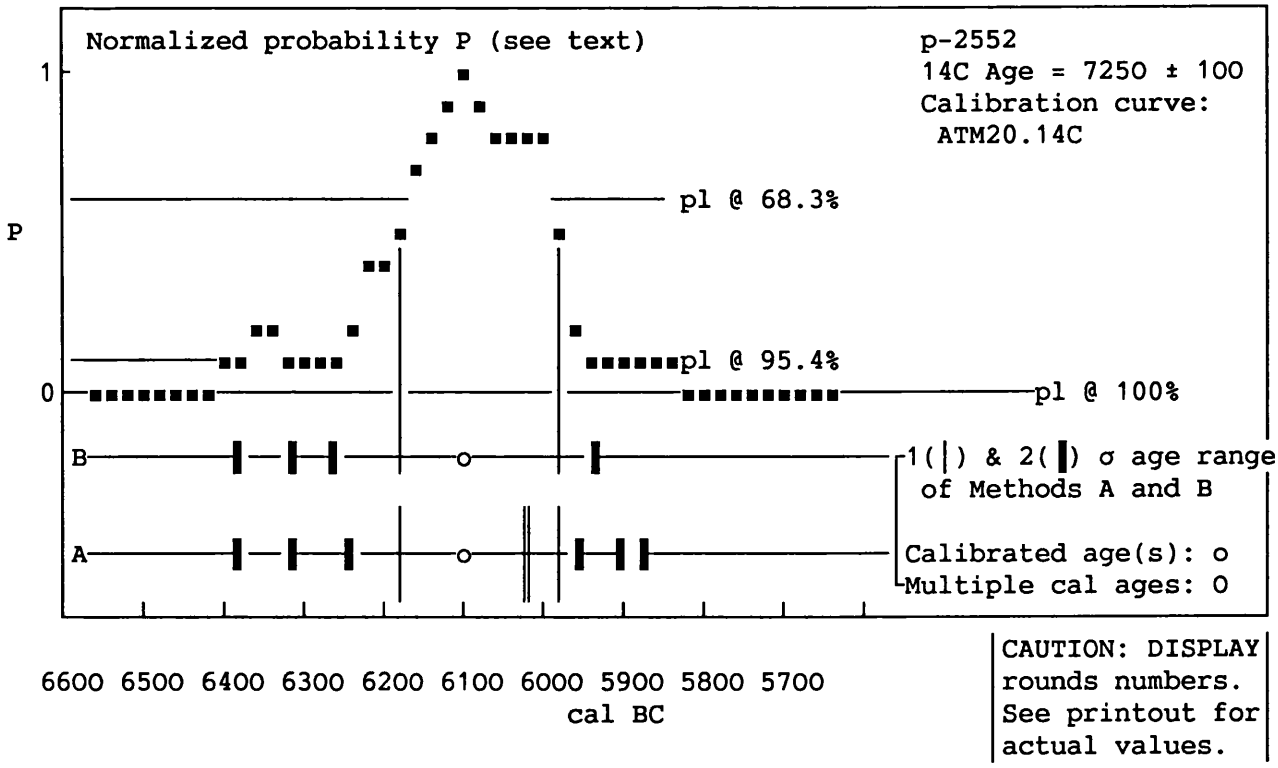
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6170-5990(8119-7939)	1.00
95.4 (two sigma)	cal BC 6385-6313(8334-8262)	.06
	6260-5950(8209-7899)	.89

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2552
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6450 6375 6300 6225 6150 6075 6000 5925 5850 5775
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2552
14C Age = 7250 ± 100
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6600 6500 6400 6300 6200 6100 6000 5900 5800 5700
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2550 7180.0 90.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2550.txt
Plot file: kt2550.plt

p-2550♥

Radiocarbon Age BP	7180.0 ± 90.0†		Reference(s)
Calibrated age(s)	cal BC	6076, 6059, 6043	(20 yr. average of
		6018, 6001	LSB,SKBF,KRBSMSB,
	cal BP	8025, 8008, 7992	and LLDF)
		7967, 7950	

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6110-5970(8059-7919)
two Sigma** cal BC 6180-5830(8129-7779)

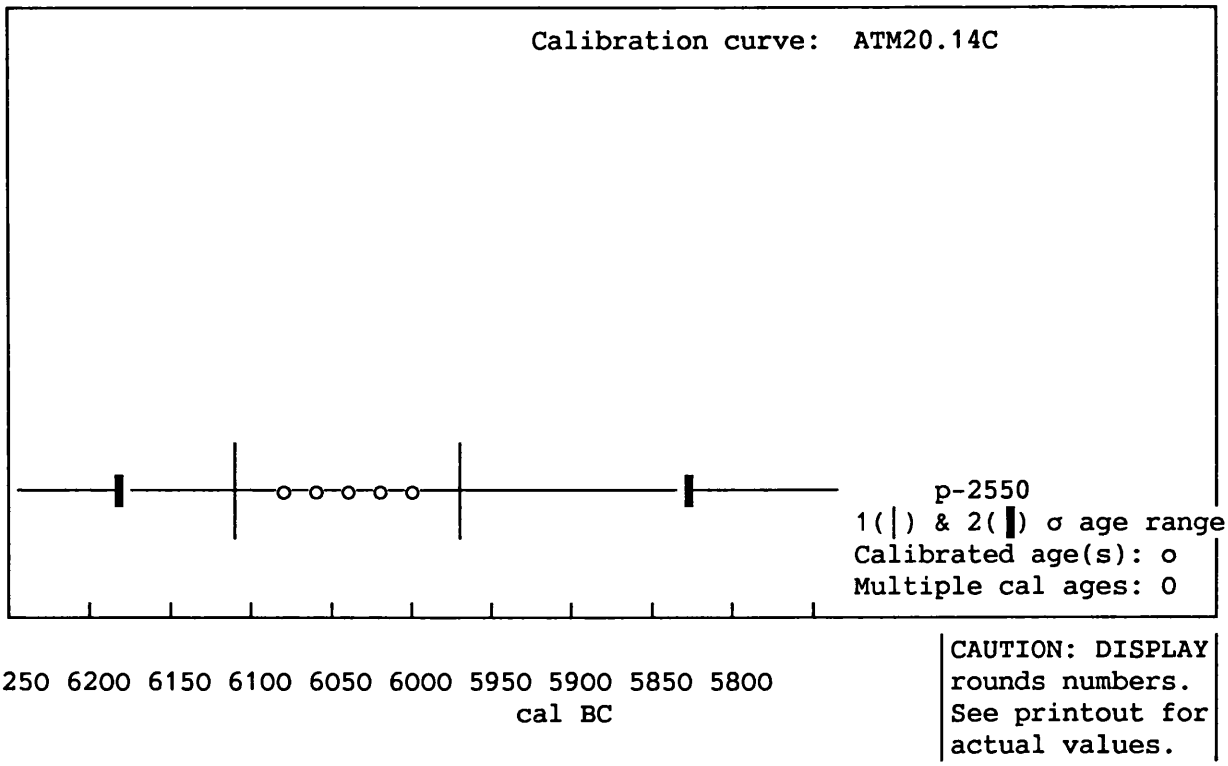
Summary of above –
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6110 (6076, 6059, 6043, 6018, 6001) 5970
cal BP 8059 (8025, 8008, 7992, 7967, 7950) 7919
two sigma cal BC 6180 (6076, 6059, 6043, 6018, 6001) 5830
cal BP 8129 (8025, 8008, 7992, 7967, 7950) 7779

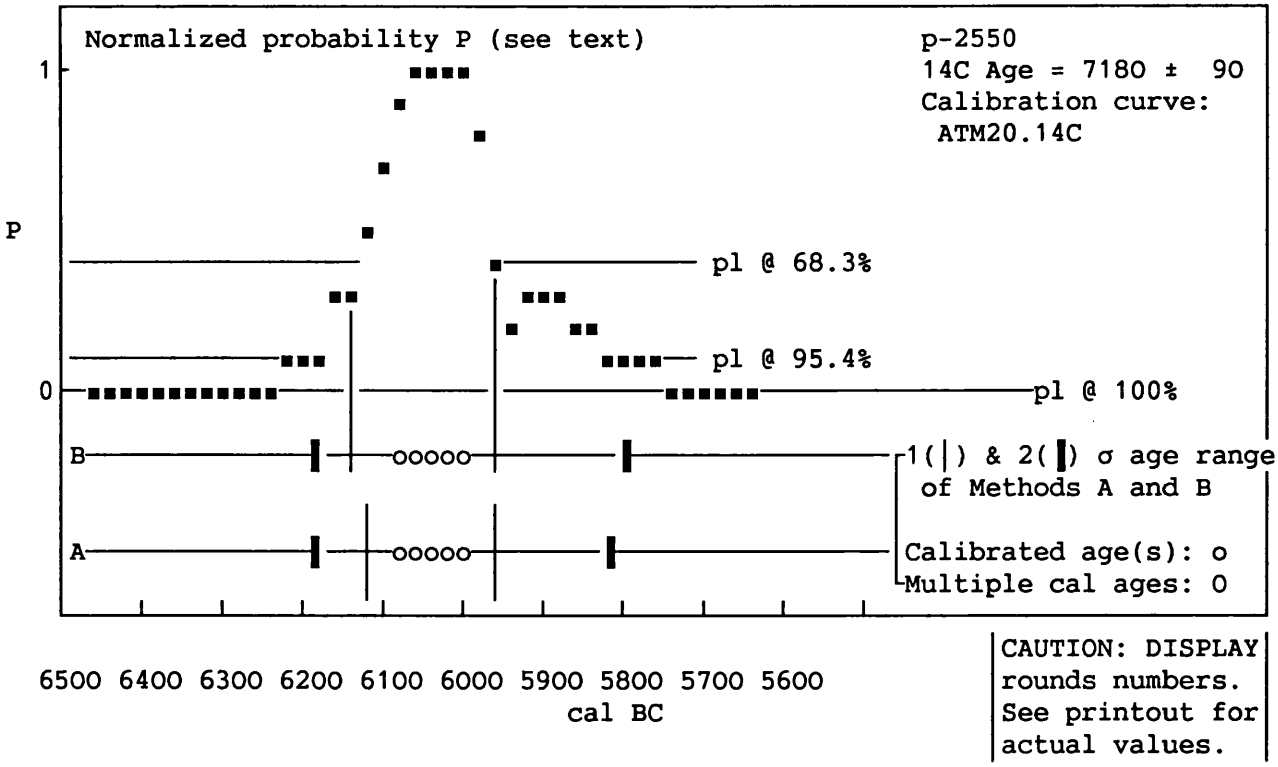
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6130-5960(8079-7909)	1.00
95.4 (two sigma)	cal BC 6180-5810(8129-7759)	.99

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2550
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6250 6200 6150 6100 6050 6000 5950 5900 5850 5800
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2550
14C Age = 7180 ± 90
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6500 6400 6300 6200 6100 6000 5900 5800 5700 5600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2551 7140.0 90.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2551.txt
Plot file: kt2551.plt

p-2551♥
Radiocarbon Age BP 7140.0 ± 90.0† Reference(s)
Calibrated age(s) cal BC 6031, 6029, 5988 (20 yr. average of
cal BP 7980, 7978, 7937 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6090-5960(8039-7909)
two Sigma** cal BC 6170-5770(8119-7719)

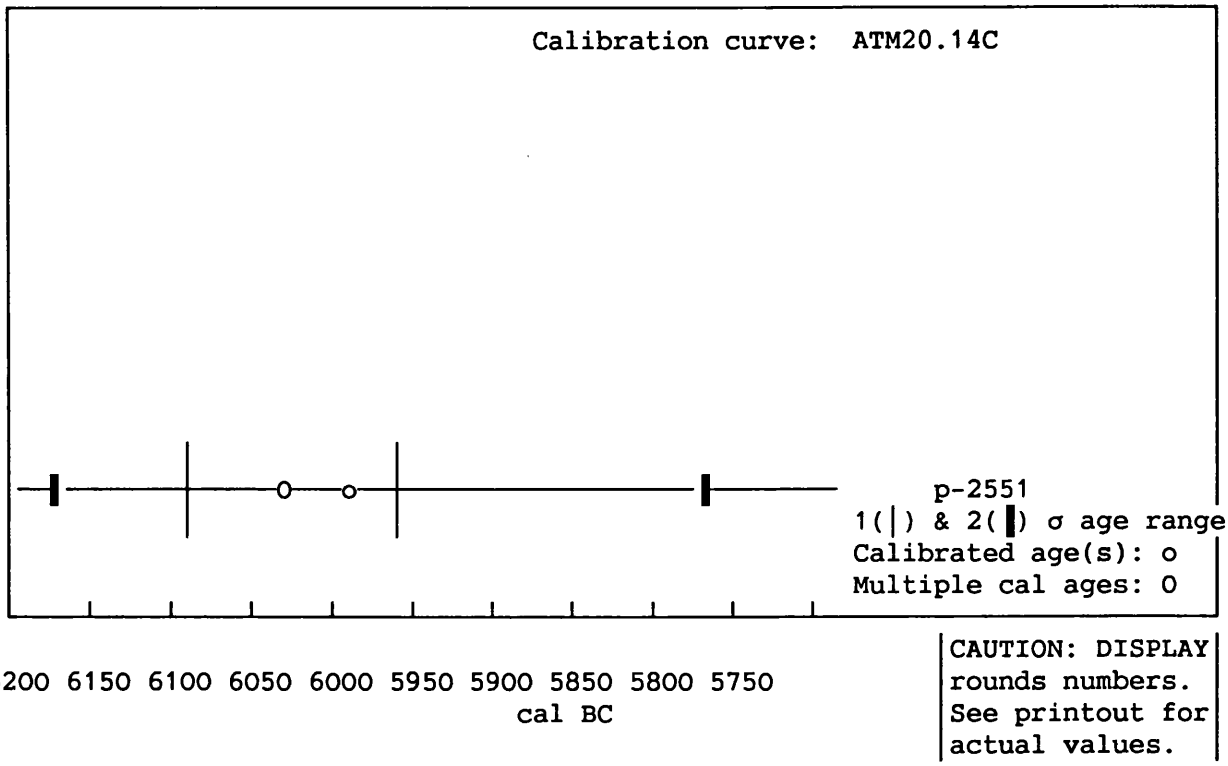
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6090 (6031, 6029, 5988) 5960
cal BP 8039 (7980, 7978, 7937) 7909
two sigma cal BC 6170 (6031, 6029, 5988) 5770
cal BP 8119 (7980, 7978, 7937) 7719

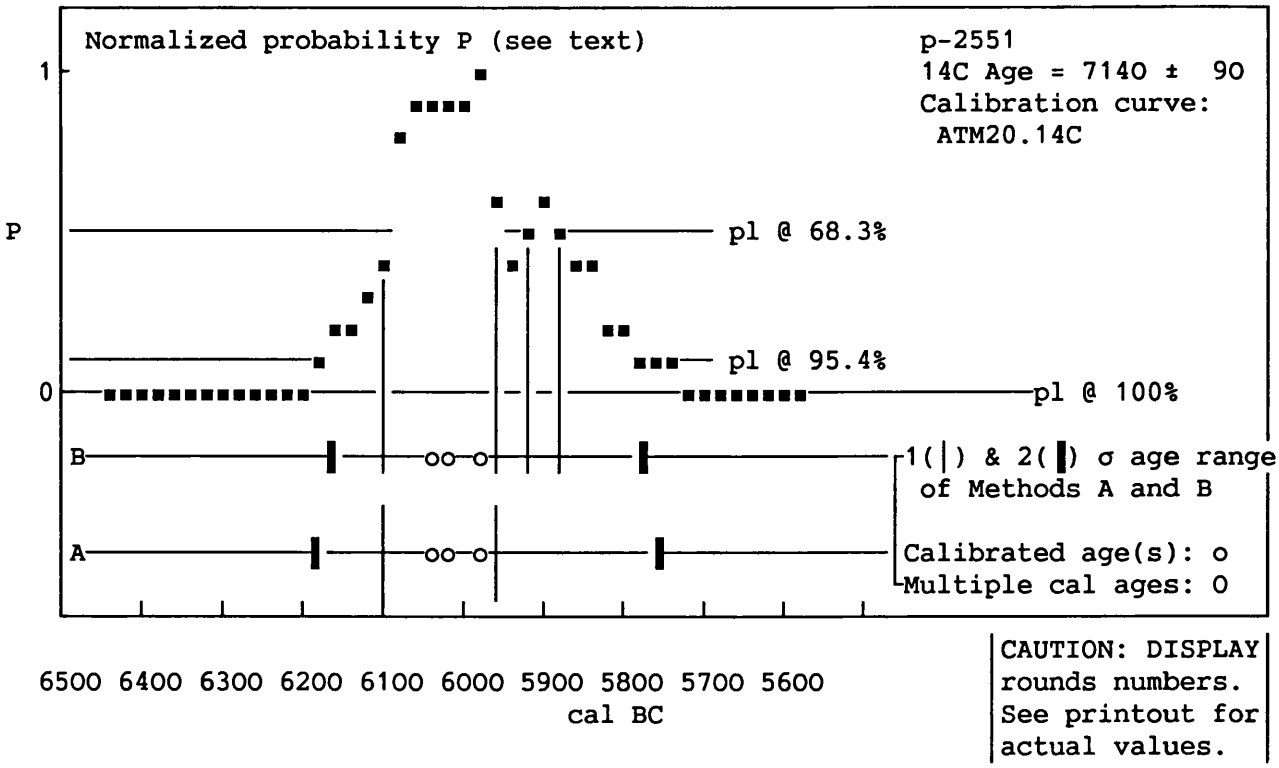
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6096-5954(8045-7903)	.83
	5925-5878(7874-7827)	.17
95.4 (two sigma)	cal BC 6165-5781(8114-7730)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2551
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6200 6150 6100 6050 6000 5950 5900 5850 5800 5750
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2551
14C Age = 7140 ± 90
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6500 6400 6300 6200 6100 6000 5900 5800 5700 5600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2783 7130.0 410.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2783.txt
Plot file: kt2783.plt

p-2783♥
Radiocarbon Age BP 7130.0 ±410.0† Reference(s)
Calibrated age(s) cal BC 5985 (20 yr. average of
cal BP 7934 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6420-5630(8369-7579)
two Sigma** cal BC 7013-7006(8962-8955) 6953-6945(8902-8894)
6820-5240(8769-7189)

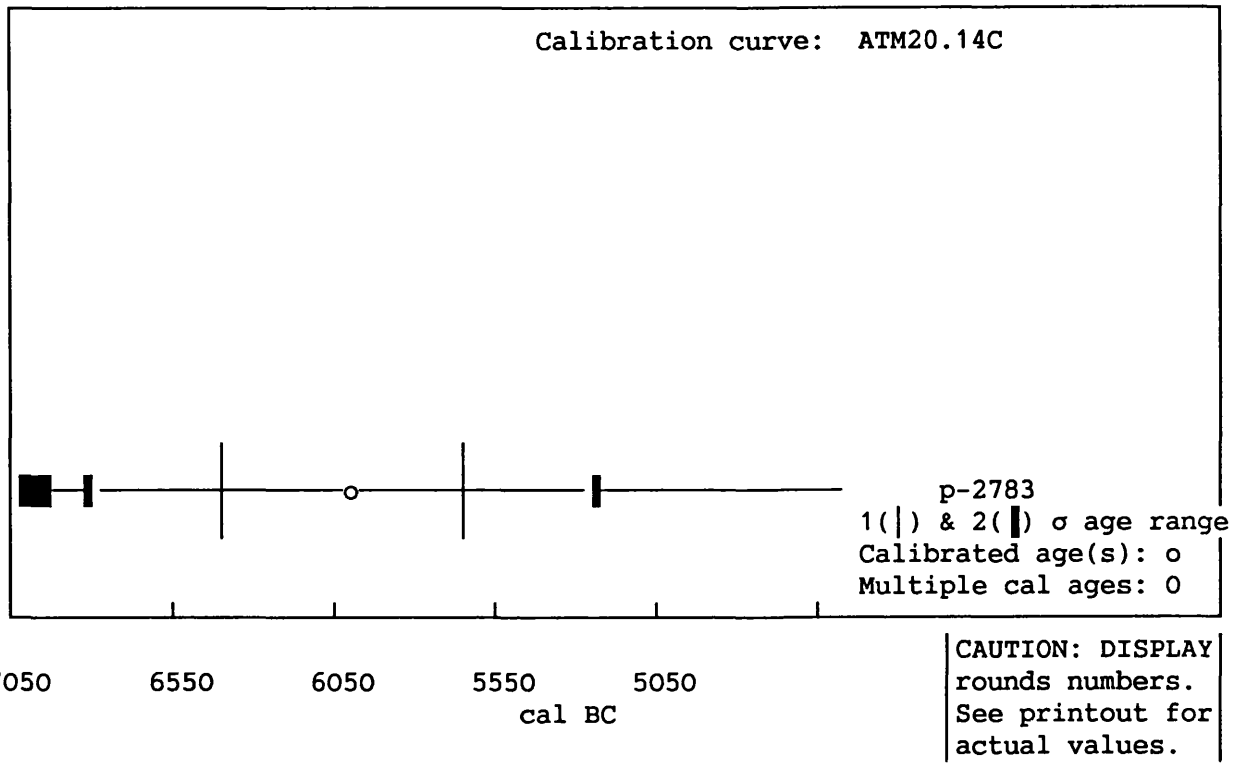
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6420 (5985) 5630
cal BP 8369 (7934) 7579
two sigma cal BC 7013 (5985) 5240
cal BP 8962 (7934) 7189

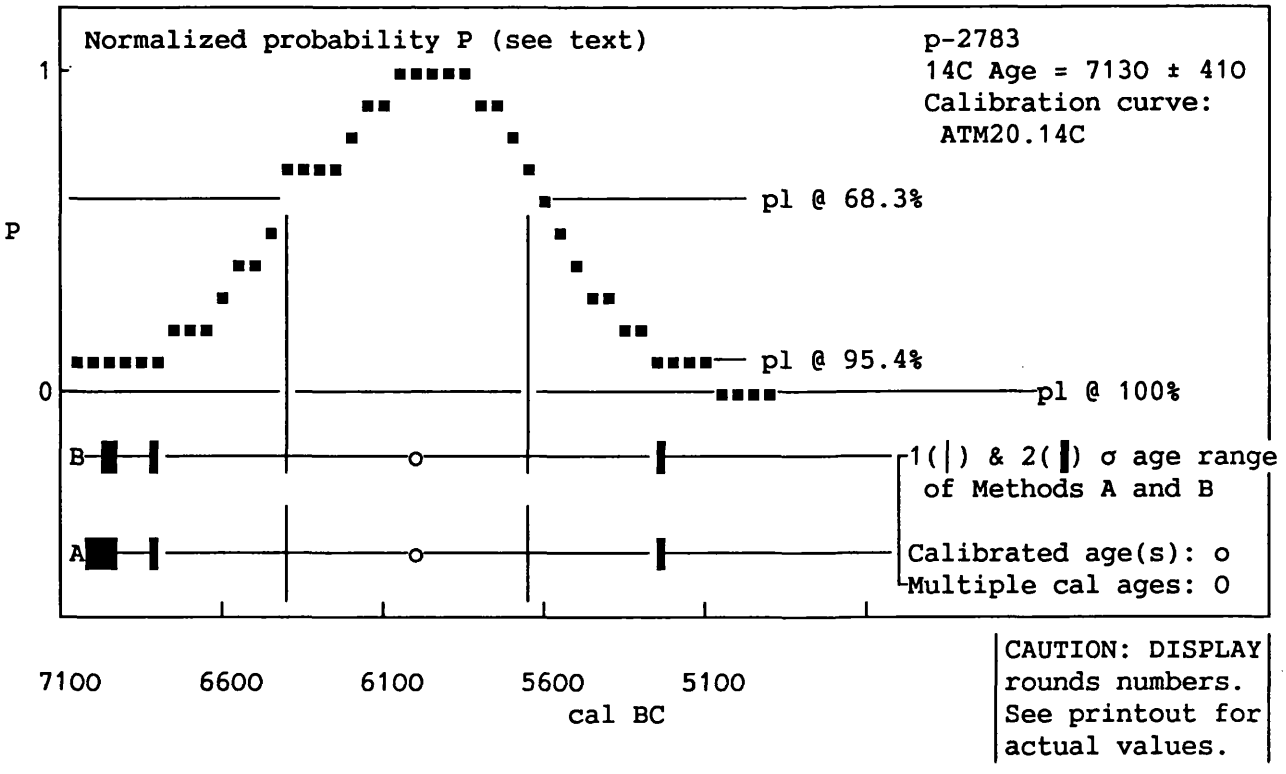
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6400-5630(8349-7579)	1.00
95.4 (two sigma)	cal BC 6954-6944(8903-8893)	.00
	6820-5240(8769-7189)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2783
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
7050
6550
6050
5550
5050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2783
14C Age = 7130 ± 410
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100
6600
6100
5600
5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2779 7120.0 90.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2779.txt
Plot file: kt2779.plt

p-2779♥
Radiocarbon Age BP 7120.0 ± 90.0† Reference(s)
Calibrated age(s) cal BC 5981 (20 yr. average of
cal BP 7930 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6080-5950(8029-7899) 5924-5878(7873-7827)
two Sigma** cal BC 6130-5750(8079-7699)

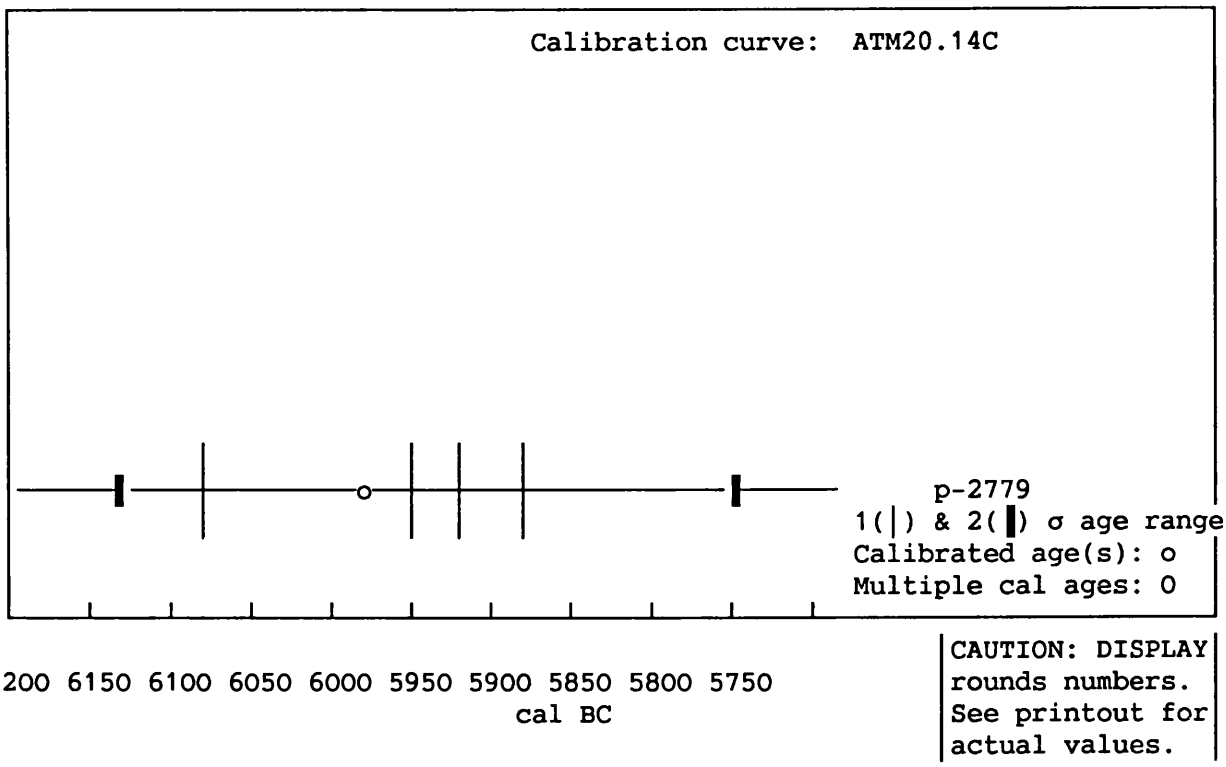
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6080 (5981) 5878
cal BP 8029 (7930) 7827
two sigma cal BC 6130 (5981) 5750
cal BP 8079 (7930) 7699

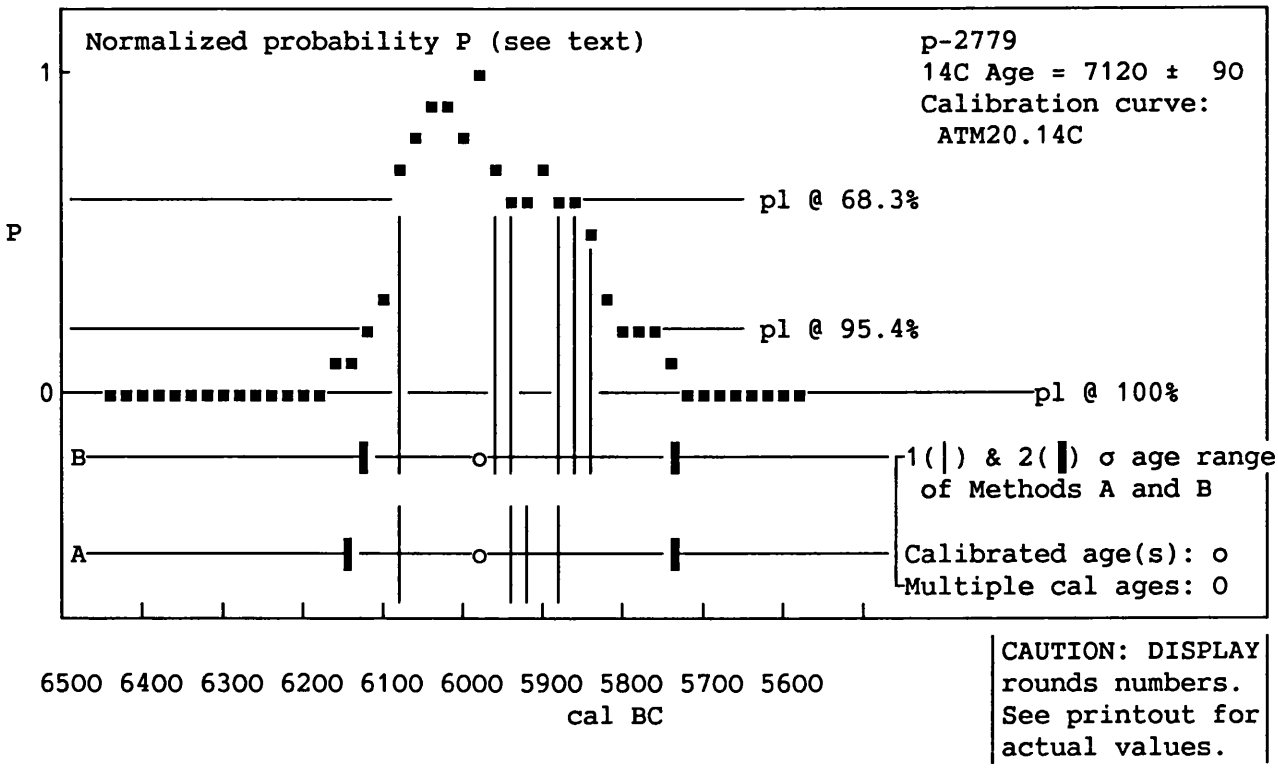
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6085-5952(8034-7901)	.72
	5933-5875(7882-7824)	.24
	5856-5848(7805-7797)	.03
95.4 (two sigma)	cal BC 6124-5749(8073-7698)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2779
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6200 6150 6100 6050 6000 5950 5900 5850 5800 5750
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2779
14C Age = 7120 ± 90
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6500 6400 6300 6200 6100 6000 5900 5800 5700 5600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2553 7110.0 90.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2553.txt
Plot file: kt2553.plt

p-2553♥
Radiocarbon Age BP 7110.0 ± 90.0† Reference(s)
Calibrated age(s) cal BC 5978 (20 yr. average of
cal BP 7927 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6080-5950(8029-7899) 5942-5873(7891-7822)
5863-5845(7812-7794)
two Sigma** cal BC 6120-5740(8069-7689)

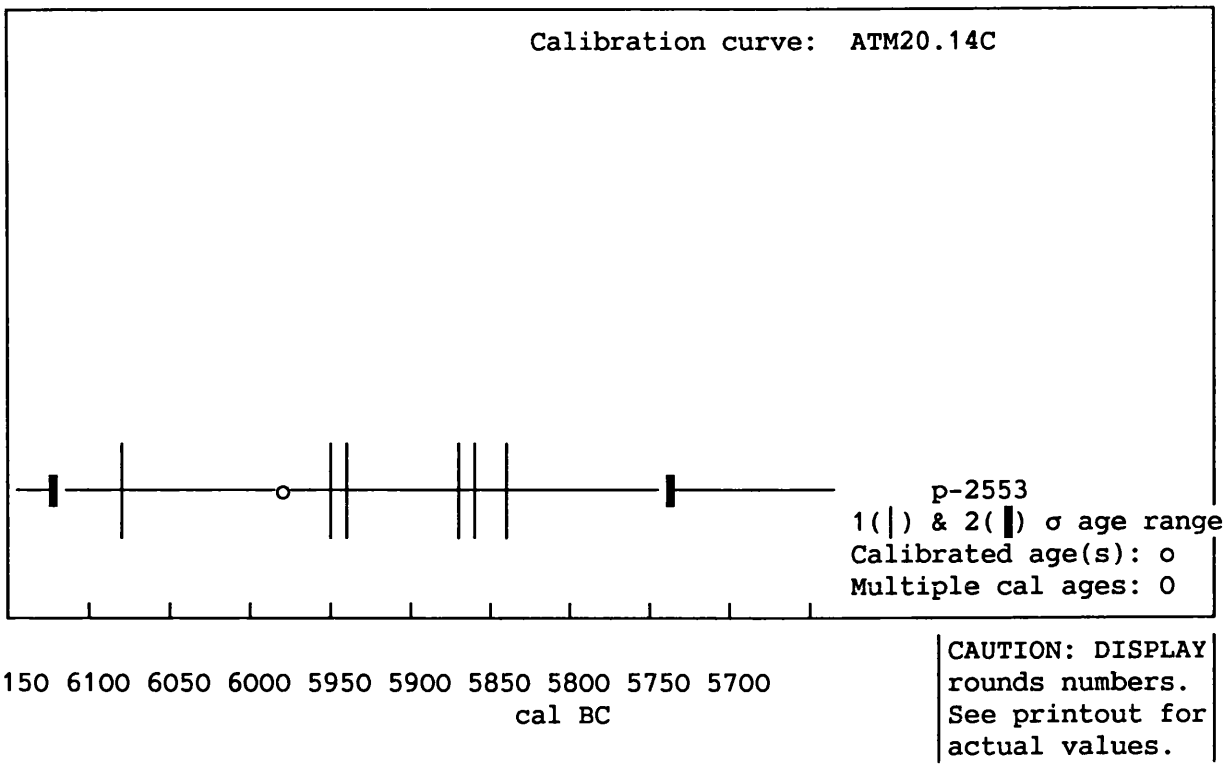
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6080 (5978) 5845
cal BP 8029 (7927) 7794
two sigma cal BC 6120 (5978) 5740
cal BP 8069 (7927) 7689

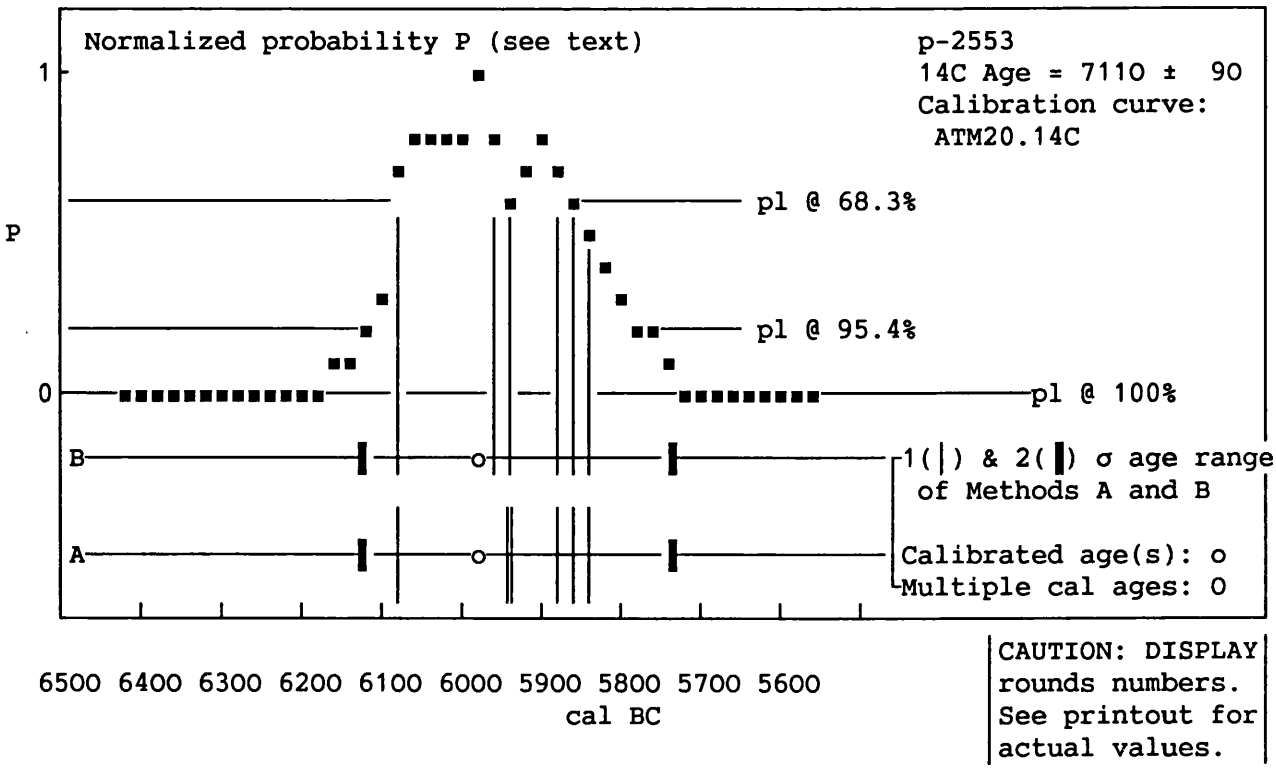
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6081-5952(8030-7901)	.68
	5936-5874(7885-7823)	.28
	5858-5847(7807-7796)	.05
95.4 (two sigma)	cal BC 6116-5748(8065-7697)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2553
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6150 6100 6050 6000 5950 5900 5850 5800 5750 5700
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2553
14C Age = 7110 ± 90
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6500 6400 6300 6200 6100 6000 5900 5800 5700 5600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

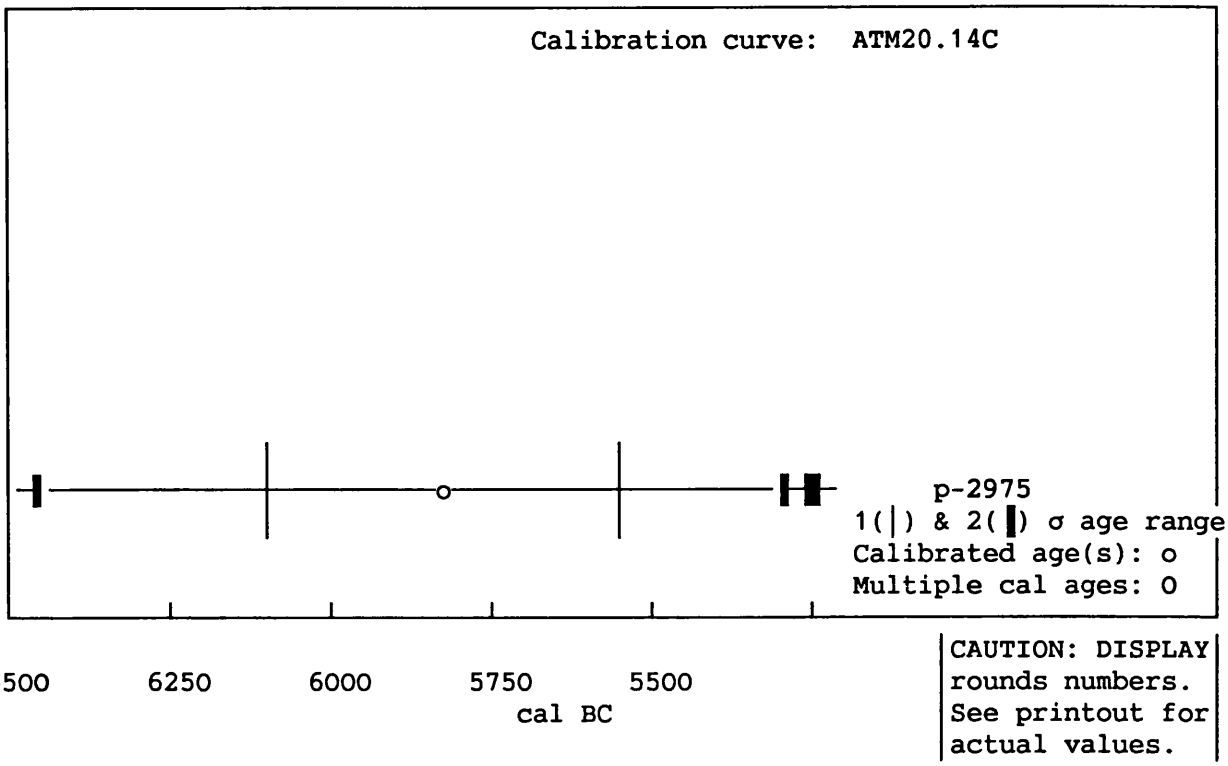
```
Site ID: R/062 tenta  1.00
p-2975              6970.0  310.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2975.txt
Plot file: kt2975.plt

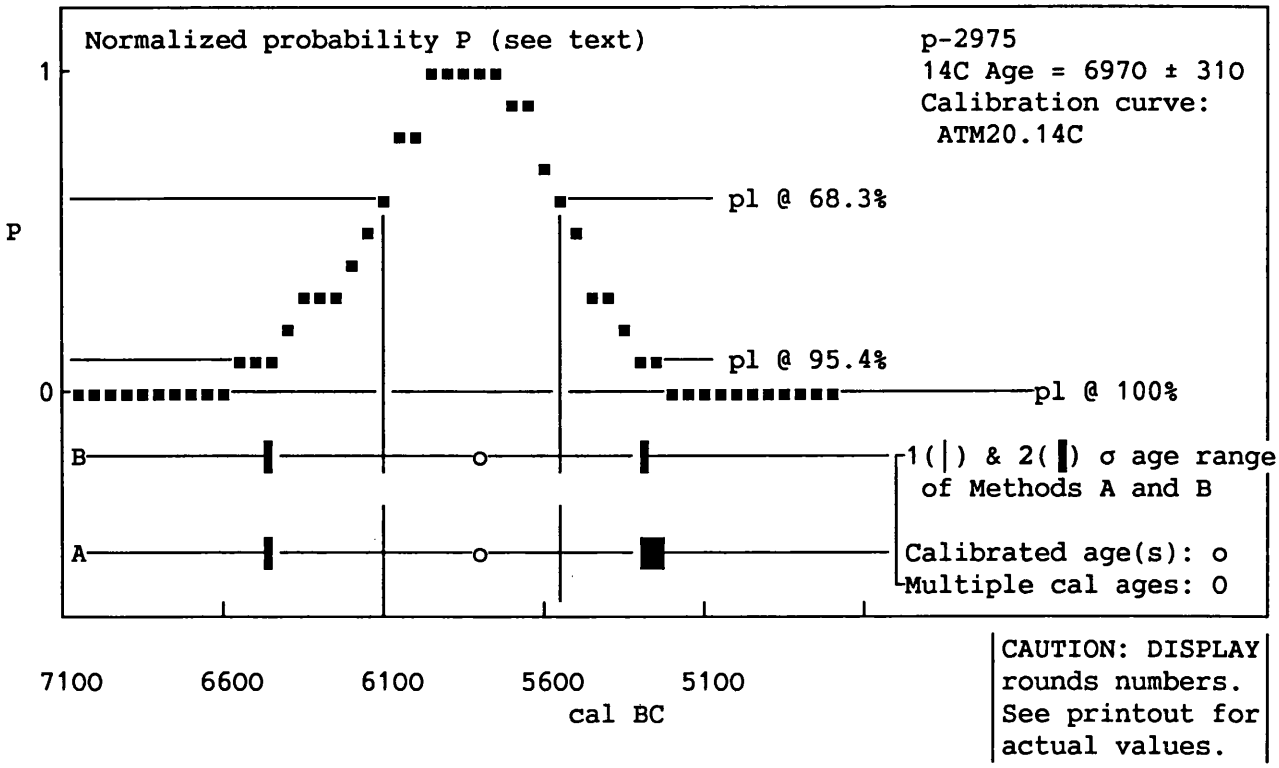

p-2975♥
 Radiocarbon Age BP  6970.0  ±310.0†                        Reference(s)
  Calibrated age(s) cal BC  5820                          (20 yr. average of
                    cal BP  7769                           LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6110-5550(8059-7499)
   two Sigma**   cal BC 6440-5310(8389-7259) 5261-5246(7210-7195)
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6110 ( 5820) 5550
                  cal BP 8059 ( 7769) 7499
      two sigma   cal BC 6440 ( 5820) 5246
                  cal BP 8389 ( 7769) 7195

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 6110-5550(8059-7499)            1.00
    95.4 (two sigma)   cal BC 6440-5320(8389-7269)            1.00
```


References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2975
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: O
6500
6250
6000
5750
5500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2975
14C Age = 6970 ± 310
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
7100
6600
6100
5600
5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2977 6580.0 290.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2977.txt
Plot file: kt2977.plt

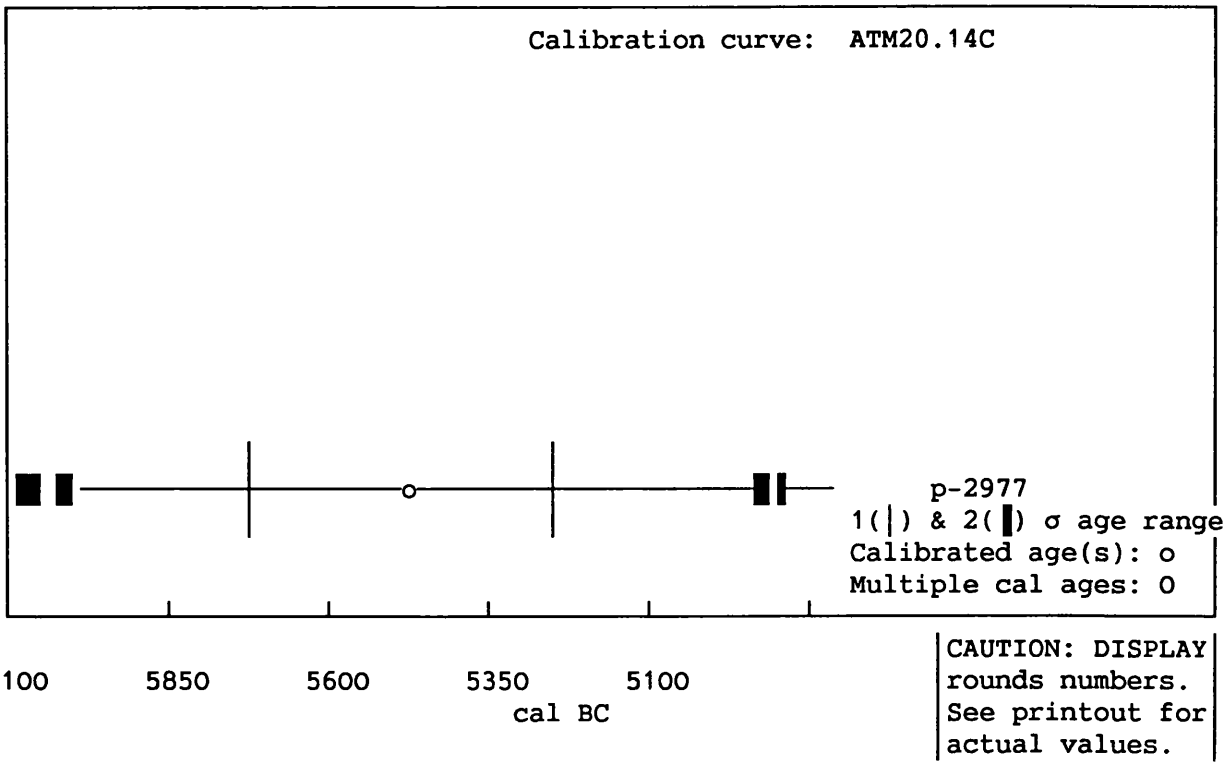
p-2977♥
Radiocarbon Age BP 6580.0 ±290.0† Reference(s)
Calibrated age(s) cal BC 5487 (20 yr. average of
cal BP 7436 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 5730-5240(7679-7189)
two Sigma** cal BC 6073-6064(8022-8013) 6039-6022(7988-7971)
6000-4930(7949-6879) 4927-4902(6876-6851)
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 5730 (5487) 5240
cal BP 7679 (7436) 7189
two sigma cal BC 6073 (5487) 4902
cal BP 8022 (7436) 6851

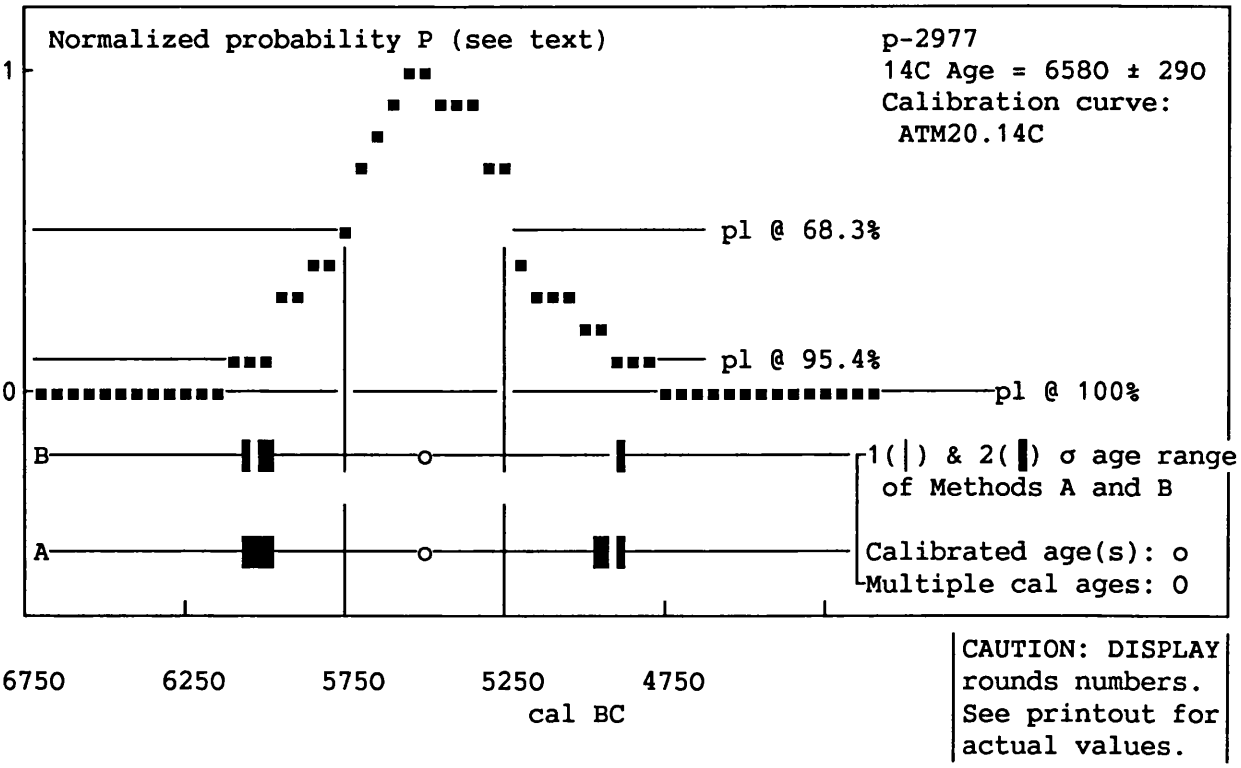
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 5770-5230(7719-7179)	1.00
95.4 (two sigma)	cal BC 6042-6018(7991-7967)	.01
	6000-4900(7949-6849)	.99

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2977
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
6100
5850
5600
5350
5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2977
14C Age = 6580 ± 290
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
6750
6250
5750
5250
4750
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: R/062 tenta  1.00
p-2781              6300.0   80.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2781.txt
Plot file: kt2781.plt

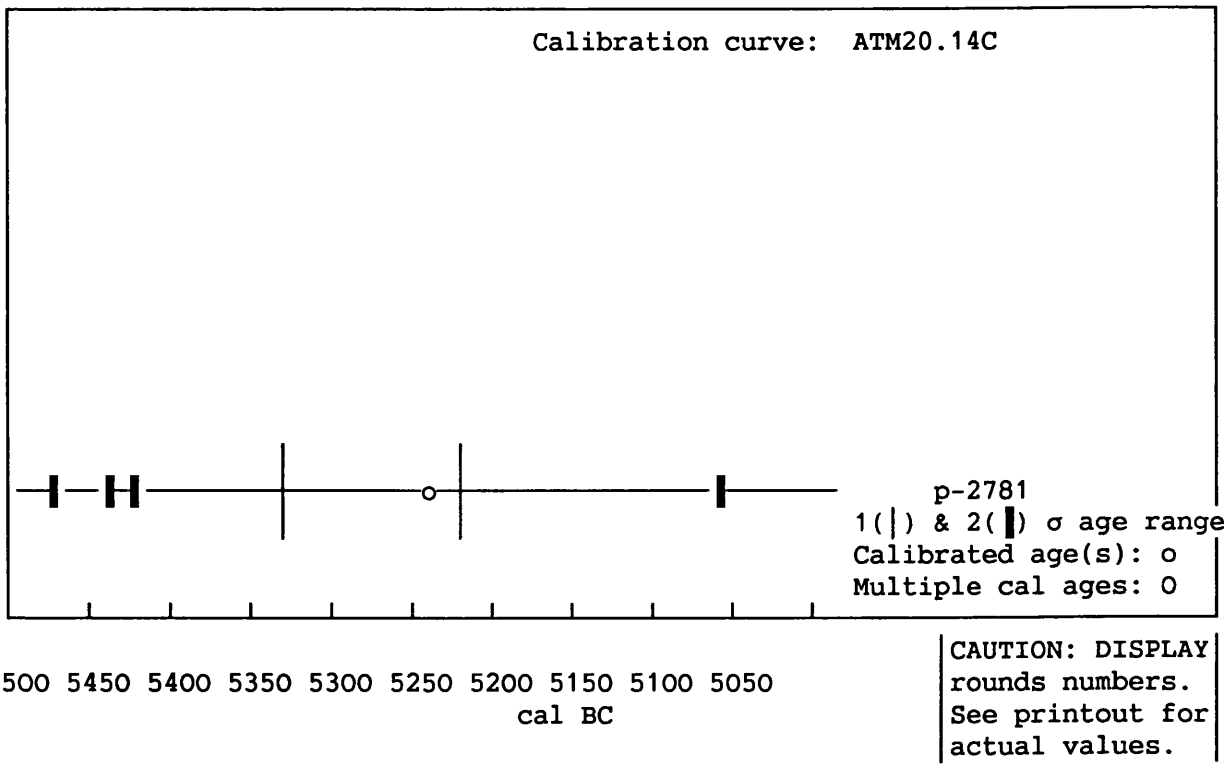

p-2781♥
 Radiocarbon Age BP  6300.0  ± 80.0†                        Reference(s)
  Calibrated age(s) cal BC  5240                          (20 yr. average of
                    cal BP  7189                           LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 5334-5219(7283-7168)
   two Sigma**   cal BC 5471-5443(7420-7392) 5420-5060(7369-7009)

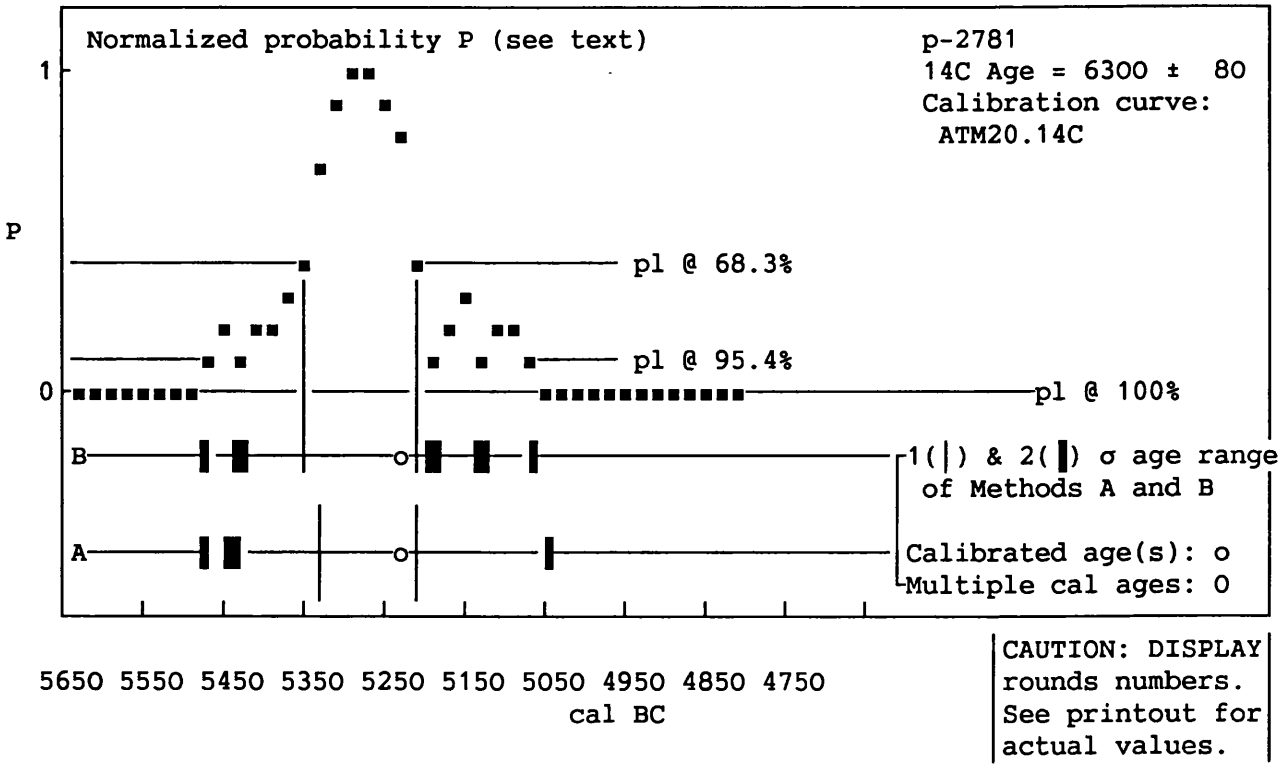
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 5334 ( 5240) 5219
                  cal BP 7283 ( 7189) 7168
      two sigma   cal BC 5471 ( 5240) 5060
                  cal BP 7420 ( 7189) 7009

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 5357-5208(7306-7157)            1.00
    95.4 (two sigma)   cal BC 5472-5439(7421-7388)             .03
                              5423-5195(7372-7144)             .83
                              5181-5130(7130-7079)             .07
                              5129-5066(7078-7015)             .07


References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
p-2781
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
5500 5450 5400 5350 5300 5250 5200 5150 5100 5050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2781
14C Age = 6300 ± 80
Calibration curve:
ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5650 5550 5450 5350 5250 5150 5050 4950 4850 4750
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2780 5830.0 60.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2780.txt
Plot file: kt2780.plt

p-2780♥
Radiocarbon Age BP 5830.0 ± 60.0† Reference(s)
Calibrated age(s) cal BC 4725 (Pearson et al. 1986)
cal BP 6674
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4785-4671(6734-6620) 4633-4620(6582-6569)
two Sigma** cal BC 4895-4880(6844-6829) 4850-4570(6799-6519)
4561-4539(6510-6488)

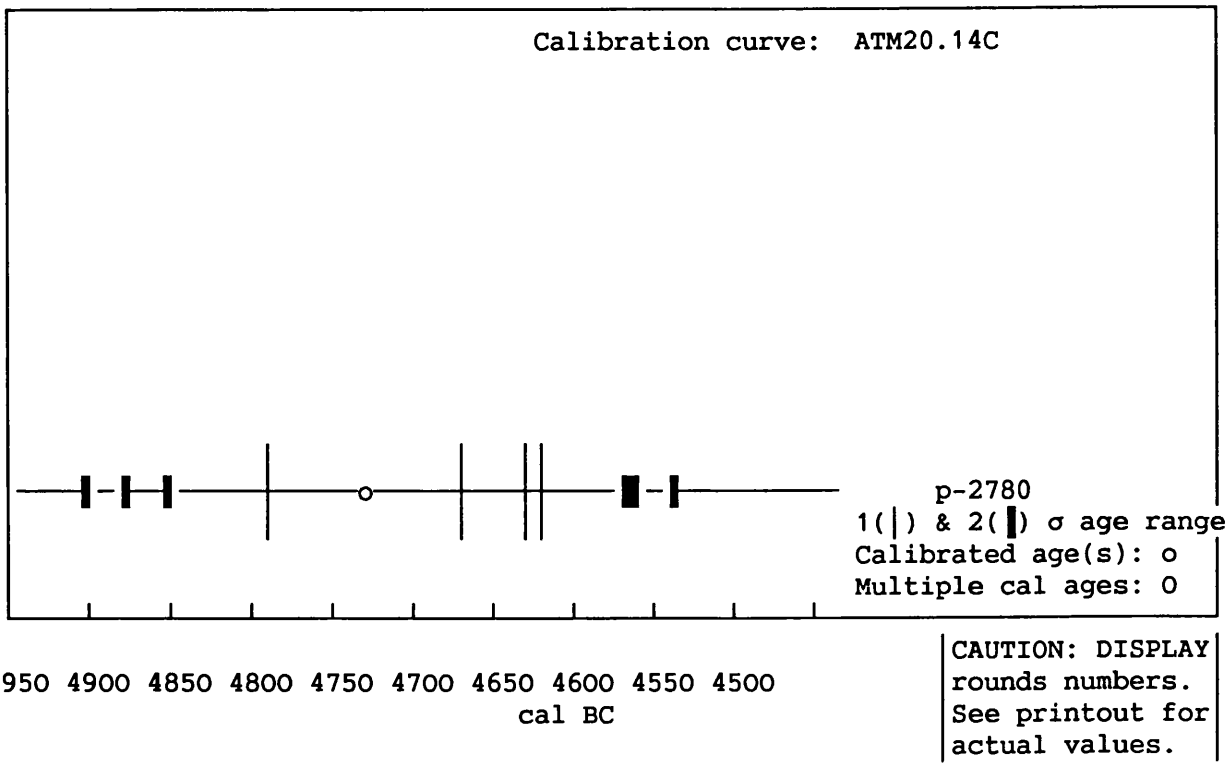
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4785 (4725) 4620
cal BP 6734 (6674) 6569
two sigma cal BC 4895 (4725) 4539
cal BP 6844 (6674) 6488

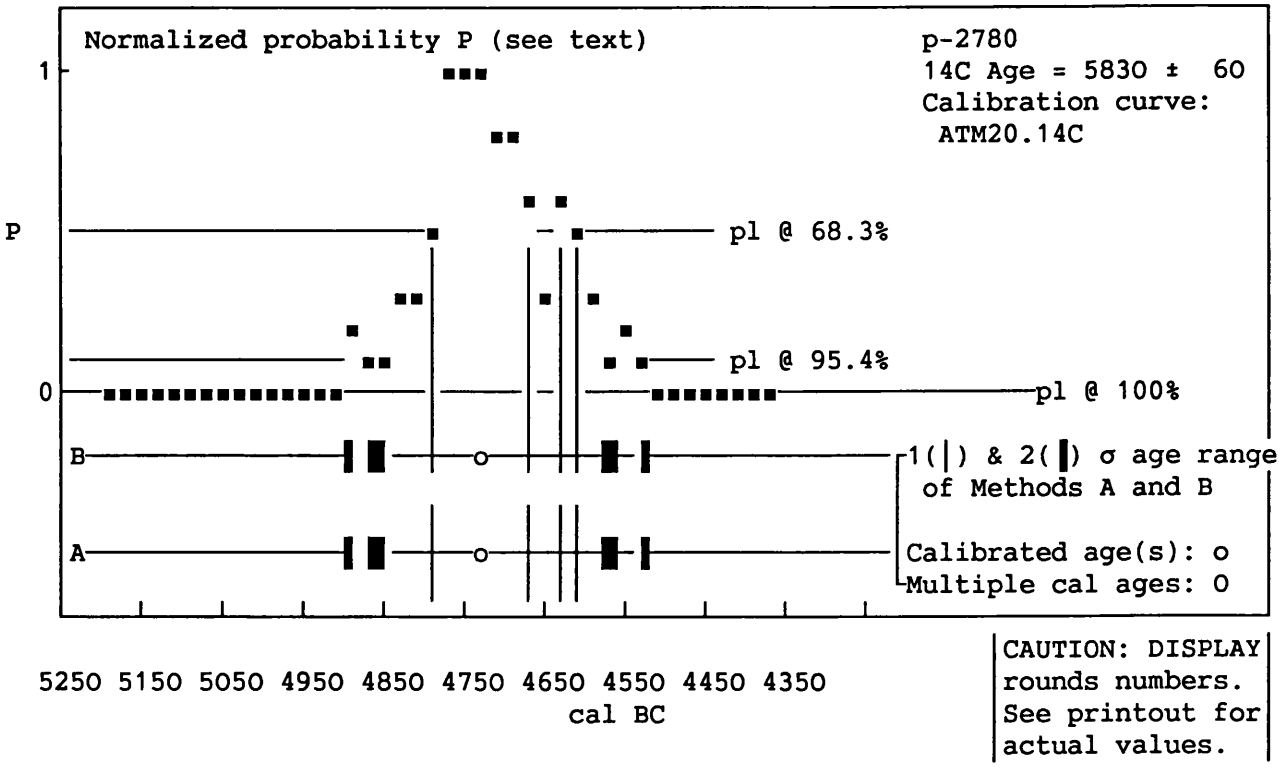
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4788-4666(6737-6615)	.86
	4636-4609(6585-6558)	.14
95.4 (two sigma)	cal BC 4895-4880(6844-6829)	.02
	4848-4573(6797-6522)	.96
	4563-4538(6512-6487)	.02

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2780
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4950 4900 4850 4800 4750 4700 4650 4600 4550 4500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2780
14C Age = 5830 ± 60
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5250 5150 5050 4950 4850 4750 4650 4550 4450 4350
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/062 tenta 1.00
p-2549 5630.0 260.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kt2549.txt
Plot file: kt2549.plt

p-2549♥
Radiocarbon Age BP 5630.0 ±260.0† Reference(s)
Calibrated age(s) cal BC 4468 (Pearson et al. 1986)
cal BP 6417
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4780-4240(6729-6189)
two Sigma** cal BC 5201-5170(7150-7119) 5140-5100(7089-7049)
5080-3960(7029-5909) 3834-3828(5783-5777)

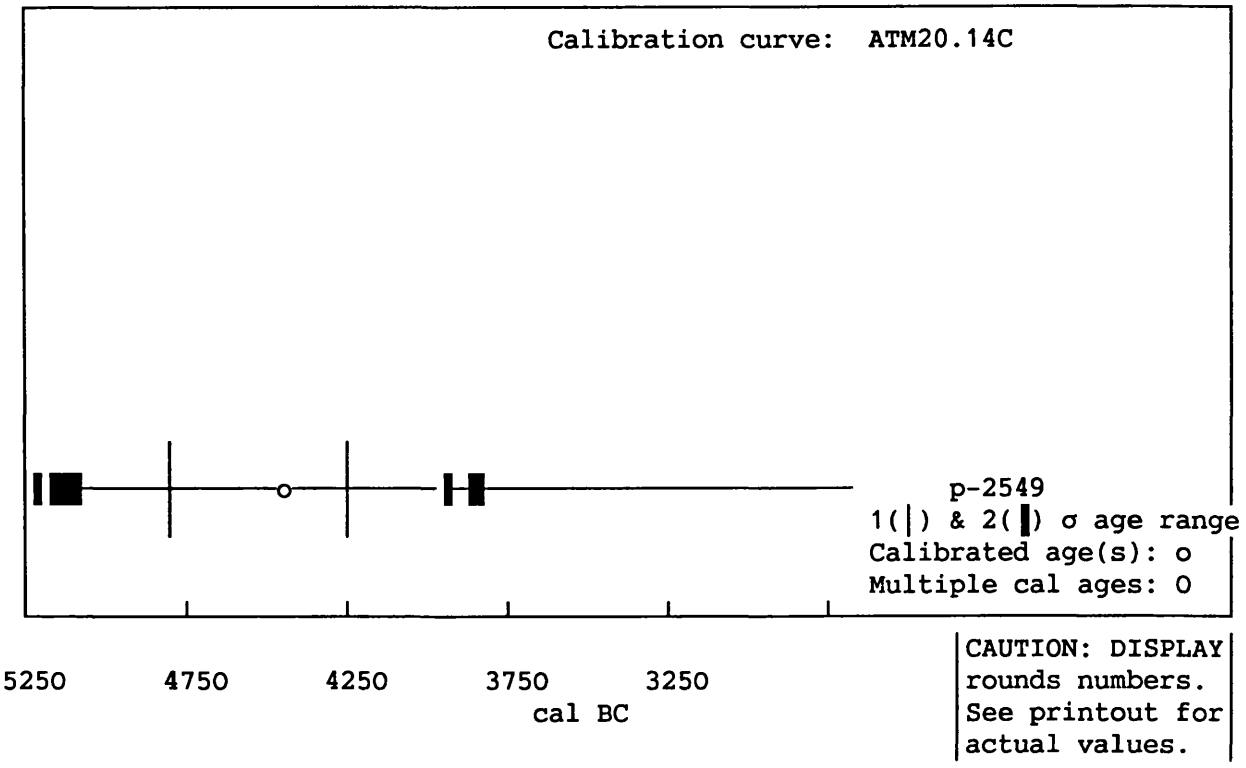
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4780 (4468) 4240
cal BP 6729 (6417) 6189
two sigma cal BC 5201 (4468) 3828
cal BP 7150 (6417) 5777

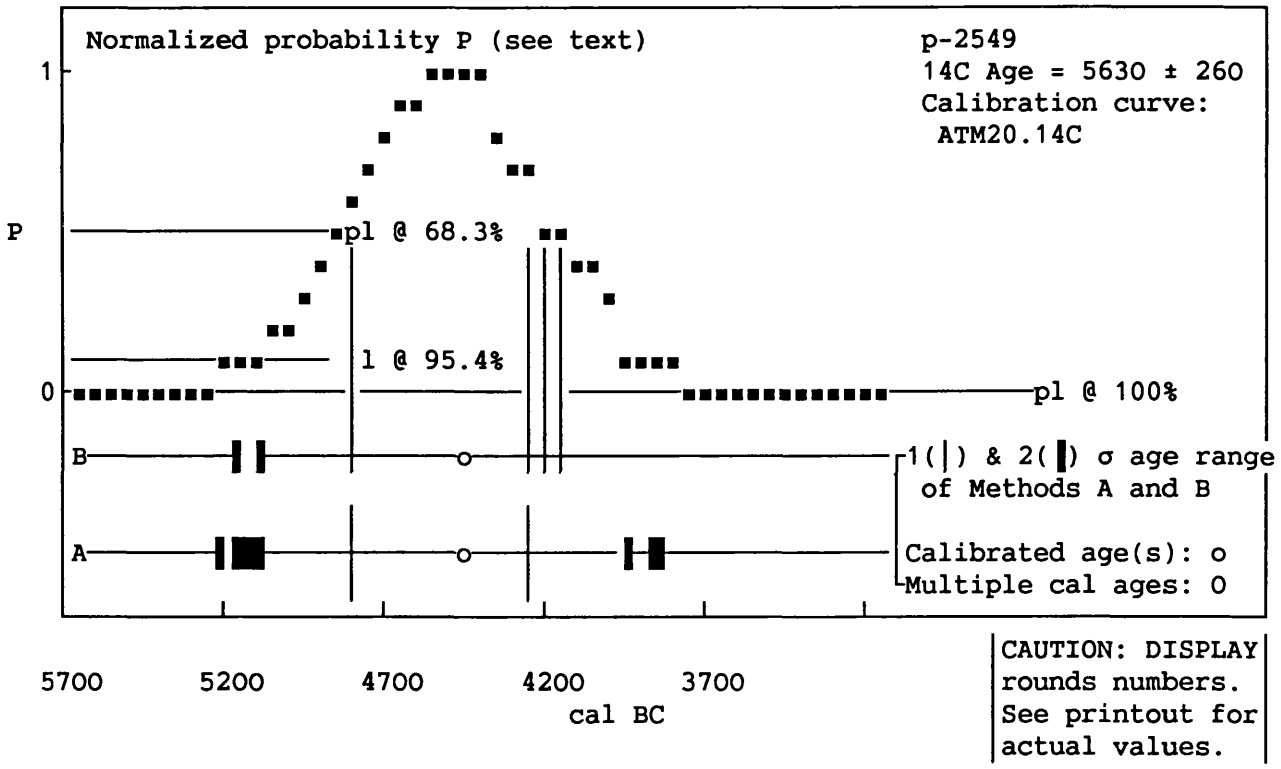
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4790-4230(6739-6179)	.96
	4191-4164(6140-6113)	.03
95.4 (two sigma)	cal BC 5140-5101(7089-7050)	.01

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2549
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
5250
4750
4250
3750
3250
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2549
14C Age = 5630 ± 260
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
1 @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5700
5200
4700
4200
3700
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: N/002 agridhi  1.00
p-2775              7990.0   80.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: da2775.txt
Plot file: da2775.plt

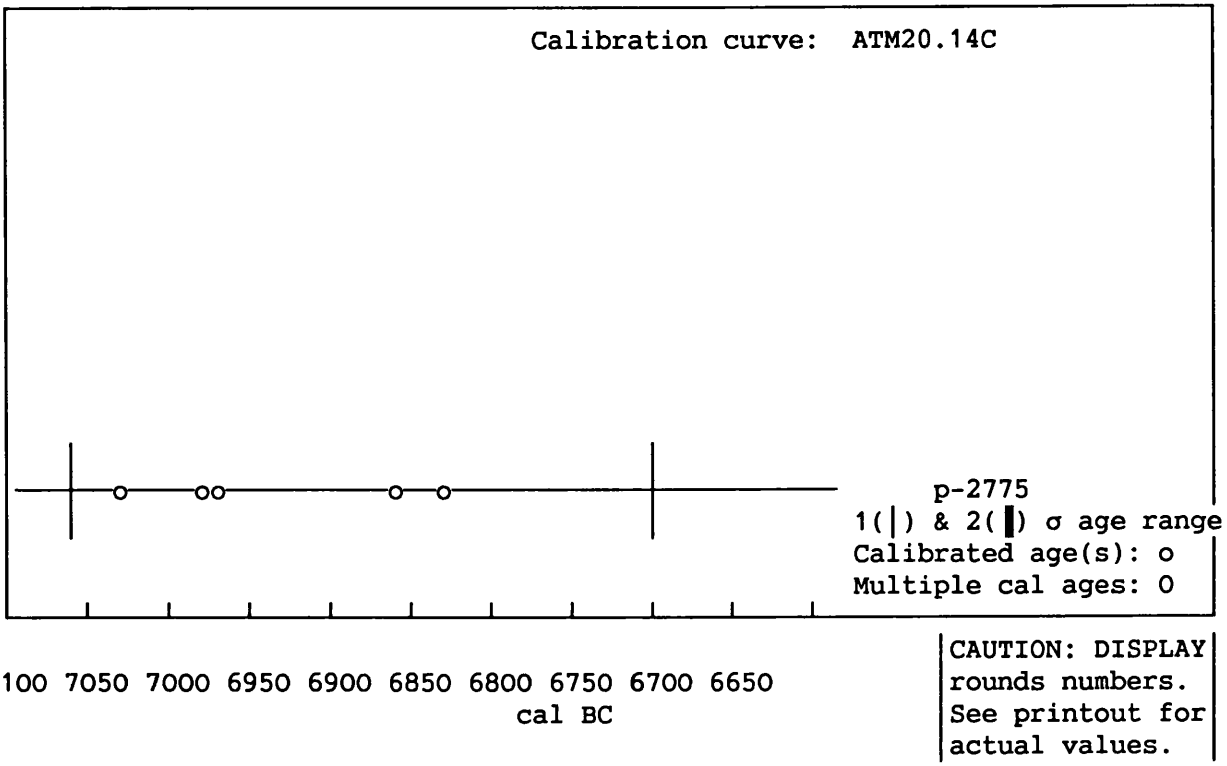

p-2775
 Radiocarbon Age BP  7990.0  ± 80.0†                        Reference(s)
  Calibrated age(s) cal BC  7028, 6979, 6966             (20 yr. average of
                            6863, 6829                    LSB,SKBF,KRBSMSB,
                    cal BP  8977, 8928, 8915              and LLDF)
                            8812, 8778
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 7059-6701(9008-8650)
   two Sigma   BEYOND CALCULABLE RANGE

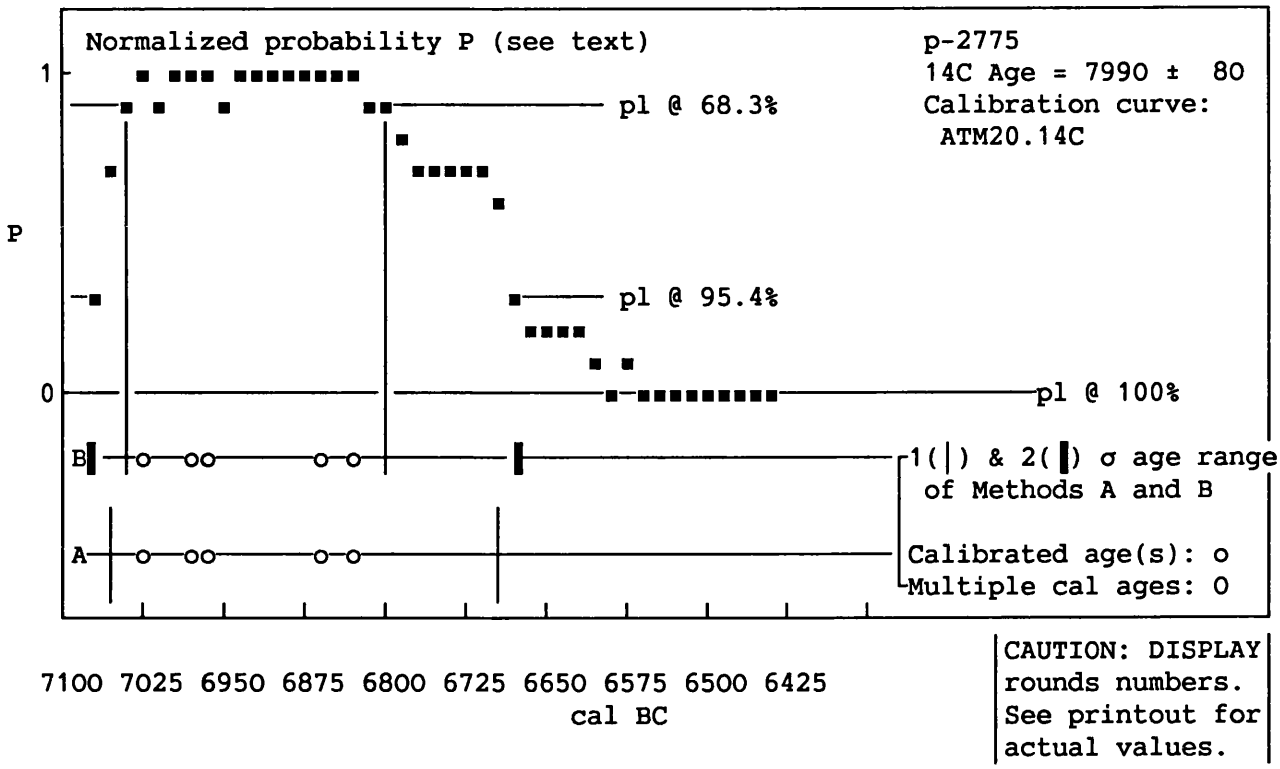
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 7059 ( 7028, 6979, 6966, 6863, 6829) 6701
                  cal BP 9008 ( 8977, 8928, 8915, 8812, 8778) 8650

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 7046-6800(8995-8749)            1.00
    95.4 (two sigma)   cal BC 7064-6677(9013-8626)            1.00
```


References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2775
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
7100 7050 7000 6950 6900 6850 6800 6750 6700 6650
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2775
14C Age = 7990 ± 80
Calibration curve: ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 7025 6950 6875 6800 6725 6650 6575 6500 6425
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: N/002 agridhi 1.00
p-2768 7400.0 60.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: da2768.txt
Plot file: da2768.plt

p-2768
Radiocarbon Age BP 7400.0 ± 60.0† Reference(s)
Calibrated age(s) cal BC 6217, 6202, 6183 (20 yr. average of
cal BP 8166, 8151, 8132 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6379-6319(8328-8268) 6248-6129(8197-8078)
two Sigma** cal BC 6420-6090(8369-8039)

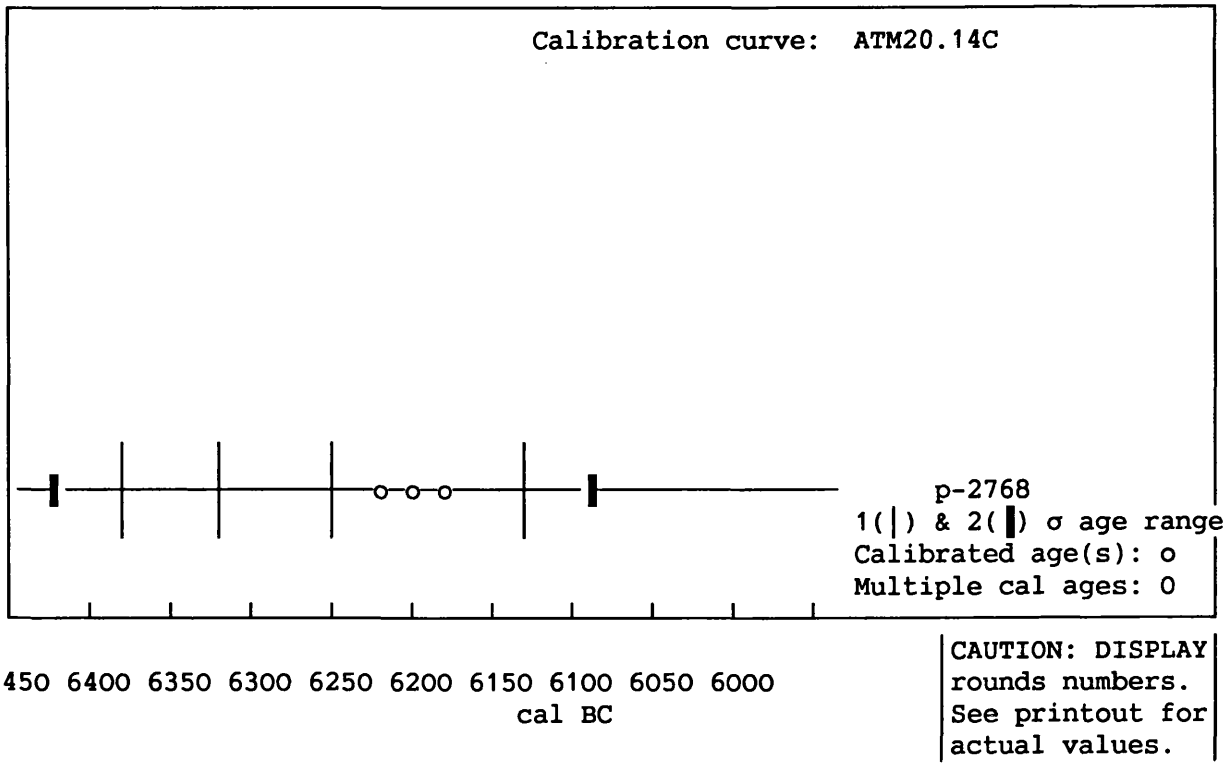
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6379 (6217, 6202, 6183) 6129
cal BP 8328 (8166, 8151, 8132) 8078
two sigma cal BC 6420 (6217, 6202, 6183) 6090
cal BP 8369 (8166, 8151, 8132) 8039

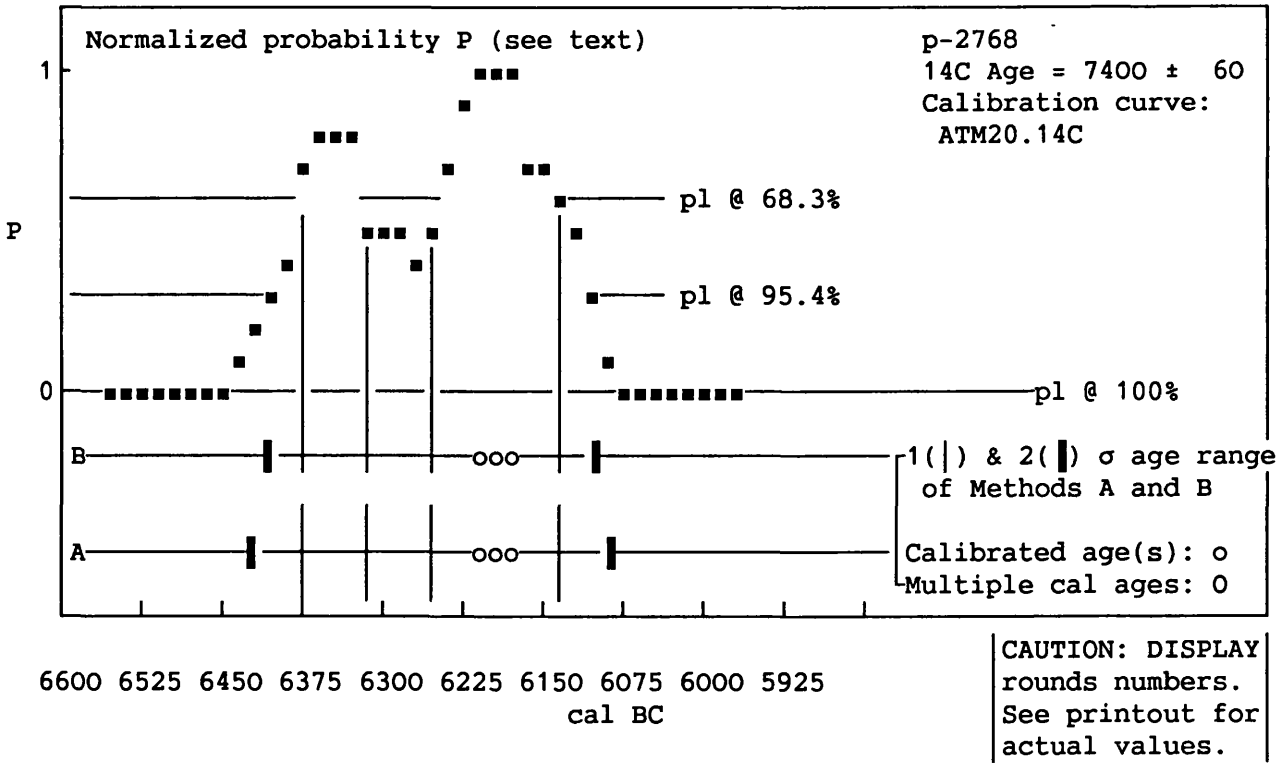
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6379-6319(8328-8268)	.33
	6248-6130(8197-8079)	.67
95.4 (two sigma)	cal BC 6409-6107(8358-8056)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2768
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6450 6400 6350 6300 6250 6200 6150 6100 6050 6000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2768
14C Age = 7400 ± 60
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6600 6525 6450 6375 6300 6225 6150 6075 6000 5925
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: N/002 agridhi  1.00
gx-2848a             7290.0  465.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: da2848a.txt
Plot file: da2848a.plt

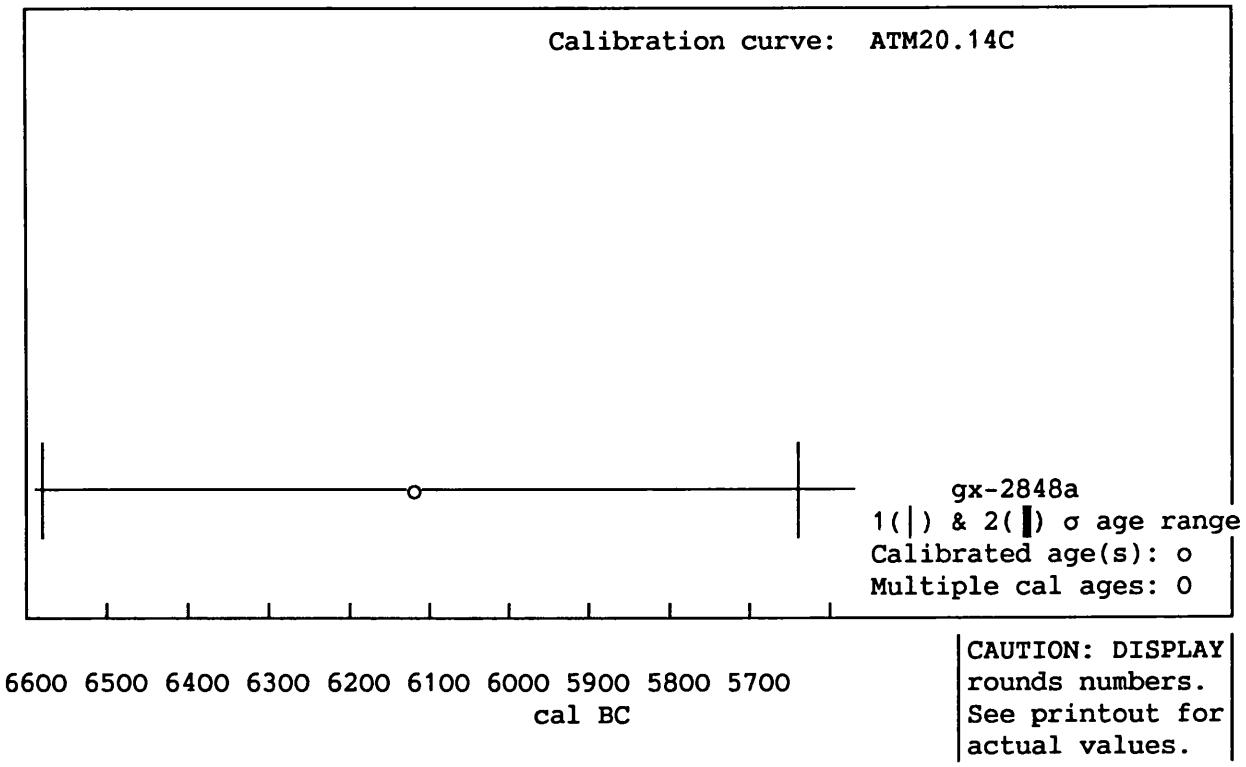

gx-2848a
 Radiocarbon Age BP  7290.0  ±465.0†                          Reference(s)
  Calibrated age(s) cal BC  6112                           (20 yr. average of
                    cal BP  8061                            LSB,SKBF,KRBSMSB,
                                                            and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6570-5650(8519-7599)
   two Sigma   BEYOND CALCULABLE RANGE

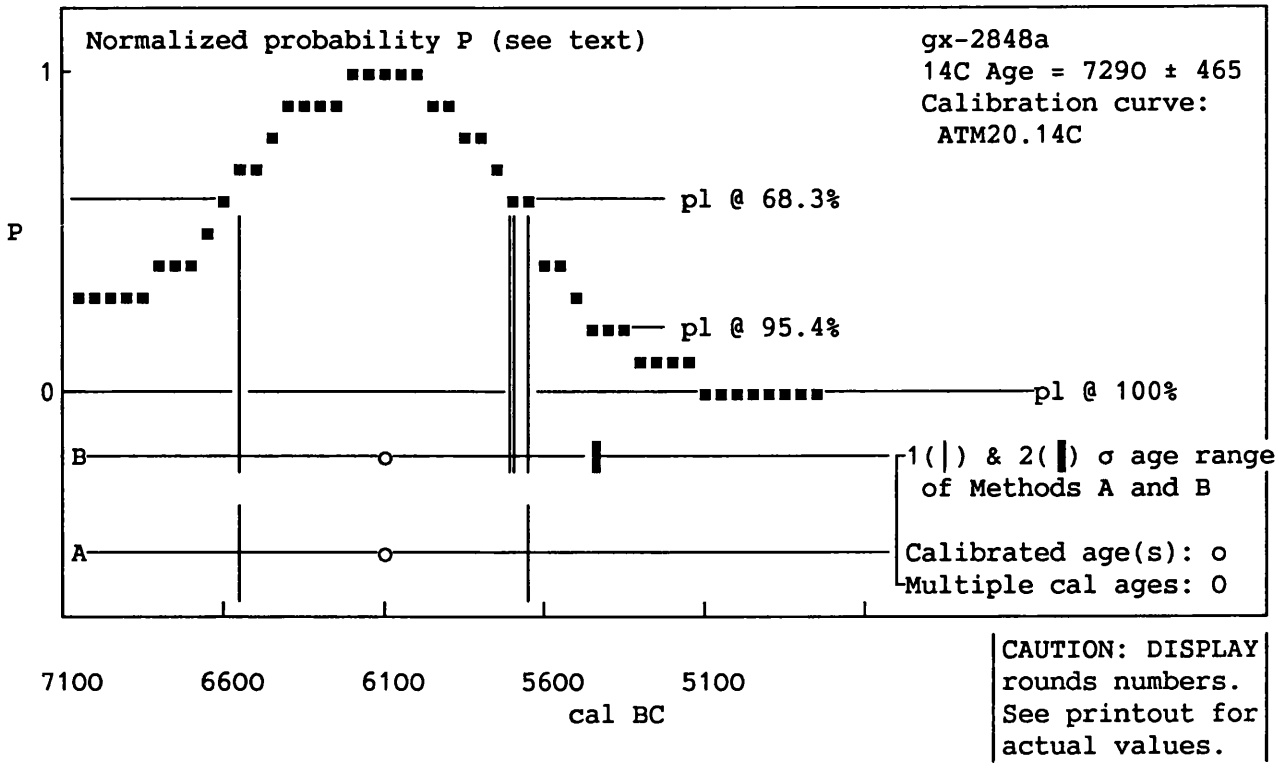
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6570 ( 6112) 5650
                  cal BP 8519 ( 8061) 7599

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 6560-5710(8509-7659)              .98
                              5686-5659(7635-7608)              .02
    95.4 (two sigma)   cal BC 7060-5470(9009-7419)              .99
```


References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
gx-2848a
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6600 6500 6400 6300 6200 6100 6000 5900 5800 5700
cal BC
CAUTION: DISPLAY
rounds numbers.
See printout for
actual values.


Normalized probability P (see text)
gx-2848a
14C Age = 7290 ± 465
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6600 6100 5600 5100
cal BC
CAUTION: DISPLAY
rounds numbers.
See printout for
actual values.

```
Site ID: N/002 agridhi  1.00
gx-2847a            6415.0  310.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: da2847a.txt
Plot file: da2847a.plt


gx-2847a
 Radiocarbon Age BP  6415.0  ±310.0†                          Reference(s)
  Calibrated age(s) cal BC  5345                           (20 yr. average of
                    cal BP  7294                            LSB,SKBF,KRBSMSB,
                                                            and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 5630-5050(7579-6999) 5011-5009(6960-6958)
   two Sigma**   cal BC 5960-4710(7909-6659) 4698-4686(6647-6635)

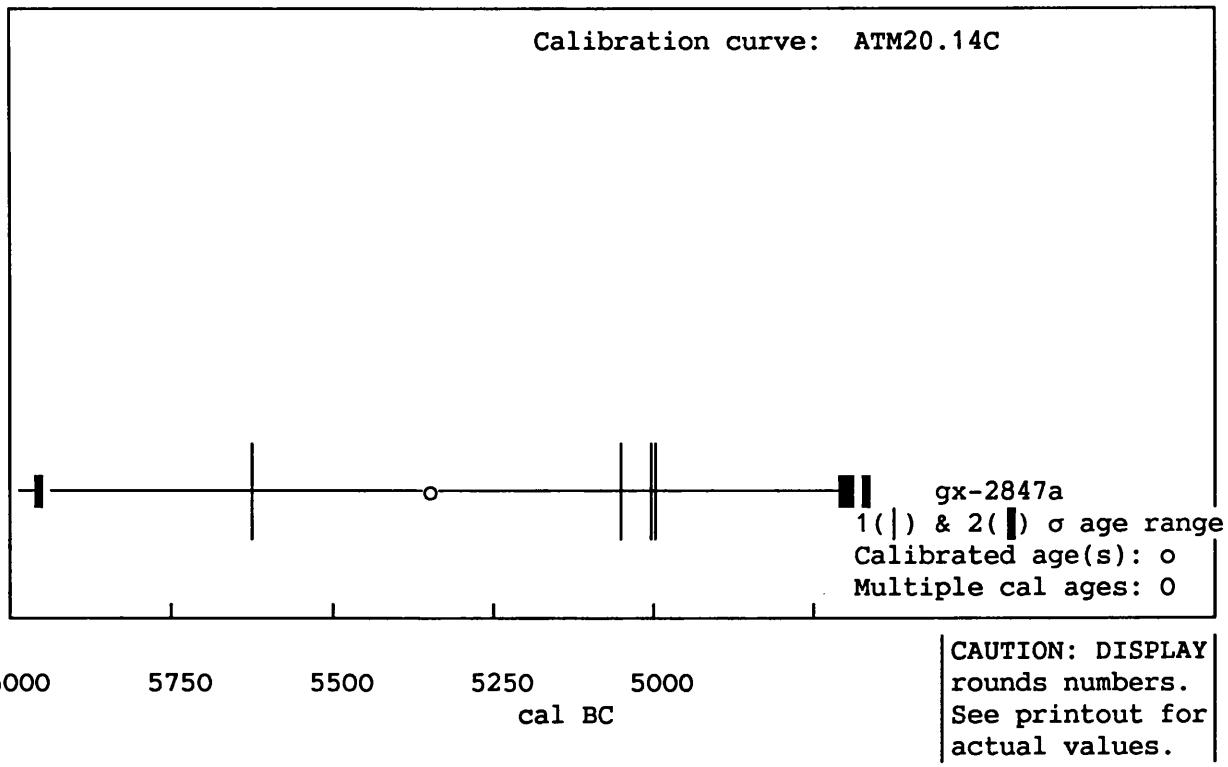
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 5630 ( 5345) 5009
                  cal BP 7579 ( 7294) 6958
      two sigma   cal BC 5960 ( 5345) 4686
                  cal BP 7909 ( 7294) 6635

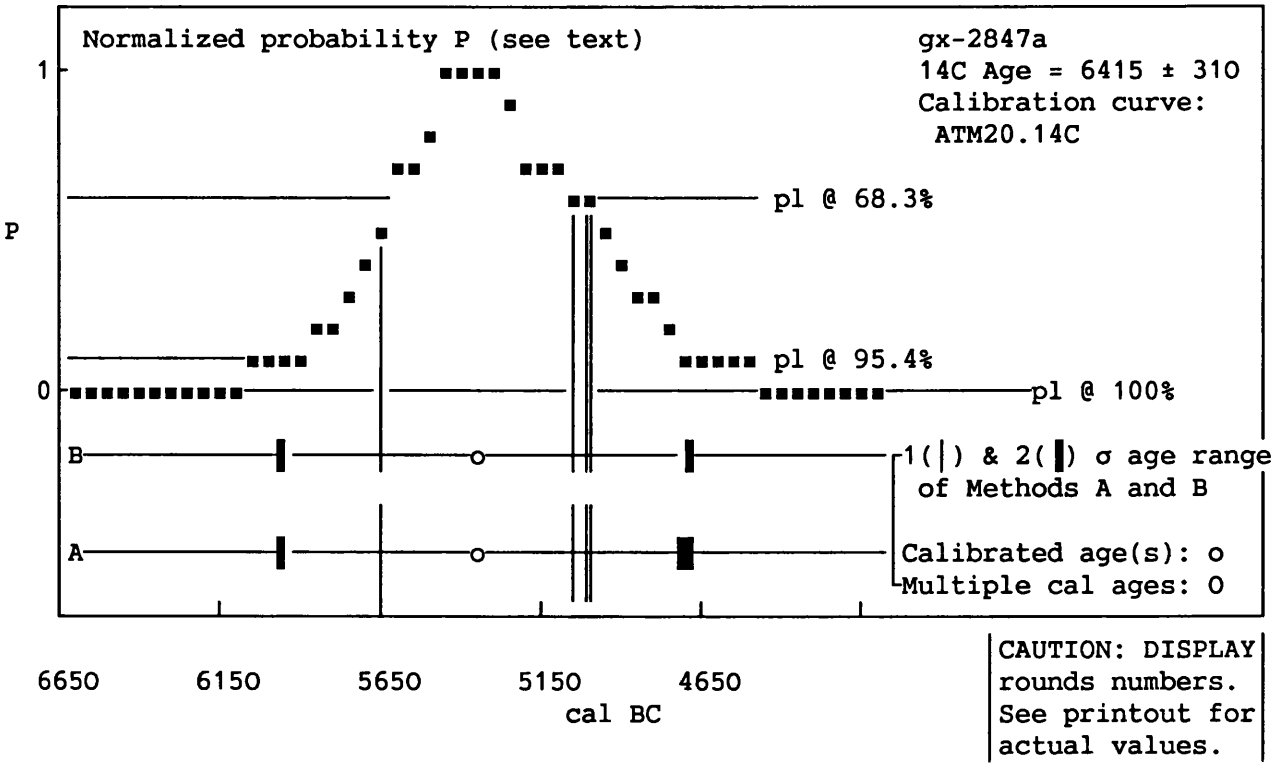
  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 5630-5040(7579-6989)              .98
                              5022-5003(6971-6952)              .02
    95.4 (two sigma)   cal BC 5960-4710(7909-6659)             1.00




References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
gx-2847a
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6000
5750
5500
5250
5000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
gx-2847a
14C Age = 6415 ± 310
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6650
6150
5650
5150
4650
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: N/002 agridhi  1.00
p-2769              5700.0  100.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: da2769.txt
Plot file: da2769.plt

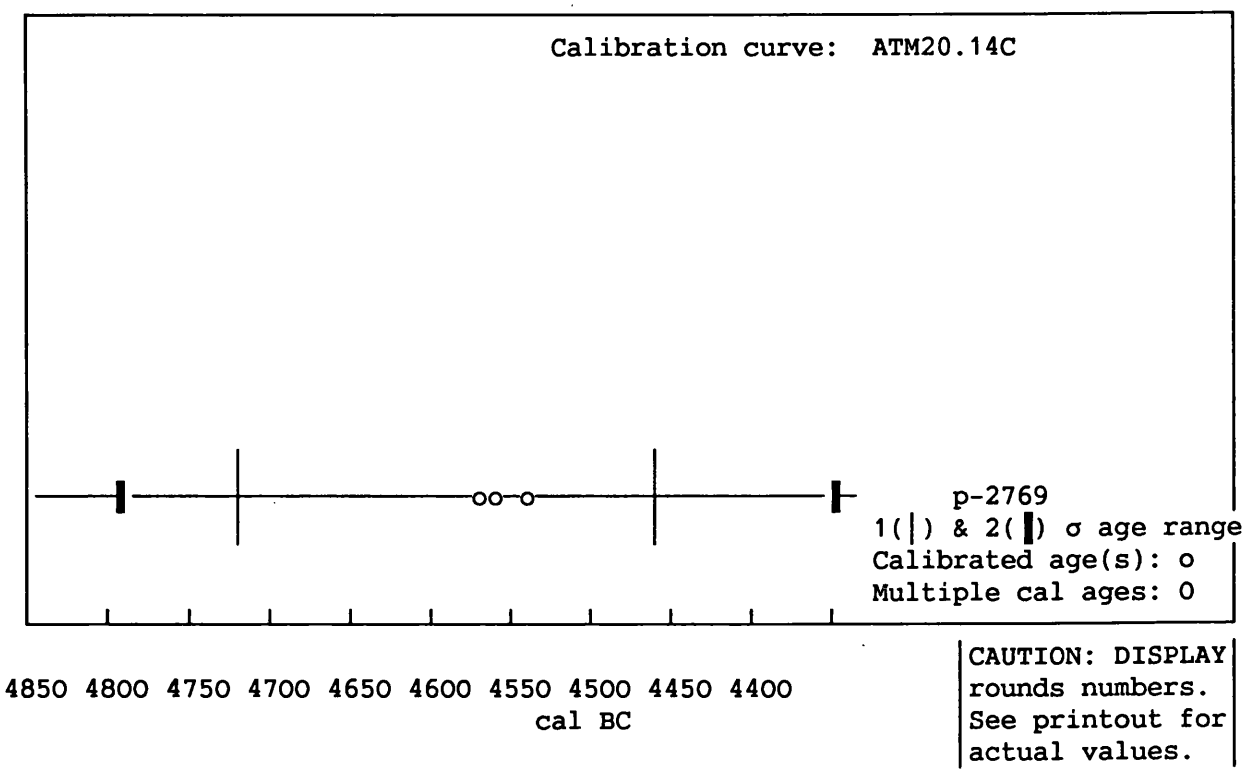

p-2769
 Radiocarbon Age BP  5700.0  ±100.0†                          Reference(s)
  Calibrated age(s) cal BC  4572, 4564, 4536             (Pearson et al. 1986)
                    cal BP  6521, 6513, 6485
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4720-4460(6669-6409)
   two Sigma**   cal BC 4790-4350(6739-6299)

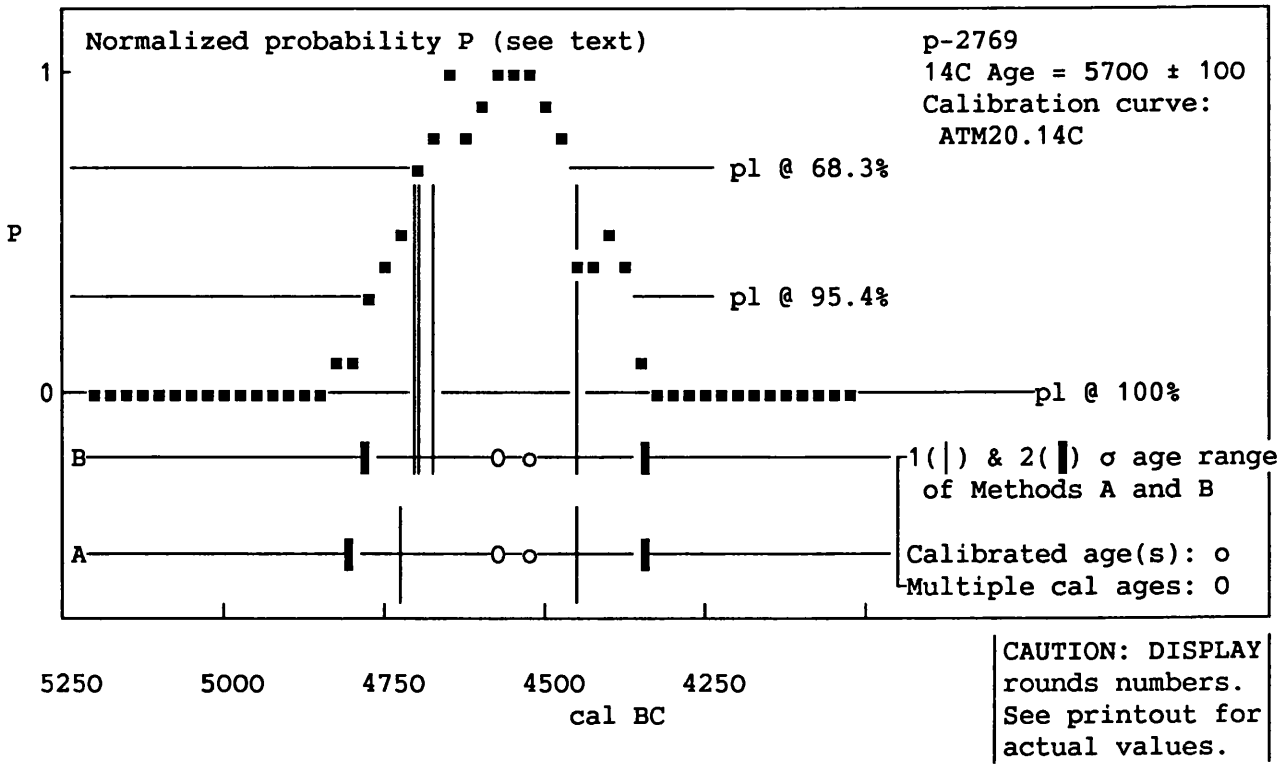
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4720 ( 4572, 4564, 4536) 4460
                  cal BP 6669 ( 6521, 6513, 6485) 6409
      two sigma   cal BC 4790 ( 4572, 4564, 4536) 4350
                  cal BP 6739 ( 6521, 6513, 6485) 6299

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4712-4701(6661-6650)              .04
                              4680-4460(6629-6409)              .96
    95.4 (two sigma)   cal BC 4780-4360(6729-6309)             1.00
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2769
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4850 4800 4750 4700 4650 4600 4550 4500 4450 4400
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2769
14C Age = 5700 ± 100
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5250 5000 4750 4500 4250
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: F/056 kastros  1.00
mc-805              7775.0  125.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: cak805.txt
Plot file: cak805.plt


mc-805
 Radiocarbon Age BP  7775.0  ±125.0†                          Reference(s)
  Calibrated age(s) cal BC  6598                           (20 yr. average of
                    cal BP  8547                            LSB,SKBF,KRBSMSB,
                                                            and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6769-6745(8718-8694) 6710-6460(8659-8409)
   two Sigma**   cal BC 7050-6400(8999-8349)

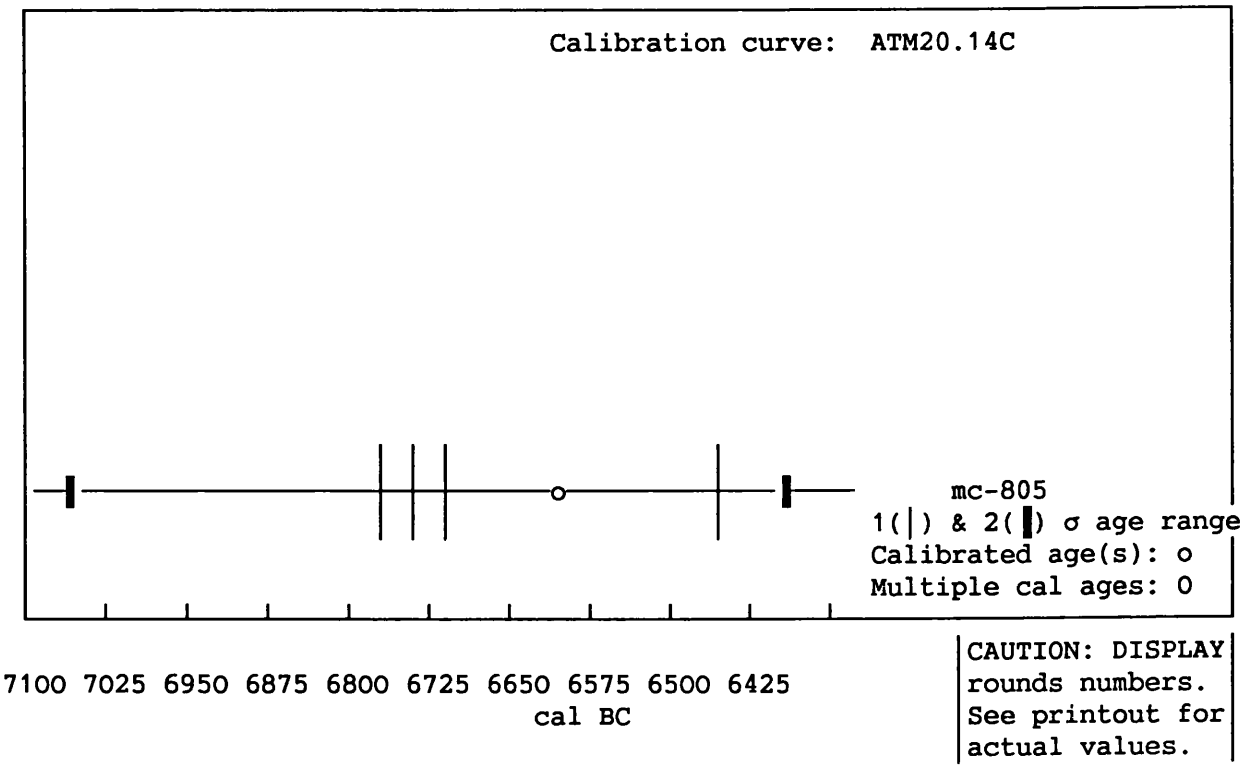
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6769 ( 6598) 6460
                  cal BP 8718 ( 8547) 8409
      two sigma   cal BC 7050 ( 6598) 6400
                  cal BP 8999 ( 8547) 8349

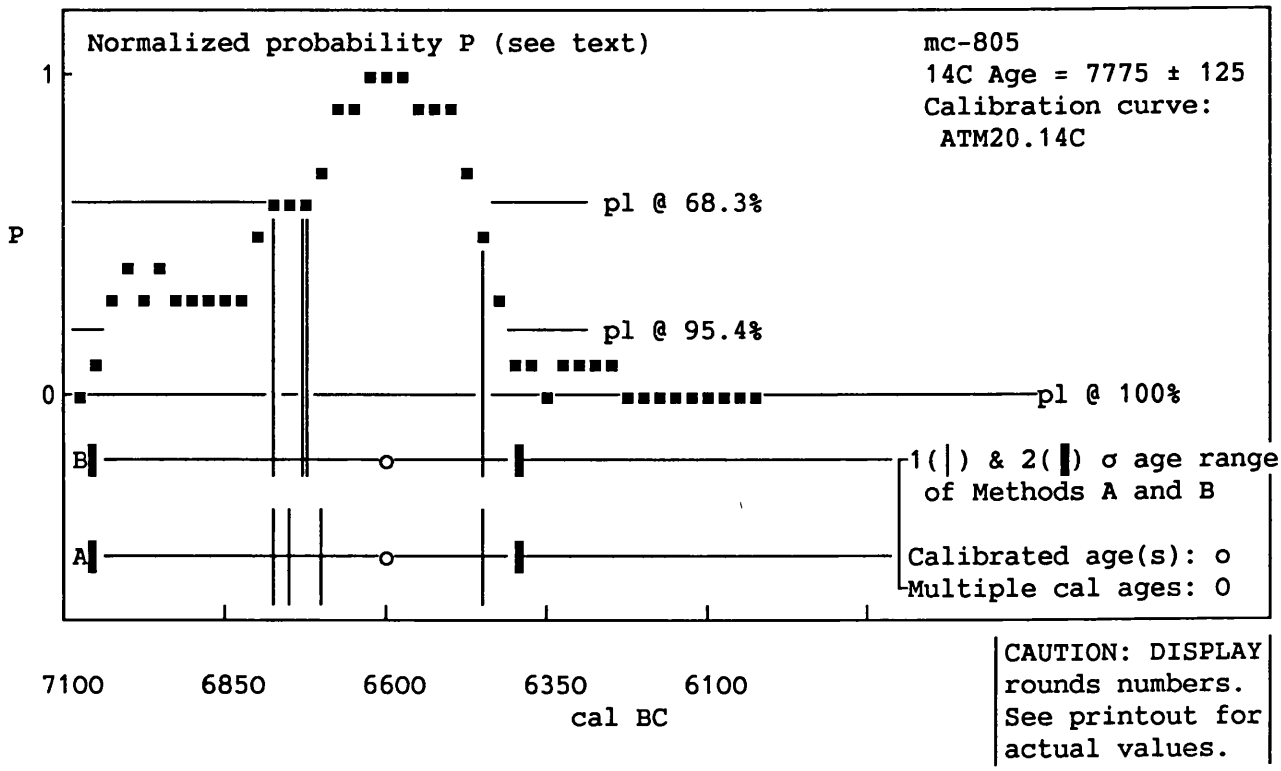
  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 6776-6731(8725-8680)              .10
                              6730-6450(8679-8399)              .90
    95.4 (two sigma)   cal BC 7040-6410(8989-8359)             1.00




References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
mc-805
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
7100 7025 6950 6875 6800 6725 6650 6575 6500 6425
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
mc-805
14C Age = 7775 ± 125
Calibration curve: ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6850 6600 6350 6100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: F/056 kastros  1.00
mc-807              7450.0  120.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: cak807.txt
Plot file: cak807.plt


mc-807
 Radiocarbon Age BP  7450.0  ±120.0†                          Reference(s)
  Calibrated age(s) cal BC  6370, 6329, 6235              (20 yr. average of
                    cal BP  8319, 8278, 8184               LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6430-6130(8379-8079)
   two Sigma**   cal BC 6555-6538(8504-8487) 6490-6080(8439-8029)
                 6054-6047(8003-7996) 6014-6005(7963-7954)

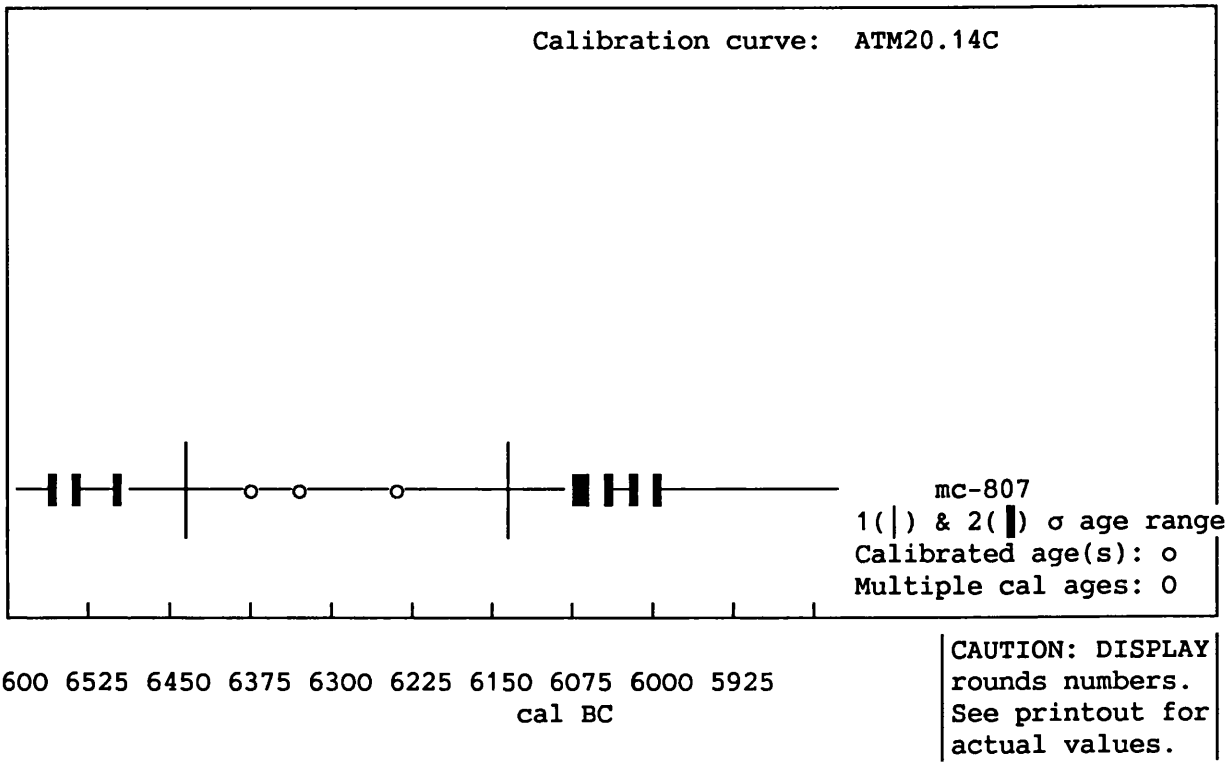
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6430 ( 6370, 6329, 6235) 6130
                  cal BP 8379 ( 8319, 8278, 8184) 8079
      two sigma   cal BC 6555 ( 6370, 6329, 6235) 6005
                  cal BP 8504 ( 8319, 8278, 8184) 7954

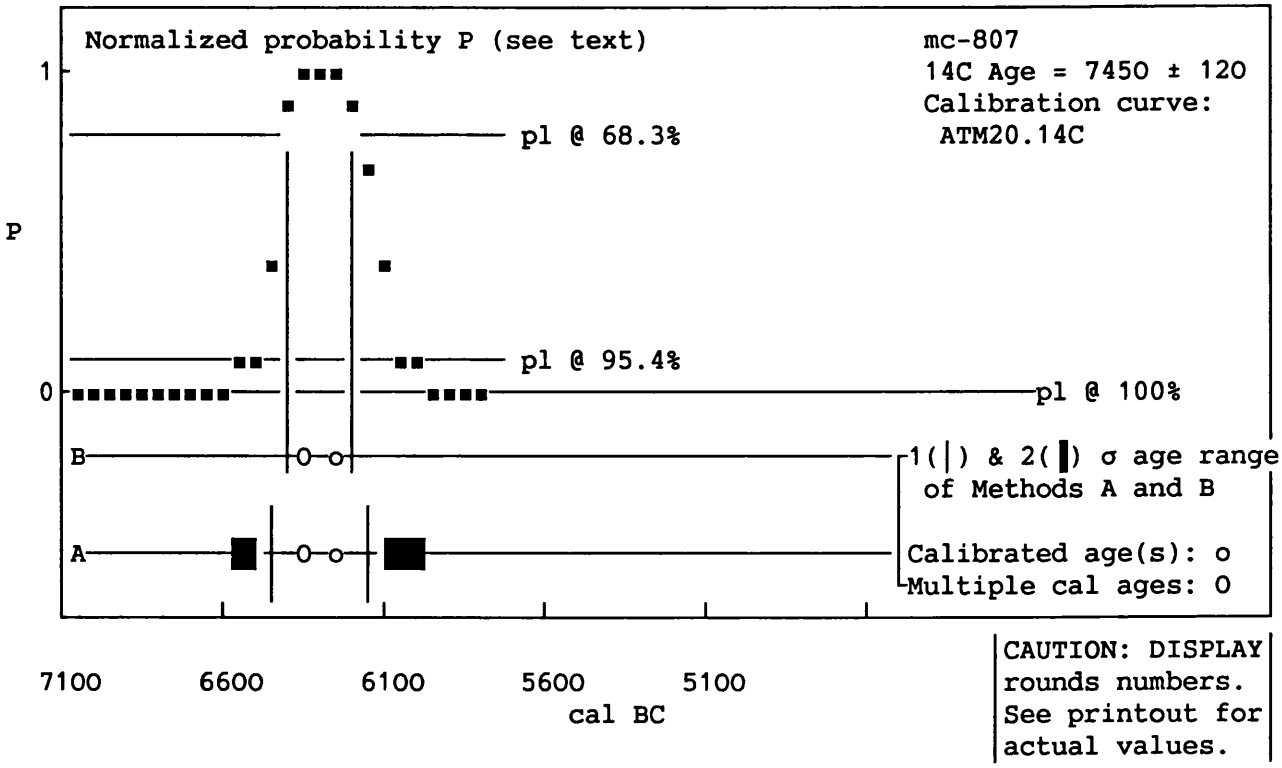
  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 6410-6180(8359-8129)            1.00
    95.4 (two sigma)    BEYOND CALCULABLE RANGE




References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
mc-807
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6600 6525 6450 6375 6300 6225 6150 6075 6000 5925
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
mc-807
14C Age = 7450 ± 120
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6600 6100 5600 5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: F/056 kastros  1.00
x-xy (ID unknown)  6760.0  140.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: cakxy.txt
Plot file: cakxy.plt

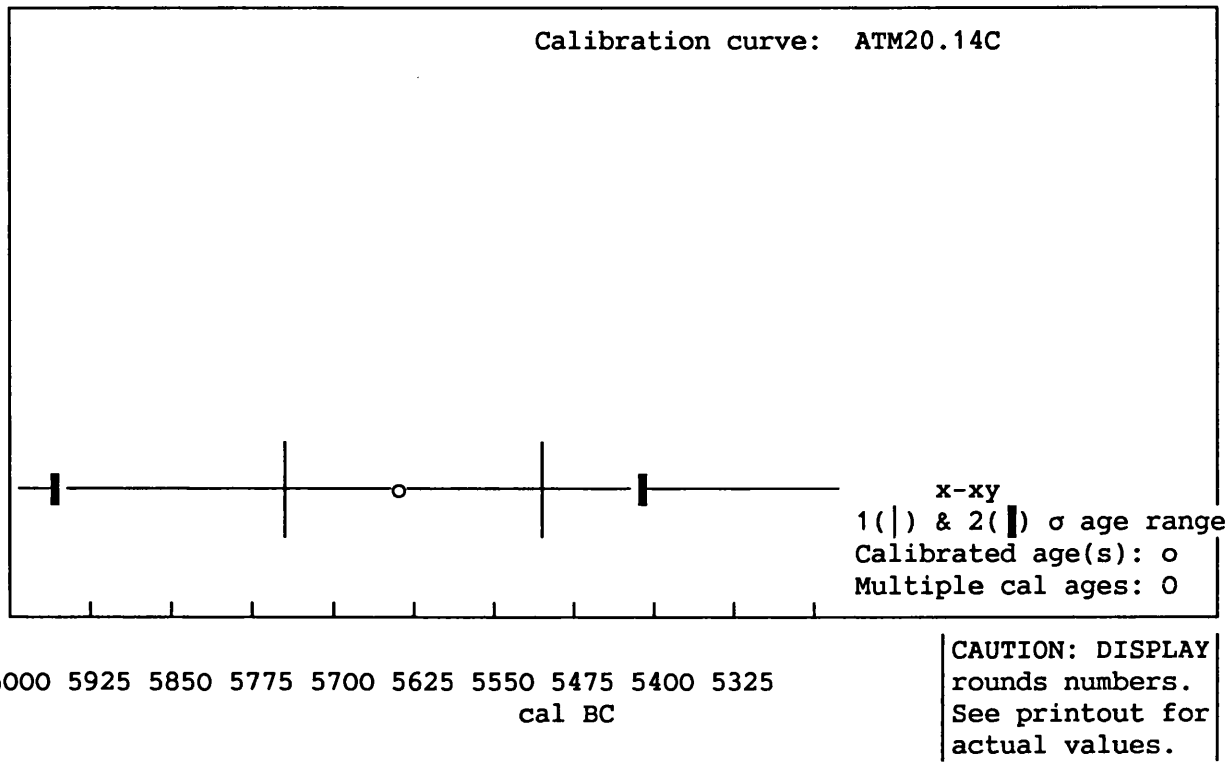

x-xy
 Radiocarbon Age BP  6760.0  ±140.0†                          Reference(s)
  Calibrated age(s) cal BC  5637                          (20 yr. average of
                    cal BP  7586                           LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 5740-5500(7689-7449)
   two Sigma**   cal BC 5960-5410(7909-7359)

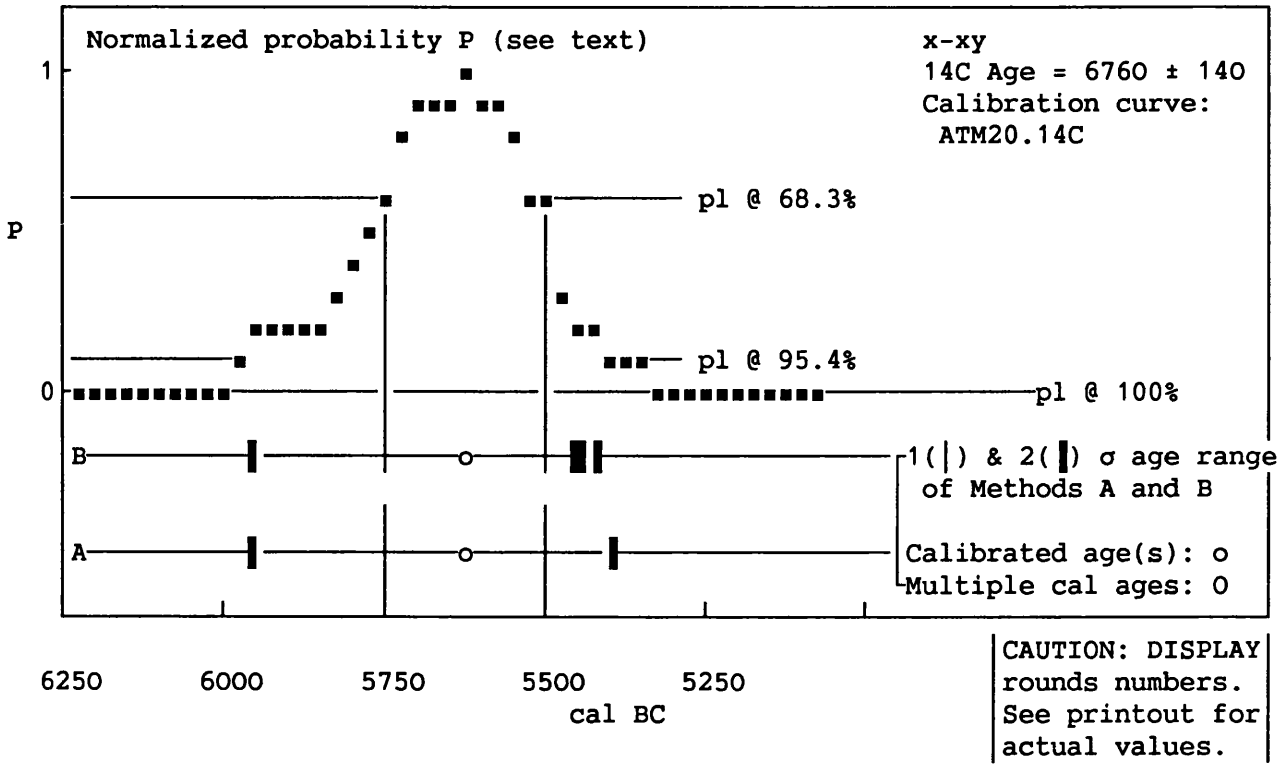
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 5740 ( 5637) 5500
                  cal BP 7689 ( 7586) 7449
      two sigma   cal BC 5960 ( 5637) 5410
                  cal BP 7909 ( 7586) 7359

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 5750-5490(7699-7439)            1.00
    95.4 (two sigma)   cal BC 5960-5450(7909-7399)             .98
                              5449-5415(7398-7364)             .02
```


References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
x-xy
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
6000 5925 5850 5775 5700 5625 5550 5475 5400 5325
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
x-xy
14C Age = 6760 ± 140
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
6250 6000 5750 5500 5250
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: F/056 kastros 1.00
x-xyz (ID unknown) 6275.0 105.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: cakxyz.txt
Plot file: cakxyz.plt

x-xyz

Radiocarbon Age BP	6275.0 ±105.0†	Reference(s)
Calibrated age(s)	cal BC 5236	(20 yr. average of
	cal BP 7185	LSB,SKBF,KRBSMSB, and LLDF)

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):

one Sigma**	cal BC 5330-5200(7279-7149)	5162-5144(7111-7093)
two Sigma**	cal BC 5474-5433(7423-7382)	5430-4940(7379-6889)

Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:

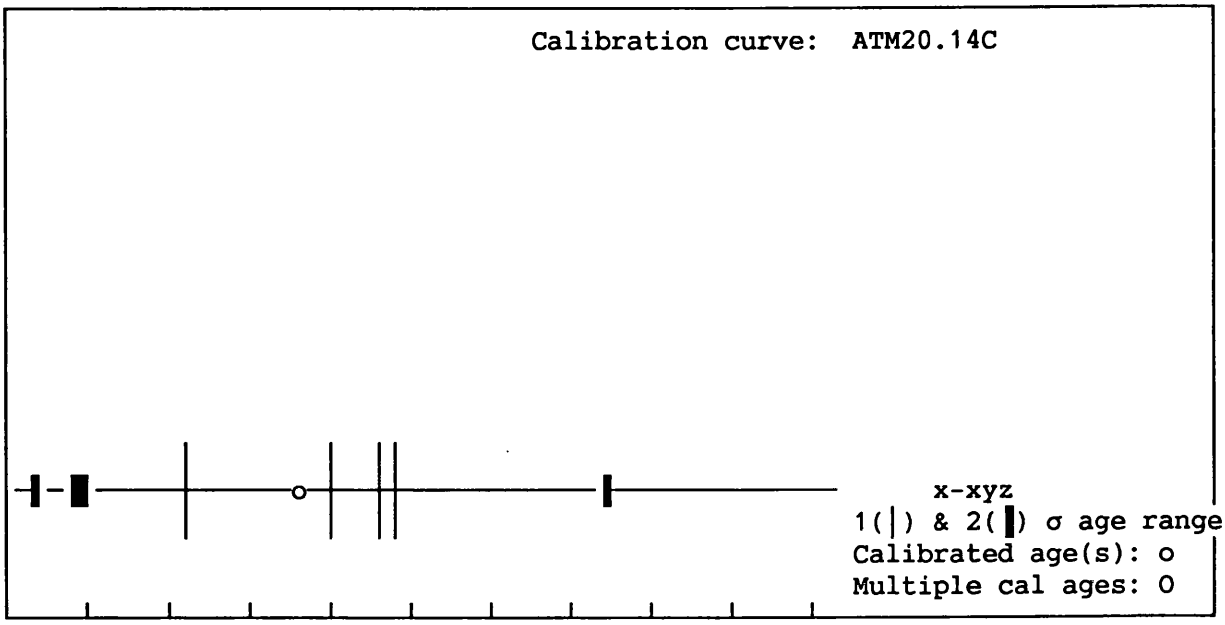
one sigma	cal BC 5330 (5236)	5144
	cal BP 7279 (7185)	7093
two sigma	cal BC 5474 (5236)	4940
	cal BP 7423 (7185)	6889

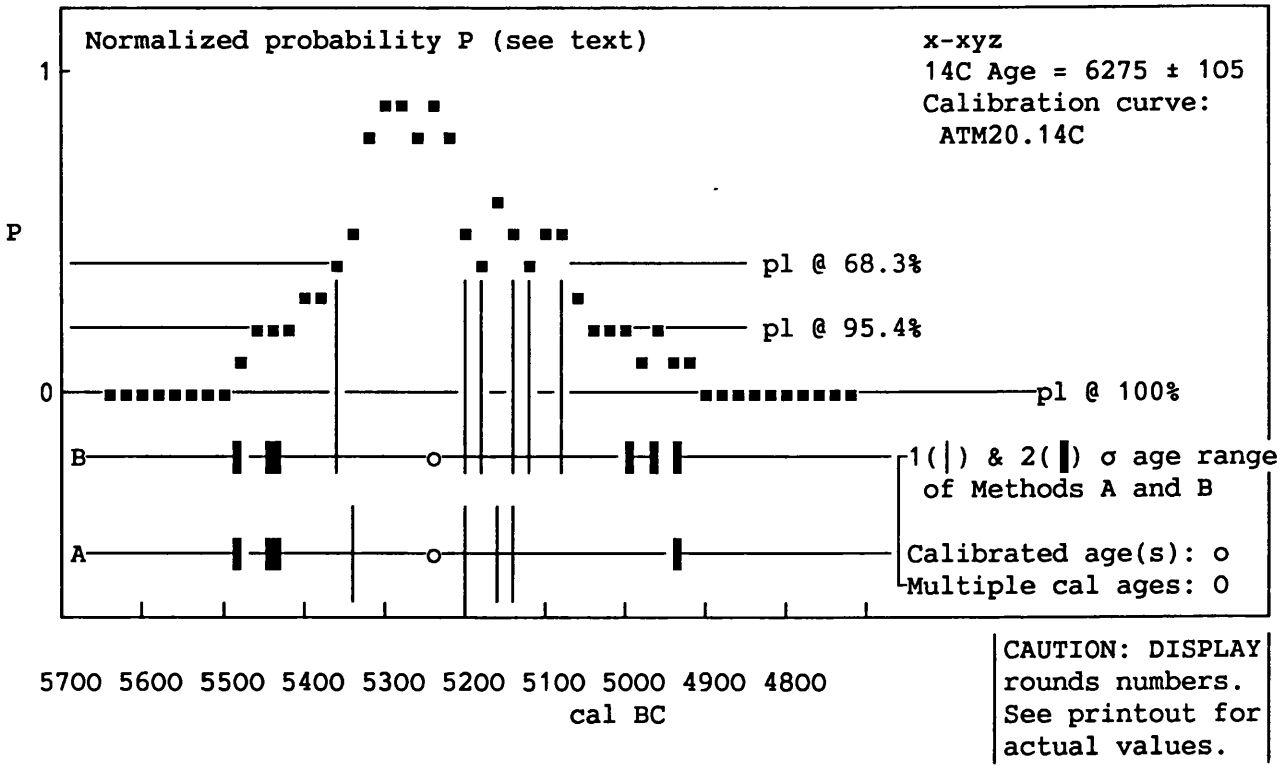
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 5350-5200(7299-7149)	.72
	5177-5134(7126-7083)	.14
	5117-5071(7066-7020)	.14
95.4 (two sigma)	cal BC 5473-5436(7422-7385)	.03
	5430-5000(7379-6949)	.95
	4966-4947(6915-6896)	.01

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
x-xyz
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
5500 5425 5350 5275 5200 5125 5050 4975 4900 4825
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
1
P
0
x-xyz
14C Age = 6275 ± 105
Calibration curve:
ATM20.14C
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5700 5600 5500 5400 5300 5200 5100 5000 4900 4800
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: F/056 kastros  1.00
mc-803              6140.0  200.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: cak803.txt
Plot file: cak803.plt

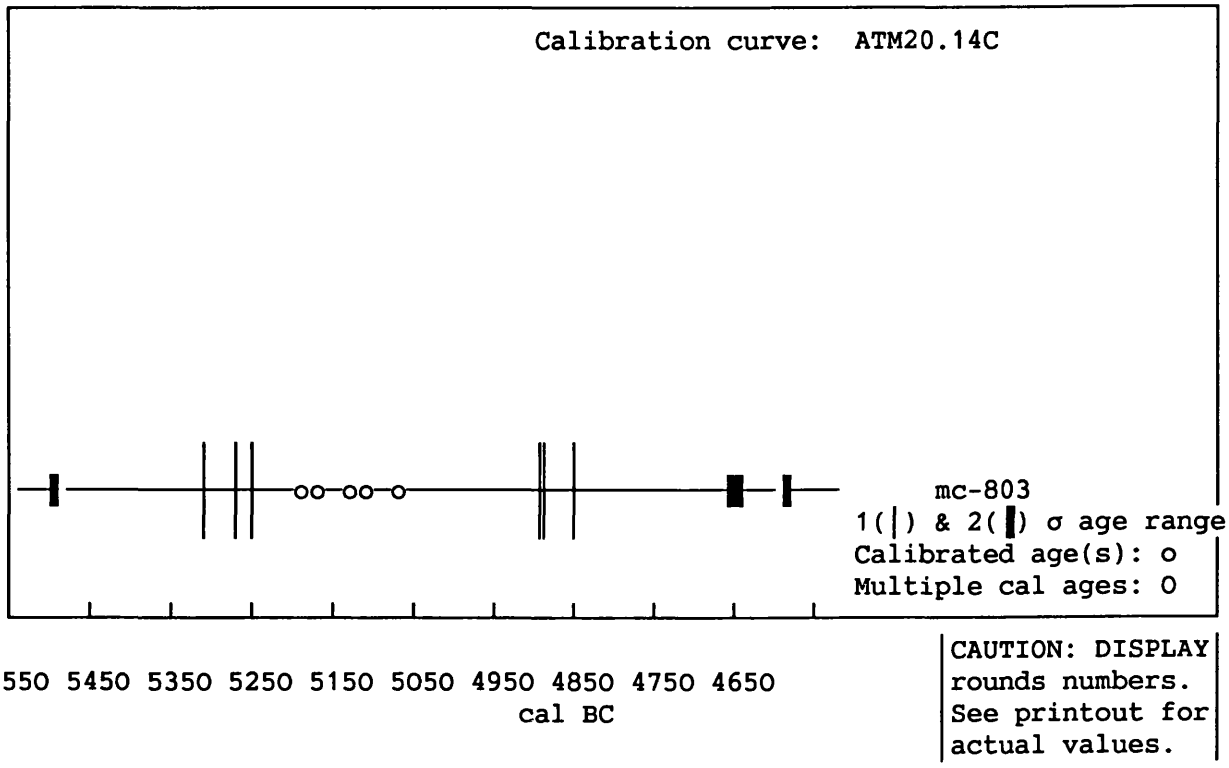

mc-803
 Radiocarbon Age BP  6140.0  ±200.0†                        Reference(s)
  Calibrated age(s) cal BC  5198, 5175, 5135            (Pearson et al. 1986)
                            5114, 5073
                    cal BP  7147, 7124, 7084
                            7063, 7022
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 5314-5262(7263-7211) 5250-4890(7199-6839)
                 4887-4841(6836-6790)
   two Sigma**   cal BC 5480-4660(7429-6609) 4642-4589(6591-6538)

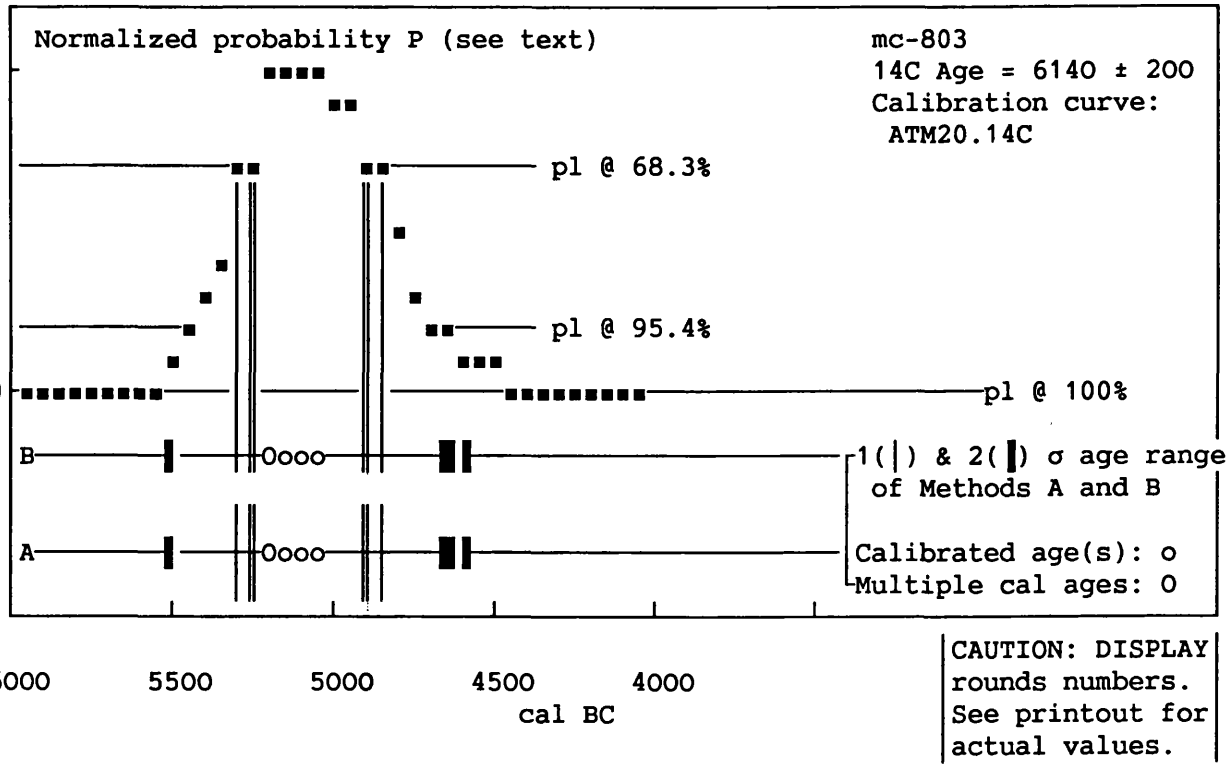
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 5314 ( 5198, 5175, 5135, 5114, 5073) 4841
                  cal BP 7263 ( 7147, 7124, 7084, 7063, 7022) 6790
      two sigma   cal BC 5480 ( 5198, 5175, 5135, 5114, 5073) 4589
                  cal BP 7429 ( 7147, 7124, 7084, 7063, 7022) 6538

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 5308-5267(7257-7216)              .08
                               5240-4890(7189-6839)              .86
                               4882-4847(6831-6796)              .07
    95.4 (two sigma)   cal BC 5480-4670(7429-6619)              .99
                               4637-4607(6586-6556)              .01
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
mc-803
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
5550 5450 5350 5250 5150 5050 4950 4850 4750 4650
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
mc-803
14C Age = 6140 ± 200
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
6000 5500 5000 4500 4000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: R/063 khirokitia  1.00
ly-4307              7930.0  130.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: khv4307.txt
Plot file: khv4307.plt


ly-4307
 Radiocarbon Age BP  7930.0  ±130.0†                          Reference(s)
  Calibrated age(s) cal BC  6784                          (20 yr. average of
                    cal BP  8733                           LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 7050-6610(8999-8559)
   two Sigma   BEYOND CALCULABLE RANGE

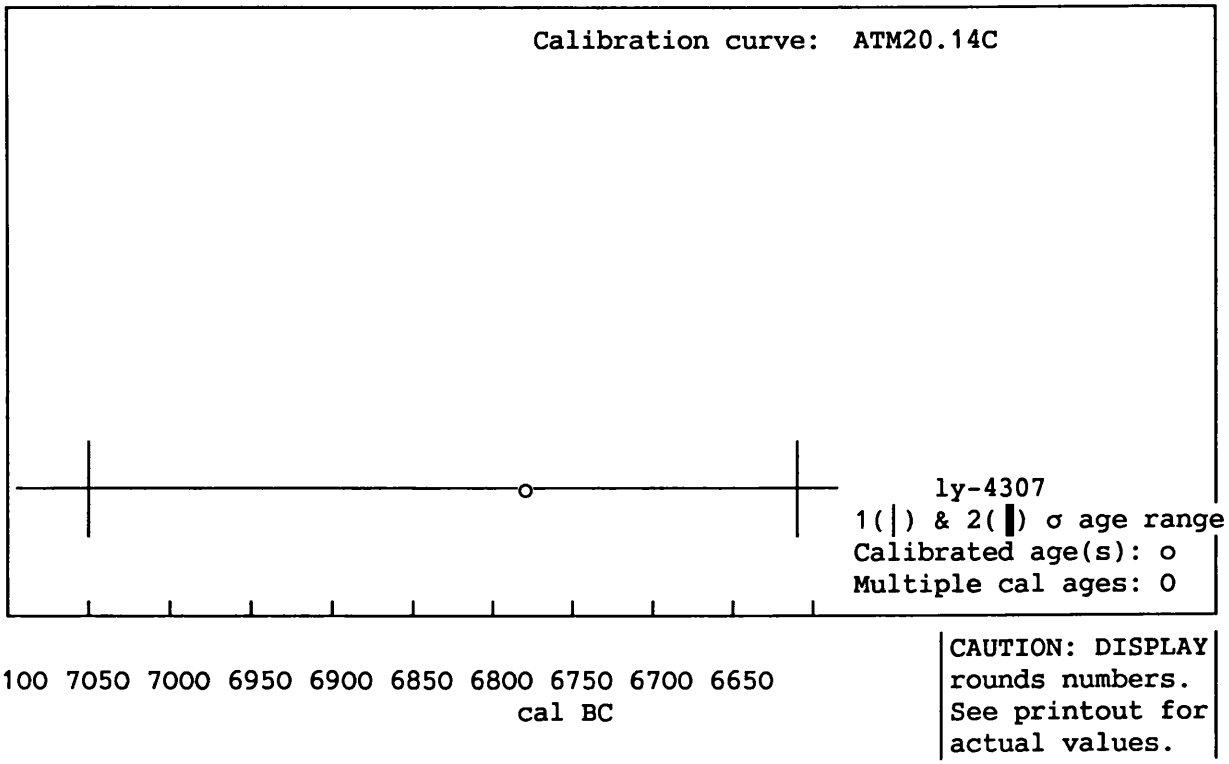
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 7050 ( 6784) 6610
                  cal BP 8999 ( 8733) 8559

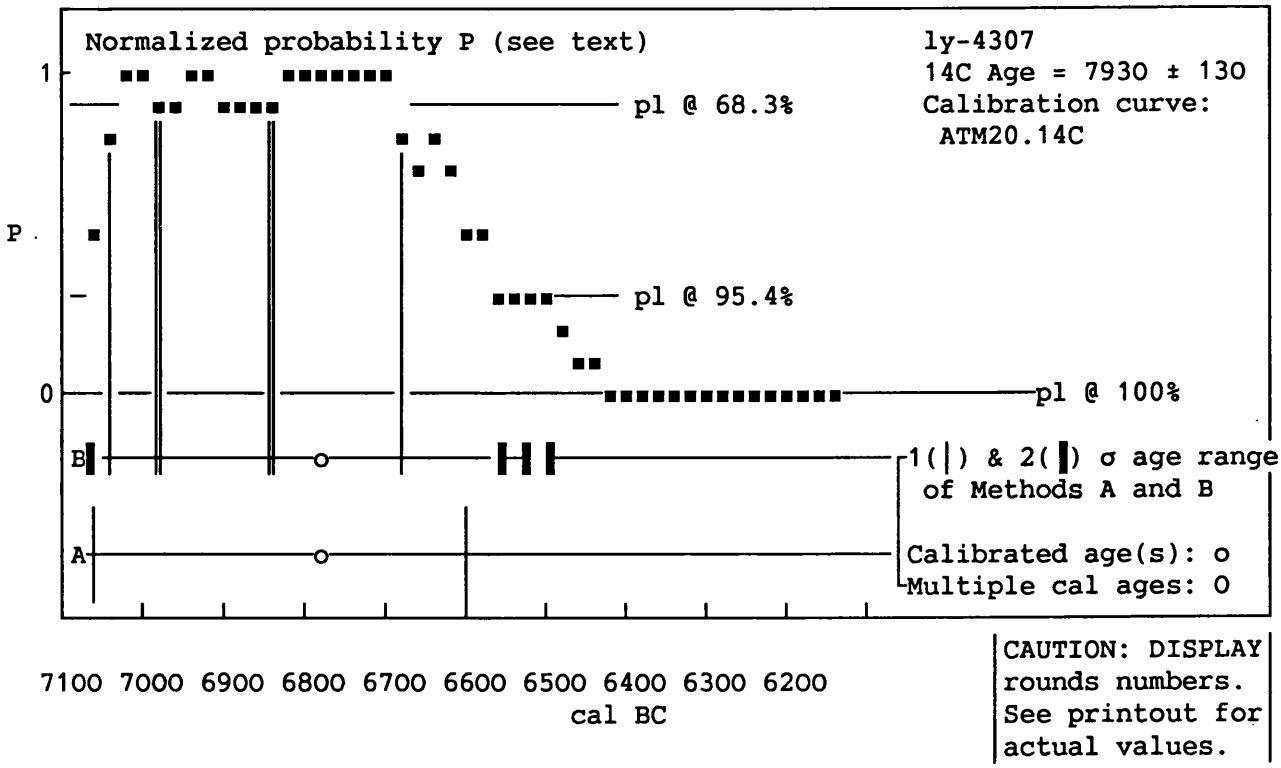
  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 7030-6975(8979-8924)              .16
                              6970-6850(8919-8799)              .35
                              6840-6680(8789-8629)              .49
    95.4 (two sigma)   cal BC 7060-6560(9009-8509)              .98
                              6524-6501(8473-8450)              .02




References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
ly-4307
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
7100 7050 7000 6950 6900 6850 6800 6750 6700 6650
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
ly-4307
14C Age = 7930 ± 130
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 7000 6900 6800 6700 6600 6500 6400 6300 6200
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/063 khirokitia 1.00
ly-3718 7930.0 320.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: khv3718.txt
Plot file: khv3718.plt

ly-3718
Radiocarbon Age BP 7930.0 ±320.0†
Reference(s)
Calibrated age(s) cal BC 6784
cal BP 8733
(20 yr. average of LSB,SKBF,KRBSMSB, and LLDF)

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma BEYOND CALCULABLE RANGE
two Sigma BEYOND CALCULABLE RANGE

cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	BEYOND CALCULABLE RANGE	
95.4 (two sigma)	BEYOND CALCULABLE RANGE	

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14

```
Site ID: R/063 khirokitia  1.00
ly-3718              7930.0  320.0       .0      .0  100.0      .0
xx
Calibration file(s): ATM20.14C
Listing file: khv3718.txt
Plot file: khv3718.plt
```

Cal Sigmas beyond Calculable Range
DISPLAY cannot compute graphs

```
Site ID: R/063 khirokitia  1.00
ly-3717              7700.0  150.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: khv3717.txt
Plot file: khv3717.plt

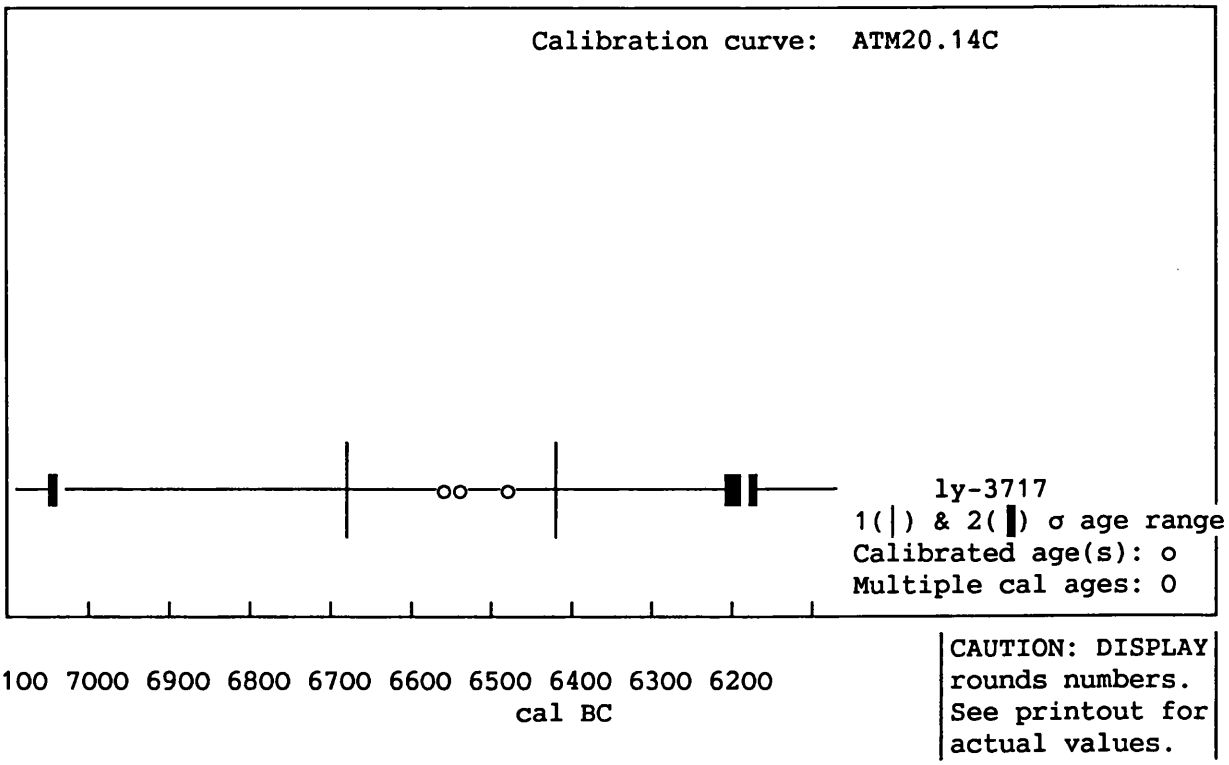

ly-3717
 Radiocarbon Age BP  7700.0  ±150.0†                          Reference(s)
  Calibrated age(s) cal BC  6553, 6542, 6487              (20 yr. average of
                    cal BP  8502, 8491, 8436               LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6680-6420(8629-8369)
   two Sigma**   cal BC 7040-6210(8989-8159) 6207-6180(8156-8129)

   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6680 ( 6553, 6542, 6487) 6420
                  cal BP 8629 ( 8502, 8491, 8436) 8369
      two sigma   cal BC 7040 ( 6553, 6542, 6487) 6180
                  cal BP 8989 ( 8502, 8491, 8436) 8129

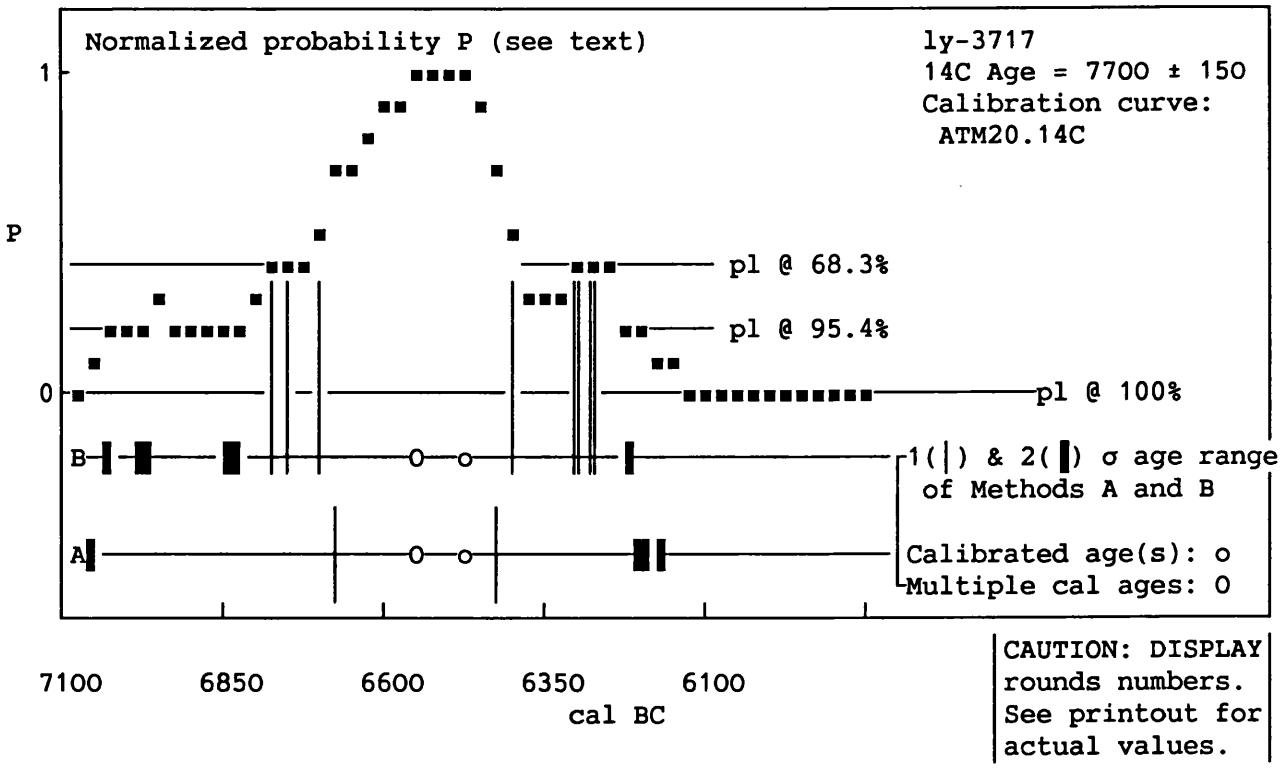
  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 6770-6744(8719-8693)              .04
                               6710-6390(8659-8339)              .92
                               6312-6301(8261-8250)              .02
                               6280-6263(8229-8212)              .03
    95.4 (two sigma)   cal BC 7029-6977(8978-8926)              .03
                               6970-6860(8919-8809)              .06
                               6830-6220(8779-8169)              .90

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```



Cal Sigmas beyond calculable Range
DISPLAY cannot computer graphs



```
Site ID: R/063 khirokitia  1.00
st-415              7655.0  160.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: khv415.txt
Plot file: khv415.plt

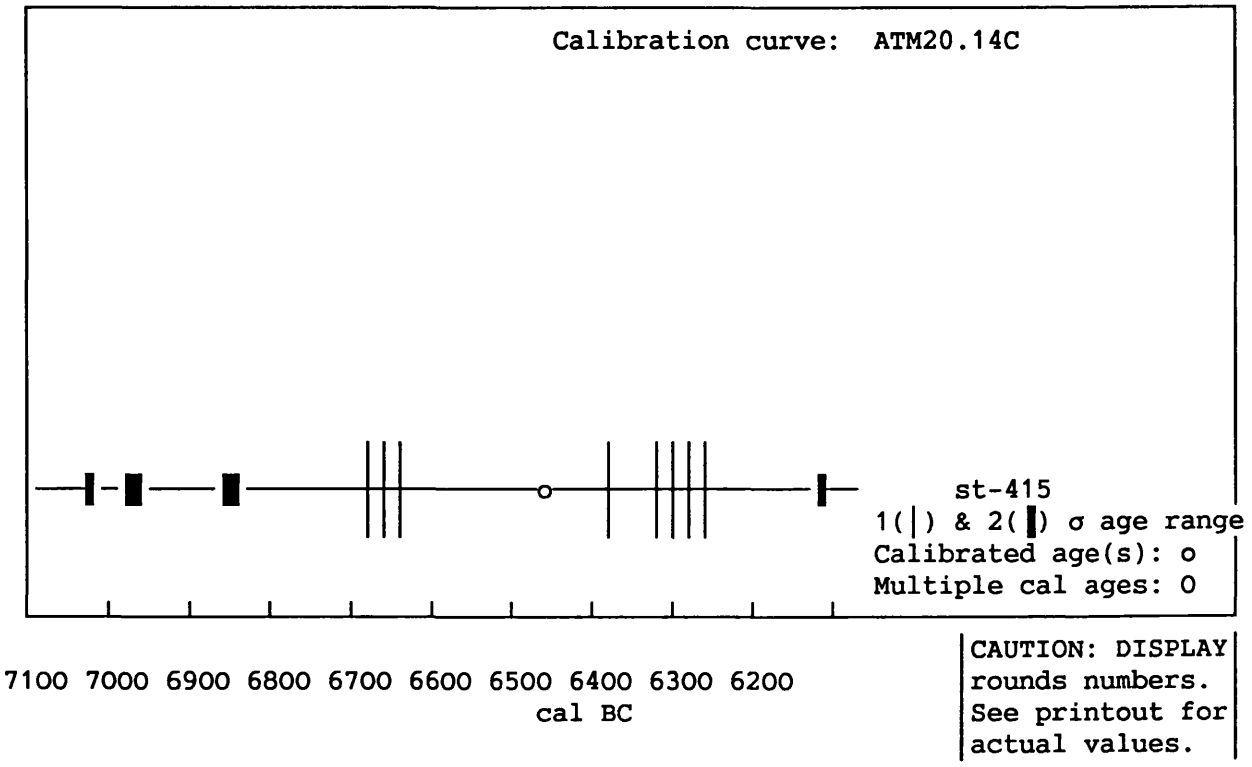

st-415
 Radiocarbon Age BP  7655.0  ±160.0†                        Reference(s)
  Calibrated age(s) cal BC  6466                          (20 yr. average of
                    cal BP  8415                           LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6672-6661(8621-8610) 6630-6380(8579-8329)
                 6313-6296(8262-8245) 6284-6260(8233-8209)
   two Sigma**   cal BC 7027-6981(8976-8930) 6965-6867(8914-8816)
                 6830-6130(8779-8079)

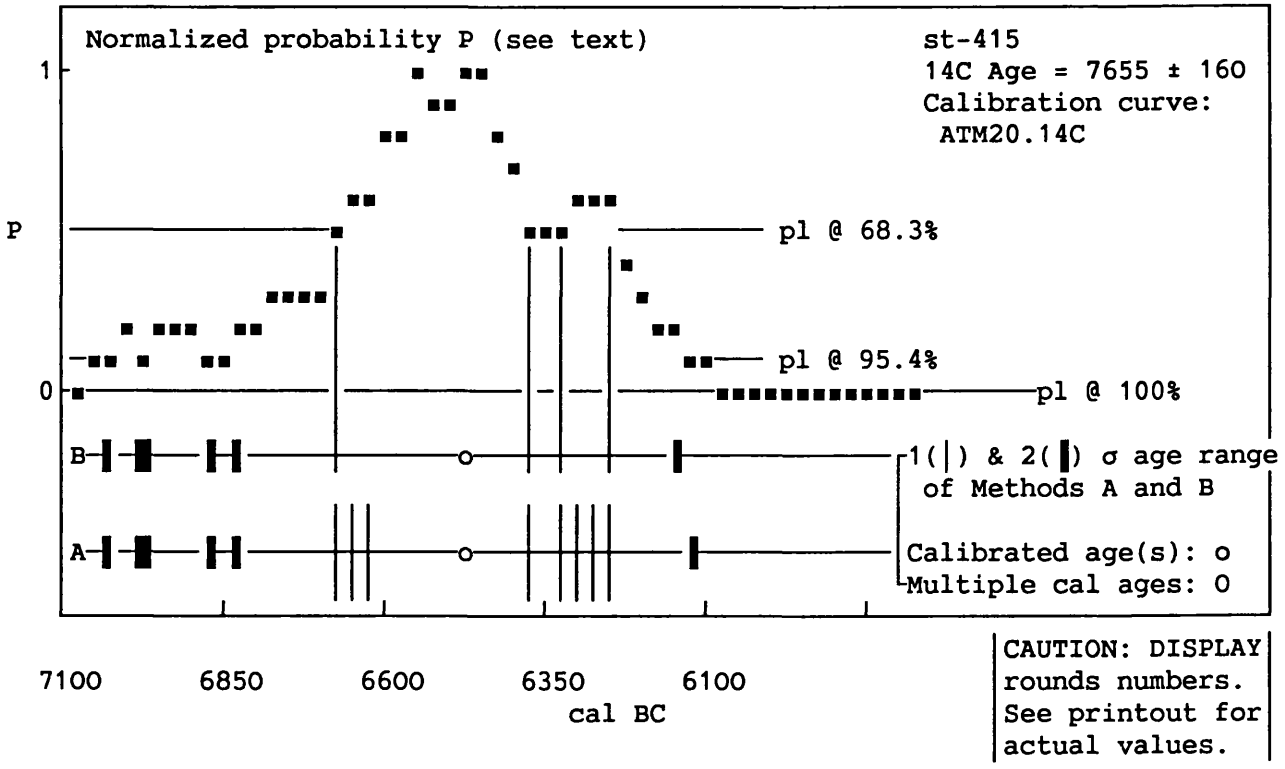
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6672 ( 6466) 6260
                  cal BP 8621 ( 8415) 8209
      two sigma   cal BC 7027 ( 6466) 6130
                  cal BP 8976 ( 8415) 8079

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 6680-6370(8629-8319)              .83
                               6324-6241(8273-8190)              .17
    95.4 (two sigma)   cal BC 7025-6985(8974-8934)              .02
                               6963-6883(8912-8832)              .03
                               6830-6140(8779-8089)              .95

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
st-415
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
7100 7000 6900 6800 6700 6600 6500 6400 6300 6200
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-415
14C Age = 7655 ± 160
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6850 6600 6350 6100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/063 khirokitia 1.00
ly-3719 7540.0 180.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: khv3719.txt
Plot file: khv3719.plt

ly-3719
Radiocarbon Age BP 7540.0 ±180.0† Reference(s)
Calibrated age(s) cal BC 6419 (20 yr. average of
cal BP 8368 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6559-6524(8508-8473) 6500-6170(8449-8119)
two Sigma** cal BC 6772-6741(8721-8690) 6720-6070(8669-8019)
6064-6039(8013-7988) 6021-5997(7970-7946)

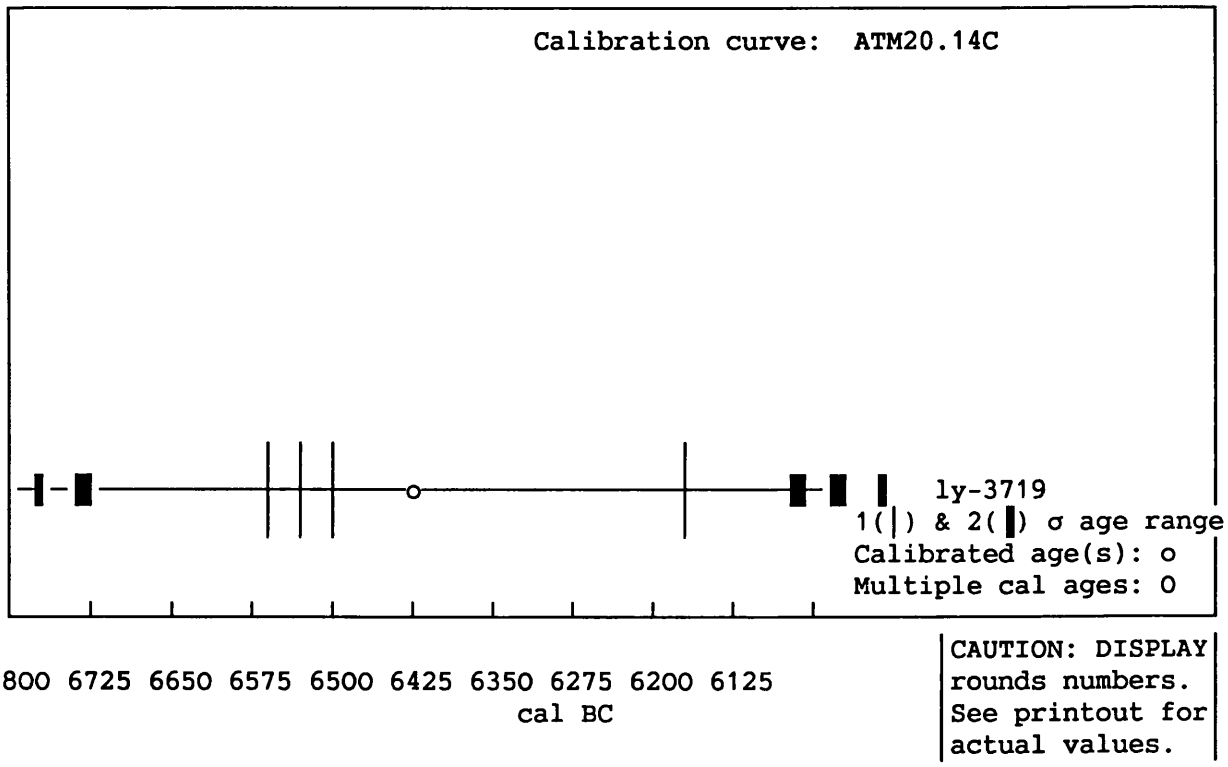
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6559 (6419) 6170
cal BP 8508 (8368) 8119
two sigma cal BC 6772 (6419) 5997
cal BP 8721 (8368) 7946

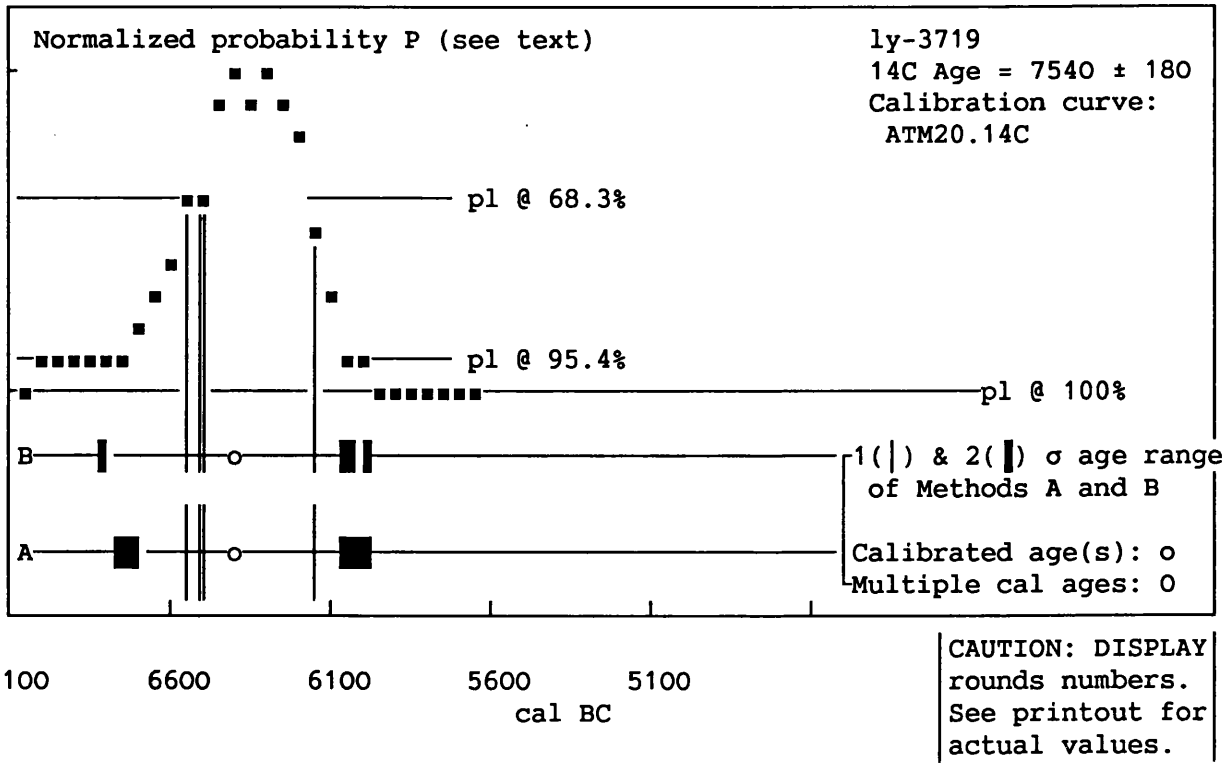
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6560-6521(8509-8470)	.08
	6500-6170(8449-8119)	.92
95.4 (two sigma)	cal BC 6790-6030(8739-7979)	.99
	6029-5988(7978-7937)	.01

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
ly-3719
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6800 6725 6650 6575 6500 6425 6350 6275 6200 6125
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
ly-3719
14C Age = 7540 ± 180
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6600 6100 5600 5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: R/063 khirokitia  1.00
st-414              7515.0  125.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: khv414.txt
Plot file: khv414.plt

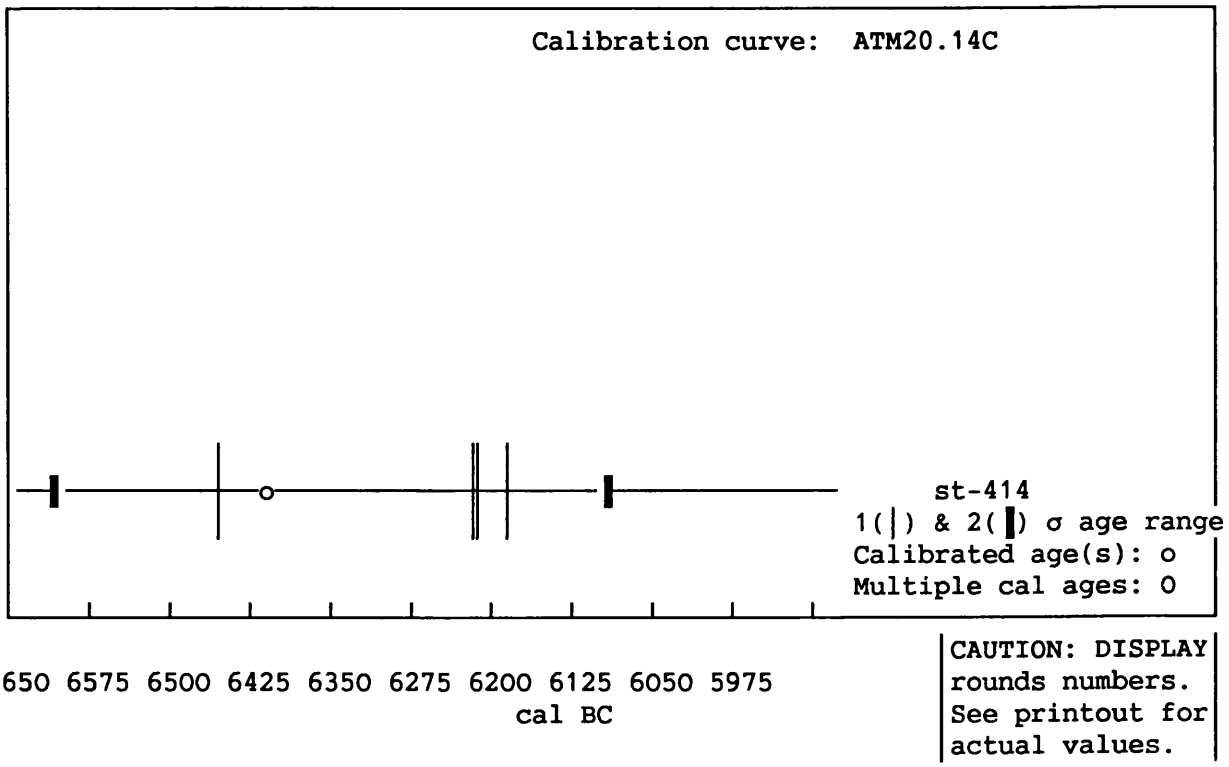

st-414
 Radiocarbon Age BP  7515.0  ±125.0†                        Reference(s)
  Calibrated age(s) cal BC  6404                          (20 yr. average of
                    cal BP  8353                           LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6460-6210(8409-8159) 6209-6179(8158-8128)
   two Sigma**   cal BC 6600-6090(8549-8039)

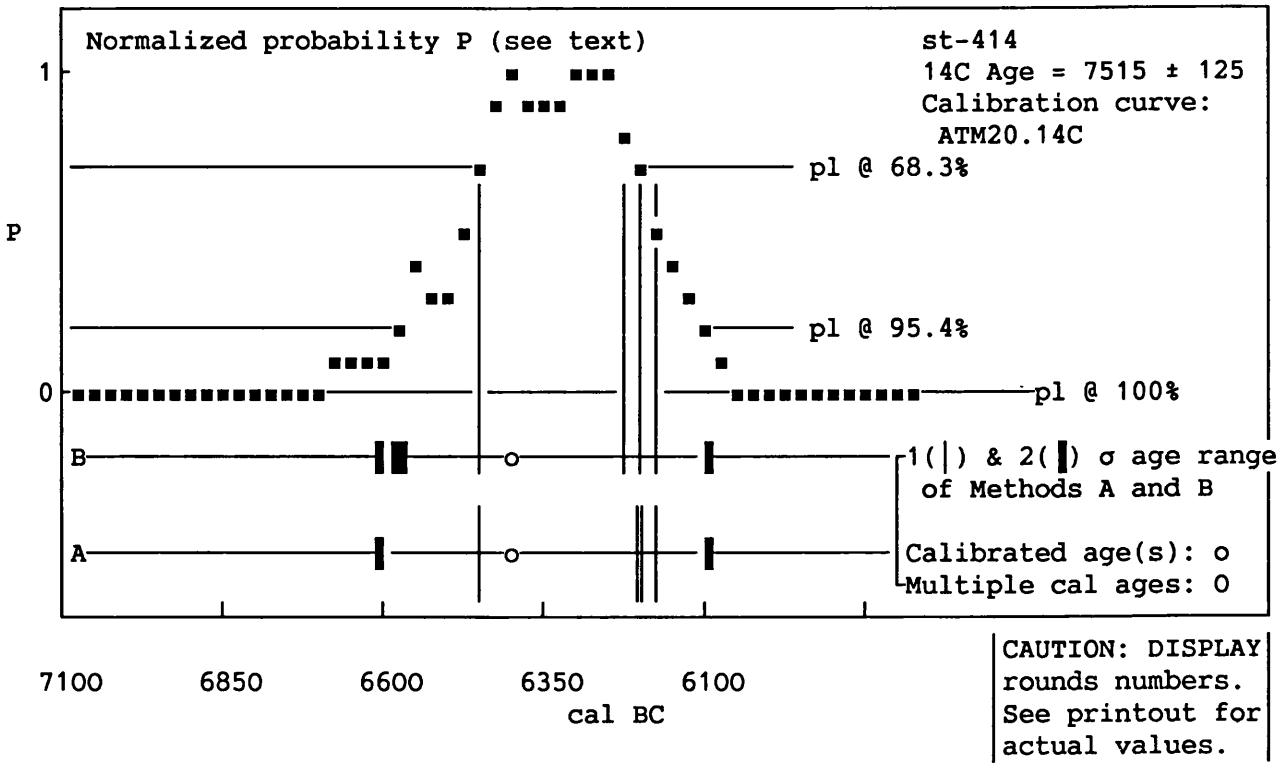
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6460 ( 6404) 6179
                  cal BP 8409 ( 8353) 8128
      two sigma   cal BC 6600 ( 6404) 6090
                  cal BP 8549 ( 8353) 8039

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 6450-6220(8399-8169)              .94
                              6201-6184(8150-8133)              .06
    95.4 (two sigma)   cal BC 6595-6574(8544-8523)              .01
                              6570-6100(8519-8049)              .99
```

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
st-414
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6650 6575 6500 6425 6350 6275 6200 6125 6050 5975
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-414
14C Age = 7515 ± 125
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6850 6600 6350 6100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/063 khirokitia 1.00
ly-4308 7470.0 140.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: khv4308.txt
Plot file: khv4308.plt

ly-4308
Radiocarbon Age BP 7470.0 ±140.0† Reference(s)
Calibrated age(s) cal BC 6377, 6321, 6245 (20 yr. average of
cal BP 8326, 8270, 8194 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6450-6130(8399-8079)
two Sigma** cal BC 6593-6581(8542-8530) 6570-6070(8519-8019)
6061-6041(8010-7990) 6019-6000(7968-7949)

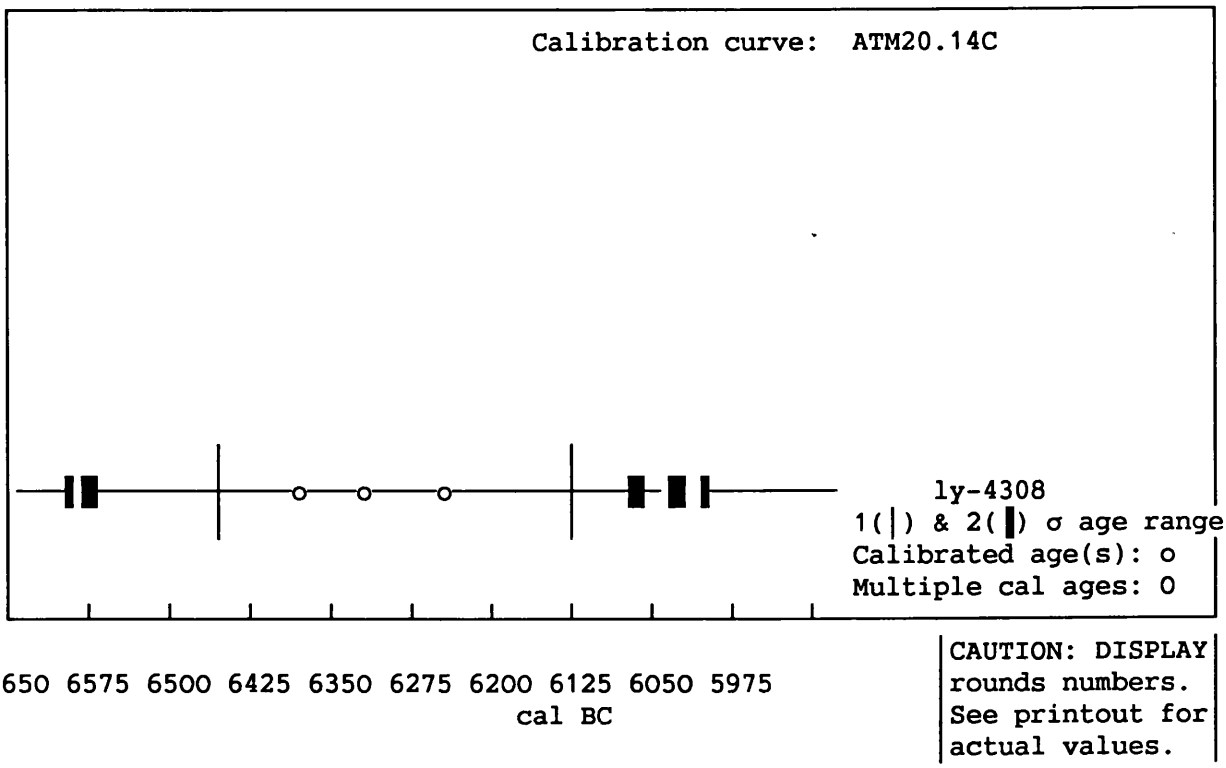
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6450 (6377, 6321, 6245) 6130
cal BP 8399 (8326, 8270, 8194) 8079
two sigma cal BC 6593 (6377, 6321, 6245) 6000
cal BP 8542 (8326, 8270, 8194) 7949

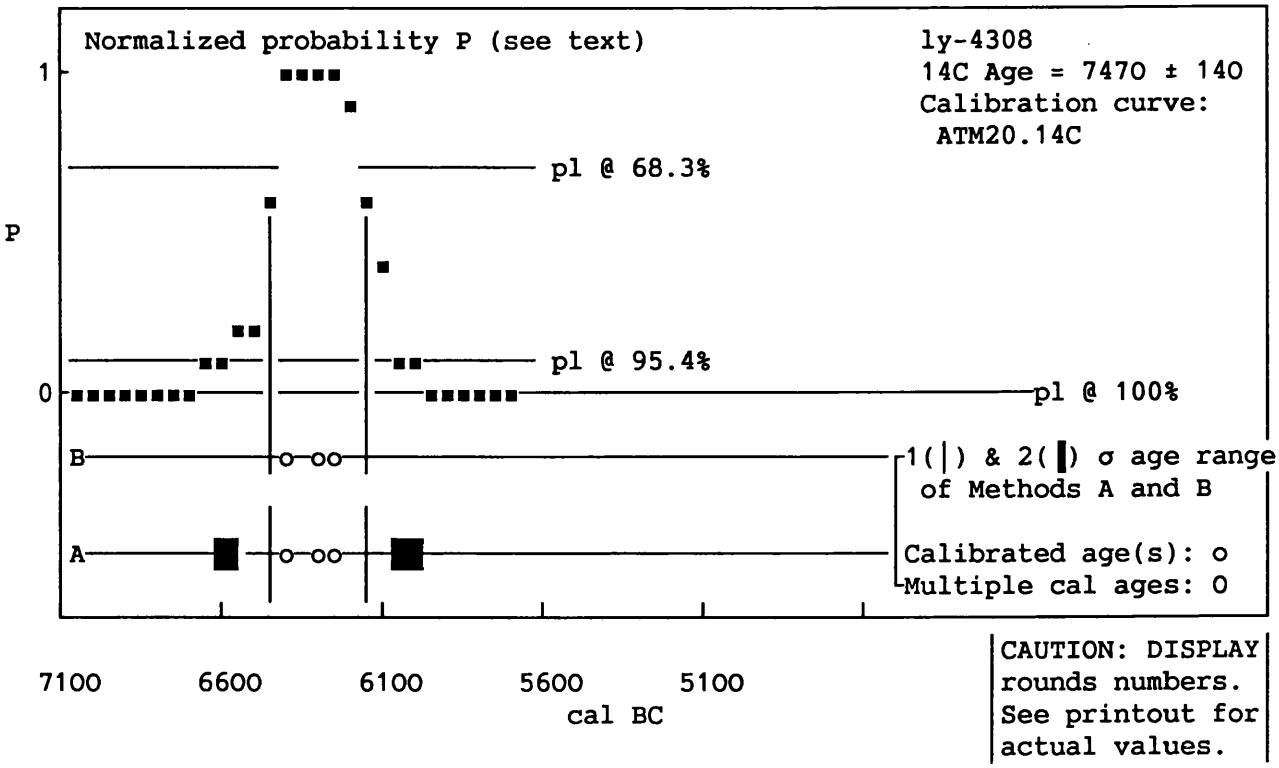
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6440-6170(8389-8119)	1.00
95.4 (two sigma)	BEYOND CALCULABLE RANGE	

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
ly-4308
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6650 6575 6500 6425 6350 6275 6200 6125 6050 5975
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
ly-4308
14C Age = 7470 ± 140
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6600 6100 5600 5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/063 khirokitia 1.00
bm-853 7451.0 81.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: khv853.txt
Plot file: khv853.plt

bm-853
Radiocarbon Age BP 7451.0 ± 81.0† Reference(s)
Calibrated age(s) cal BC 6370, 6329, 6235 (20 yr. average of
cal BP 8319, 8278, 8184 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6420-6174(8369-8123)
two Sigma** cal BC 6460-6100(8409-8049)

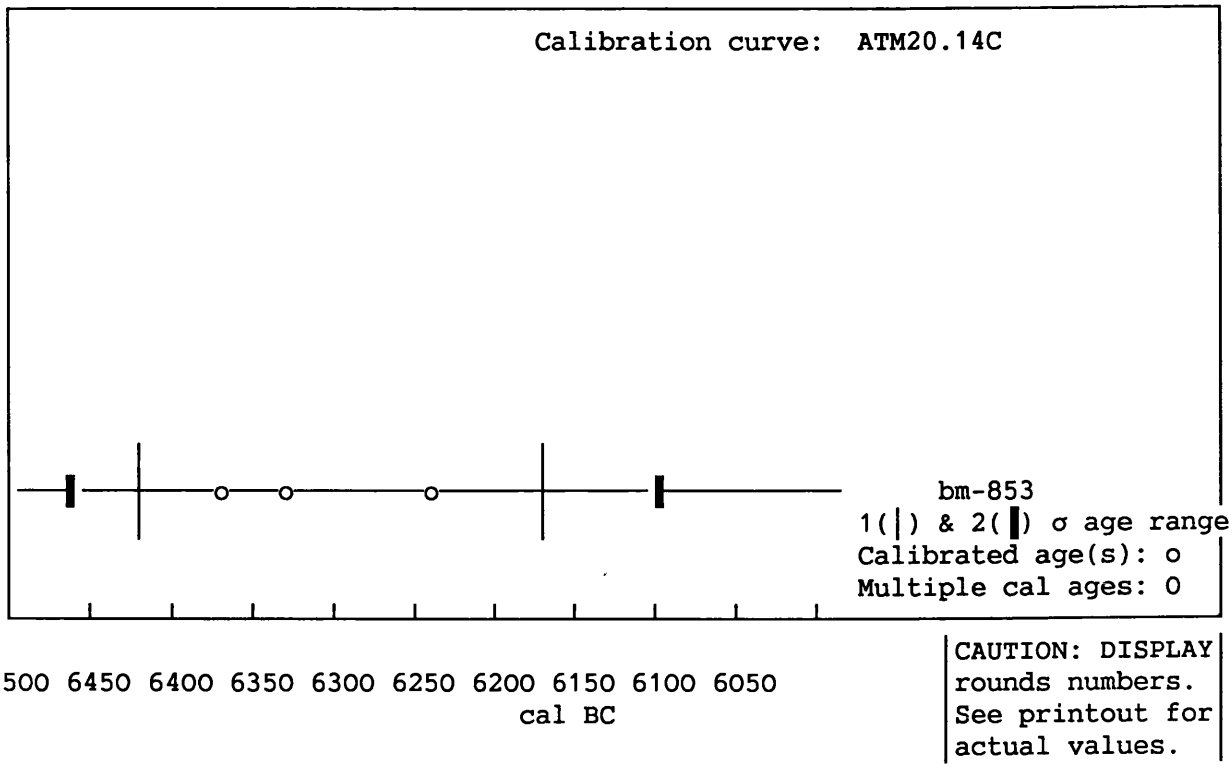
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6420 (6370, 6329, 6235) 6174
cal BP 8369 (8319, 8278, 8184) 8123
two sigma cal BC 6460 (6370, 6329, 6235) 6100
cal BP 8409 (8319, 8278, 8184) 8049

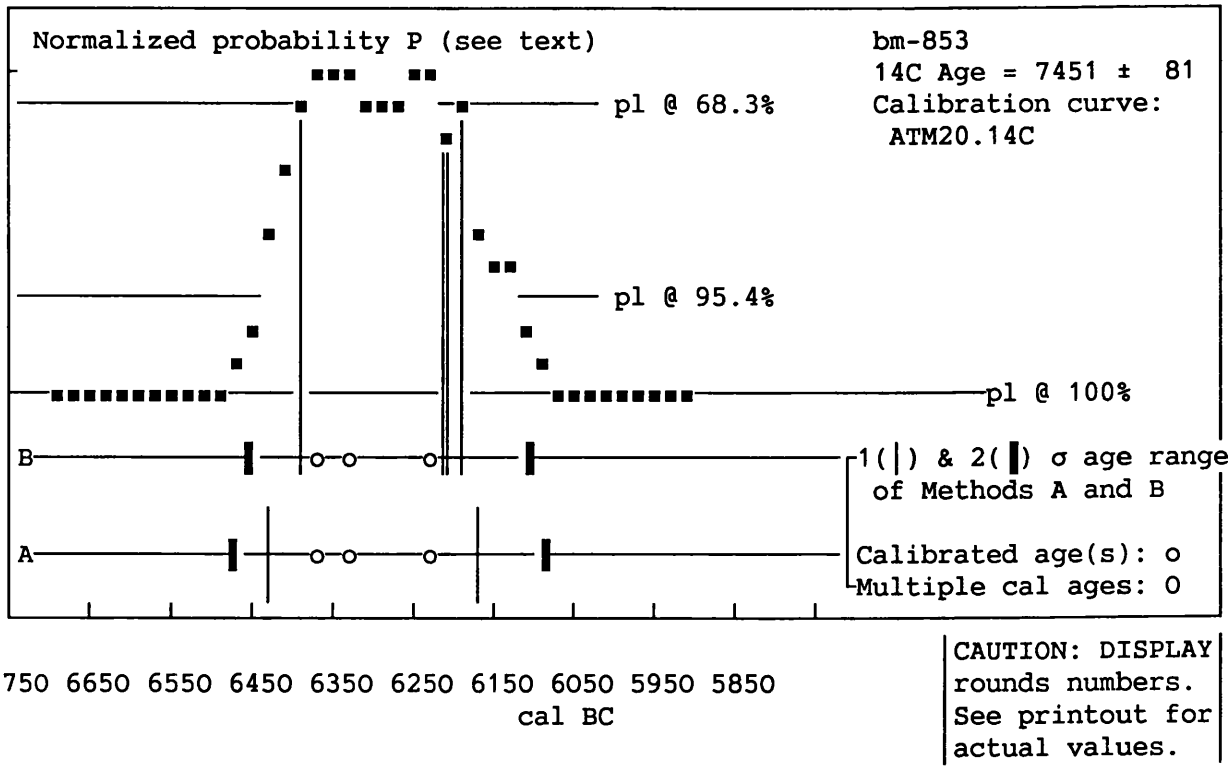
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6390-6216(8339-8165)	.90
	6203-6183(8152-8132)	.10
95.4 (two sigma)	cal BC 6442-6116(8391-8065)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-853
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6500 6450 6400 6350 6300 6250 6200 6150 6100 6050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-853
14C Age = 7451 ± 81
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6750 6650 6550 6450 6350 6250 6150 6050 5950 5850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: R/063 khirokitia  1.00
st-416              7445.0  160.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: khv416.txt
Plot file: khv416.plt

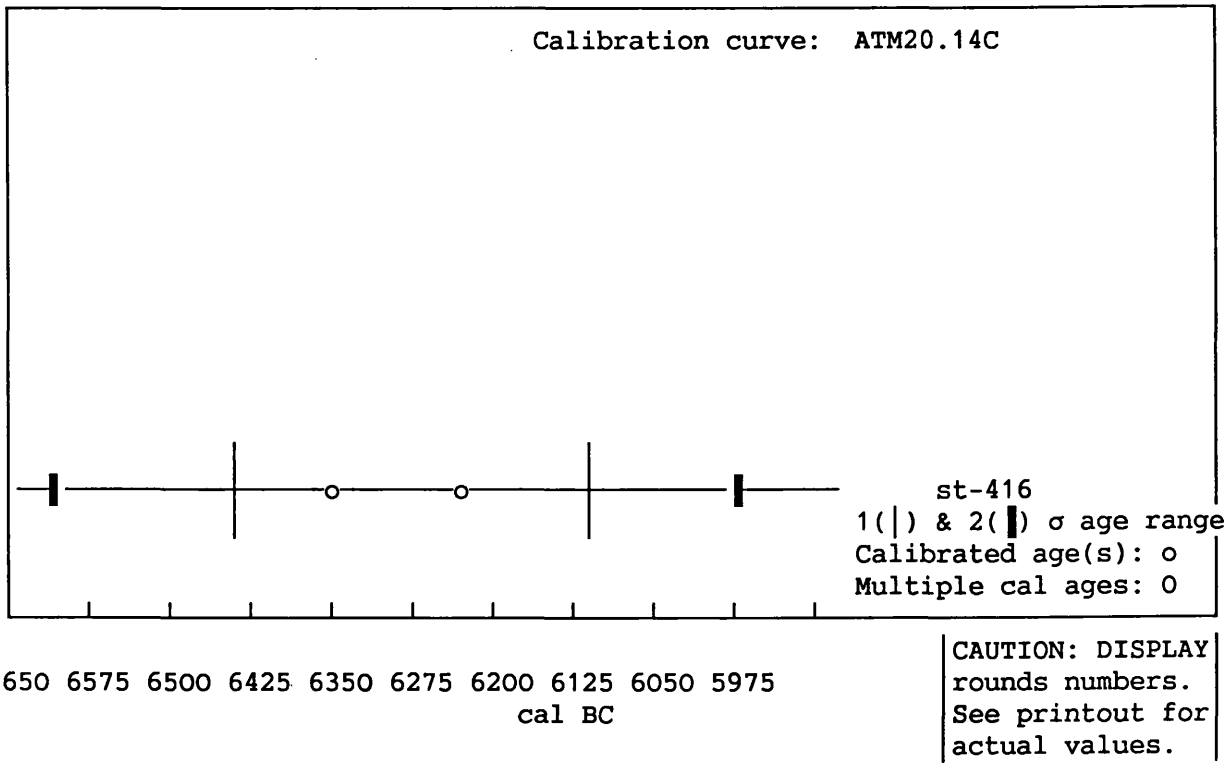

st-416
 Radiocarbon Age BP  7445.0  ±160.0†                          Reference(s)
  Calibrated age(s) cal BC  6350, 6232                    (20 yr. average of
                    cal BP  8299, 8181                     LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6440-6110(8389-8059)
   two Sigma**   cal BC 6600-5980(8549-7929)

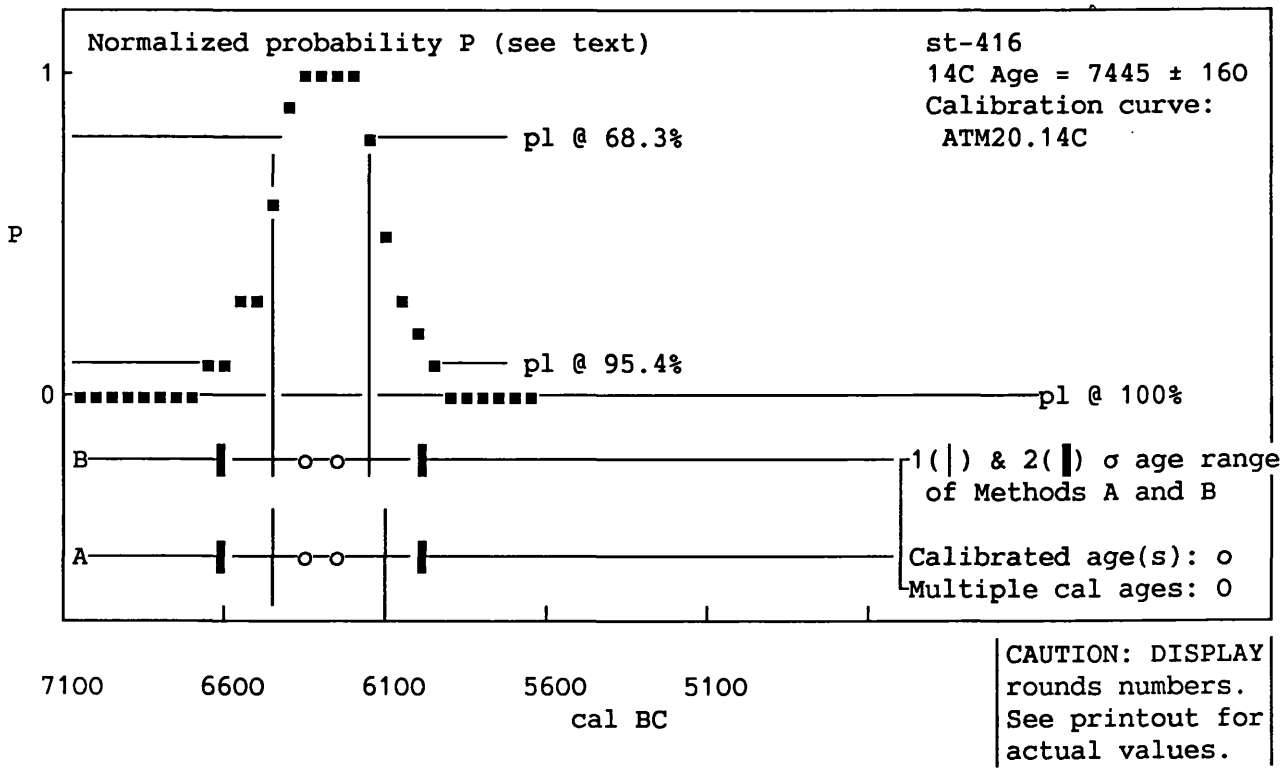
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6440 ( 6350, 6232) 6110
                  cal BP 8389 ( 8299, 8181) 8059
      two sigma   cal BC 6600 ( 6350, 6232) 5980
                  cal BP 8549 ( 8299, 8181) 7929

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 6430-6130(8379-8079)            1.00
    95.4 (two sigma)   cal BC 6600-5980(8549-7929)            1.00
```


References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
st-416
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6650 6575 6500 6425 6350 6275 6200 6125 6050 5975
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-416
14C Age = 7445 ± 160
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
7100 6600 6100 5600 5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/063 khirokitia 1.00
bm-854 7442.0 61.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: khv854.txt
Plot file: khv854.plt

bm-854
Radiocarbon Age BP 7442.0 ± 61.0† Reference(s)
Calibrated age(s) cal BC 6231 (20 yr. average of
cal BP 8180 LSB,SKBF,KRBSMSB,
and LLDF)

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6407-6176(8356-8125)
two Sigma** cal BC 6440-6110(8389-8059)

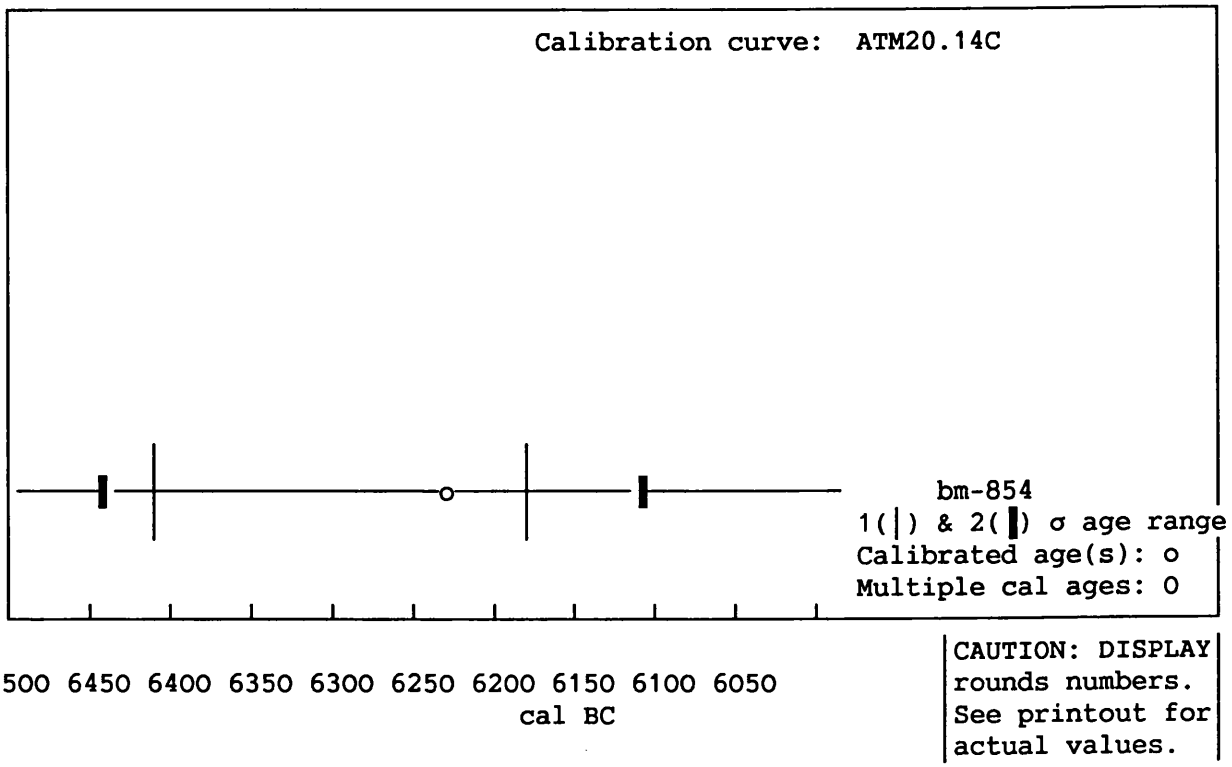
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6407 (6231) 6176
cal BP 8356 (8180) 8125
two sigma cal BC 6440 (6231) 6110
cal BP 8389 (8180) 8059

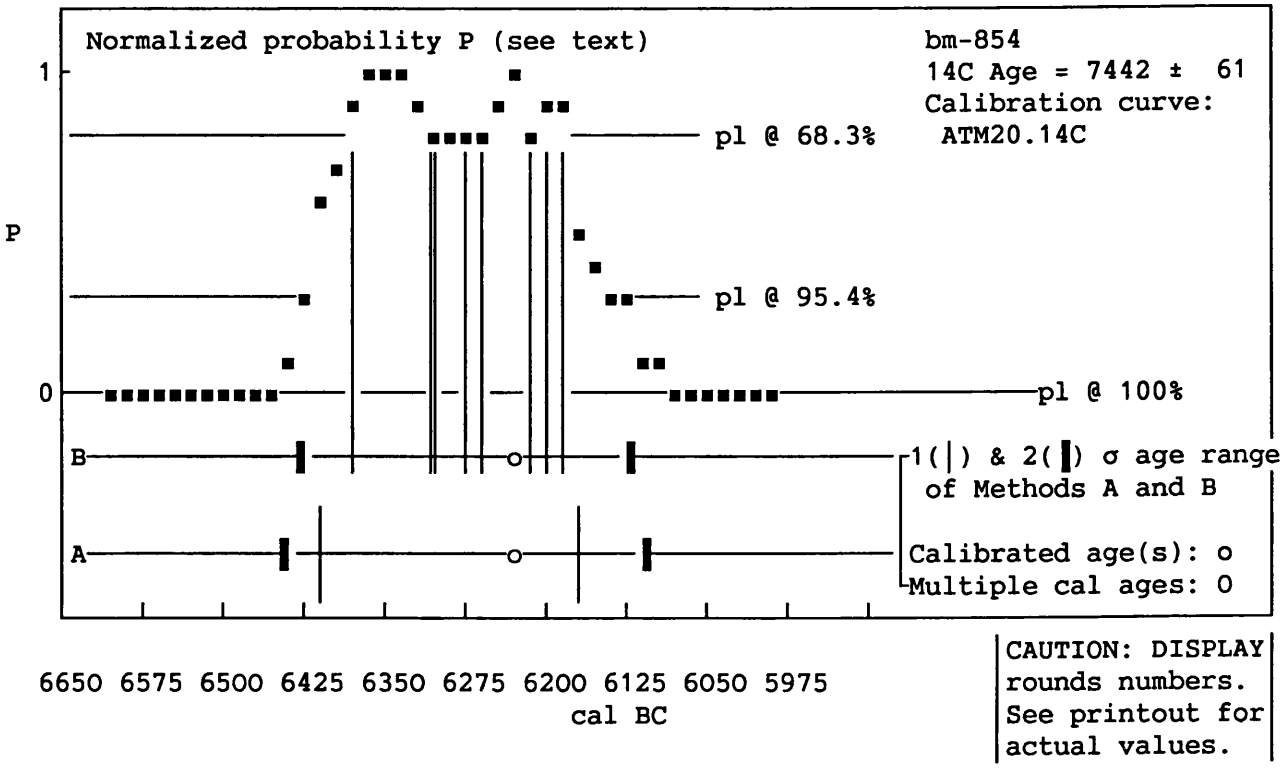
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6386-6312(8335-8261)	.43
	6304-6277(8253-8226)	.14
	6265-6214(8214-8163)	.29
	6206-6181(8155-8130)	.14
95.4 (two sigma)	cal BC 6426-6132(8375-8081)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY:
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-854
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6500 6450 6400 6350 6300 6250 6200 6150 6100 6050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-854
14C Age = 7442 ± 61
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6650 6575 6500 6425 6350 6275 6200 6125 6050 5975
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/063 khirokitia 1.00
bm-855 7308.0 74.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: khv855.txt
Plot file: khv855.plt

bm-855
Radiocarbon Age BP 7308.0 ± 74.0† Reference(s)
Calibrated age(s) cal BC 6121 (20 yr. average of
cal BP 8070 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6215-6204(8164-8153) 6182-6084(8131-8033)
two Sigma** cal BC 6382-6316(8331-8265) 6250-5990(8199-7939)

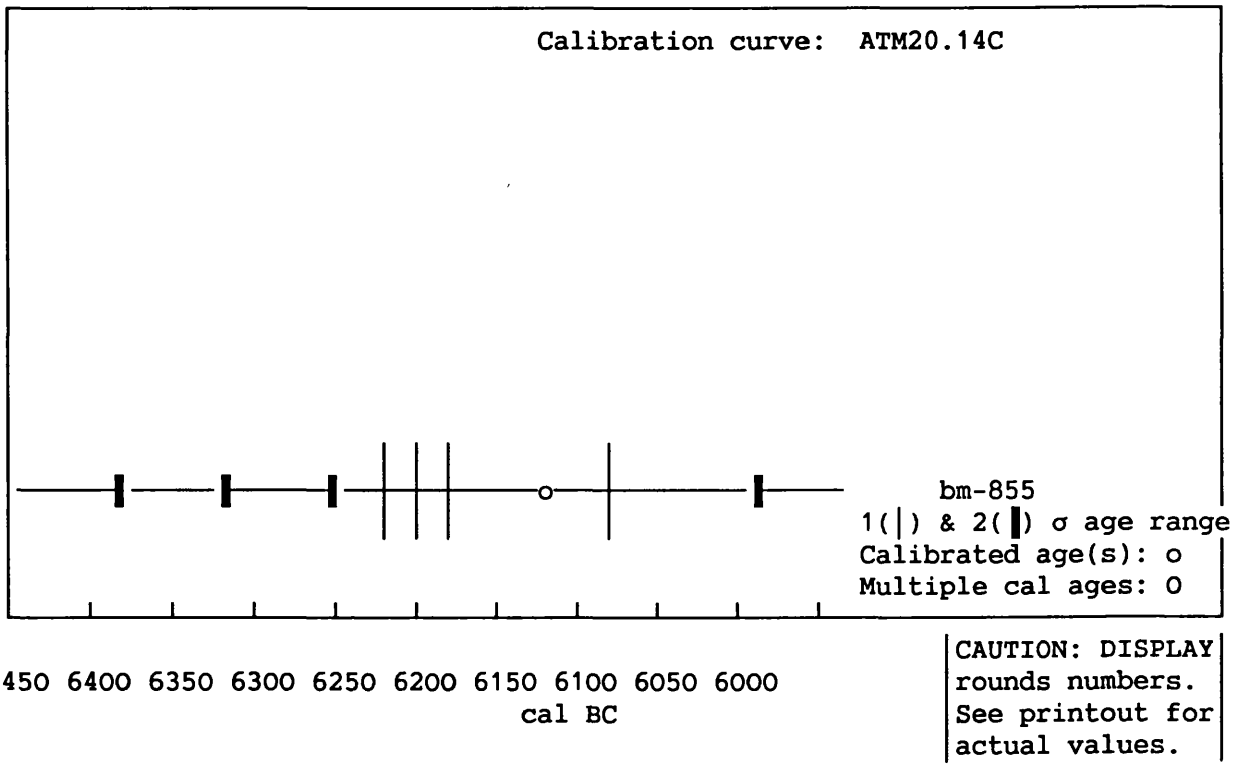
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6215 (6121) 6084
cal BP 8164 (8070) 8033
two sigma cal BC 6382 (6121) 5990
cal BP 8331 (8070) 7939

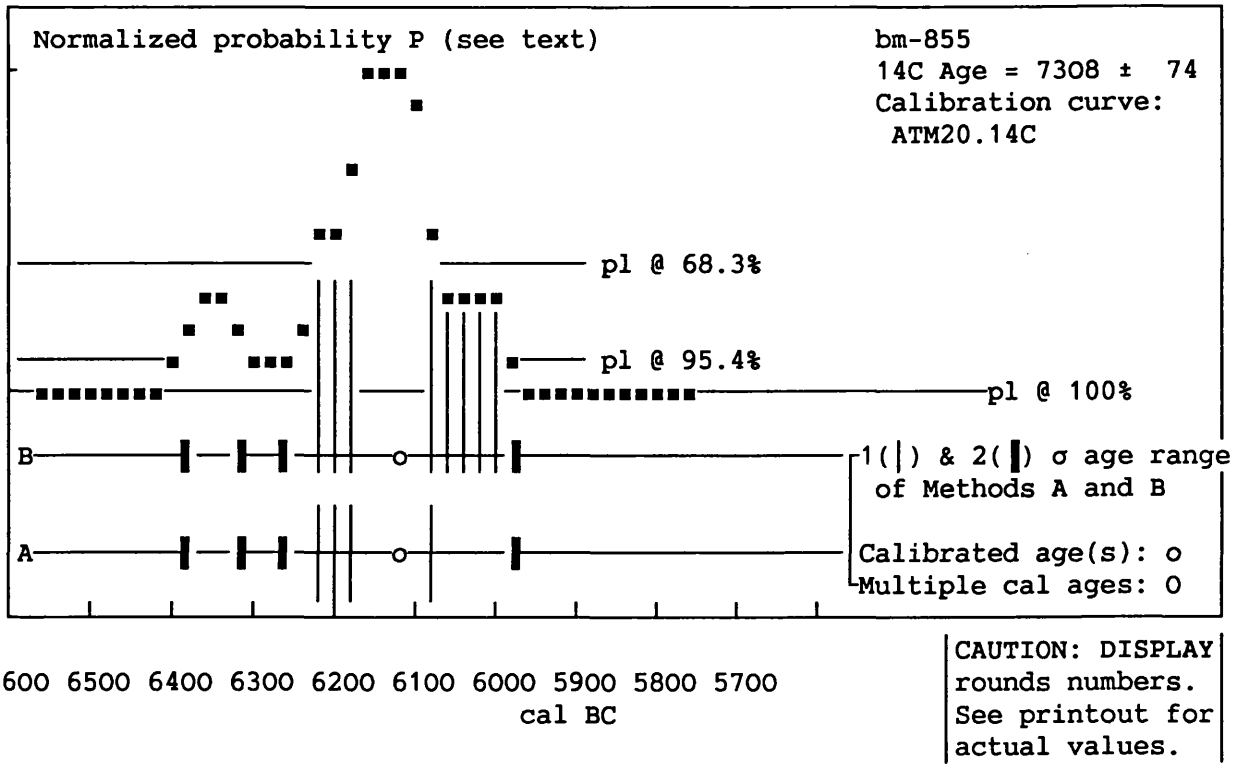
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6224-6193(8173-8142)	.14
	6188-6078(8137-8027)	.78
	6055-6046(8004-7995)	.04
	6014-6005(7963-7954)	.04
95.4 (two sigma)	cal BC 6384-6313(8333-8262)	.10
	6260-5984(8209-7933)	.89

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-855
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6450 6400 6350 6300 6250 6200 6150 6100 6050 6000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-855
14C Age = 7308 ± 74
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6600 6500 6400 6300 6200 6100 6000 5900 5800 5700
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: R/063 khirokitia  1.00
bm-852              7294.0   78.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: khv852.txt
Plot file: khv852.plt

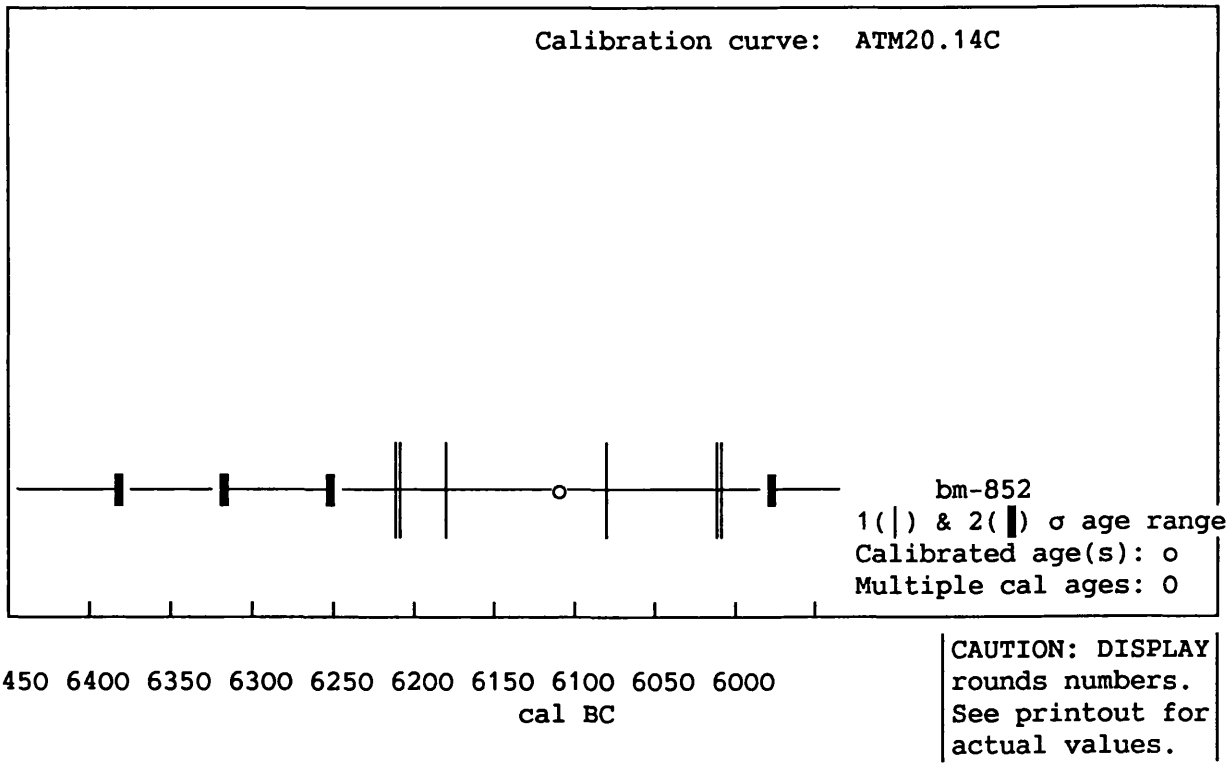

bm-852
 Radiocarbon Age BP  7294.0  ± 78.0†                          Reference(s)
  Calibrated age(s) cal BC  6114                           (20 yr. average of
                    cal BP  8063                            LSB,SKBF,KRBSMSB,
                                                            and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 6211-6208(8160-8157) 6180-6081(8129-8030)
                 6011-6009(7960-7958)
   two Sigma**   cal BC 6379-6319(8328-8268) 6250-5980(8199-7929)

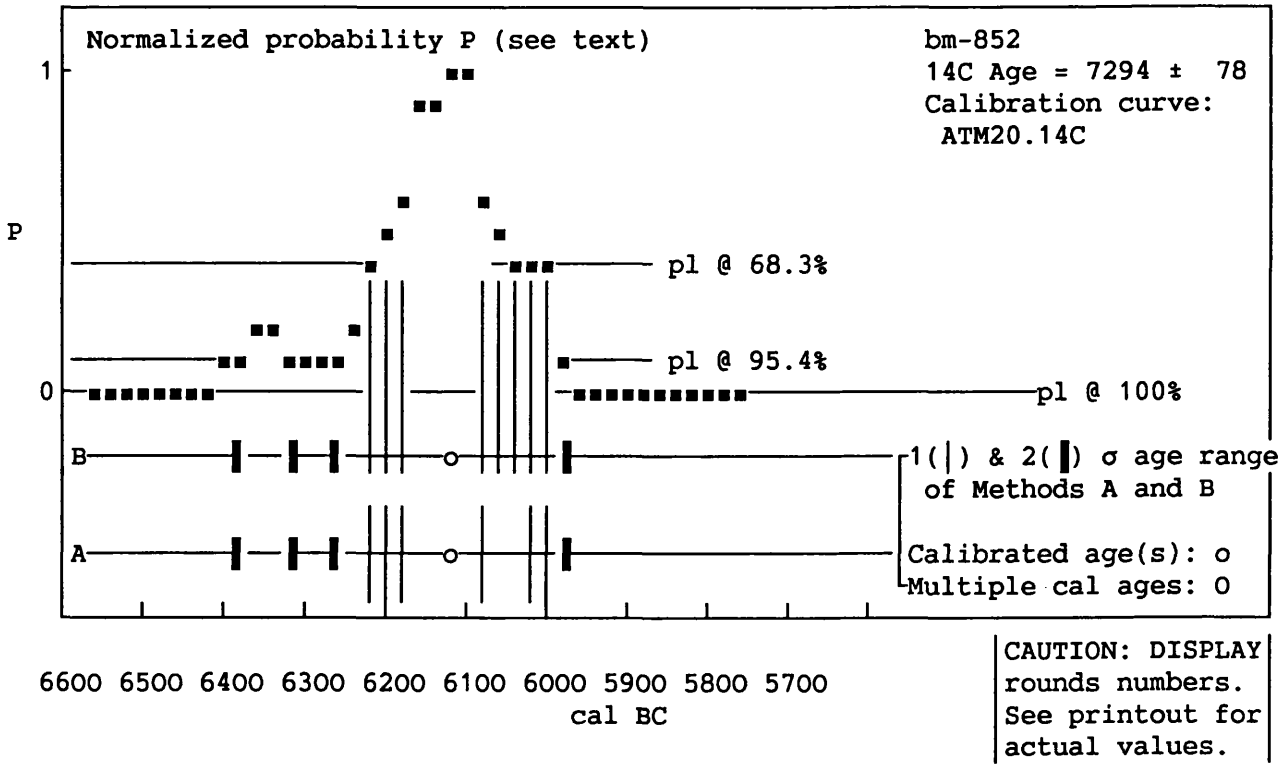
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 6211 ( 6114) 6009
                  cal BP 8160 ( 8063) 7958
      two sigma   cal BC 6379 ( 6114) 5980
                  cal BP 8328 ( 8063) 7929

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 6219-6199(8168-8148)              .09
                               6185-6076(8134-8025)              .76
                               6059-6043(8008-7992)              .07
                               6018-6001(7967-7950)              .08
    95.4 (two sigma)   cal BC 6384-6314(8333-8263)              .08
                               6259-5975(8208-7924)              .91

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
bm-852
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
6450 6400 6350 6300 6250 6200 6150 6100 6050 6000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-852
14C Age = 7294 ± 78
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
6600 6500 6400 6300 6200 6100 6000 5900 5800 5700
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/063 khirokitia 1.00
ly-3716 7000.0 150.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: khv3716.txt
Plot file: khv3716.plt

ly-3716
Radiocarbon Age BP 7000.0 ±150.0† Reference(s)
Calibrated age(s) cal BC 5840 (20 yr. average of
cal BP 7789 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 6071-6068(8020-8017) 6036-6025(7985-7974)
5990-5720(7939-7669) 5673-5668(7622-7617)
two Sigma** cal BC 6120-5610(8069-7559) 5604-5572(7553-7521)

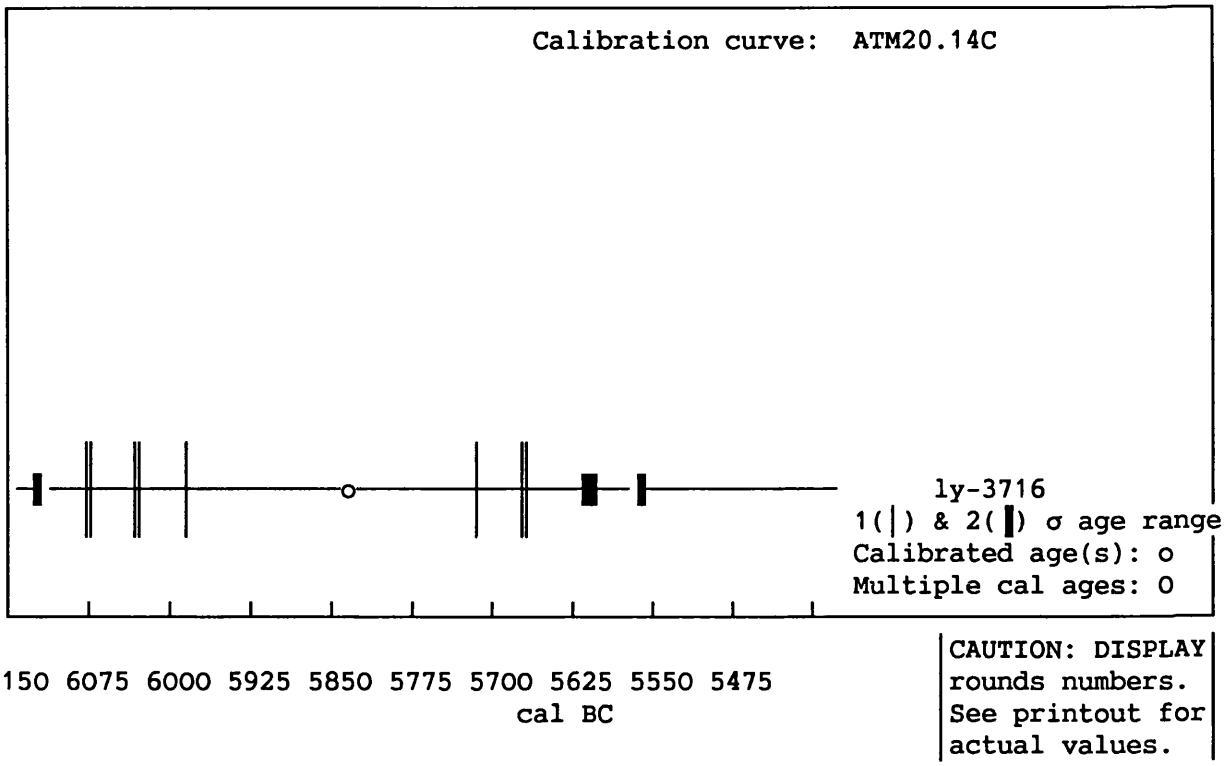
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 6071 (5840) 5668
cal BP 8020 (7789) 7617
two sigma cal BC 6120 (5840) 5572
cal BP 8069 (7789) 7521

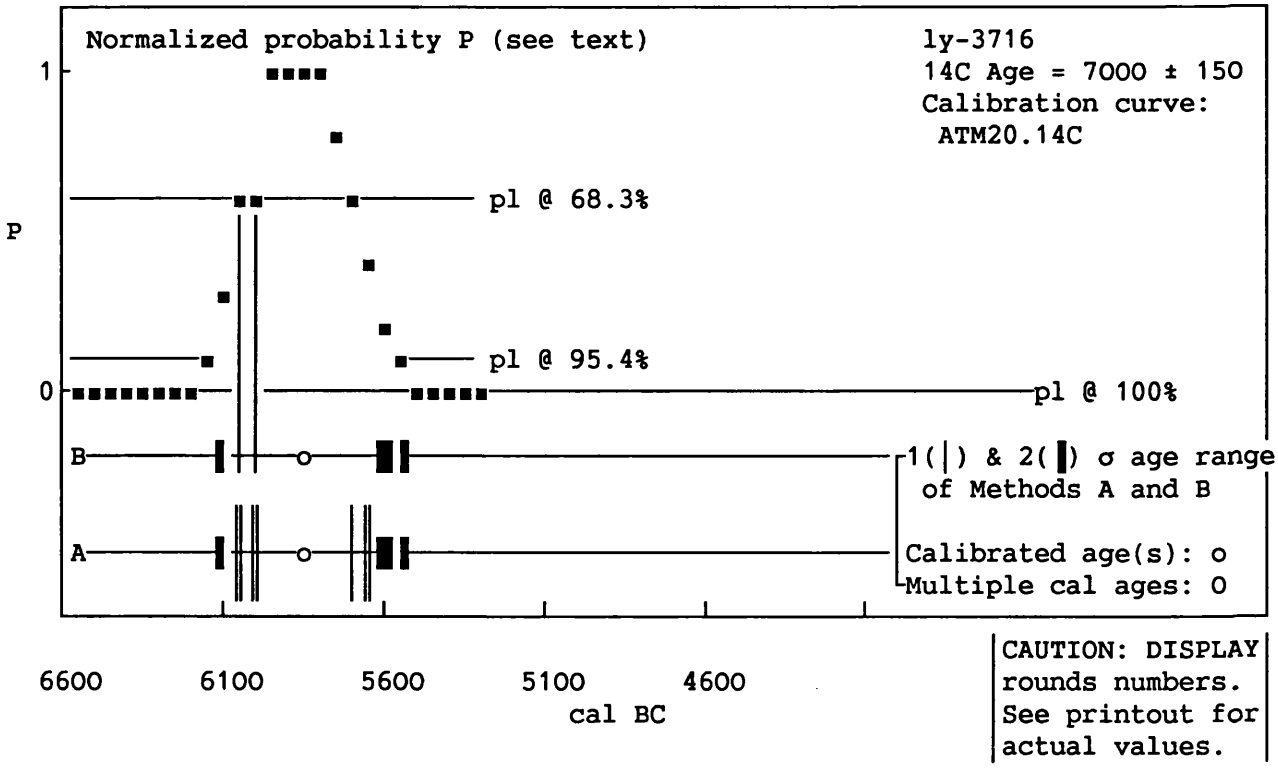
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 6035-6025(7984-7974)	.03
95.4 (two sigma)	cal BC 6120-5610(8069-7559)	.99
	5603-5573(7552-7522)	.01

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
ly-3716
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
6150 6075 6000 5925 5850 5775 5700 5625 5550 5475
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
ly-3716
14C Age = 7000 ± 150
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
6600 6100 5600 5100 4600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: R/063 khirokitia  1.00
ly-4306              6310.0   170.0      .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: khv4306.txt
Plot file: khv4306.plt

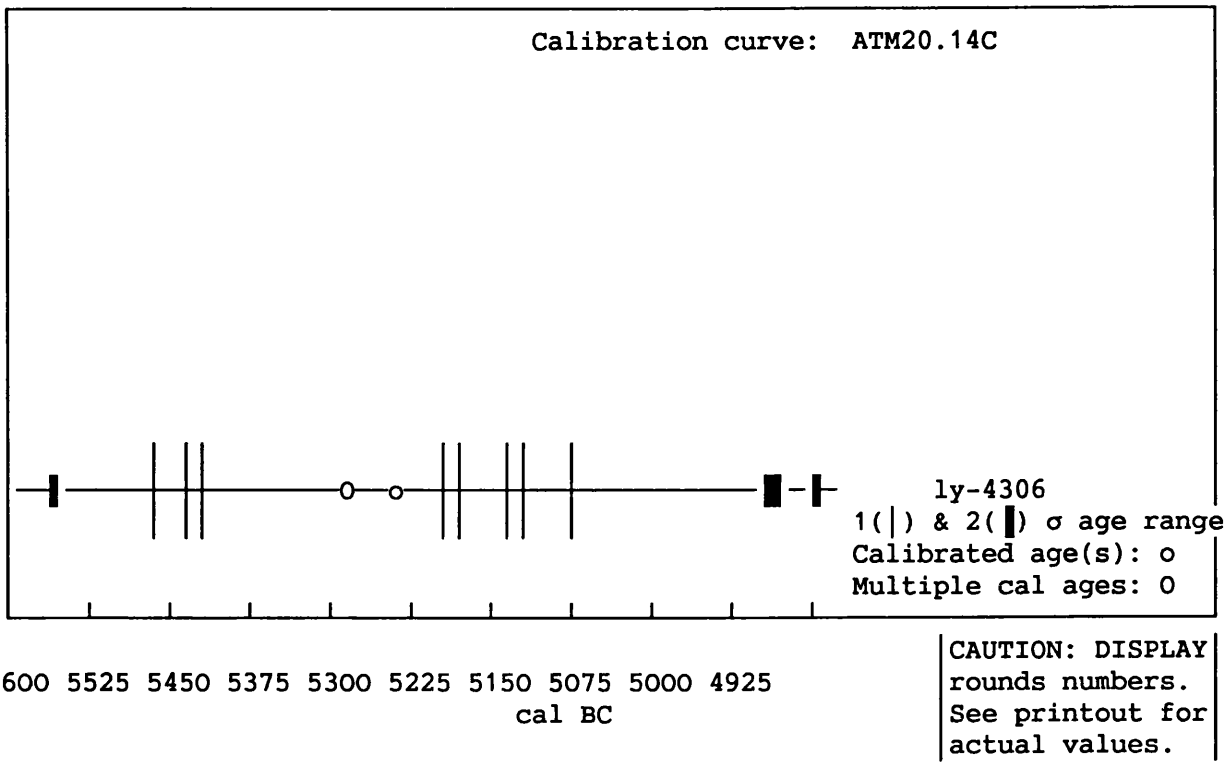

ly-4306
 Radiocarbon Age BP  6310.0  ±170.0†                          Reference(s)
  Calibrated age(s) cal BC  5292, 5286, 5241              (20 yr. average of
                    cal BP  7241, 7235, 7190               LSB,SKBF,KRBSMSB,
                                                           and LLDF)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 5471-5441(7420-7390) 5420-5200(7369-7149)
                 5178-5133(7127-7082) 5121-5069(7070-7018)
   two Sigma**   cal BC 5550-4900(7499-6849) 4880-4848(6829-6797)

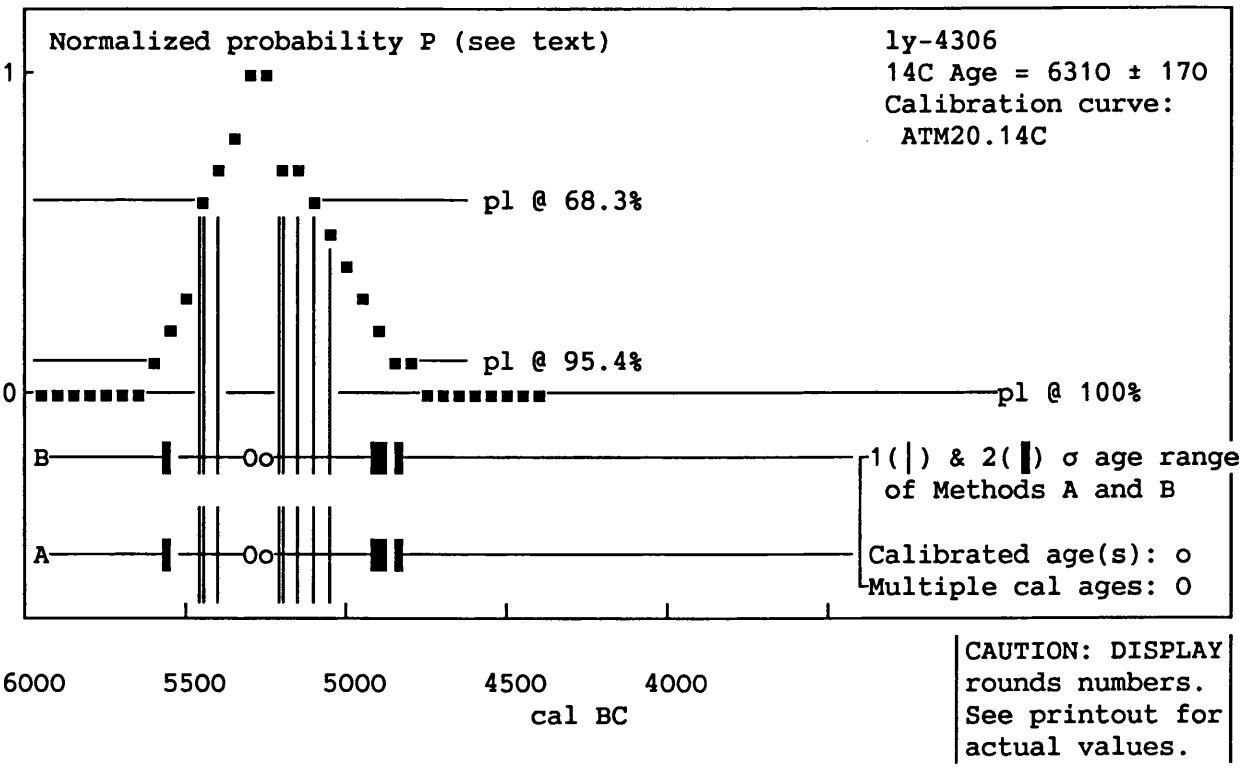
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 5471 ( 5292, 5286, 5241) 5069
                  cal BP 7420 ( 7241, 7235, 7190) 7018
      two sigma   cal BC 5550 ( 5292, 5286, 5241) 4848
                  cal BP 7499 ( 7241, 7235, 7190) 6797

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 5472-5439(7421-7388)              .08
                               5420-5200(7369-7149)              .69
                               5178-5133(7127-7082)              .11
                               5122-5069(7071-7018)              .12
    95.4 (two sigma)   cal BC 5560-4900(7509-6849)              .99
                               4878-4851(6827-6800)              .01

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF)  1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM20.14C
ly-4306
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
5600 5525 5450 5375 5300 5225 5150 5075 5000 4925
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
ly-4306
14C Age = 6310 ± 170
Calibration curve:
ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
6000 5500 5000 4500 4000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/063 khirokitia 1.00
ly-4309 6230.0 160.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: khv4309.txt
Plot file: khv4309.plt

ly-4309
Radiocarbon Age BP 6230.0 ±160.0†
Reference(s)
Calibrated age(s) cal BC 5230
cal BP 7179
(20 yr. average of LSB,SKBF,KRBSMSB, and LLDF)

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 5340-4990(7289-6939) 4972-4946(6921-6895)
two Sigma** cal BC 5480-4790(7429-6739)

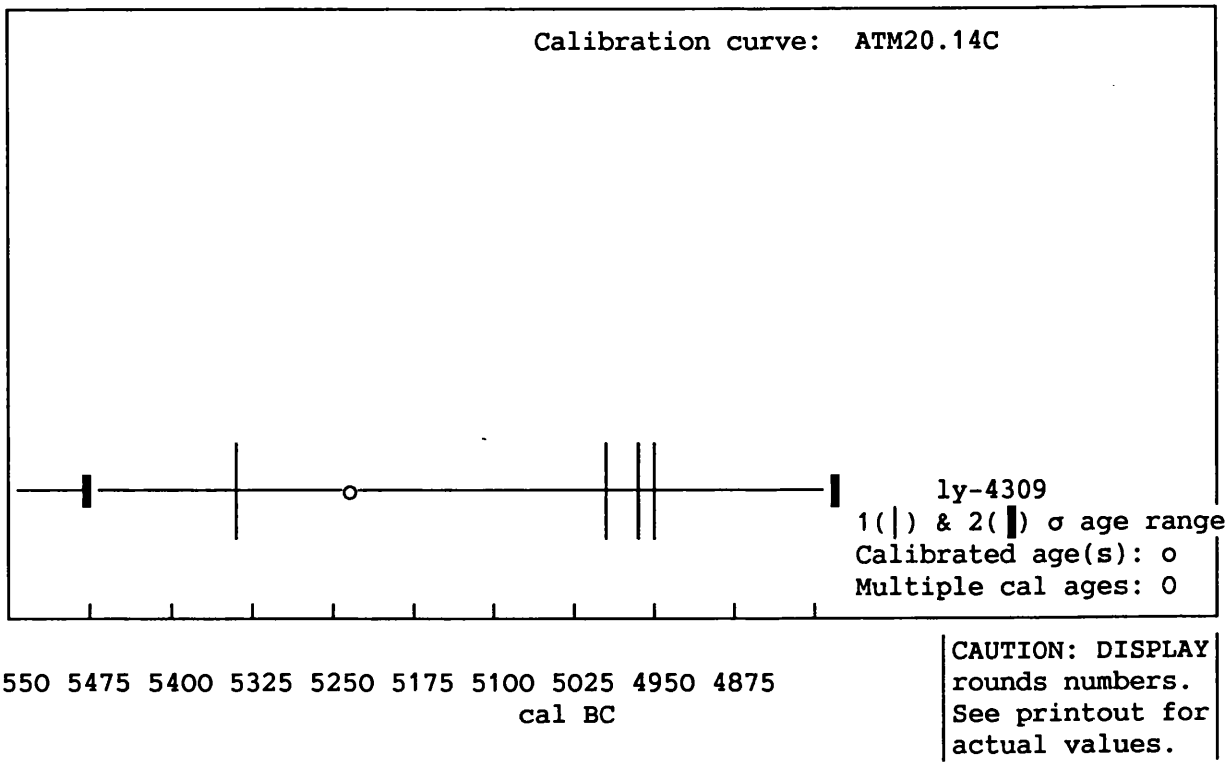
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 5340 (5230) 4946
cal BP 7289 (7179) 6895
two sigma cal BC 5480 (5230) 4790
cal BP 7429 (7179) 6739

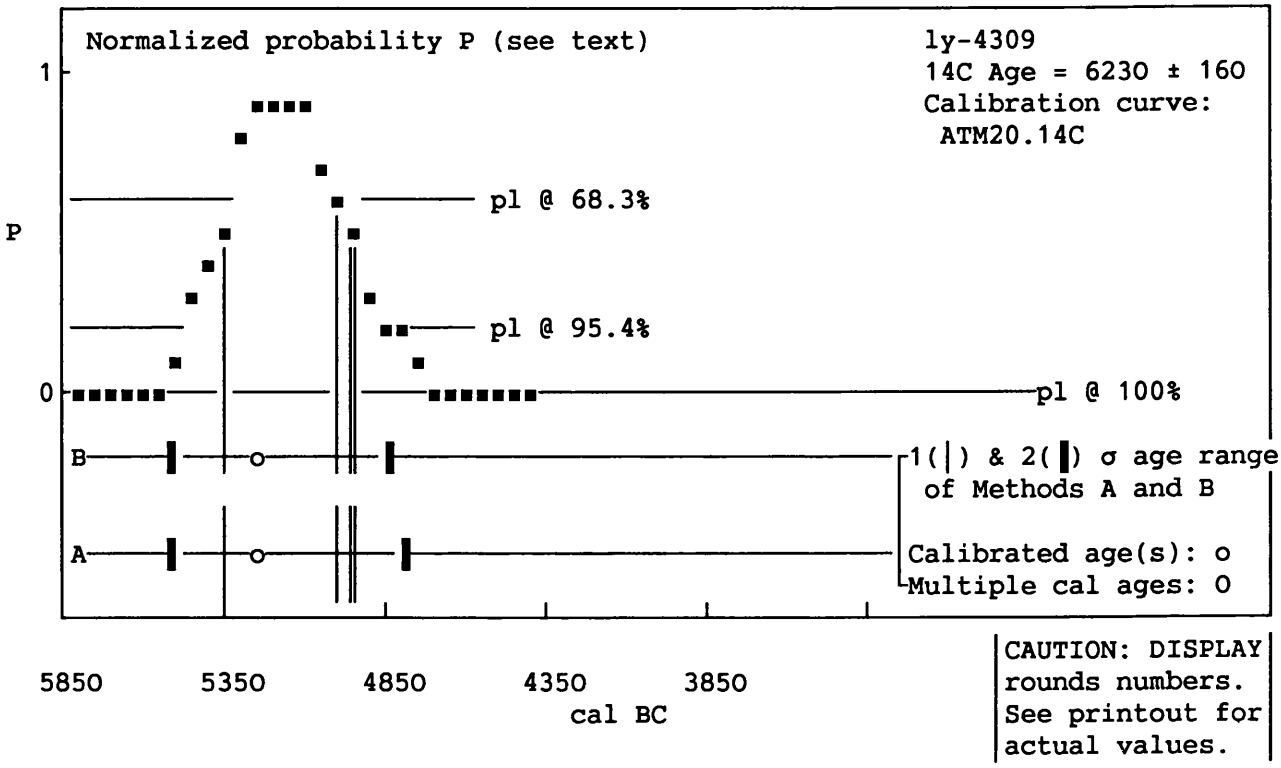
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 5330-5000(7279-6949)	.97
	4962-4948(6911-6897)	.03
95.4 (two sigma)	cal BC 5480-4840(7429-6789)	.99

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
ly-4309
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
5550 5475 5400 5325 5250 5175 5100 5025 4950 4875
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
ly-4309
14C Age = 6230 ± 160
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5850 5350 4850 4350 3850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/382 vasilikos 1.00
ox-a-805 6330.0 100.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kvs805.txt
Plot file: kvs805.plt

ox-a-805
Radiocarbon Age BP 6330.0 ±100.0† Reference(s)
Calibrated age(s) cal BC 5308, 5267, 5244 (20 yr. average of
cal BP 7257, 7216, 7193 LSB,SKBF,KRBSMSB,
and LLDF)
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 5370-5230(7319-7179)
two Sigma** cal BC 5480-5060(7429-7009)

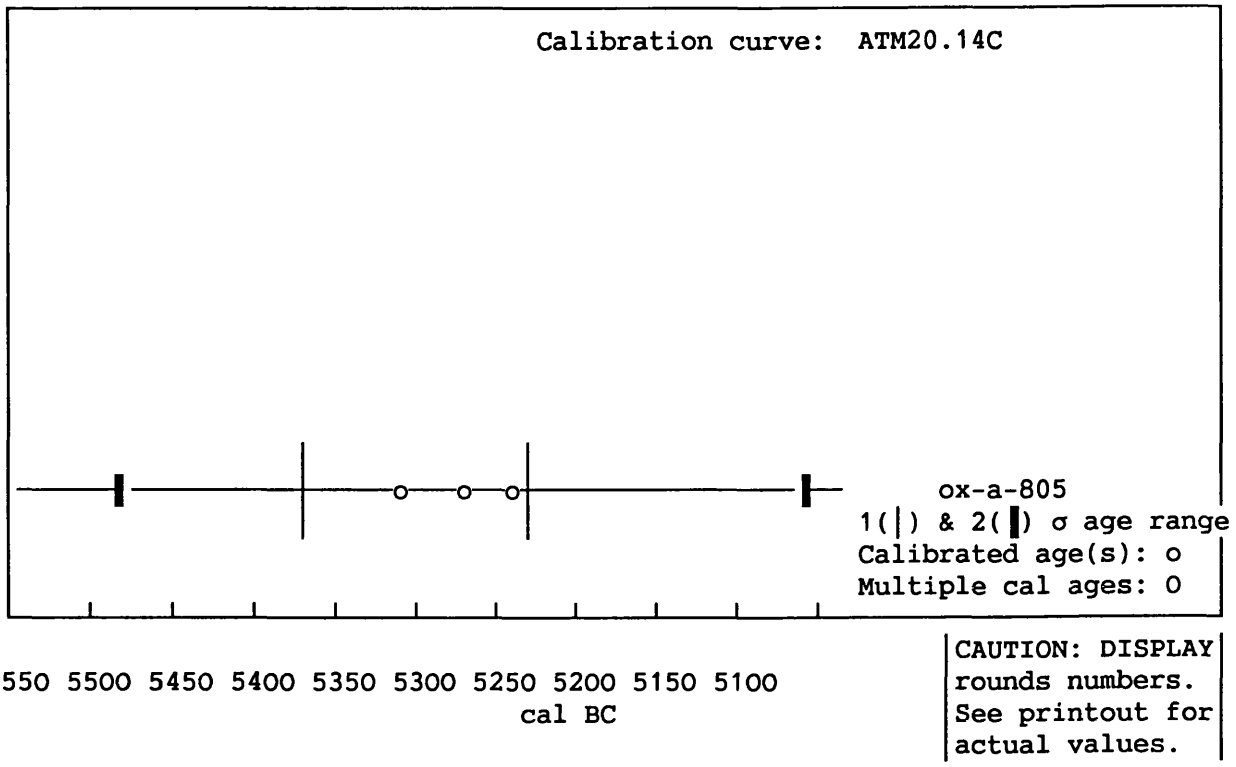
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 5370 (5308, 5267, 5244) 5230
cal BP 7319 (7257, 7216, 7193) 7179
two sigma cal BC 5480 (5308, 5267, 5244) 5060
cal BP 7429 (7257, 7216, 7193) 7009

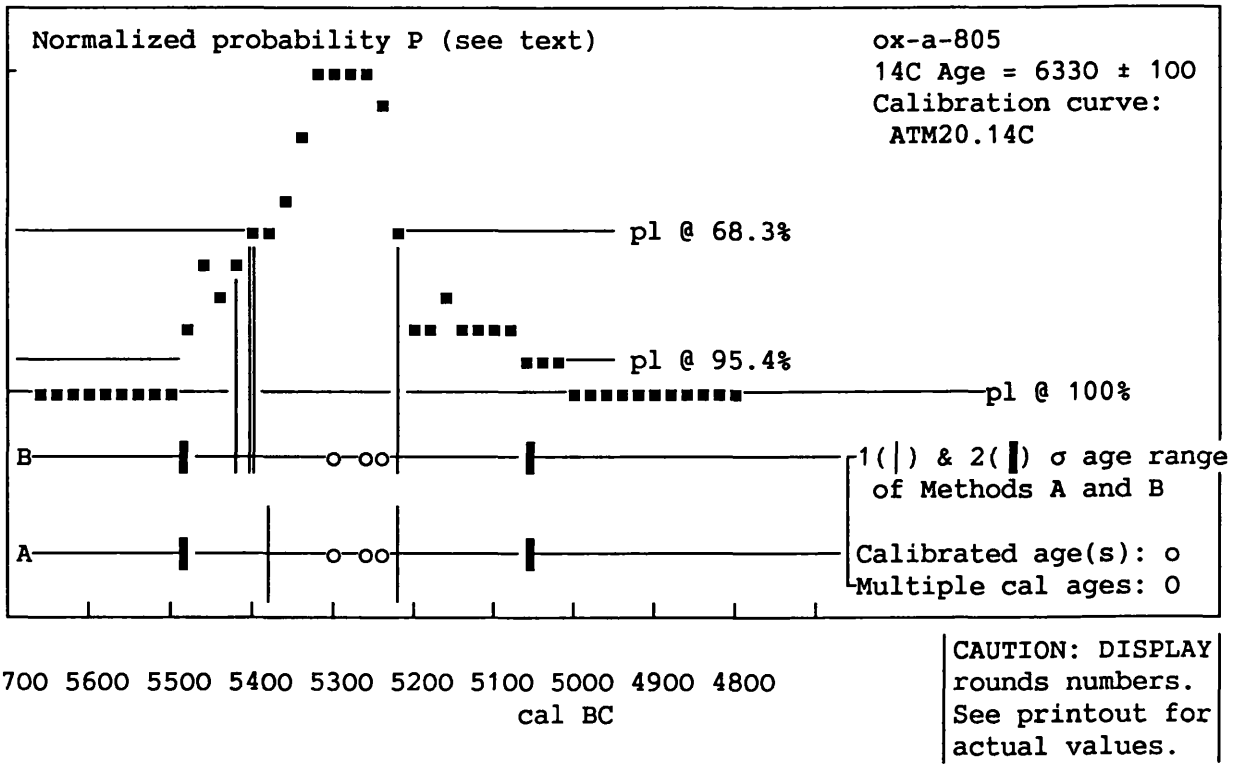
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 5411-5392(7360-7341)	.07
	5390-5220(7339-7169)	.93
95.4 (two sigma)	cal BC 5480-5060(7429-7009)	1.00

References for datasets [and intervals] used:
Bidecadal weighted average of data from:
Linick, TW, Suess, HE and Becker, B, (LSB) 1985,
Radiocarbon, 27, 20-32. [for the interval 5219-7199 BC]
Stuiver, M, Kromer, B, Becker, B, and Ferguson, CW, (SKBF)
1986, Radiocarbon, 28, 969-979.
Kromer, B, Rhein, M, Bruns, M, Schoch-Fischer, H, Munnich, KO,
Stuiver, M, and Becker, B, (KRBSMSB) 1986, Radiocarbon, 28,
954-960. [for the interval 5229 -7207 BC]
Linick, TW, Long, A, Damon, PE and Ferguson, CW, (LLDF) 1986,
Radiocarbon, 28, 943-953.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
ox-a-805
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
5550 5500 5450 5400 5350 5300 5250 5200 5150 5100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
ox-a-805
14C Age = 6330 ± 100
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5700 5600 5500 5400 5300 5200 5100 5000 4900 4800
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
birm-182            5825.0  145.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev182.txt
Plot file: aev182.plt

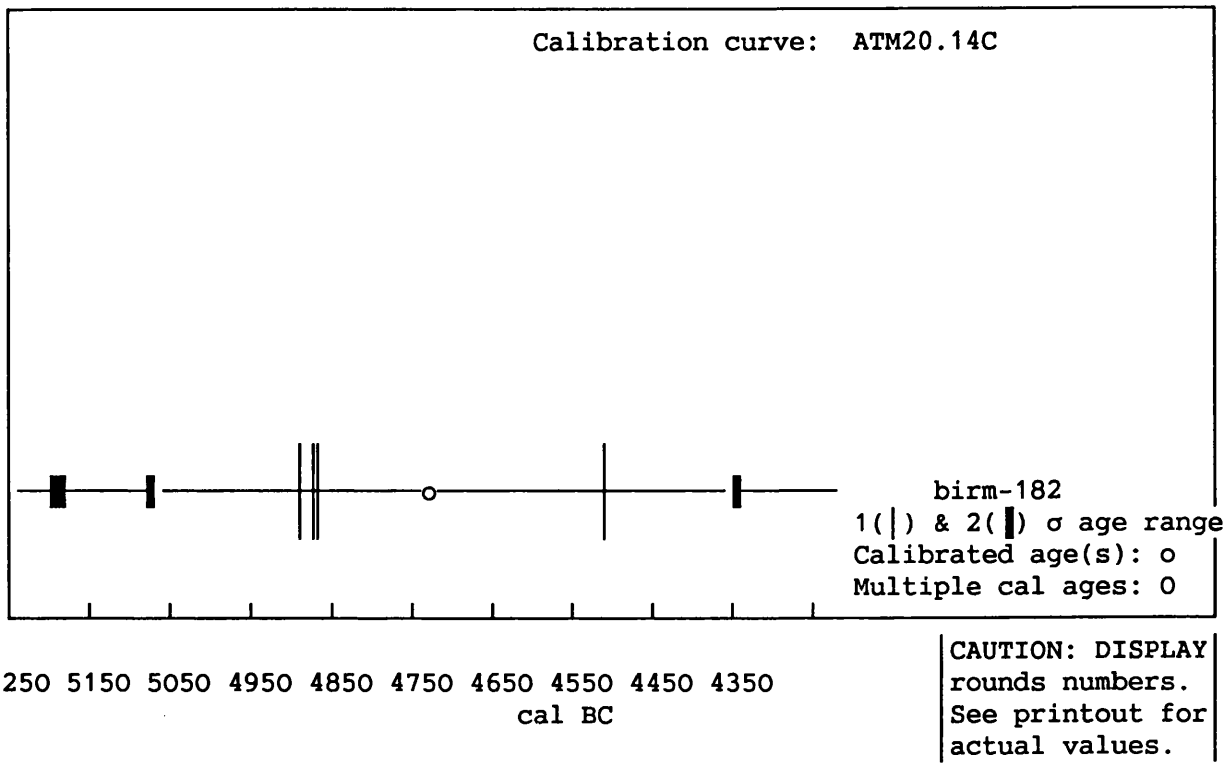

birm-182
 Radiocarbon Age BP  5825.0  ±145.0†                          Reference(s)
  Calibrated age(s) cal BC  4724                          (Pearson et al. 1986)
                    cal BP  6673
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4898-4875(6847-6824) 4860-4520(6809-6469)
   two Sigma**   cal BC 5192-5186(7141-7135) 5060-4360(7009-6309)

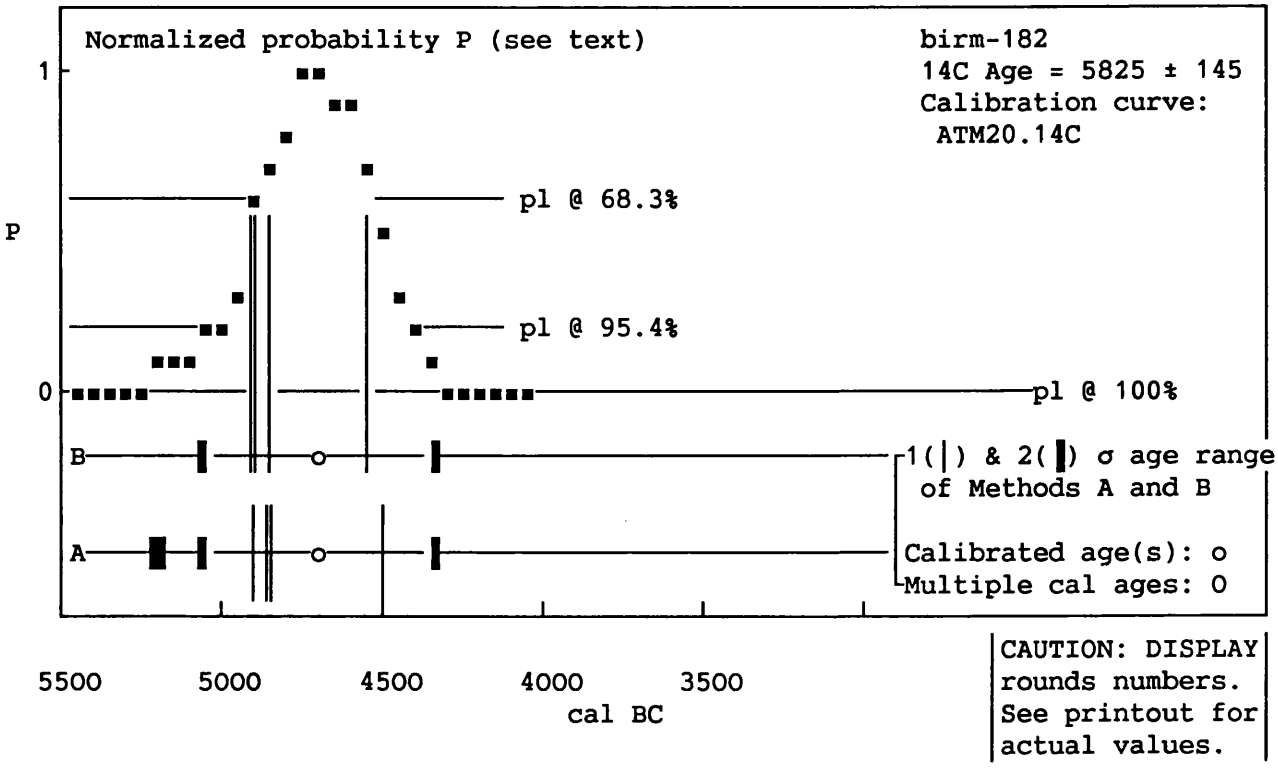
   Summary of above --
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4898 ( 4724) 4520
                  cal BP 6847 ( 6673) 6469
      two sigma   cal BC 5192 ( 4724) 4360
                  cal BP 7141 ( 6673) 6309

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4896-4878(6845-6827)              .05
                               4850-4530(6799-6479)              .95
    95.4 (two sigma)   cal BC 5060-4360(7009-6309)             1.00
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
birm-182
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
5250 5150 5050 4950 4850 4750 4650 4550 4450 4350
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
birm-182
14C Age = 5825 ± 145
Calibration curve: ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5500 5000 4500 4000 3500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
birm-337             5740.0  140.0       .0      .0  100.0      .0
xx
Calibration file(s): ATM20.14C
Listing file: aev337.txt
Plot file: aev337.plt

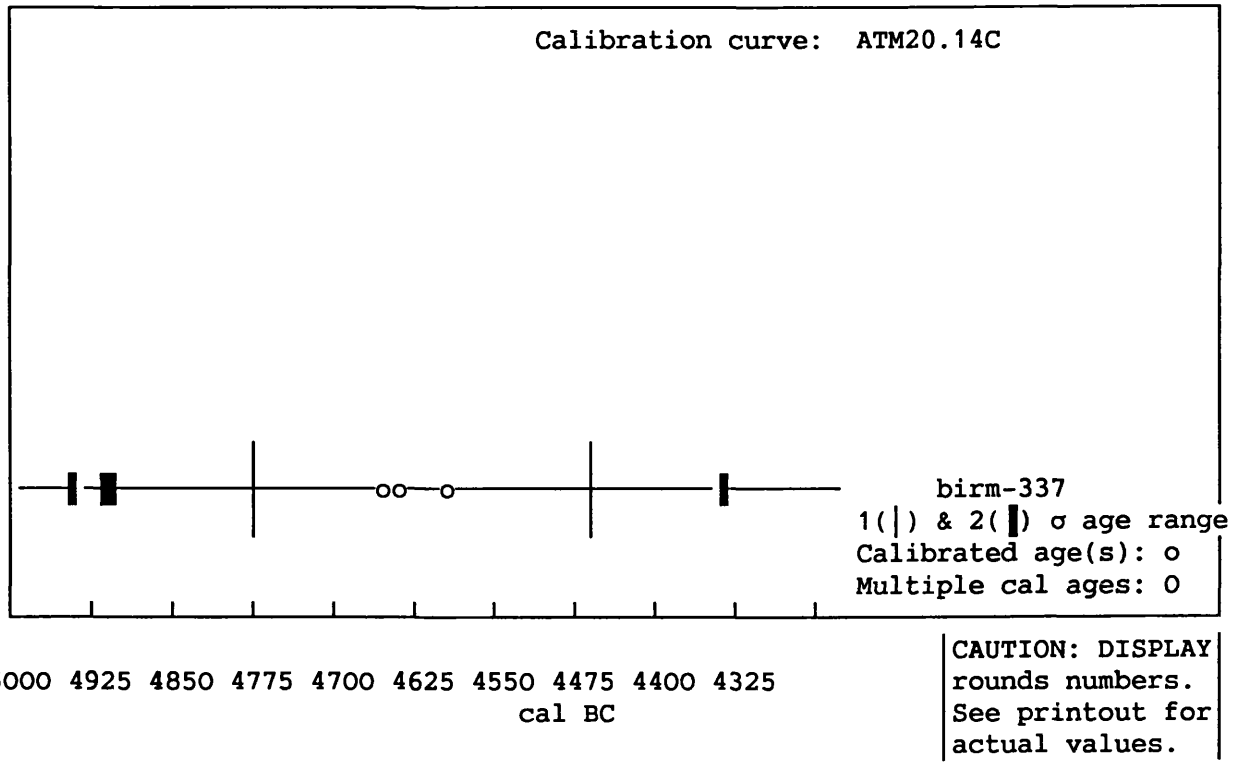

birm-337
 Radiocarbon Age BP  5740.0  ±140.0†                          Reference(s)
  Calibrated age(s) cal BC  4660, 4641, 4590            (Pearson et al. 1986)
                    cal BP  6609, 6590, 6539
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4780-4460(6729-6409)
   two Sigma**   cal BC 4938-4915(6887-6864) 4910-4340(6859-6289)

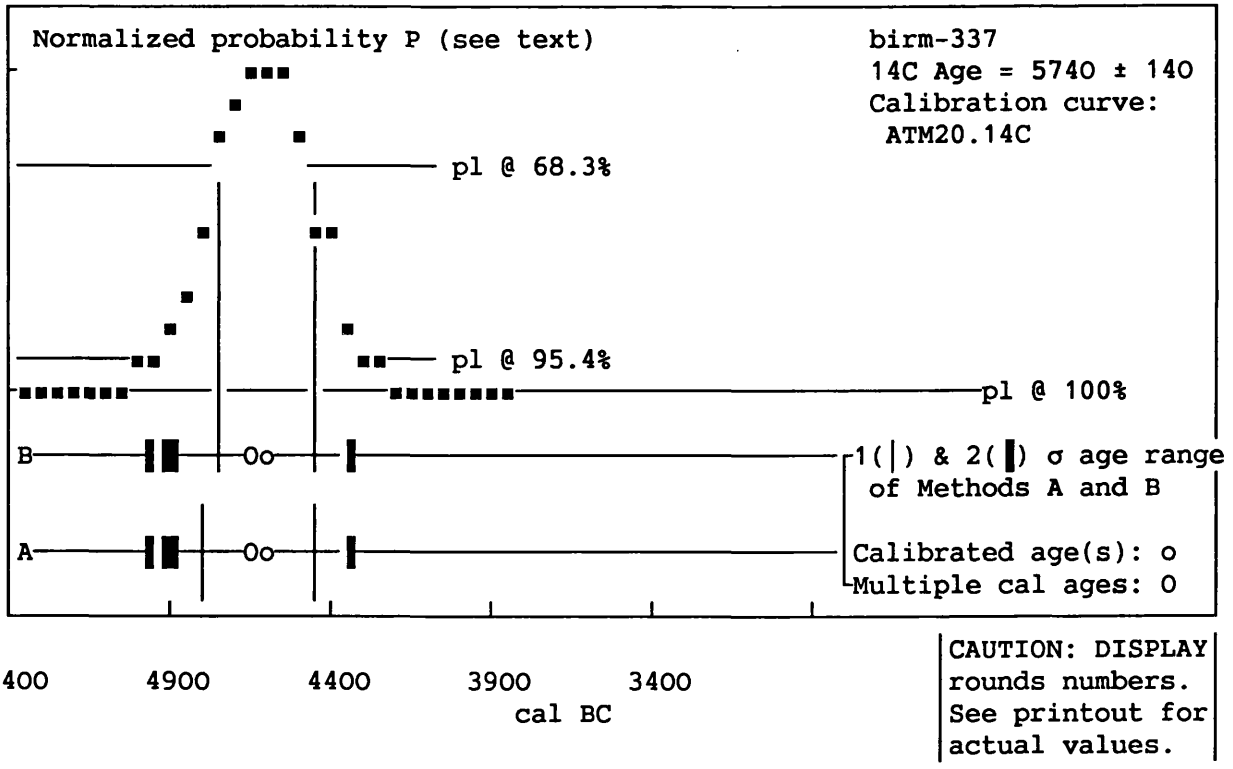
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4780 ( 4660, 4641, 4590) 4460
                  cal BP 6729 ( 6609, 6590, 6539) 6409
      two sigma   cal BC 4938 ( 4660, 4641, 4590) 4340
                  cal BP 6887 ( 6609, 6590, 6539) 6289

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4770-4470(6719-6419)            1.00
    95.4 (two sigma)   cal BC 4939-4912(6888-6861)             .01
                              4910-4340(6859-6289)             .99
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
birm-337
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
5000 4925 4850 4775 4700 4625 4550 4475 4400 4325
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
birm-337
14C Age = 5740 ± 140
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
5400 4900 4400 3900 3400
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
gu-522              5420.0   80.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev522.txt
Plot file: aev522.plt

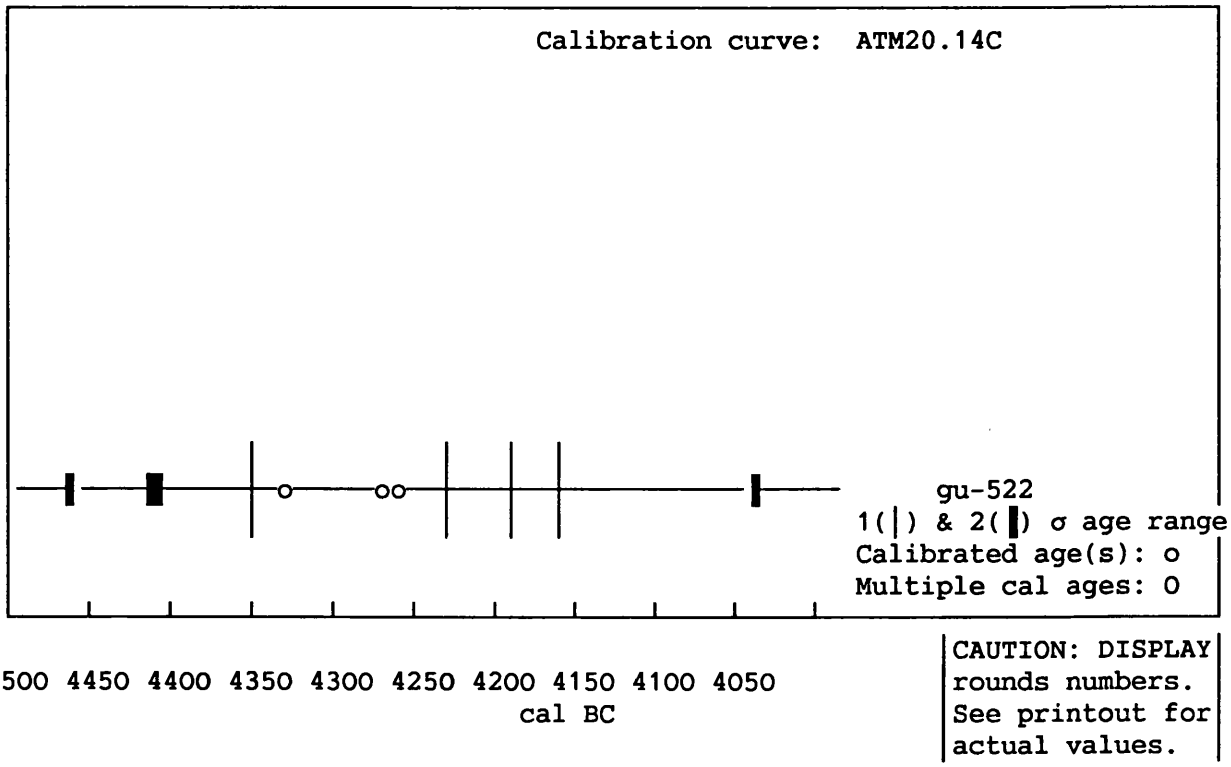

gu-522
 Radiocarbon Age BP  5420.0  ± 80.0†                          Reference(s)
  Calibrated age(s) cal BC  4333, 4273, 4259             (Pearson et al. 1986)
                    cal BP  6282, 6222, 6208
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4353-4230(6302-6179) 4192-4162(6141-6111)
   two Sigma**   cal BC 4458-4414(6407-6363) 4410-4040(6359-5989)

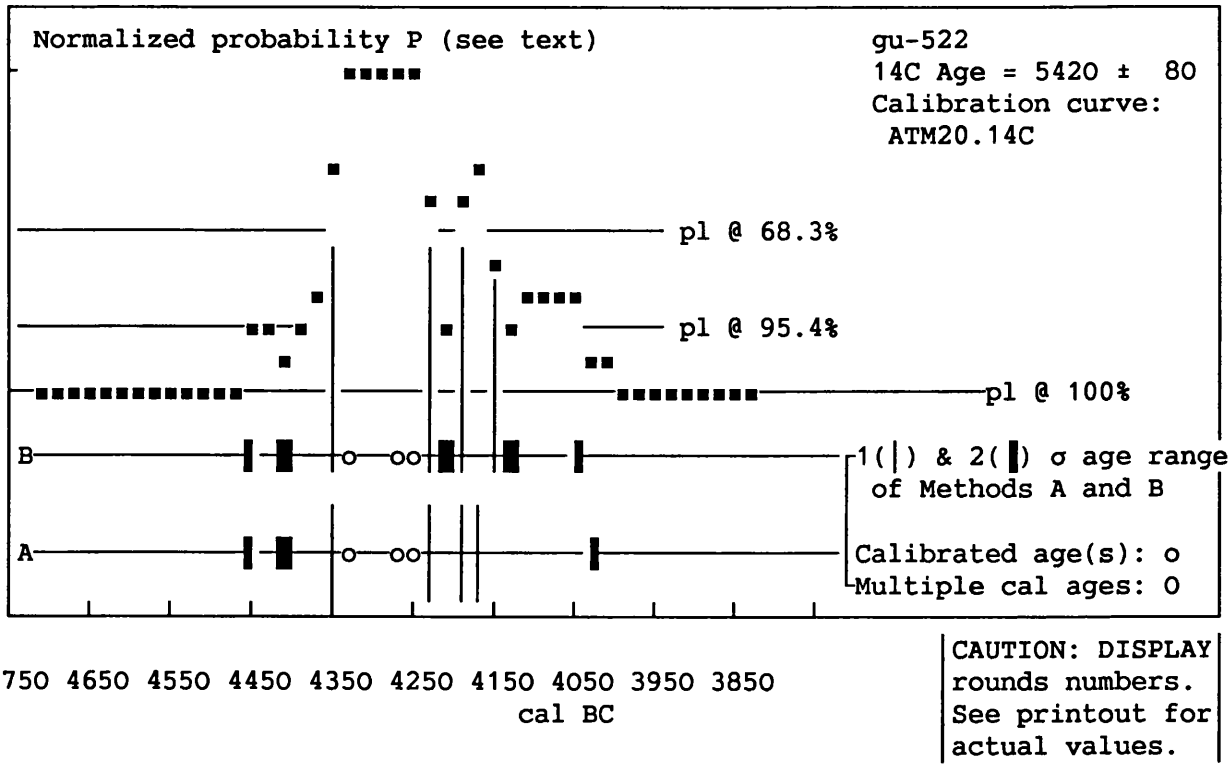
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4353 ( 4333, 4273, 4259) 4162
                  cal BP 6302 ( 6282, 6222, 6208) 6111
      two sigma   cal BC 4458 ( 4333, 4273, 4259) 4040
                  cal BP 6407 ( 6282, 6222, 6208) 5989

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4358-4225(6307-6174)              .81
                               4197-4154(6146-6103)              .19
    95.4 (two sigma)   cal BC 4455-4420(6404-6369)              .04
                               4400-4212(6349-6161)              .65
                               4208-4131(6157-6080)              .18
                               4128-4042(6077-5991)              .13
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
gu-522
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4500 4450 4400 4350 4300 4250 4200 4150 4100 4050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
gu-522
14C Age = 5420 ± 80
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4750 4650 4550 4450 4350 4250 4150 4050 3950 3850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
bm-847              5389.0   53.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev847.txt
Plot file: aev847.plt

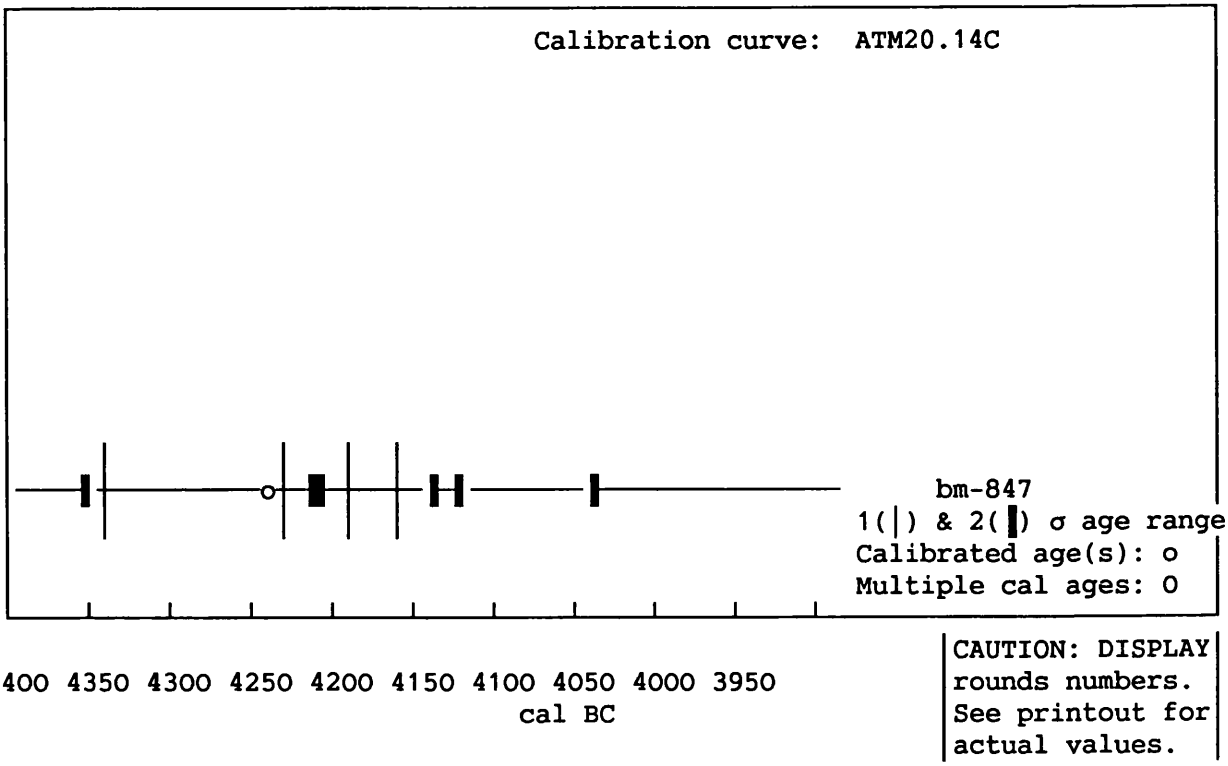

bm-847
 Radiocarbon Age BP  5389.0  ± 53.0†                        Reference(s)
  Calibrated age(s) cal BC  4243                        (Pearson et al. 1986)
                    cal BP  6192
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4339-4228(6288-6177) 4193-4160(6142-6109)
   two Sigma**   cal BC 4350-4210(6299-6159) 4206-4136(6155-6085)
                 4122-4044(6071-5993)

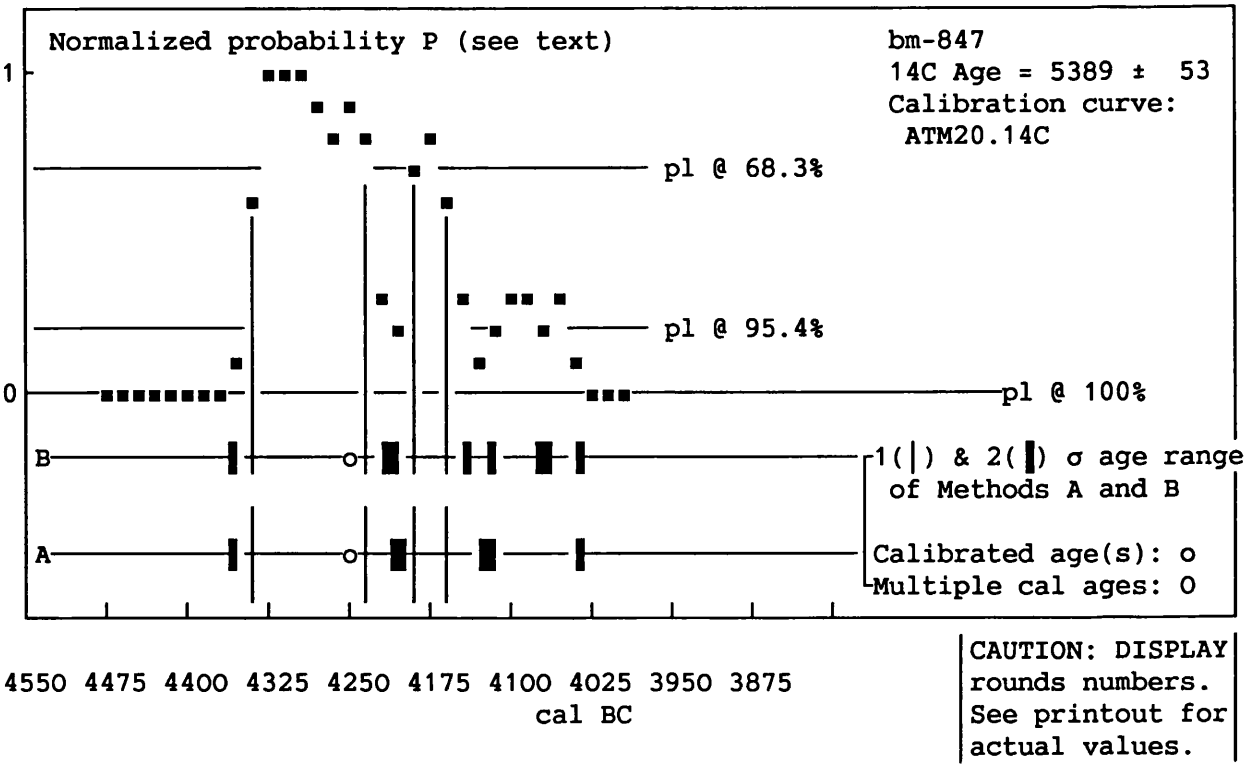
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4339 ( 4243) 4160
                  cal BP 6288 ( 6192) 6109
      two sigma   cal BC 4350 ( 4243) 4044
                  cal BP 6299 ( 6192) 5993

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 4337-4231(6286-6180)              .82
                               4191-4164(6140-6113)              .18
    95.4 (two sigma)   cal BC 4350-4217(6299-6166)              .66
                               4204-4140(6153-6089)              .23
                               4118-4071(6067-6020)              .07
                               4069-4046(6018-5995)              .04
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-847
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4400 4350 4300 4250 4200 4150 4100 4050 4000 3950
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-847
14C Age = 5389 ± 53
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4550 4475 4400 4325 4250 4175 4100 4025 3950 3875
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
bm-846              5372.0   92.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev846.txt
Plot file: aev846.plt

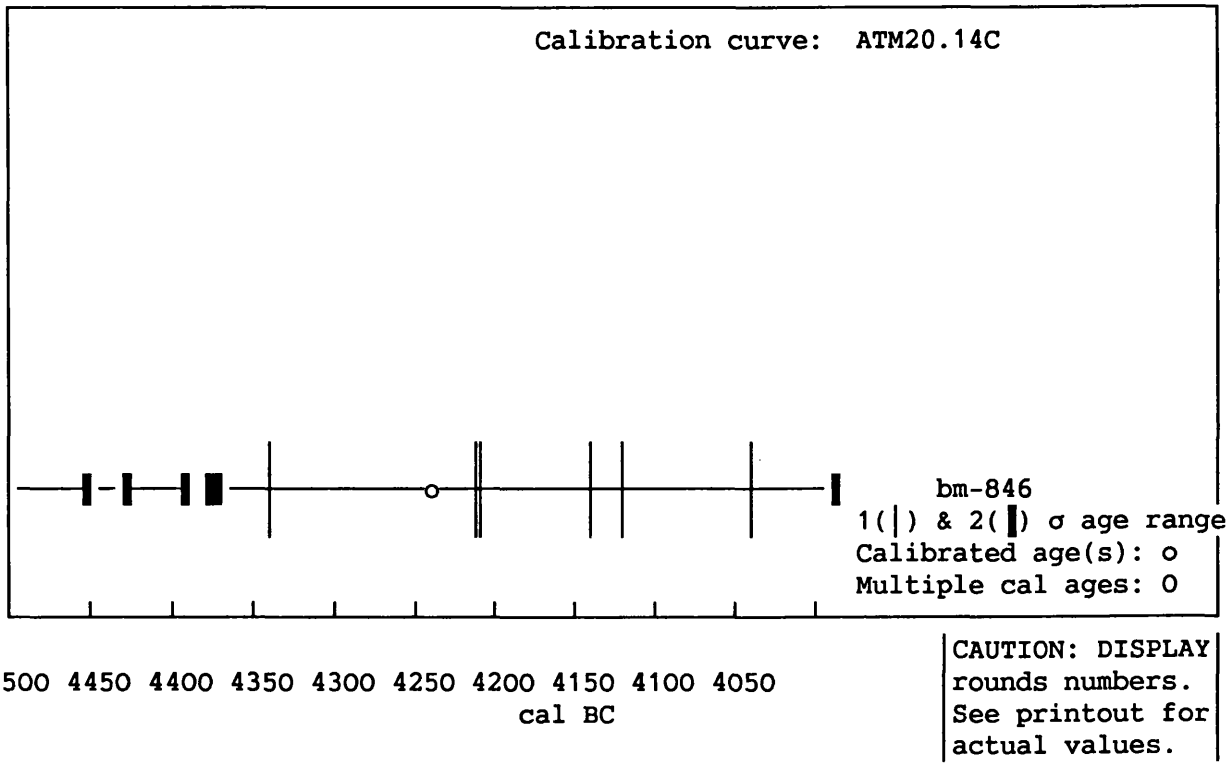

bm-846
 Radiocarbon Age BP  5372.0  ± 92.0†                          Reference(s)
  Calibrated age(s) cal BC  4238                          (Pearson et al. 1986)
                    cal BP  6187
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4344-4215(6293-6164) 4205-4137(6154-6086)
                 4121-4044(6070-5993)
   two Sigma**   cal BC 4452-4428(6401-6377) 4392-4384(6341-6333)
                 4370-3990(6319-5939)

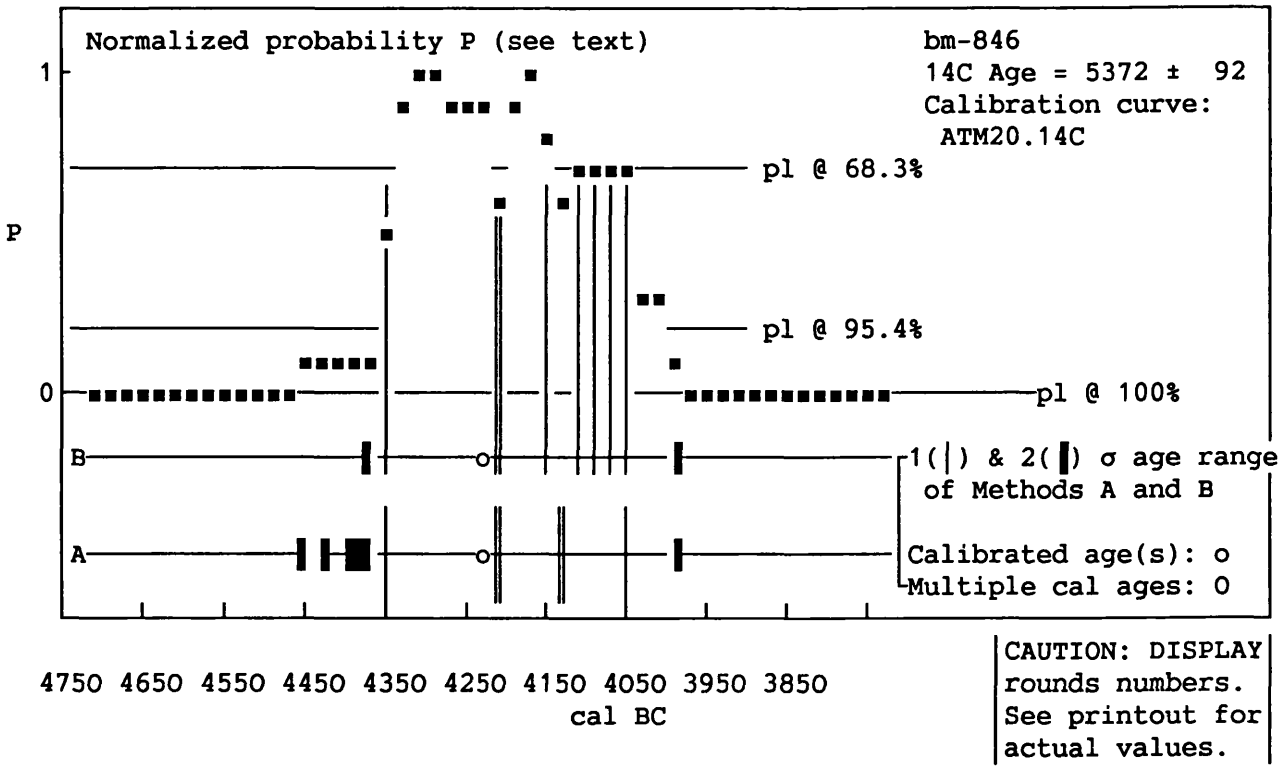
   Summary of above --
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4344 ( 4238) 4044
                  cal BP 6293 ( 6187) 5993
      two sigma   cal BC 4452 ( 4238) 3990
                  cal BP 6401 ( 6187) 5939

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4340-4220(6289-6169)              .57
                               4201-4145(6150-6094)              .26
                               4112-4084(6061-6033)              .11
                               4062-4048(6011-5997)              .06
    95.4 (two sigma)   cal BC 4366-3996(6315-5945)              .99
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-846
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4500 4450 4400 4350 4300 4250 4200 4150 4100 4050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-846
14C Age = 5372 ± 92
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4750 4650 4550 4450 4350 4250 4150 4050 3950 3850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
bm-845              5360.0   57.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev845.txt
Plot file: aev845.plt

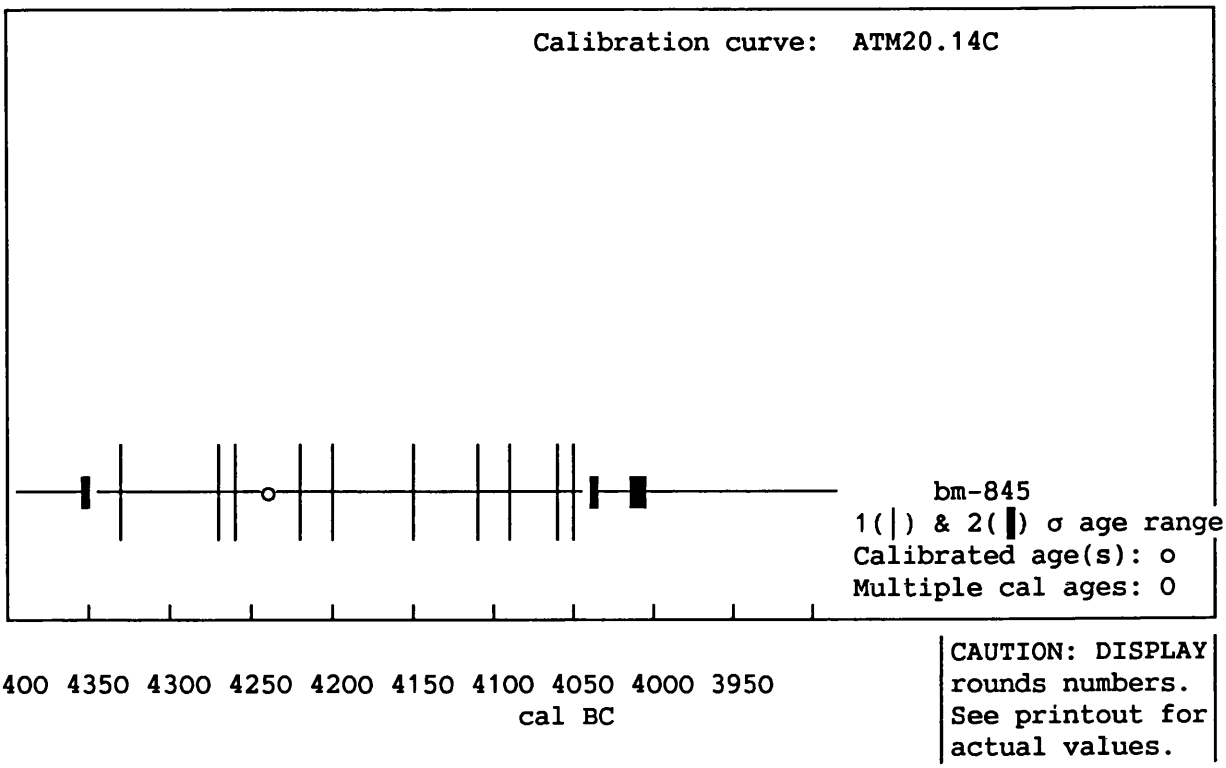

bm-845
 Radiocarbon Age BP  5360.0  ± 57.0†                        Reference(s)
  Calibrated age(s) cal BC  4235                        (Pearson et al. 1986)
                    cal BP  6184
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4333-4272(6282-6221) 4260-4220(6209-6169)
                 4201-4147(6150-6096) 4110-4088(6059-6037)
                 4060-4048(6009-5997)
   two Sigma**   cal BC 4350-4040(6299-5989) 4014-4007(5963-5956)

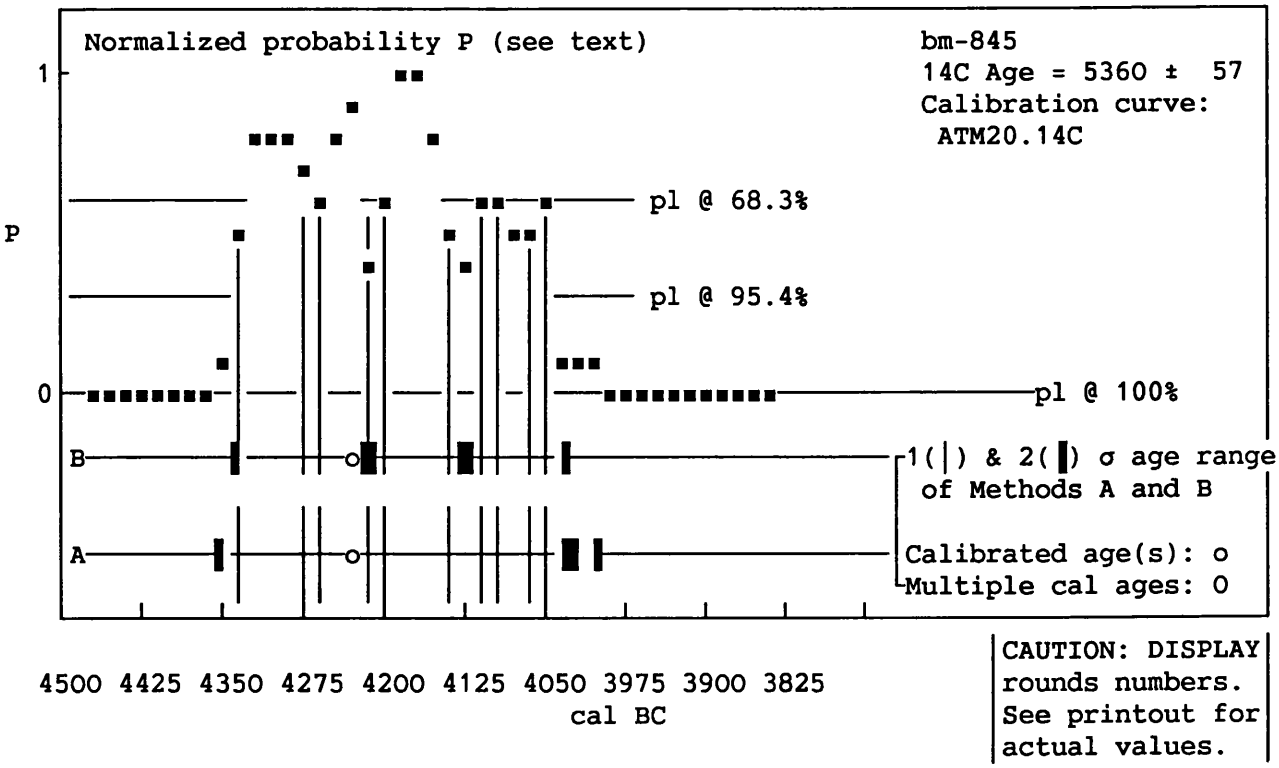
   Summary of above --
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4333 ( 4235) 4048
                  cal BP 6282 ( 6184) 5997
      two sigma   cal BC 4350 ( 4235) 4007
                  cal BP 6299 ( 6184) 5956

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 4333-4272(6282-6221)              .33
                               4259-4220(6208-6169)              .22
                               4201-4146(6150-6095)              .33
                               4104-4090(6053-6039)              .06
                               4059-4048(6008-5997)              .05
    95.4 (two sigma)   cal BC 4341-4212(6290-6161)              .47
                               4208-4132(6157-6081)              .29
                               4127-4042(6076-5991)              .23
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-845
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4400 4350 4300 4250 4200 4150 4100 4050 4000 3950
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-845
14C Age = 5360 ± 57
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4500 4425 4350 4275 4200 4125 4050 3975 3900 3825
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
bm-843              5355.0   67.0       .0      .0  100.0      .0
xx
Calibration file(s): ATM20.14C
Listing file: aev843.txt
Plot file: aev843.plt

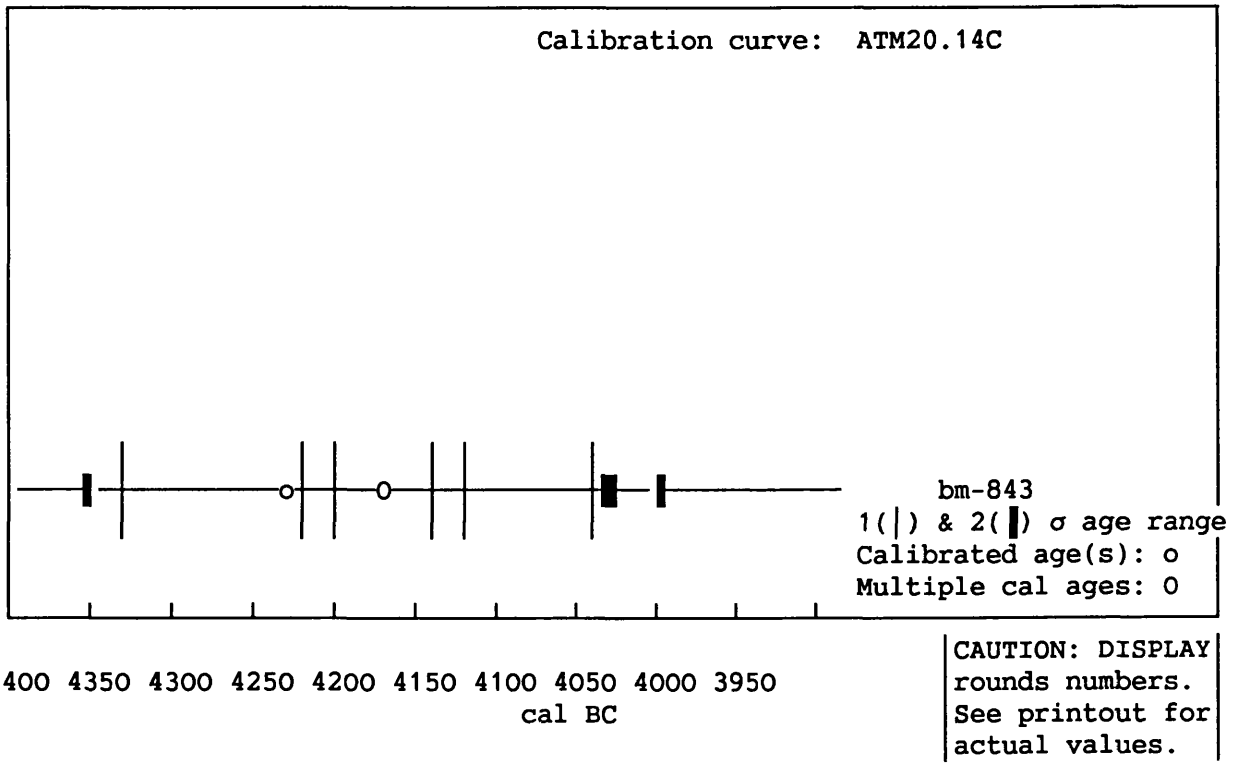

bm-843
 Radiocarbon Age BP  5355.0  ± 67.0†                          Reference(s)
  Calibrated age(s) cal BC  4234, 4174, 4169              (Pearson et al. 1986)
                    cal BP  6183, 6123, 6118
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4334-4217(6283-6166) 4204-4140(6153-6089)
                 4118-4045(6067-5994)
   two Sigma**   cal BC 4350-4030(6299-5979) 4025-4002(5974-5951)

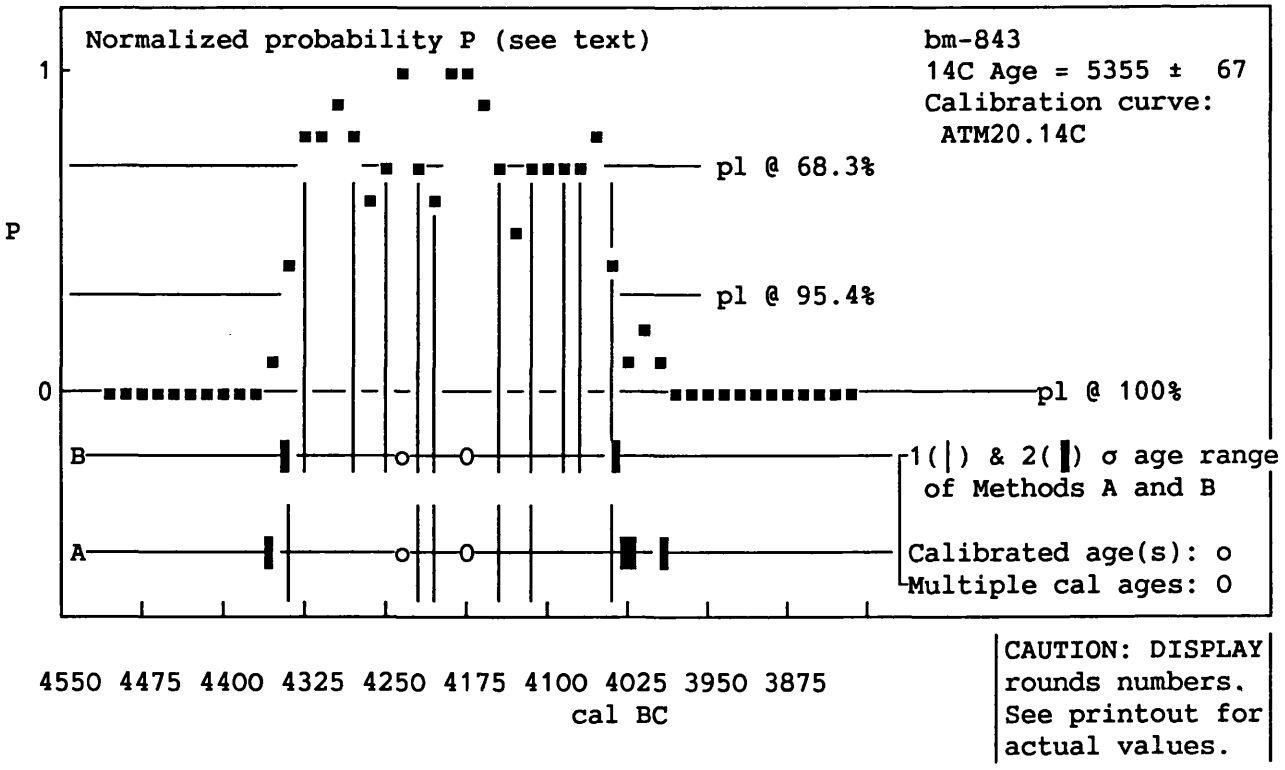
   Summary of above --
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4334 ( 4234, 4174, 4169) 4045
                  cal BP 6283 ( 6183, 6123, 6118) 5994
      two sigma   cal BC 4350 ( 4234, 4174, 4169) 4002
                  cal BP 6299 ( 6183, 6123, 6118) 5951

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4332-4275(6281-6224)              .28
                               4250-4219(6199-6168)              .17
                               4202-4144(6151-6093)              .32
                               4113-4081(6062-6030)              .14
                               4064-4047(6013-5996)              .08
    95.4 (two sigma)   cal BC 4343-4039(6292-5988)             1.00
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-843
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4400 4350 4300 4250 4200 4150 4100 4050 4000 3950
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-843
14C Age = 5355 ± 67
Calibration curve:
ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4550 4475 4400 4325 4250 4175 4100 4025 3950 3875
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
gu-523              5340.0   95.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev523.txt
Plot file: aev523.plt

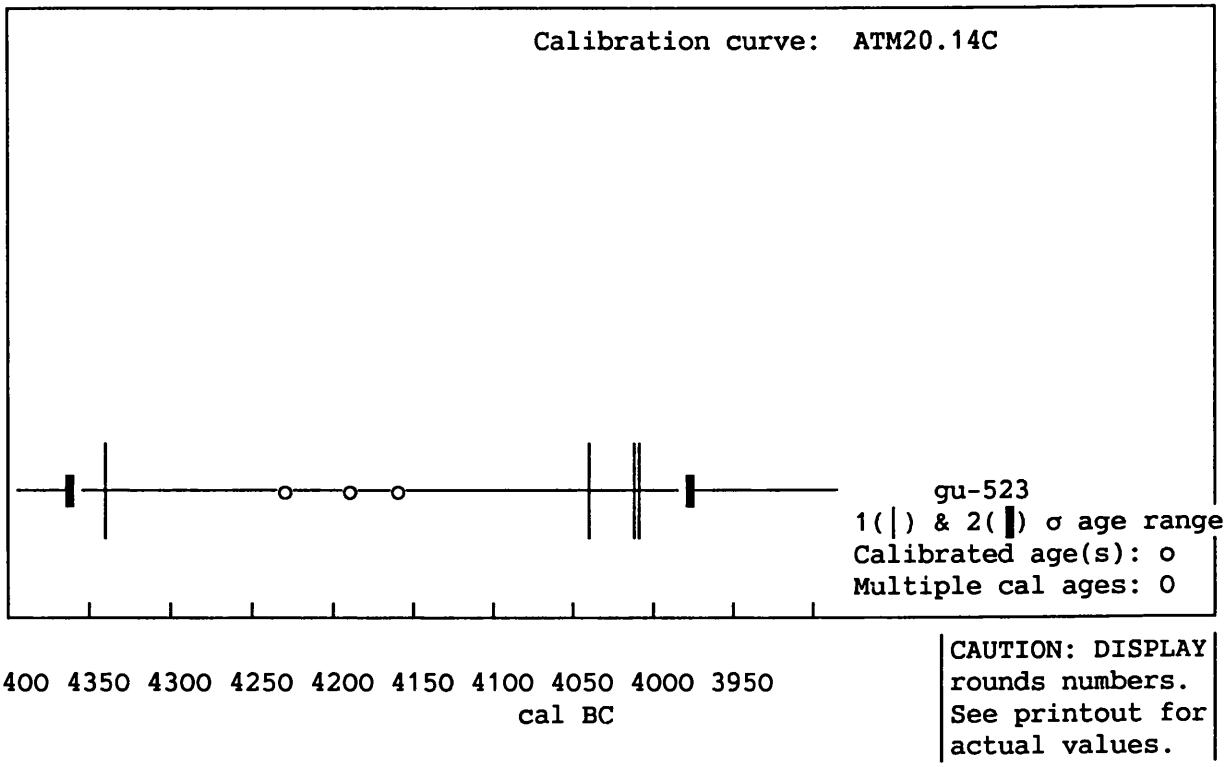

gu-523
 Radiocarbon Age BP  5340.0  ± 95.0†                          Reference(s)
  Calibrated age(s) cal BC  4230, 4191, 4163              (Pearson et al. 1986)
                    cal BP  6179, 6140, 6112
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4337-4038(6286-5987) 4013-4008(5962-5957)
   two Sigma**   cal BC 4360-3980(6309-5929)

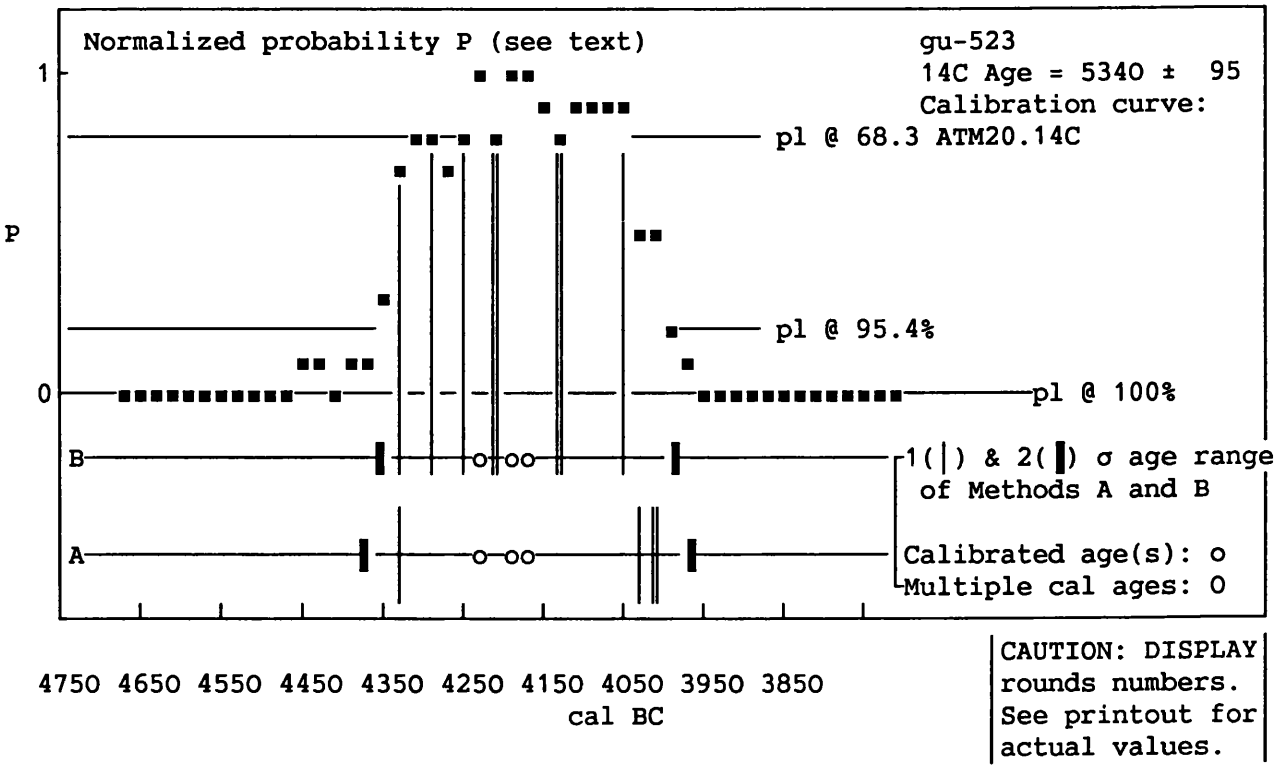
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4337 ( 4230, 4191, 4163) 4008
                  cal BP 6286 ( 6179, 6140, 6112) 5957
      two sigma   cal BC 4360 ( 4230, 4191, 4163) 3980
                  cal BP 6309 ( 6179, 6140, 6112) 5929

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 4325-4282(6274-6231)              .18
                              4247-4214(6196-6163)              .15
                              4206-4136(6155-6085)              .33
                              4123-4044(6072-5993)              .35
    95.4 (two sigma)   cal BC 4357-3989(6306-5938)             1.00
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
gu-523
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4400 4350 4300 4250 4200 4150 4100 4050 4000 3950
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
gu-523
14C Age = 5340 ± 95
Calibration curve:
pl @ 68.3 ATM20.14C
pl @ 95.4%
pl @ 100%
P
1
0
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4750 4650 4550 4450 4350 4250 4150 4050 3950 3850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
bm-848              5330.0   57.0       .0      .0  100.0      .0
xx
Calibration file(s): ATM20.14C
Listing file: aev848.txt
Plot file: aev848.plt

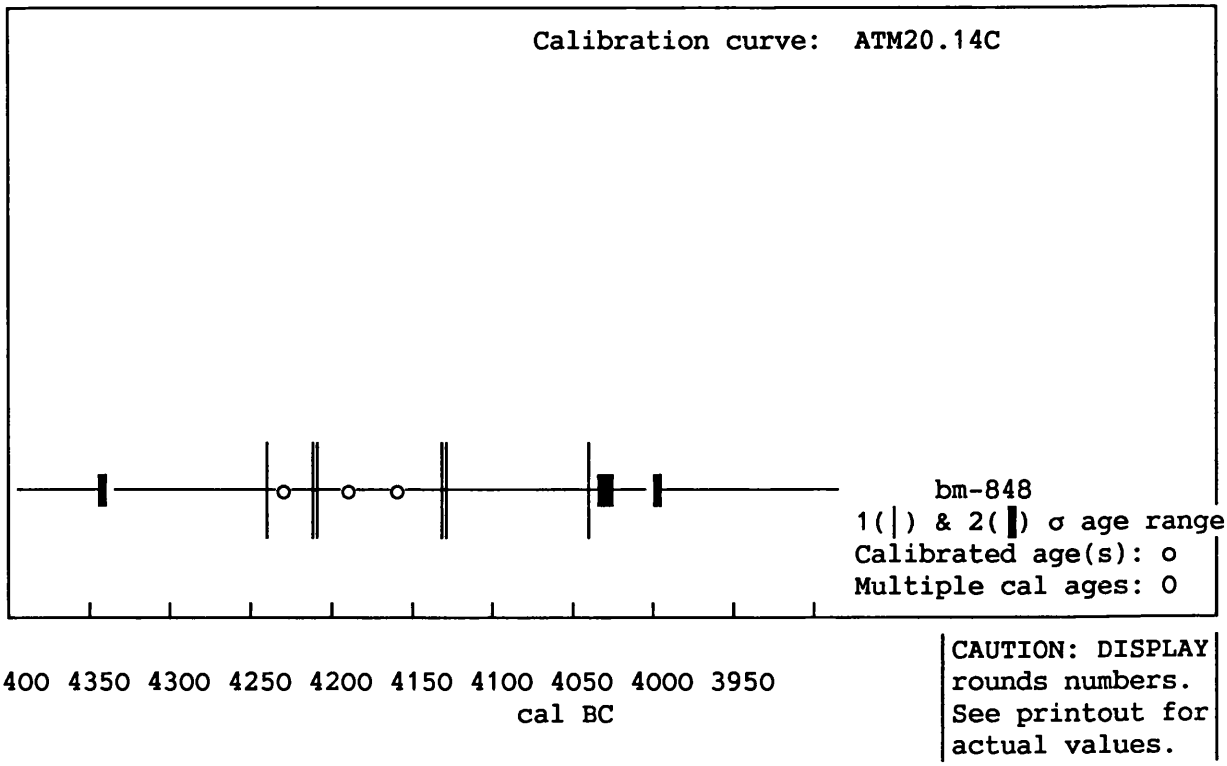

bm-848
 Radiocarbon Age BP  5330.0  ± 57.0†                          Reference(s)
  Calibrated age(s) cal BC  4228, 4194, 4159              (Pearson et al. 1986)
                    cal BP  6177, 6143, 6108
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4243-4213(6192-6162) 4208-4133(6157-6082)
                 4126-4042(6075-5991)
   two Sigma**   cal BC 4340-4030(6289-5979) 4027-4000(5976-5949)

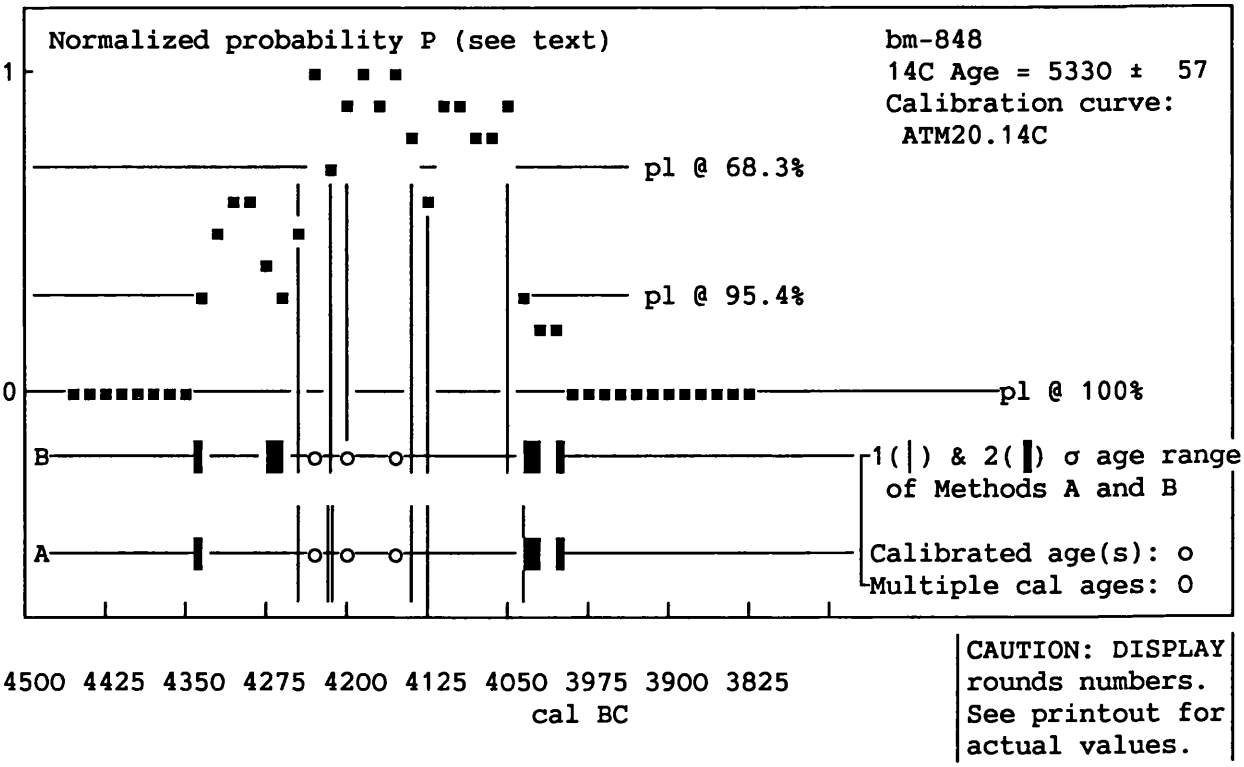
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4243 ( 4228, 4194, 4159) 4042
                  cal BP 6192 ( 6177, 6143, 6108) 5991
      two sigma   cal BC 4340 ( 4228, 4194, 4159) 4000
                  cal BP 6289 ( 6177, 6143, 6108) 5949

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4241-4215(6190-6164)              .15
                              4206-4137(6155-6086)              .41
                              4122-4044(6071-5993)              .43
    95.4 (two sigma)   cal BC 4333-4271(6282-6220)              .15
                              4266-4037(6215-5986)              .84
                              4014-4007(5963-5956)              .01
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-848
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4400 4350 4300 4250 4200 4150 4100 4050 4000 3950
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-848
14C Age = 5330 ± 57
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4500 4425 4350 4275 4200 4125 4050 3975 3900 3825
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: K/028 vrysi 1.00

bm-844	5275.0	47.0	.0	.0	100.0	.0

xx
Calibration file(s): ATM20.14C
Listing file: aev844.txt
Plot file: aev844.plt

bm-844
Radiocarbon Age BP 5275.0 ± 47.0† Reference(s)
Calibrated age(s) cal BC 4214, 4206, 4136 (Pearson et al. 1986)
4123, 4043
cal BP 6163, 6155, 6085
6072, 5992

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4227-4194(6176-6143) 4158-4034(6107-5983)
4021-4004(5970-5953)
two Sigma** cal BC 4240-3990(6189-5939)

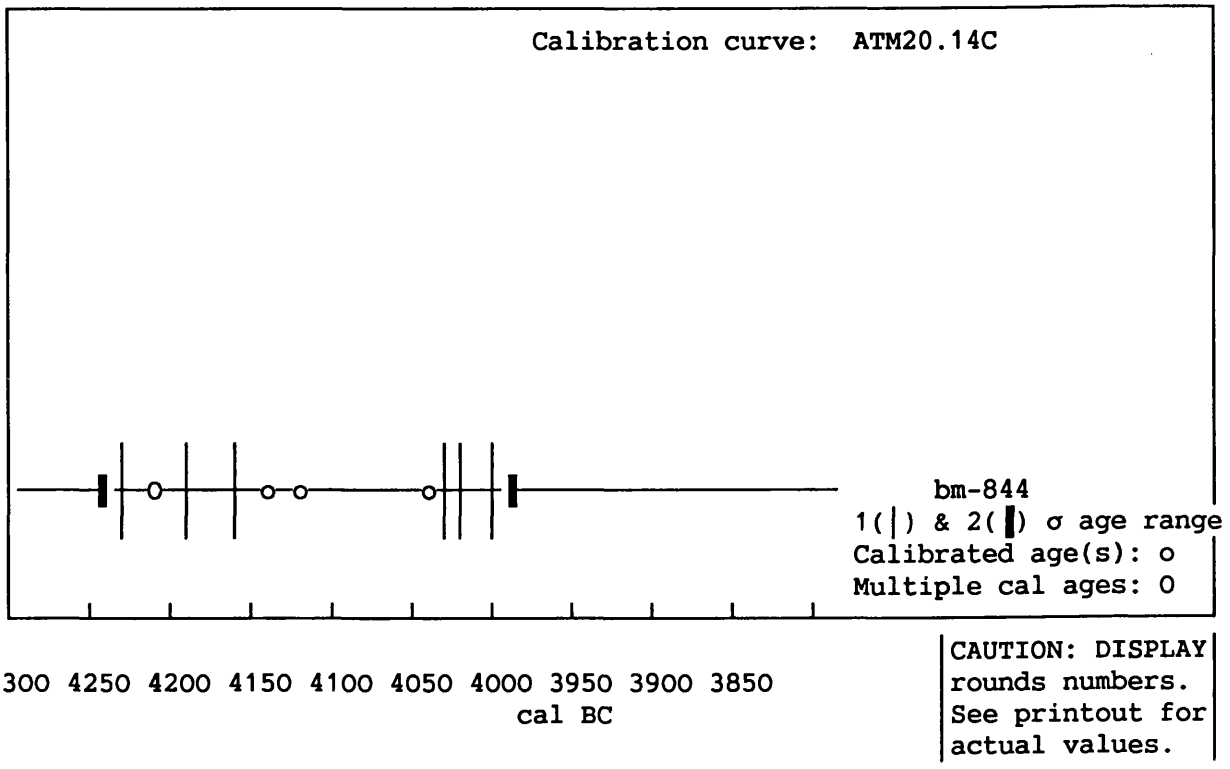
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4227 (4214, 4206, 4136, 4123, 4043) 4004
cal BP 6176 (6163, 6155, 6085, 6072, 5992) 5953
two sigma cal BC 4240 (4214, 4206, 4136, 4123, 4043) 3990
cal BP 6189 (6163, 6155, 6085, 6072, 5992) 5939

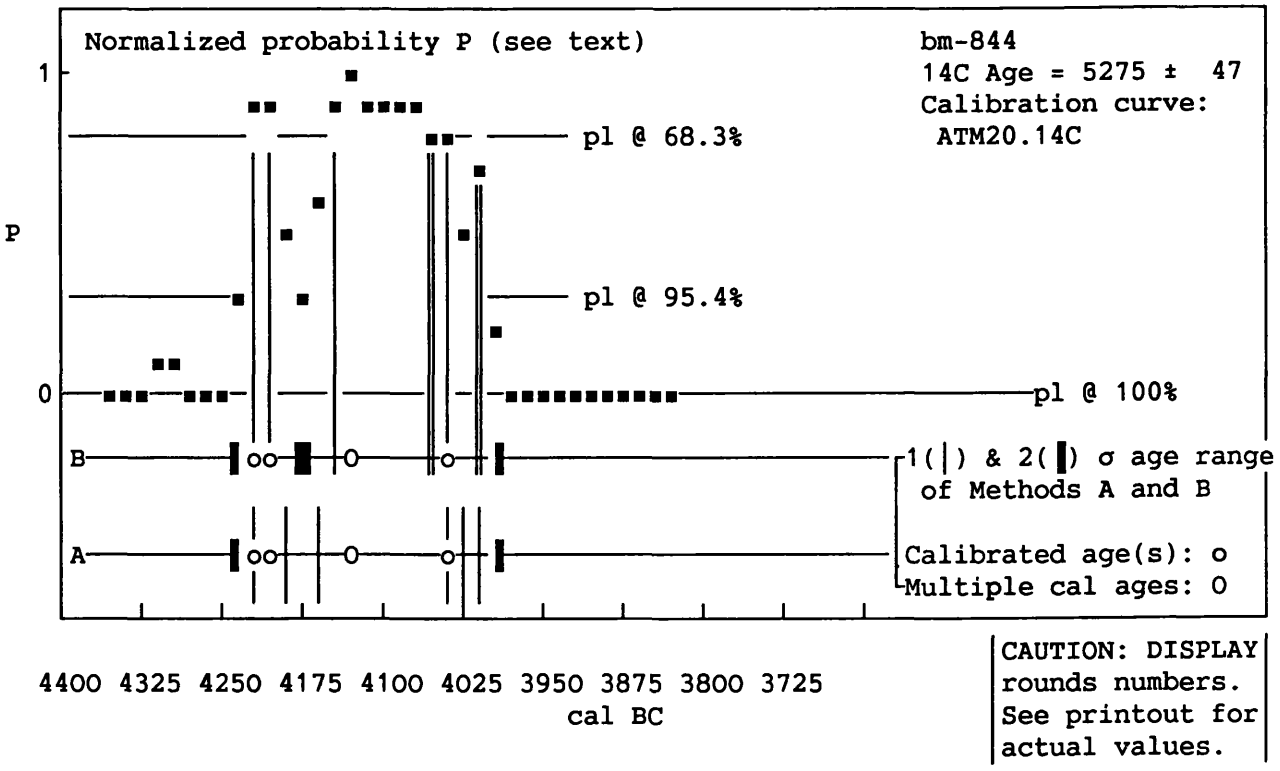
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4222-4199(6171-6148)	.18
	4151-4054(6100-6003)	.70
	4049-4038(5998-5987)	.09
	4013-4008(5962-5957)	.04
95.4 (two sigma)	cal BC 4234-4173(6183-6122)	.23
	4169-3998(6118-5947)	.77

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-844
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4300 4250 4200 4150 4100 4050 4000 3950 3900 3850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-844
14C Age = 5275 ± 47
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4400 4325 4250 4175 4100 4025 3950 3875 3800 3725
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
gu-524              5255.0  120.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev524.txt
Plot file: aev524.plt

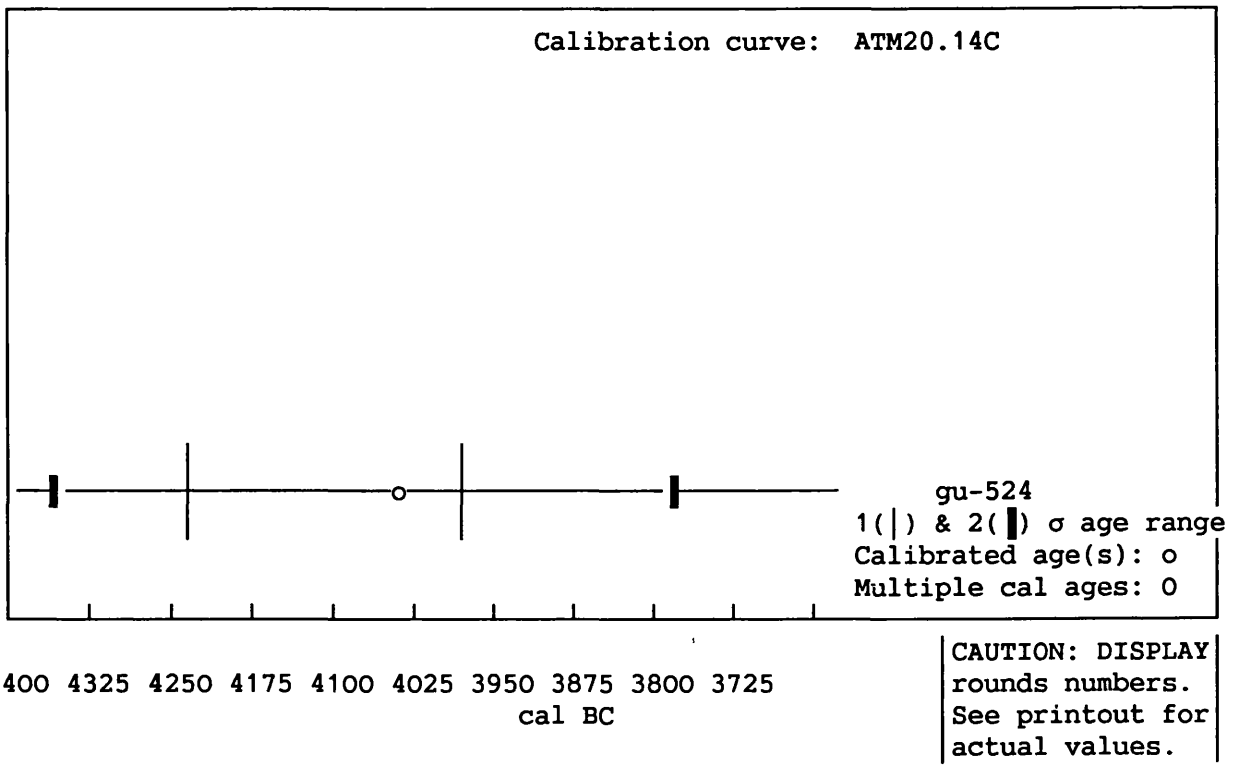

gu-524
 Radiocarbon Age BP  5255.0  ±120.0†                        Reference(s)
  Calibrated age(s) cal BC  4040                         (Pearson et al. 1986)
                    cal BP  5989
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4240-3980(6189-5929)
   two Sigma**   cal BC 4350-3790(6299-5739)

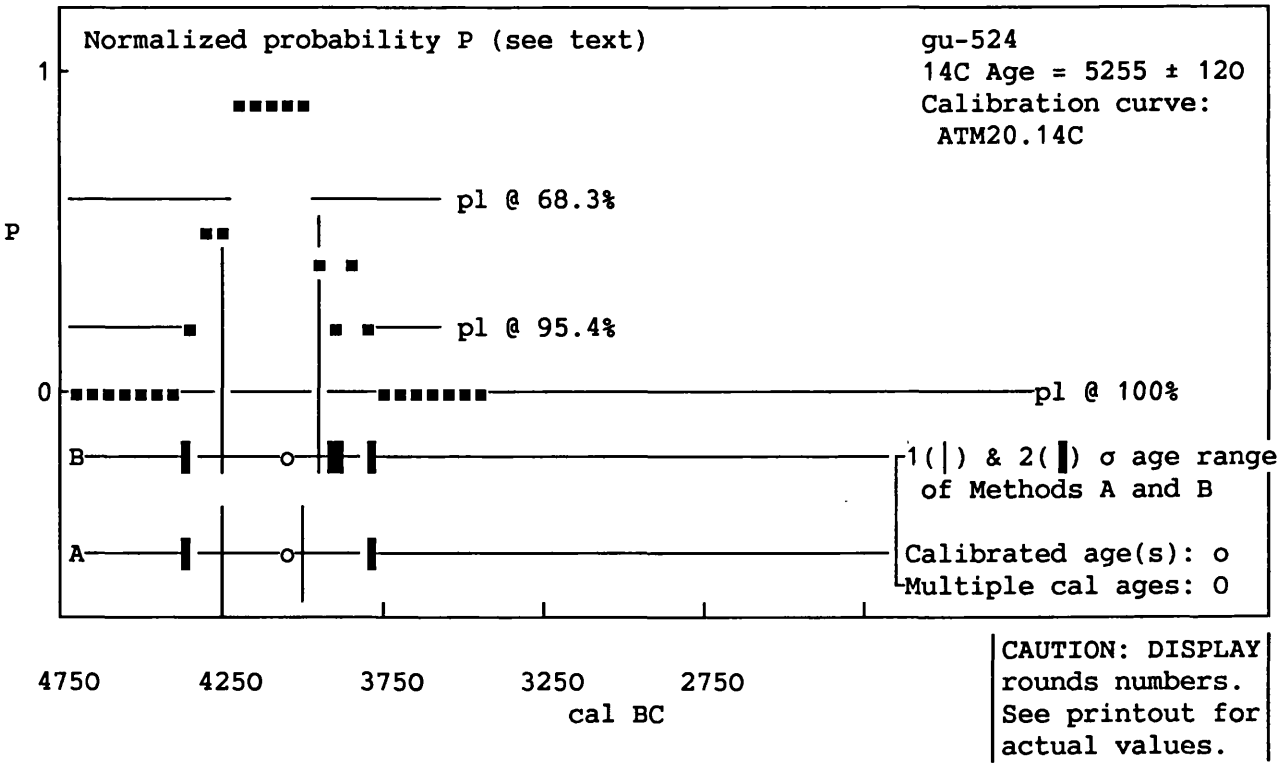
   Summary of above --
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4240 ( 4040) 3980
                  cal BP 6189 ( 5989) 5929
      two sigma   cal BC 4350 ( 4040) 3790
                  cal BP 6299 ( 5989) 5739

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4240-3970(6189-5919)            1.00
    95.4 (two sigma)   cal BC 4350-3900(6299-5849)             .93
                              3883-3812(5832-5761)             .07
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
gu-524
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4400 4325 4250 4175 4100 4025 3950 3875 3800 3725
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
gu-524
14C Age = 5255 ± 120
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4750 4250 3750 3250 2750
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: K/028 vrysi 1.00
bm-849 5224.0 78.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: aev849.txt
Plot file: aev849.plt

bm-849
Radiocarbon Age BP 5224.0 ± 78.0† Reference(s)
Calibrated age(s) cal BC 4034, 4021, 4004 (Pearson et al. 1986)
cal BP 5983, 5970, 5953
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4221-4200(6170-6149) 4149-4056(6098-6005)
4049-3981(5998-5930)
two Sigma** cal BC 4240-3940(6189-5889) 3859-3819(5808-5768)

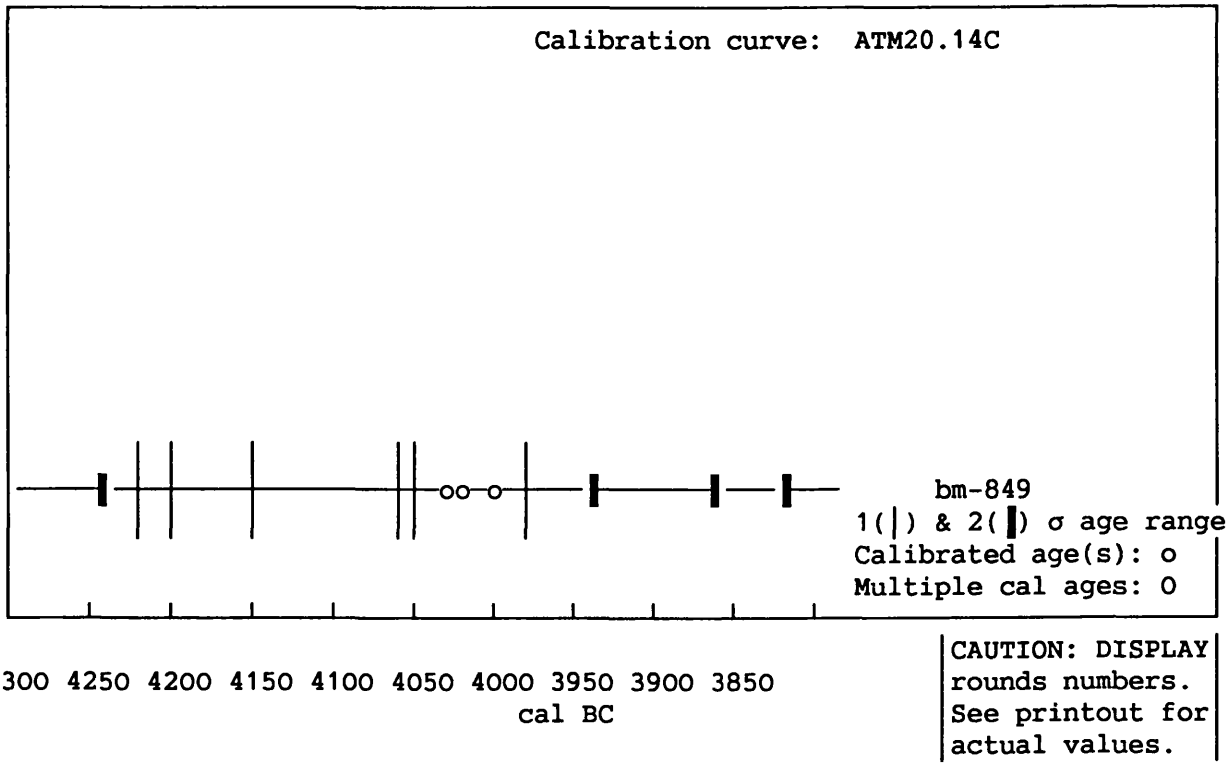
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4221 (4034, 4021, 4004) 3981
cal BP 6170 (5983, 5970, 5953) 5930
two sigma cal BC 4240 (4034, 4021, 4004) 3819
cal BP 6189 (5983, 5970, 5953) 5768

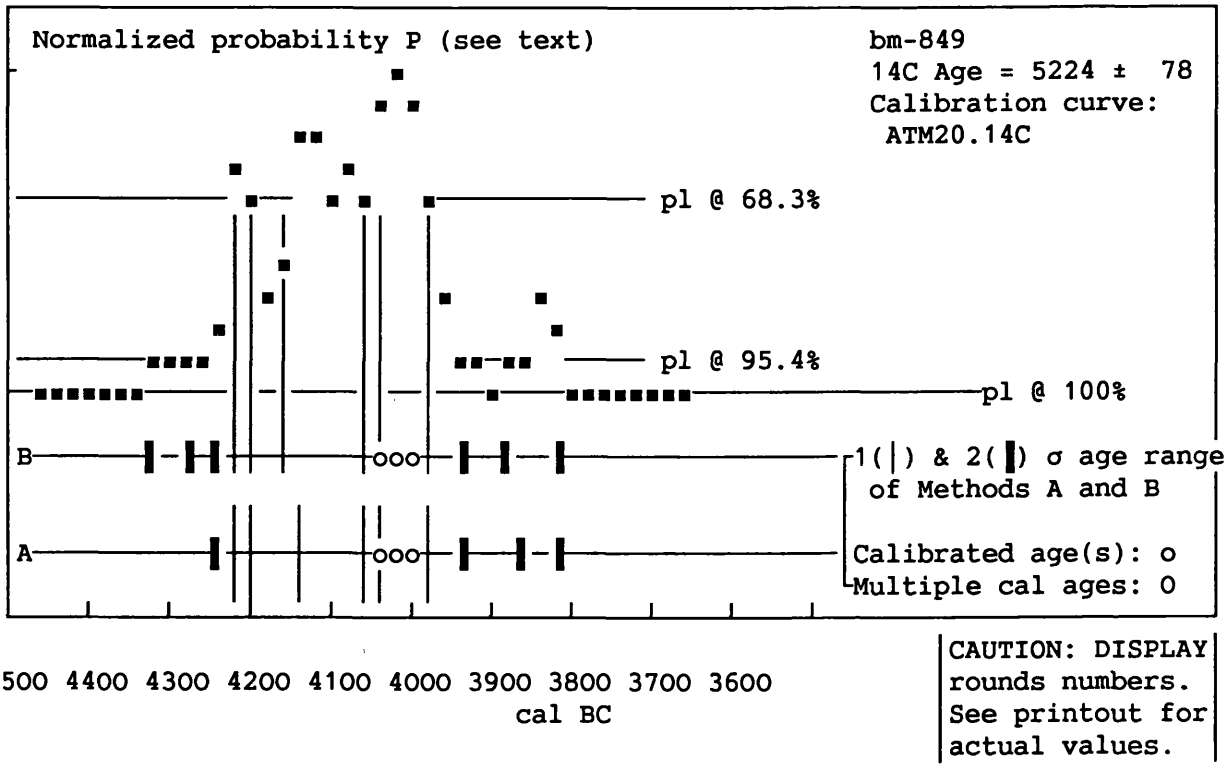
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4222-4199(6171-6148)	.12
	4150-4055(6099-6004)	.46
	4049-3980(5998-5929)	.42
95.4 (two sigma)	cal BC 4315-4286(6264-6235)	.02
	4245-3934(6194-5883)	.93
	3873-3816(5822-5765)	.06

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-849
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4300 4250 4200 4150 4100 4050 4000 3950 3900 3850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-849
14C Age = 5224 ± 78
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4500 4400 4300 4200 4100 4000 3900 3800 3700 3600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
gu-1459              5210.0   85.0       .0      .0  100.0      .0
xx
Calibration file(s): ATM20.14C
Listing file: aev1459.txt
Plot file: aev1459.plt

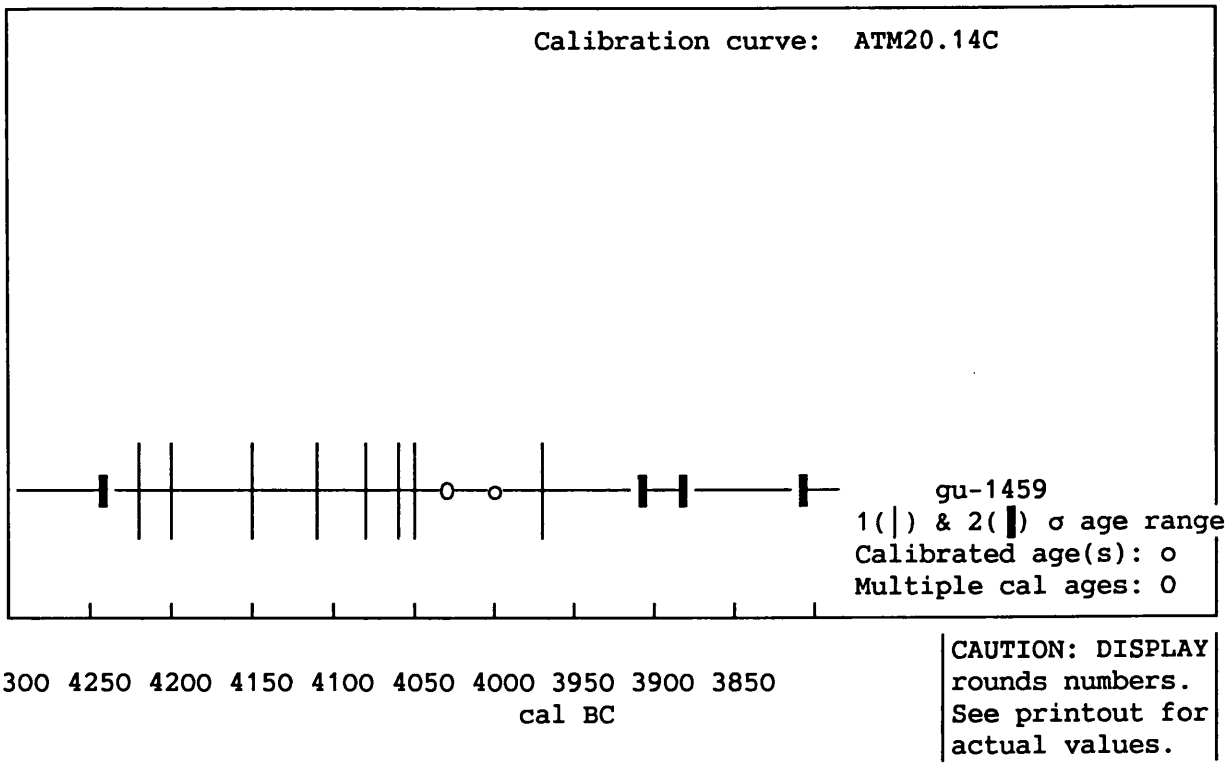

gu-1459
 Radiocarbon Age BP  5210.0  ± 85.0†                          Reference(s)
  Calibrated age(s) cal BC  4032, 4026, 4001              (Pearson et al. 1986)
                    cal BP  5981, 5975, 5950
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4220-4201(6169-6150) 4145-4112(6094-6061)
                 4083-4063(6032-6012) 4047-3971(5996-5920)
   two Sigma**   cal BC 4240-3910(6189-5859) 3880-3813(5829-5762)

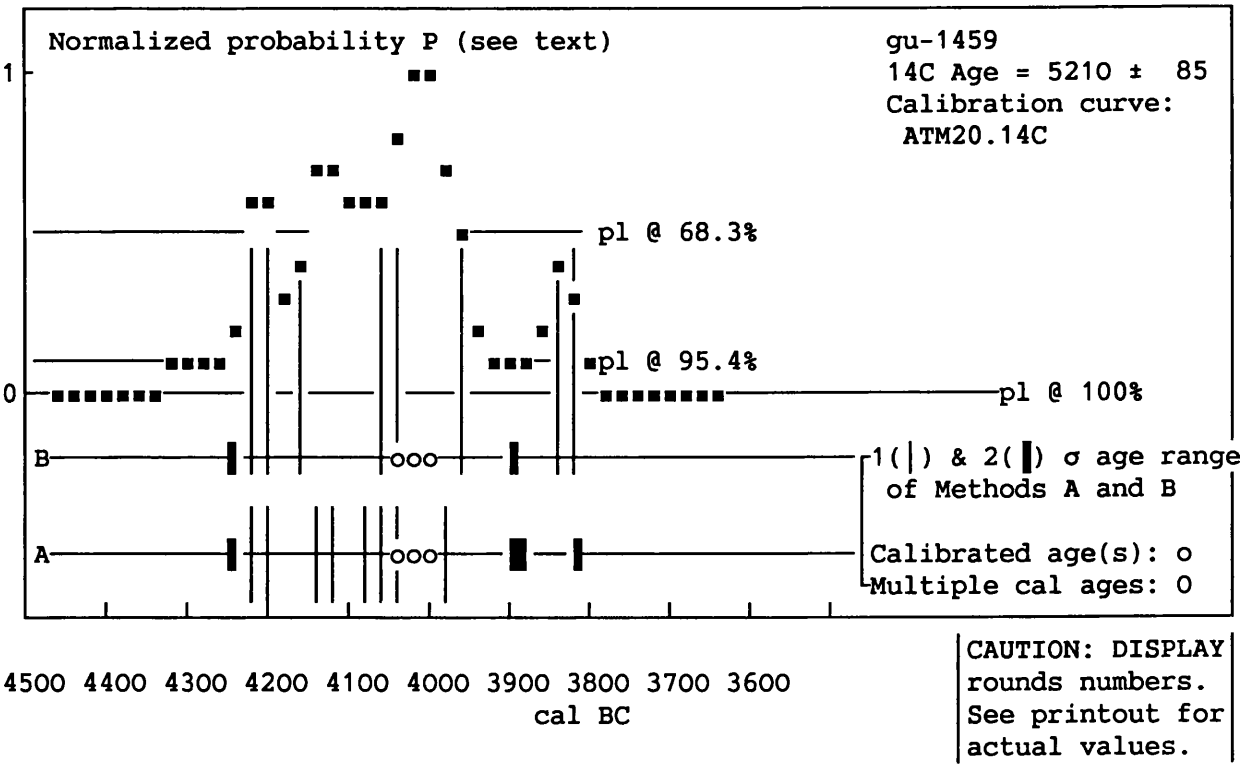
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4220 ( 4032, 4026, 4001) 3971
                  cal BP 6169 ( 5981, 5975, 5950) 5920
      two sigma   cal BC 4240 ( 4032, 4026, 4001) 3813
                  cal BP 6189 ( 5981, 5975, 5950) 5762

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4222-4198(6171-6147)              .11
                              4151-4053(6100-6002)              .41
                              4049-3964(5998-5913)              .47
                              3833-3829(5782-5778)              .02
    95.4 (two sigma)   cal BC 4244-3901(6193-5850)              .89
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
gu-1459
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4300 4250 4200 4150 4100 4050 4000 3950 3900 3850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
gu-1459
14C Age = 5210 ± 85
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4500 4400 4300 4200 4100 4000 3900 3800 3700 3600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: K/028 vrysi 1.00
bm-1908 5180.0 60.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: aev1908.txt
Plot file: aev1908.plt

bm-1908♦
Radiocarbon Age BP 5180.0 ± 60.0† Reference(s)
Calibrated age(s) cal BC 3994 (Pearson et al. 1986)
cal BP 5943
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4038-4013(5987-5962) 4008-3967(5957-5916)
two Sigma** cal BC 4222-4199(6171-6148) 4149-4055(6098-6004)
4050-3940(5999-5889) 3871-3817(5820-5766)

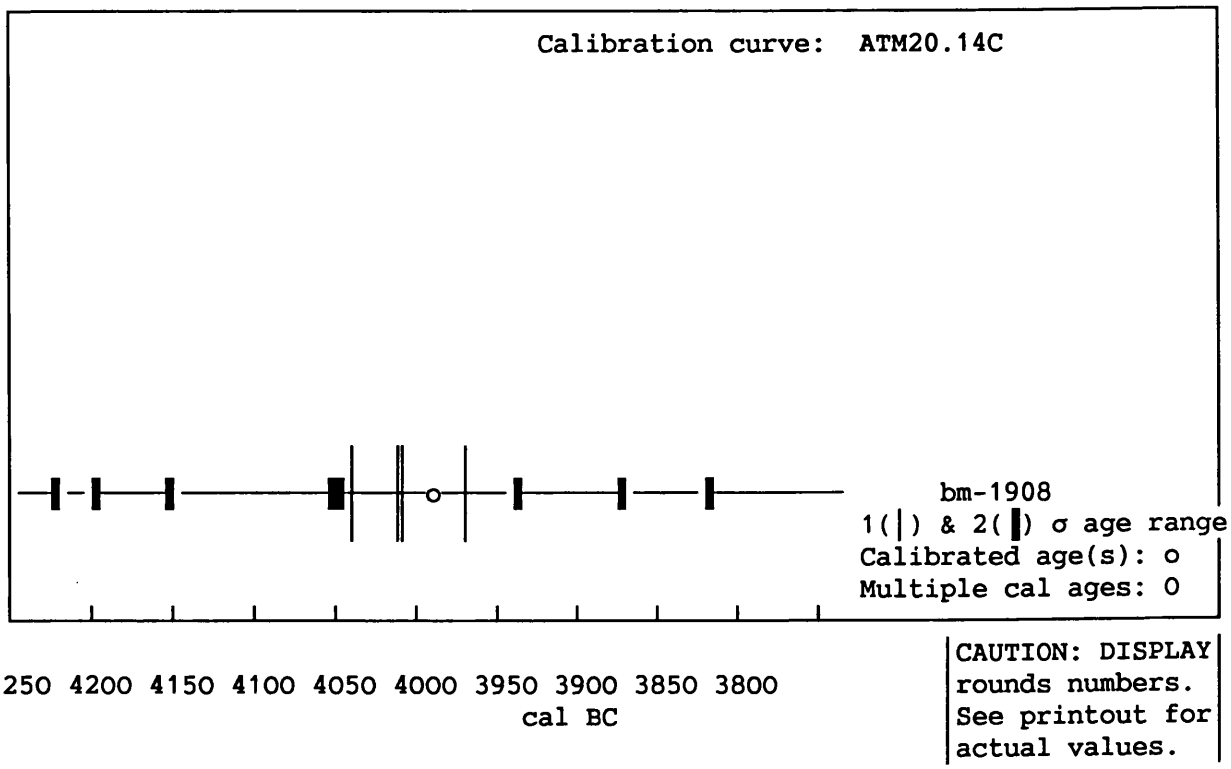
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4038 (3994) 3967
cal BP 5987 (5943) 5916
two sigma cal BC 4222 (3994) 3817
cal BP 6171 (5943) 5766

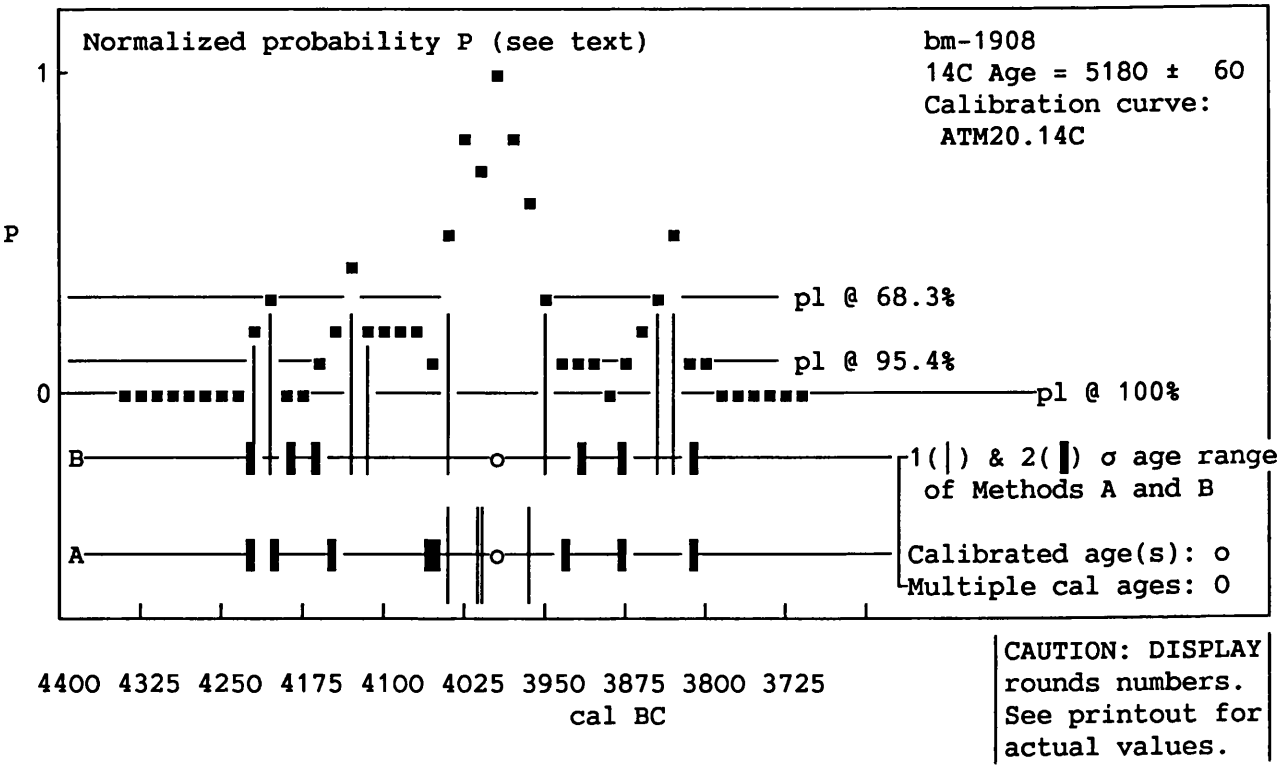
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4214-4206(6163-6155)	.04
	4137-4122(6086-6071)	.07
	4043-3949(5992-5898)	.78
	3843-3823(5792-5772)	.11
95.4 (two sigma)	cal BC 4226-4195(6175-6144)	.06
	4157-3917(6106-5866)	.79
	3878-3814(5827-5763)	.14

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1908
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4250 4200 4150 4100 4050 4000 3950 3900 3850 3800
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1908
14C Age = 5180 ± 60
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4400 4325 4250 4175 4100 4025 3950 3875 3800 3725
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
bm-1907              5120.0   45.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev1907.txt
Plot file: aev1907.plt

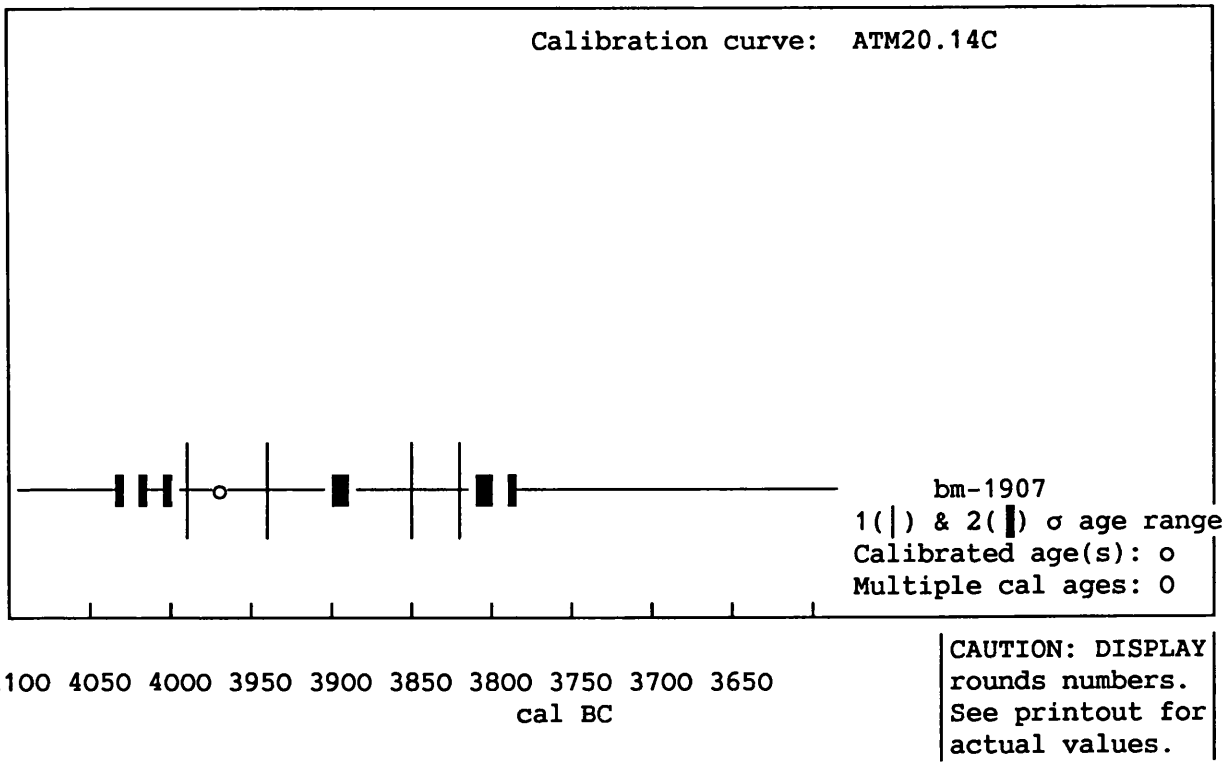

bm-1907♦
 Radiocarbon Age BP  5120.0  ± 45.0†                          Reference(s)
  Calibrated age(s) cal BC  3969                          (Pearson et al. 1986)
                    cal BP  5918
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3991-3943(5940-5892) 3849-3821(5798-5770)
   two Sigma**   cal BC 4033-4024(5982-5973) 4002-3899(5951-5848)
                 3885-3811(5834-5760) 3801-3789(5750-5738)

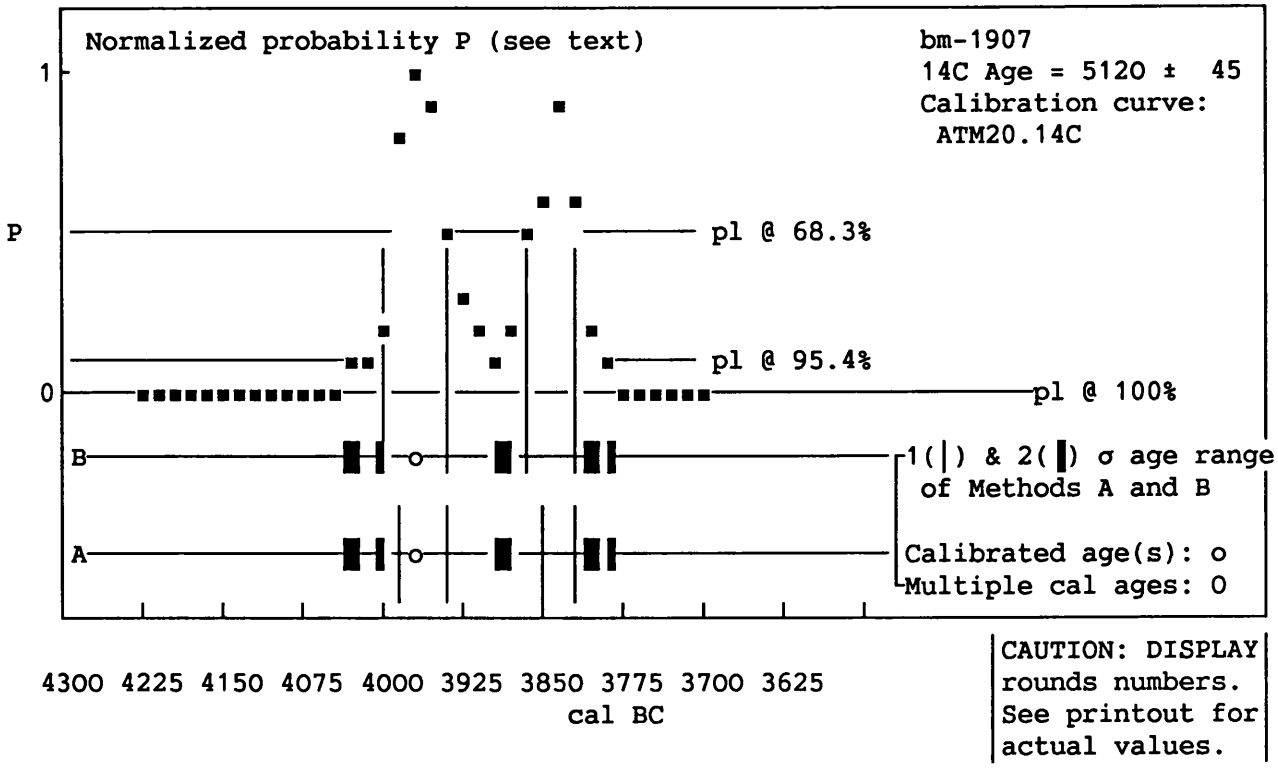
   Summary of above --
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3991 ( 3969) 3821
                  cal BP 5940 ( 5918) 5770
      two sigma   cal BC 4033 ( 3969) 3789
                  cal BP 5982 ( 5918) 5738

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 3993-3940(5942-5889)              .59
                               3859-3819(5808-5768)              .41
    95.4 (two sigma)   cal BC 4033-4024(5982-5973)              .02
                               4002-3899(5951-5848)              .55
                               3885-3810(5834-5759)              .40
                               3809-3788(5758-5737)              .03
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1907
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4100 4050 4000 3950 3900 3850 3800 3750 3700 3650
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1907
14C Age = 5120 ± 45
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4300 4225 4150 4075 4000 3925 3850 3775 3700 3625
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
bm-1906              5030.0   80.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: aev1906.txt
Plot file: aev1906.plt

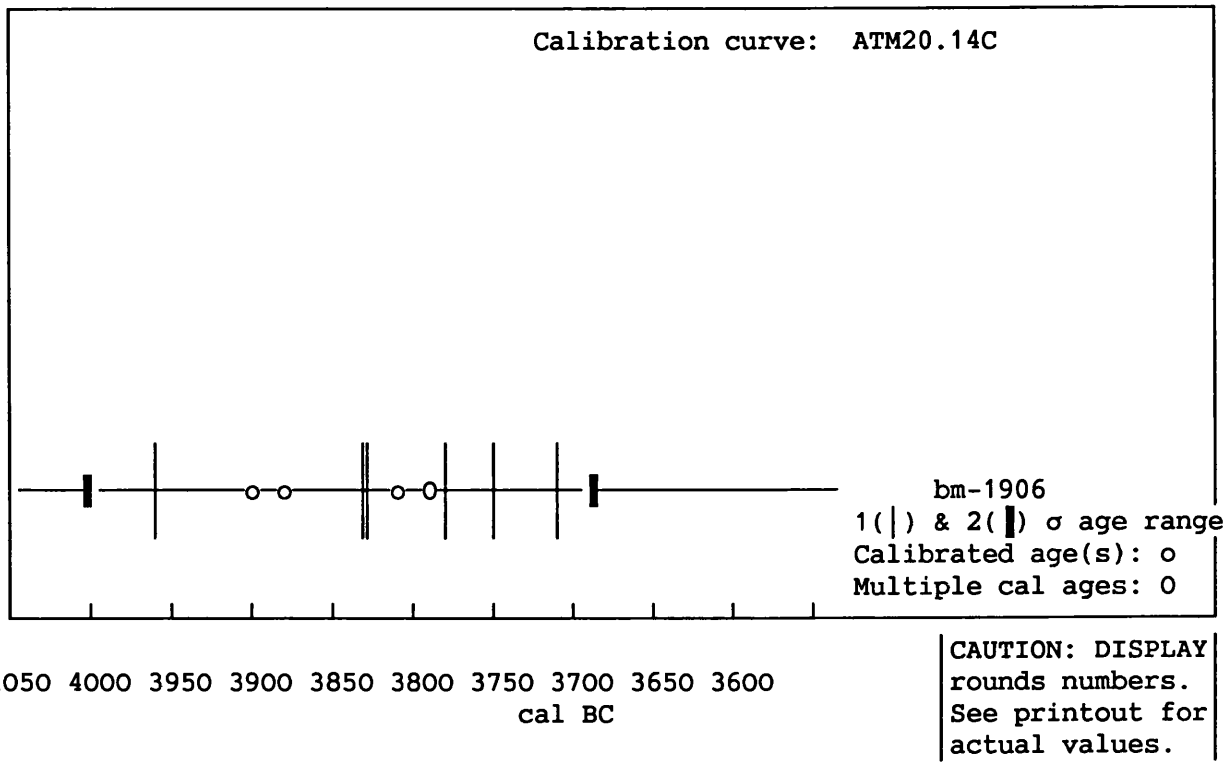
bm-1906♦
 Radiocarbon Age BP  5030.0  ± 80.0†                        Reference(s)
  Calibrated age(s) cal BC  3902, 3883, 3812            (Pearson et al. 1986)
                            3792, 3790
                    cal BP  5851, 5832, 5761
                            5741, 5739
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3964-3833(5913-5782) 3829-3776(5778-5725)
                 3746-3708(5695-5657)
   two Sigma**   cal BC 4000-3690(5949-5639)

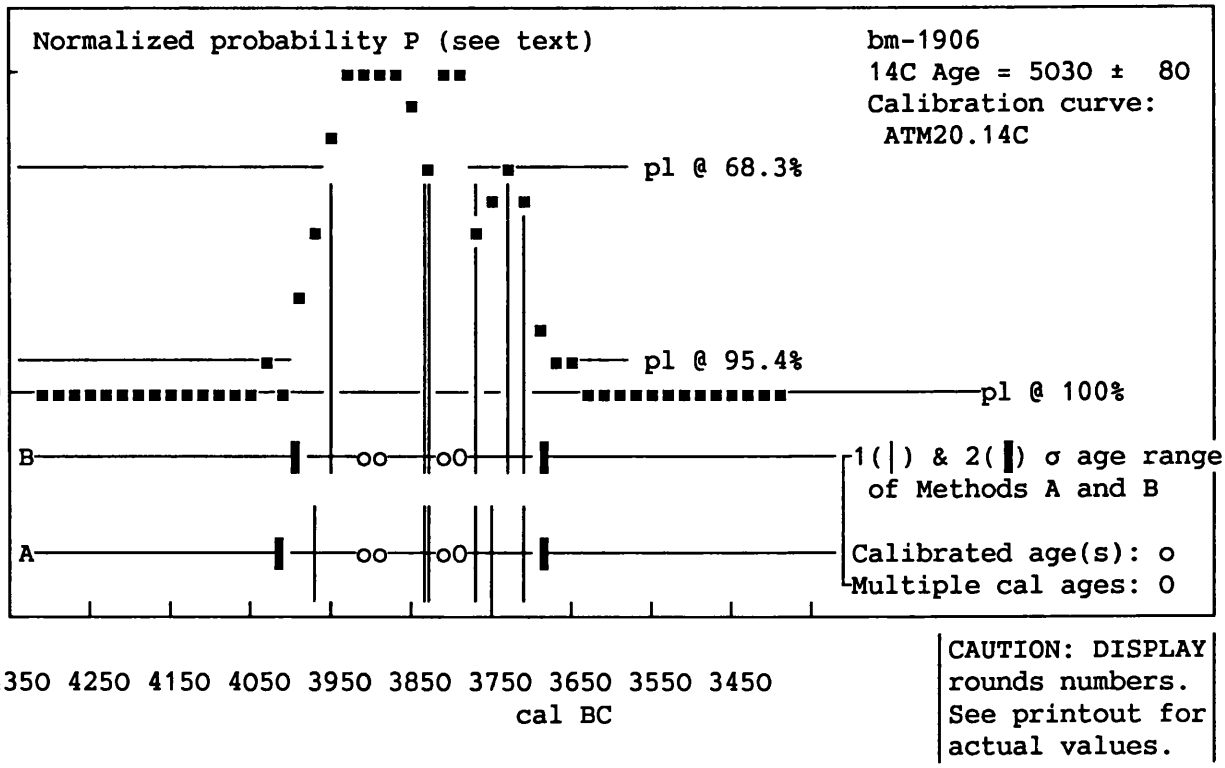
   Summary of above --
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3964 ( 3902, 3883, 3812, 3792, 3790) 3708
                  cal BP 5913 ( 5851, 5832, 5761, 5741, 5739) 5657
      two sigma   cal BC 4000 ( 3902, 3883, 3812, 3792, 3790) 3690
                  cal BP 5949 ( 5851, 5832, 5761, 5741, 5739) 5639

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3953-3840(5902-5789)              .65
                               3825-3779(5774-5728)              .27
                               3735-3718(5684-5667)              .08
    95.4 (two sigma)   cal BC 3997-3687(5946-5636)             1.00
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1906
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4050 4000 3950 3900 3850 3800 3750 3700 3650 3600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1906
14C Age = 5030 ± 80
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4350 4250 4150 4050 3950 3850 3750 3650 3550 3450
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: K/028 vrysi  1.00
gu-521              3105.0  130.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM10.14C
Listing file: aev521.txt
Plot file: aev521.plt

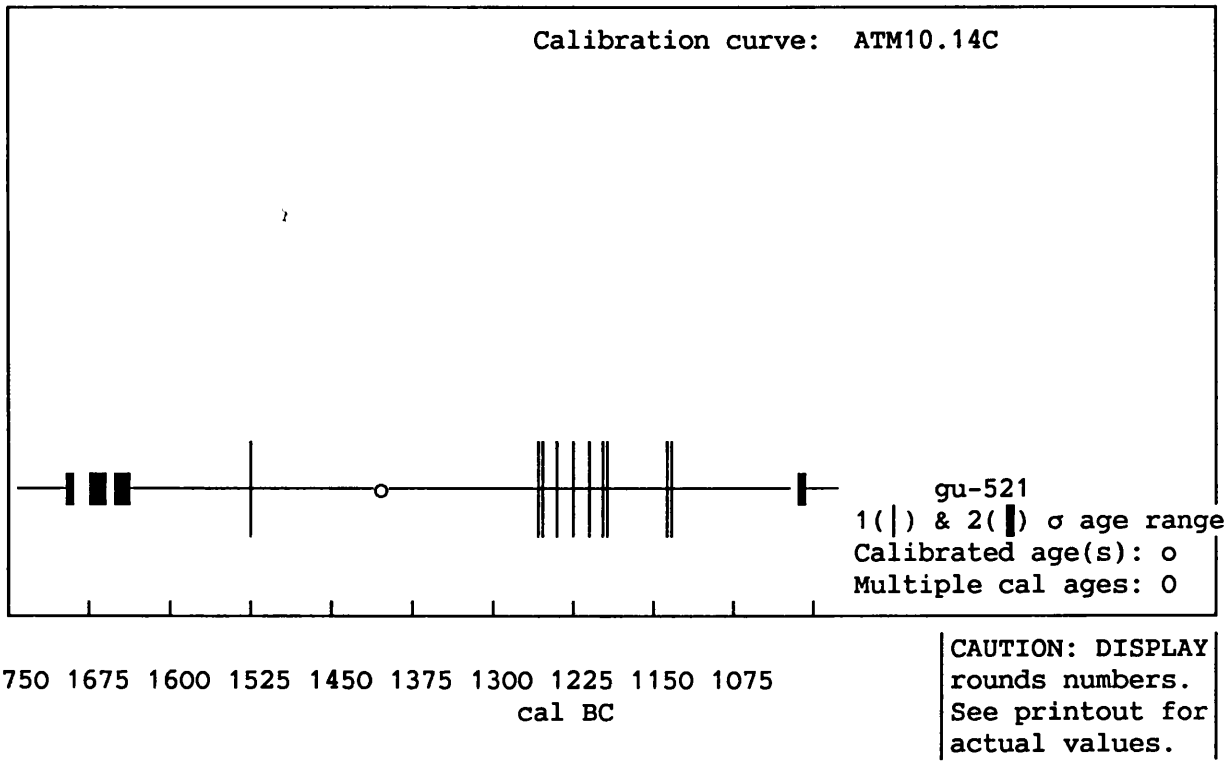

gu-521
 Radiocarbon Age BP  3105.0  ±130.0†                        Reference(s)
  Calibrated age(s) cal BC  1410                        (Stuiver and Becker)
                    cal BP  3359
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 1520-1260(3469-3209) 1251-1245(3200-3194)
                 1232-1215(3181-3164) 1199-1194(3148-3143)
                 1139-1135(3088-3084)
   two Sigma**   cal BC 1689-1670(3638-3619) 1662-1648(3611-3597)
                 1640-1010(3589-2959)

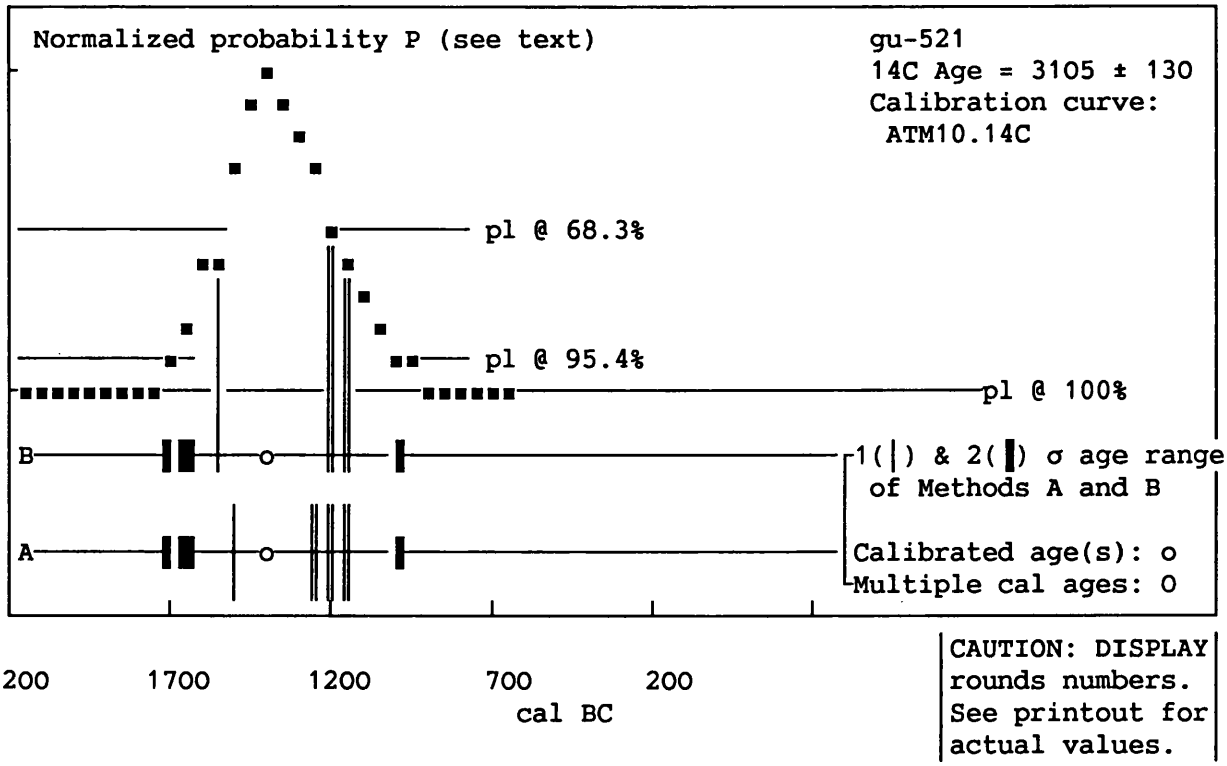
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 1520 ( 1410) 1135
                  cal BP 3469 ( 3359) 3084
      two sigma   cal BC 1689 ( 1410) 1010
                  cal BP 3638 ( 3359) 2959

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 1530-1210(3479-3159)              .95
                              1201-1192(3150-3141)              .02
                              1141-1132(3090-3081)              .02
    95.4 (two sigma)   cal BC 1689-1670(3638-3619)              .01
                              1640-1010(3589-2959)              .98
```

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
gu-521
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
1750 1675 1600 1525 1450 1375 1300 1225 1150 1075
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
gu-521
14C Age = 3105 ± 130
Calibration curve:
ATM10.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2200 1700 1200 700 200
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: S/080 teppes 1.00
st-337 5405.0 110.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: sot337.txt
Plot file: sot337.plt

st-337
Radiocarbon Age BP 5405.0 ±110.0† Reference(s)
Calibrated age(s) cal BC 4325, 4282, 4247 (Pearson et al. 1986)
cal BP 6274, 6231, 6196
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4360-4220(6309-6169) 4202-4144(6151-6093)
4113-4078(6062-6027) 4065-4047(6014-5996)
two Sigma** cal BC 4470-3990(6419-5939)

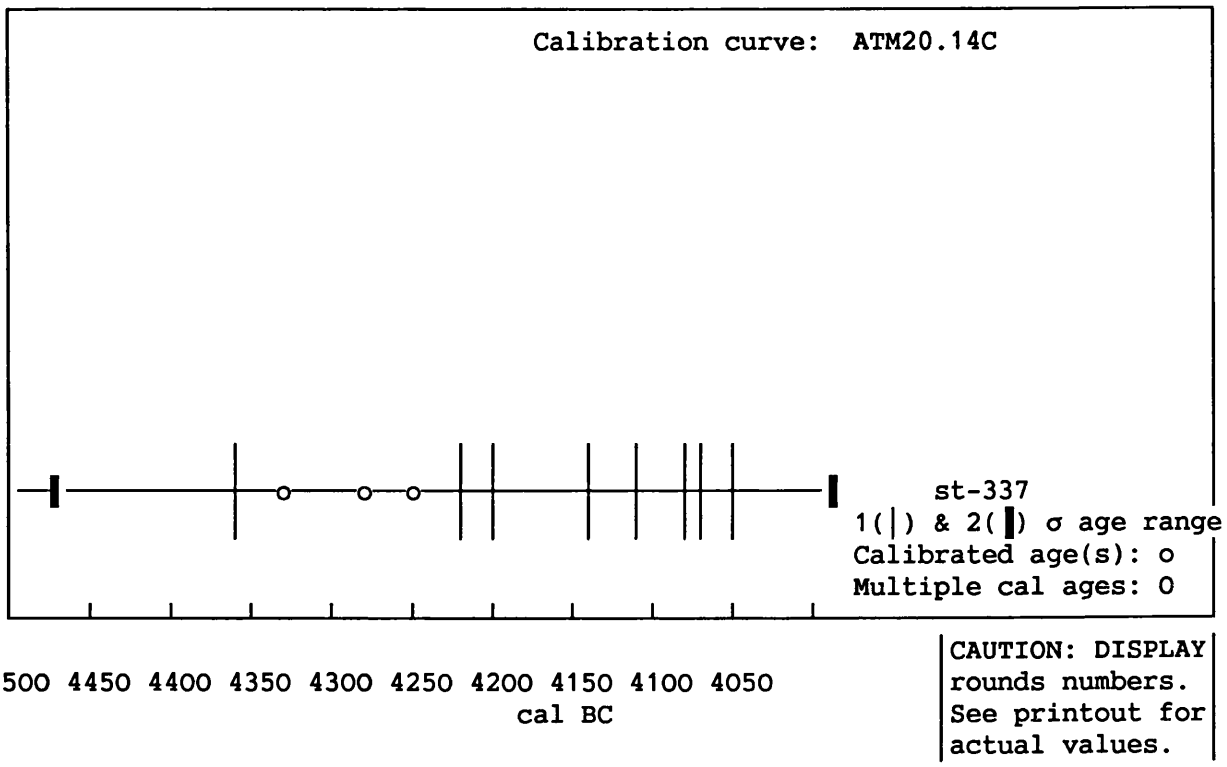
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4360 (4325, 4282, 4247) 4047
cal BP 6309 (6274, 6231, 6196) 5996
two sigma cal BC 4470 (4325, 4282, 4247) 3990
cal BP 6419 (6274, 6231, 6196) 5939

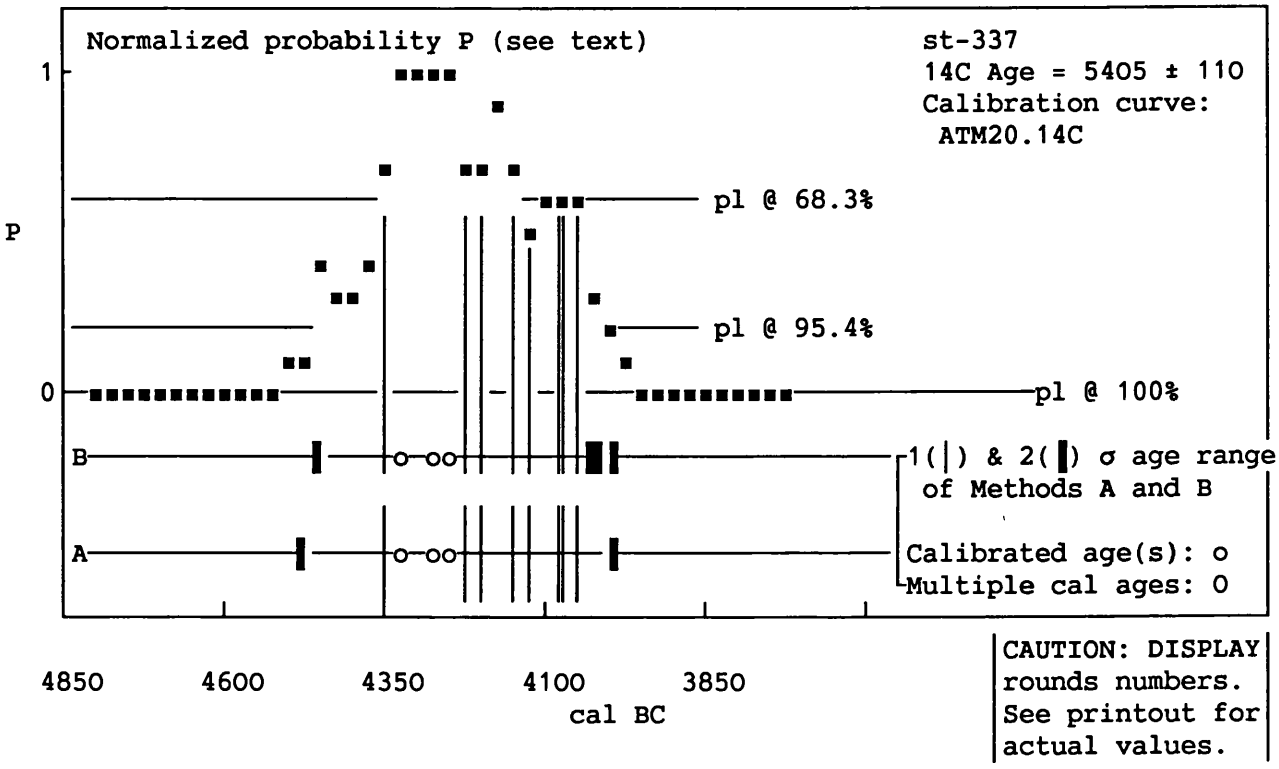
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4360-4220(6309-6169)	.61
	4202-4144(6151-6093)	.22
	4114-4079(6063-6028)	.11
	4065-4047(6014-5996)	.06
95.4 (two sigma)	cal BC 4460-4030(6409-5979)	.97
	4027-4000(5976-5949)	.03

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
st-337
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4500 4450 4400 4350 4300 4250 4200 4150 4100 4050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-337
14C Age = 5405 ± 110
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4850 4600 4350 4100 3850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: S/080 teppes 1.00
st-350 5095.0 130.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: sot350.txt
Plot file: sot350.plt

st-350
Radiocarbon Age BP 5095.0 ±130.0† Reference(s)
Calibrated age(s) cal BC 3954, 3840, 3825 (Pearson et al. 1986)
cal BP 5903, 5789, 5774
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4035-4020(5984-5969) 4000-3780(5949-5729)
3735-3718(5684-5667)
two Sigma** cal BC 4230-3640(6179-5589)

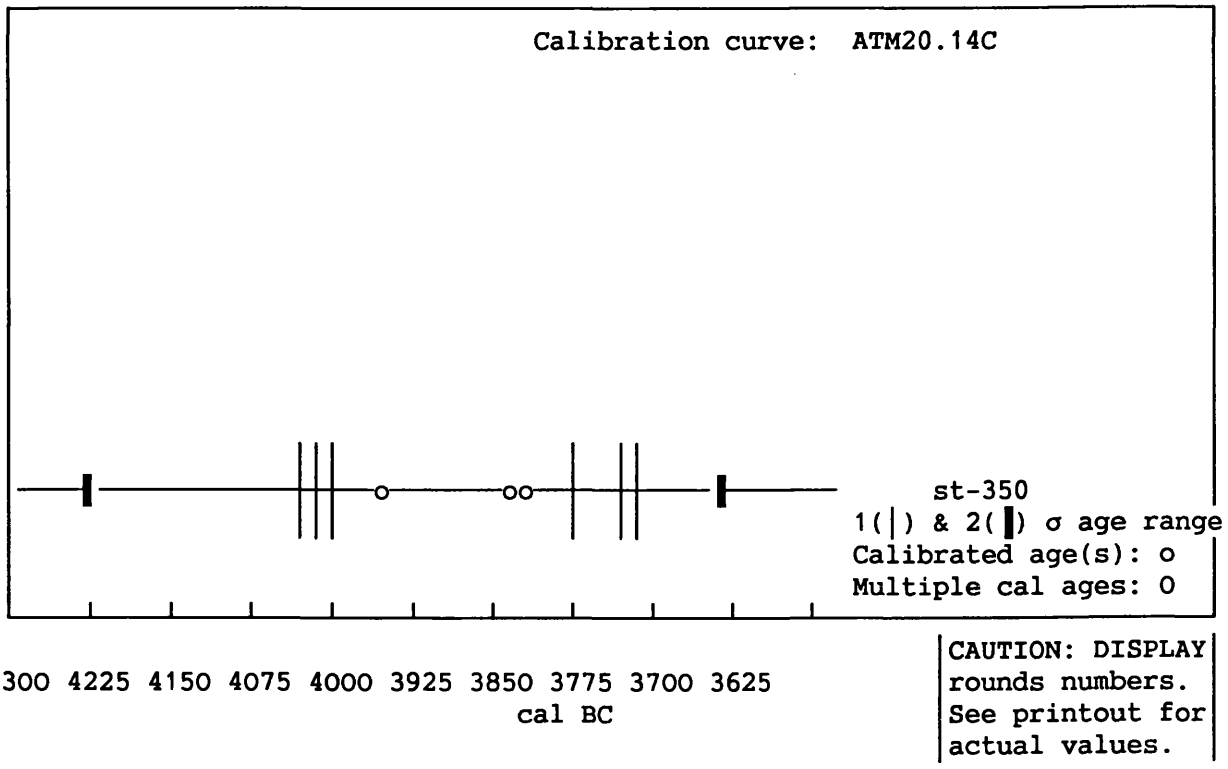
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4035 (3954, 3840, 3825) 3718
cal BP 5984 (5903, 5789, 5774) 5667
two sigma cal BC 4230 (3954, 3840, 3825) 3640
cal BP 6179 (5903, 5789, 5774) 5589

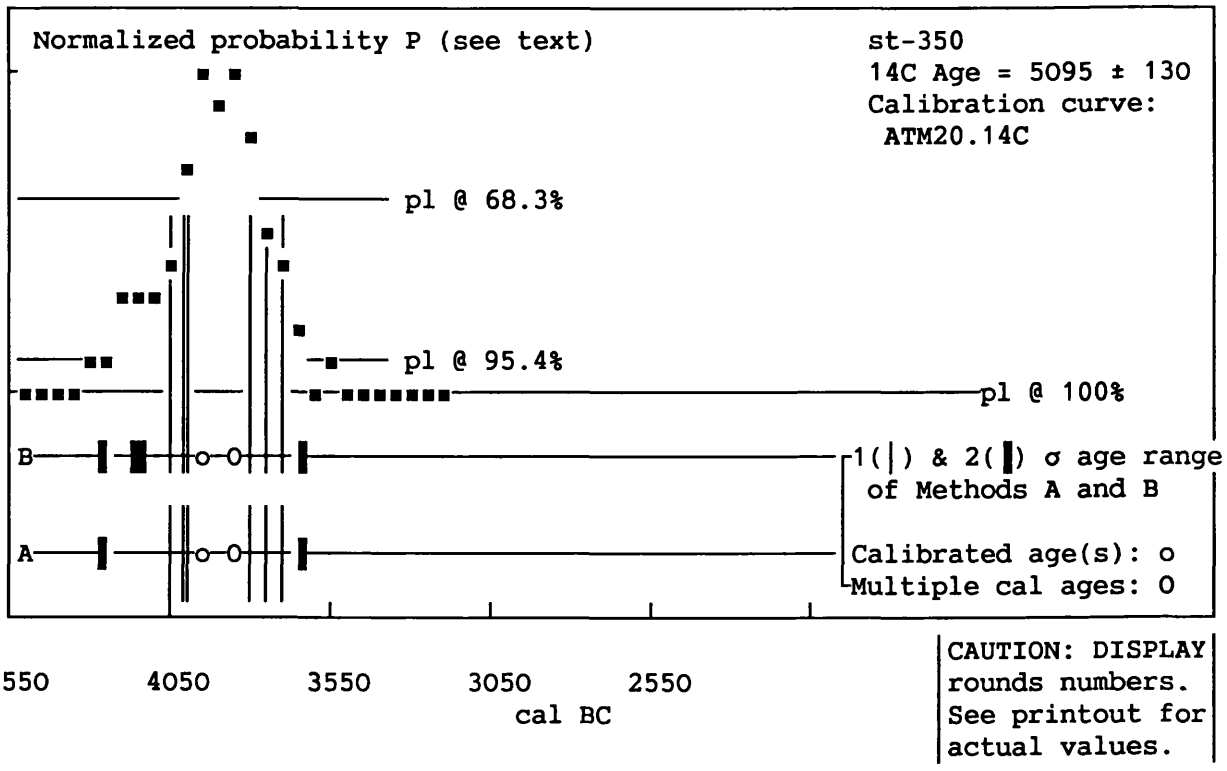
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4036-4016(5985-5965)	.06
	4010-3780(5959-5729)	.86
	3742-3709(5691-5658)	.09
95.4 (two sigma)	cal BC 4234-4174(6183-6123)	.05
	4170-3640(6119-5589)	.95

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
st-350
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
4300 4225 4150 4075 4000 3925 3850 3775 3700 3625
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-350
14C Age = 5095 ± 130
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
4550 4050 3550 3050 2550
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: N/019 drakos a  1.00
birm-72              5270.0  100.0       .0      .0  100.0      .0
xx
Calibration file(s): ATM20.14C
Listing file: pda72.txt
Plot file: pda72.plt

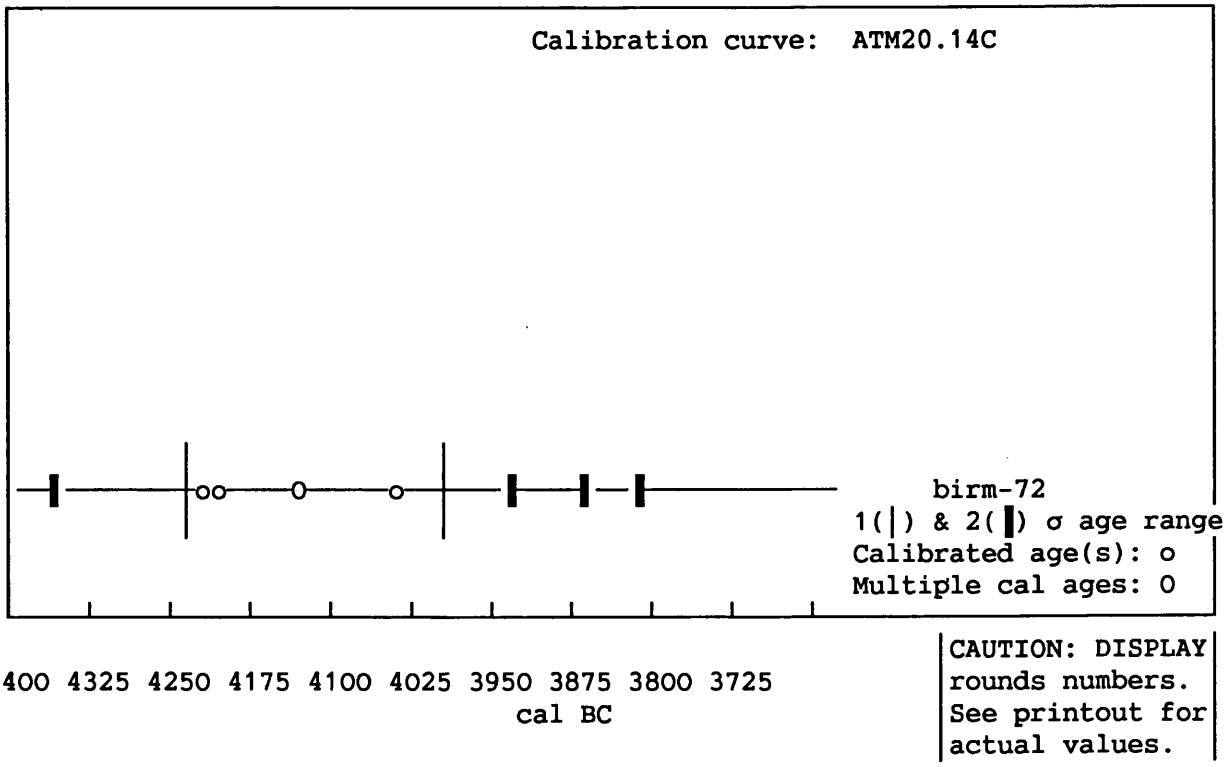

birm-72
 Radiocarbon Age BP  5270.0  ±100.0†                          Reference(s)
  Calibrated age(s) cal BC  4213, 4207, 4134              (Pearson et al. 1986)
                            4125, 4043
                    cal BP  6162, 6156, 6083
                            6074, 5992
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4240-3990(6189-5939)
   two Sigma**   cal BC 4350-3940(6299-5889) 3857-3819(5806-5768)

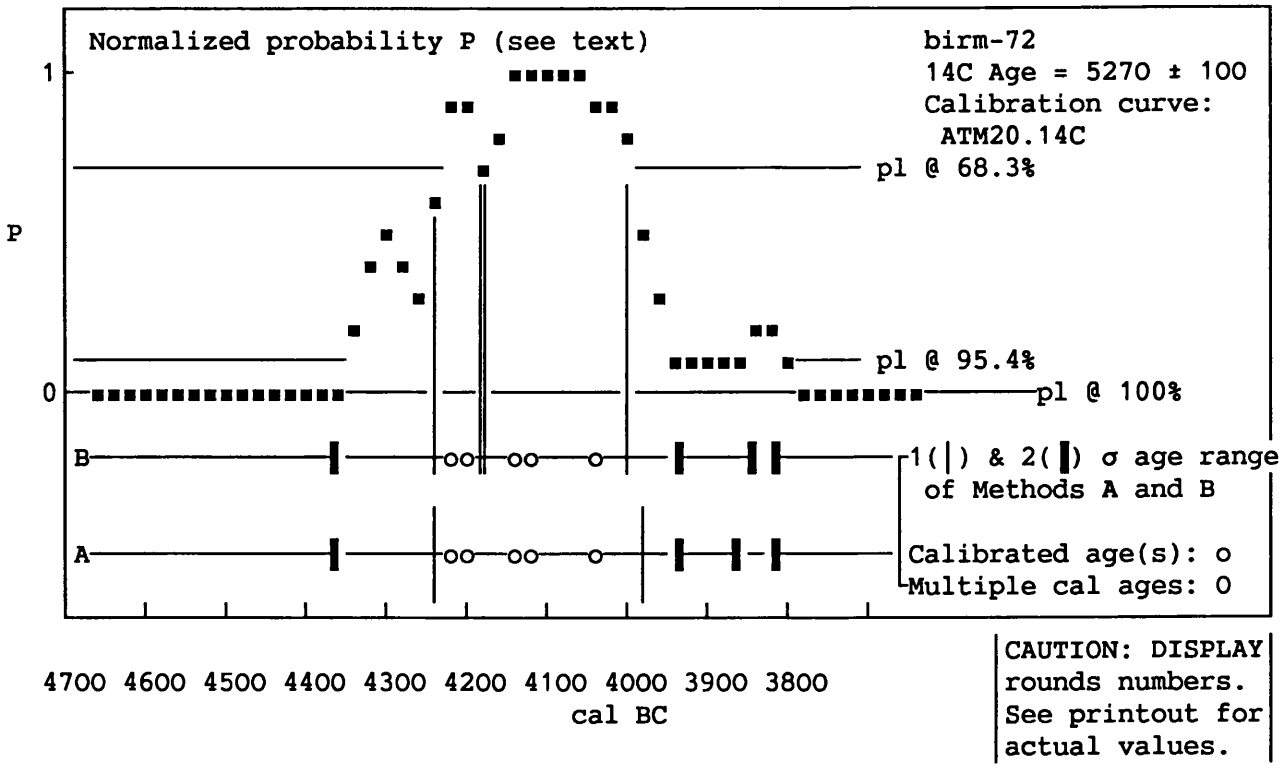
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4240 ( 4213, 4207, 4134, 4125, 4043) 3990
                  cal BP 6189 ( 6162, 6156, 6083, 6074, 5992) 5939
      two sigma   cal BC 4350 ( 4213, 4207, 4134, 4125, 4043) 3819
                  cal BP 6299 ( 6162, 6156, 6083, 6074, 5992) 5768

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4233-4181(6182-6130)              .23
                              4170-4000(6119-5949)              .77
    95.4 (two sigma)   cal BC 4350-3940(6299-5889)              .98
                              3849-3820(5798-5769)              .02
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
birm-72
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4400 4325 4250 4175 4100 4025 3950 3875 3800 3725
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
P
1
0
birm-72
14C Age = 5270 ± 100
Calibration curve:
ATM20.14C
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4700 4600 4500 4400 4300 4200 4100 4000 3900 3800
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/061 k-pamboules 1.00
st-419 5085.0 110.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kpam419.txt
Plot file: kpam419.plt

st-419
Radiocarbon Age BP 5085.0 ±110.0† Reference(s)
Calibrated age(s) cal BC 3948, 3844, 3823 (Pearson et al. 1986)
cal BP 5897, 5793, 5772
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4000-3780(5949-5729)
two Sigma** cal BC 4222-4199(6171-6148) 4150-4053(6099-6002)
4050-3680(5999-5629) 3656-3649(5605-5598)

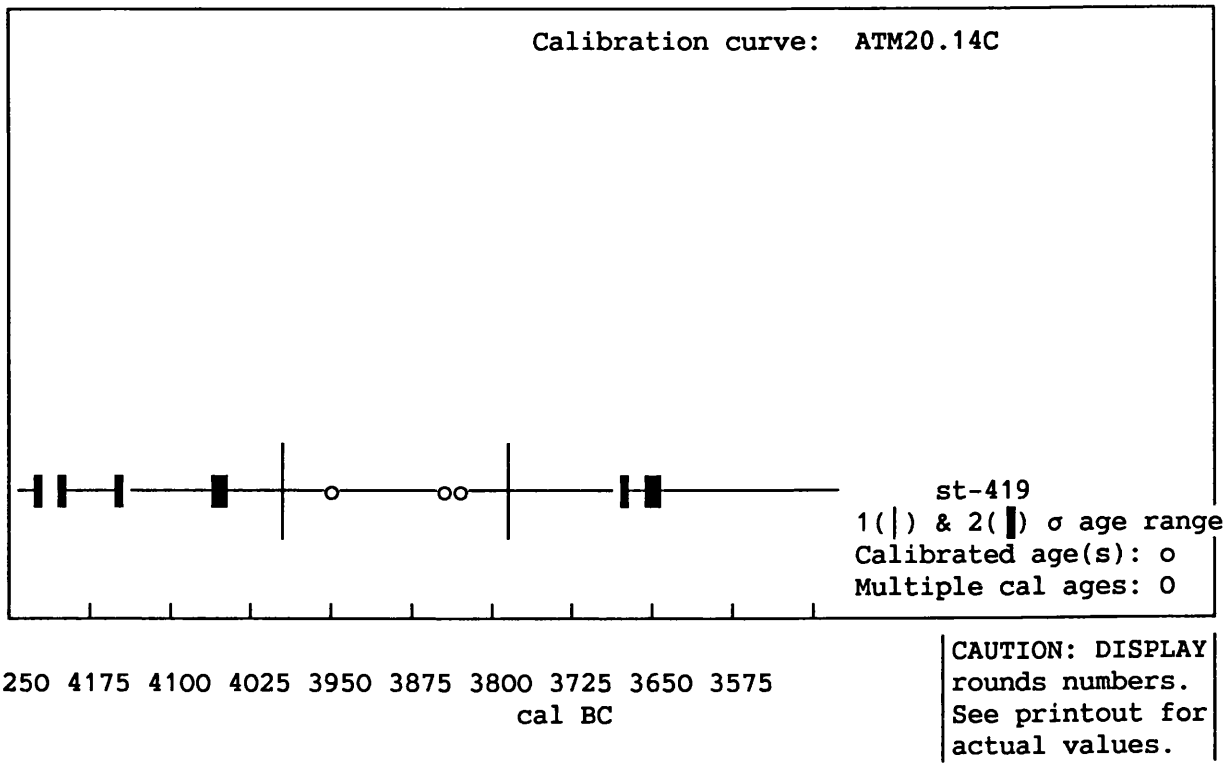
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4000 (3948, 3844, 3823) 3780
cal BP 5949 (5897, 5793, 5772) 5729
two sigma cal BC 4222 (3948, 3844, 3823) 3649
cal BP 6171 (5897, 5793, 5772) 5598

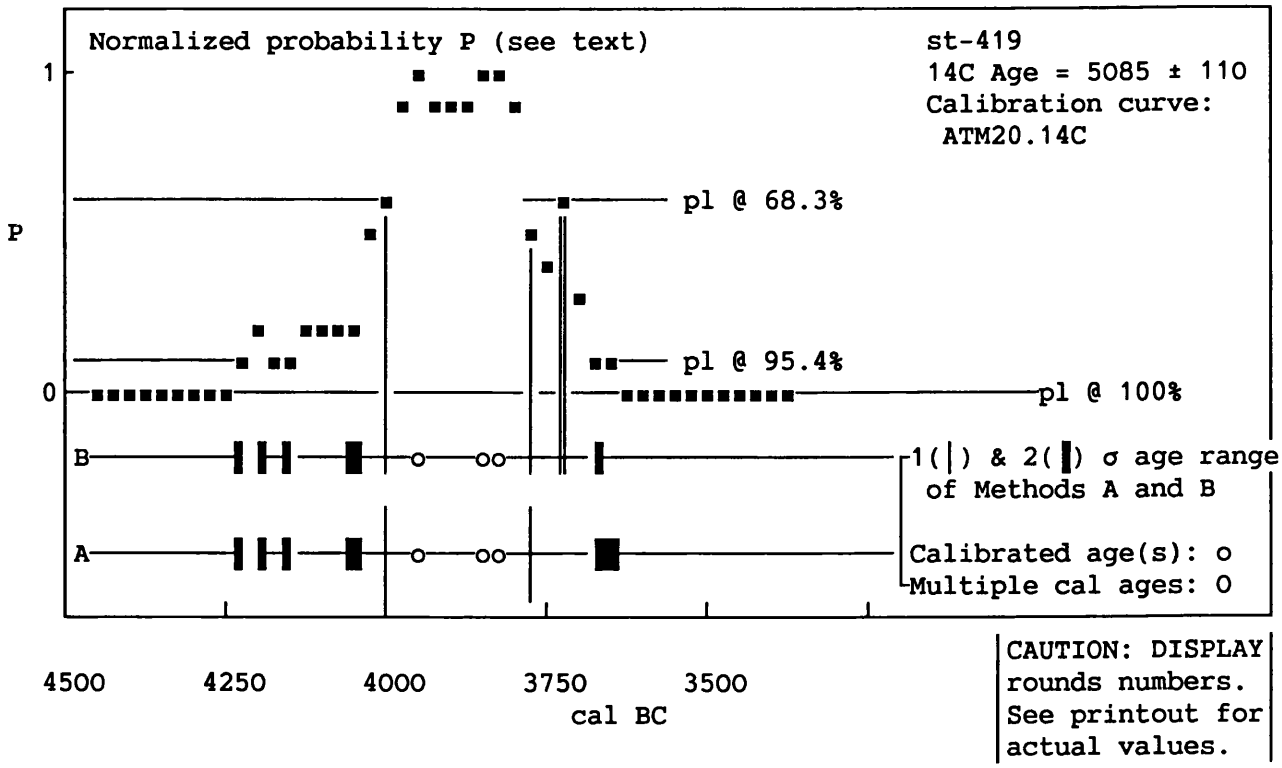
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4000-3780(5949-5729)	.97
	3733-3724(5682-5673)	.03
95.4 (two sigma)	cal BC 4222-4198(6171-6147)	.02
	4151-4053(6100-6002)	.06
	4050-3680(5999-5629)	.91

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
st-419
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
4250 4175 4100 4025 3950 3875 3800 3725 3650 3575
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-419
14C Age = 5085 ± 110
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
4500 4250 4000 3750 3500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

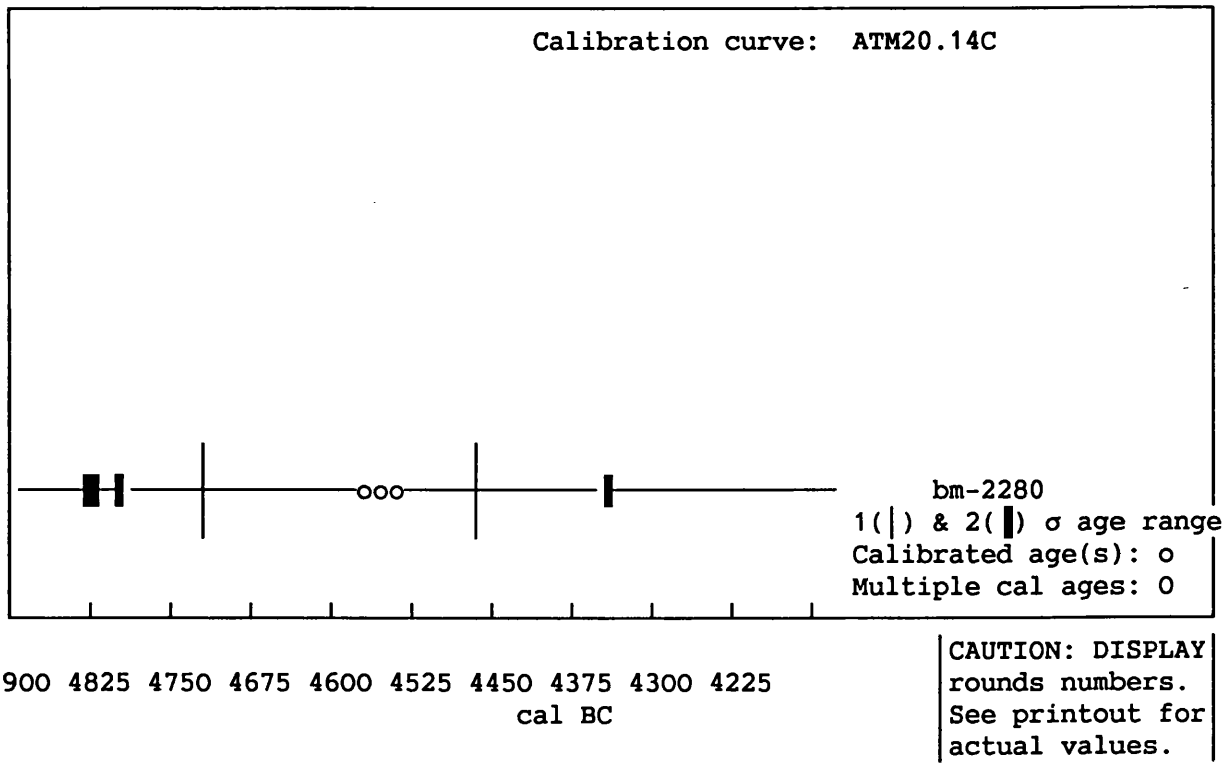
```
Site ID: P/085 lemba  1.00
bm-2280              5710.0  100.0       .0      .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: ll2280.txt
Plot file: ll2280.plt

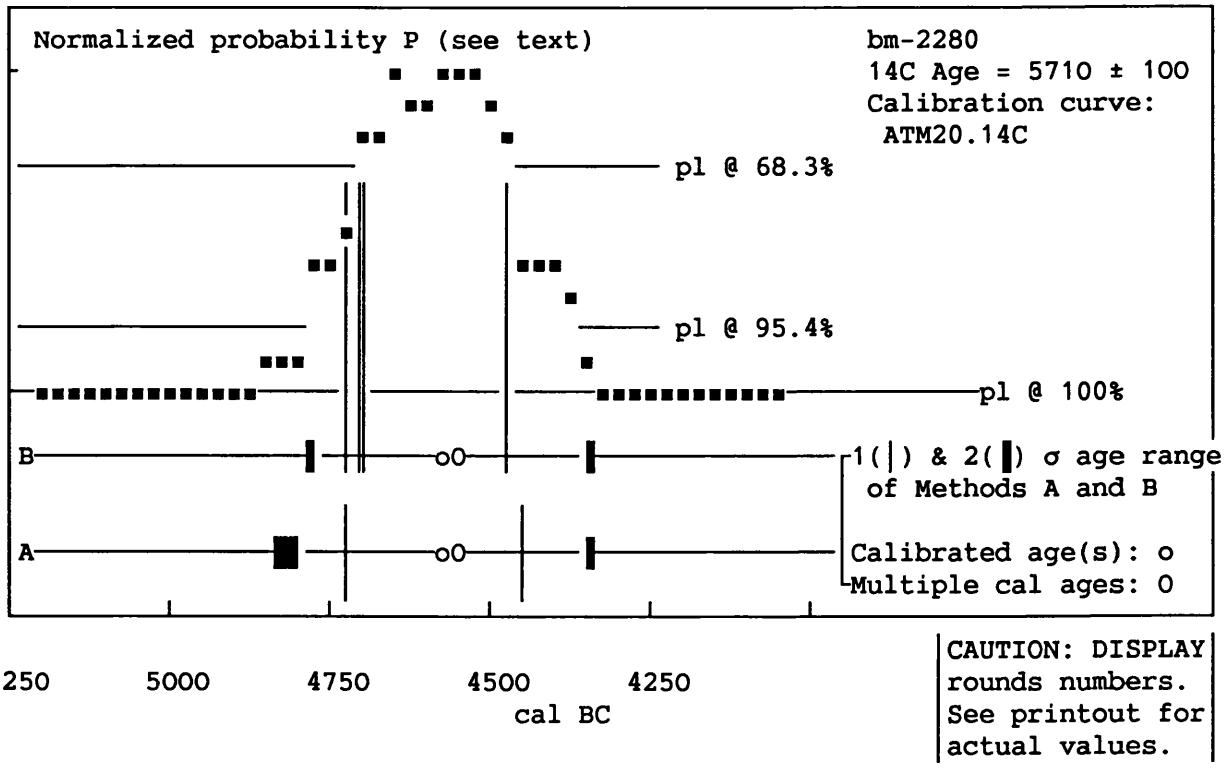

bm-2280◆
 Radiocarbon Age BP  5710.0  ±100.0†                          Reference(s)
  Calibrated age(s) cal BC  4577, 4553, 4547             (Pearson et al. 1986)
                    cal BP  6526, 6502, 6496
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 4720-4460(6669-6409)
   two Sigma**   cal BC 4831-4829(6780-6778) 4790-4350(6739-6299)
   Summary of above —-
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 4720 ( 4577, 4553, 4547) 4460
                  cal BP 6669 ( 6526, 6502, 6496) 6409
      two sigma   cal BC 4831 ( 4577, 4553, 4547) 4350
                  cal BP 6780 ( 6526, 6502, 6496) 6299

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 4713-4699(6662-6648)              .05
                              4690-4470(6639-6419)              .95
    95.4 (two sigma)   cal BC 4780-4360(6729-6309)             1.00
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-2280
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4900 4825 4750 4675 4600 4525 4450 4375 4300 4225
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-2280
14C Age = 5710 ± 100
Calibration curve: ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5250 5000 4750 4500 4250
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: P/085 lemba 1.00
bm-1543 5000.0 260.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: ll1543.txt
Plot file: ll1543.plt

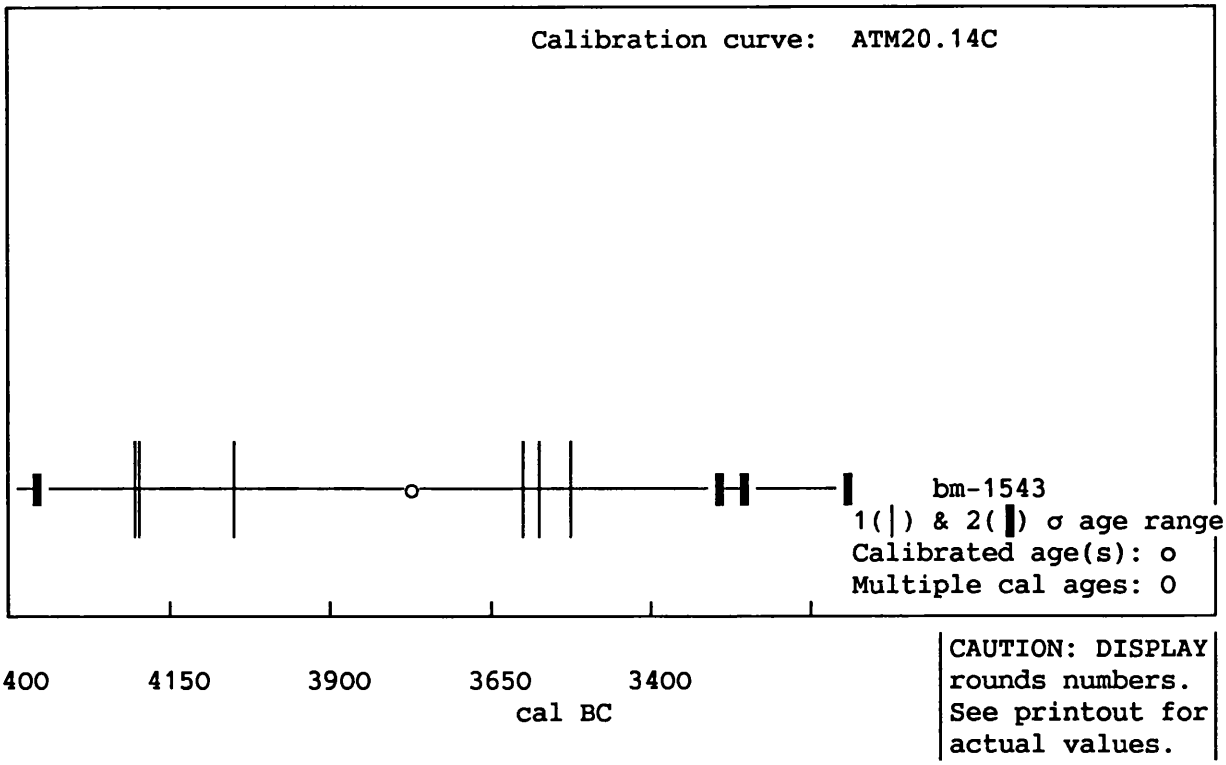
bm-1543
Radiocarbon Age BP 5000.0 ±260.0† Reference(s)
Calibrated age(s) cal BC 3785 (Pearson et al. 1986)
cal BP 5734
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 4211-4209(6160-6158) 4040-3600(5989-5549)
3586-3518(5535-5467)
two Sigma** cal BC 4360-3290(6309-5239) 3240-3100(5189-5049)
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 4211 (3785) 3518
cal BP 6160 (5734) 5467
two sigma cal BC 4360 (3785) 3100
cal BP 6309 (5734) 5049

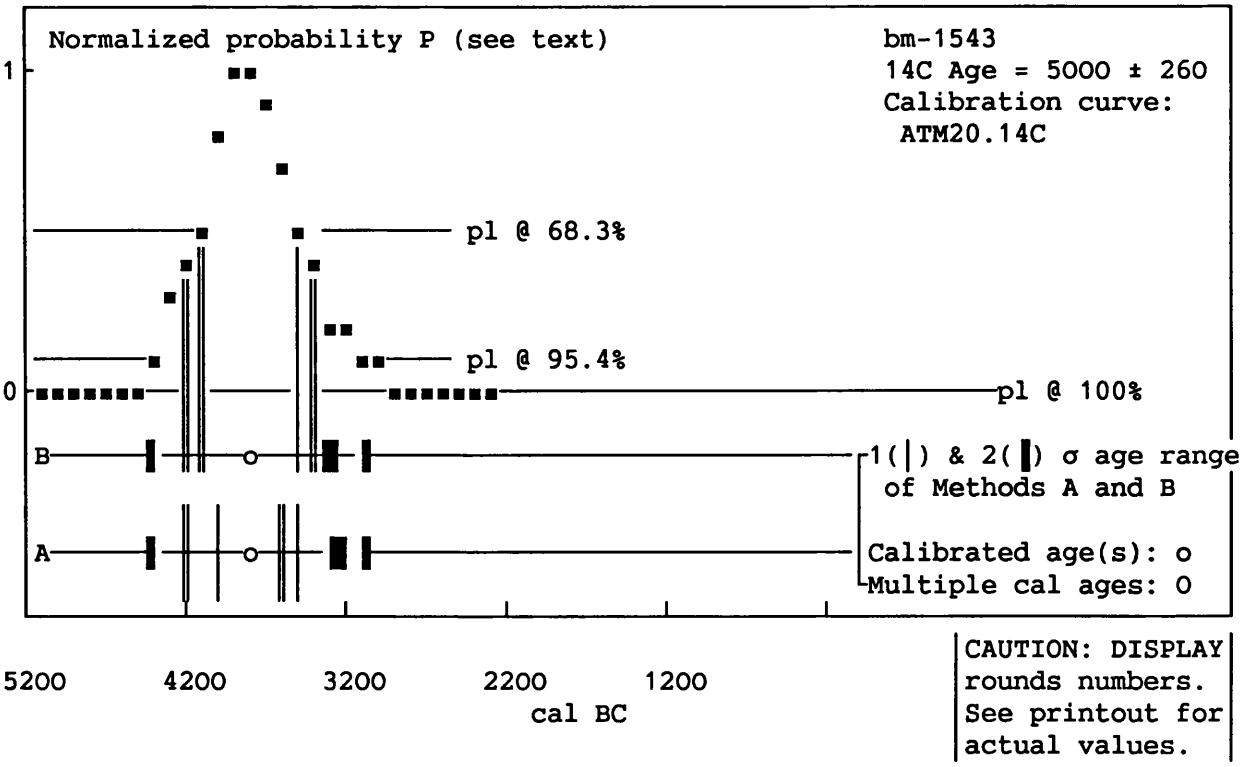
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 4218-4202(6167-6151)	.02
	4144-4114(6093-6063)	.03
	4076-4067(6025-6016)	.01
	4050-3510(5999-5459)	.92
	3402-3386(5351-5335)	.02
95.4 (two sigma)	cal BC 4360-3260(6309-5209)	.96
	3250-3100(5199-5049)	.04

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1543
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4400
4150
3900
3650
3400
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1543
14C Age = 5000 ± 260
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
5200
4200
3200
2200
1200
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: P/085 lemba 1.00
har-6173 4280.0 100.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: ll6173.txt
Plot file: ll6173.plt

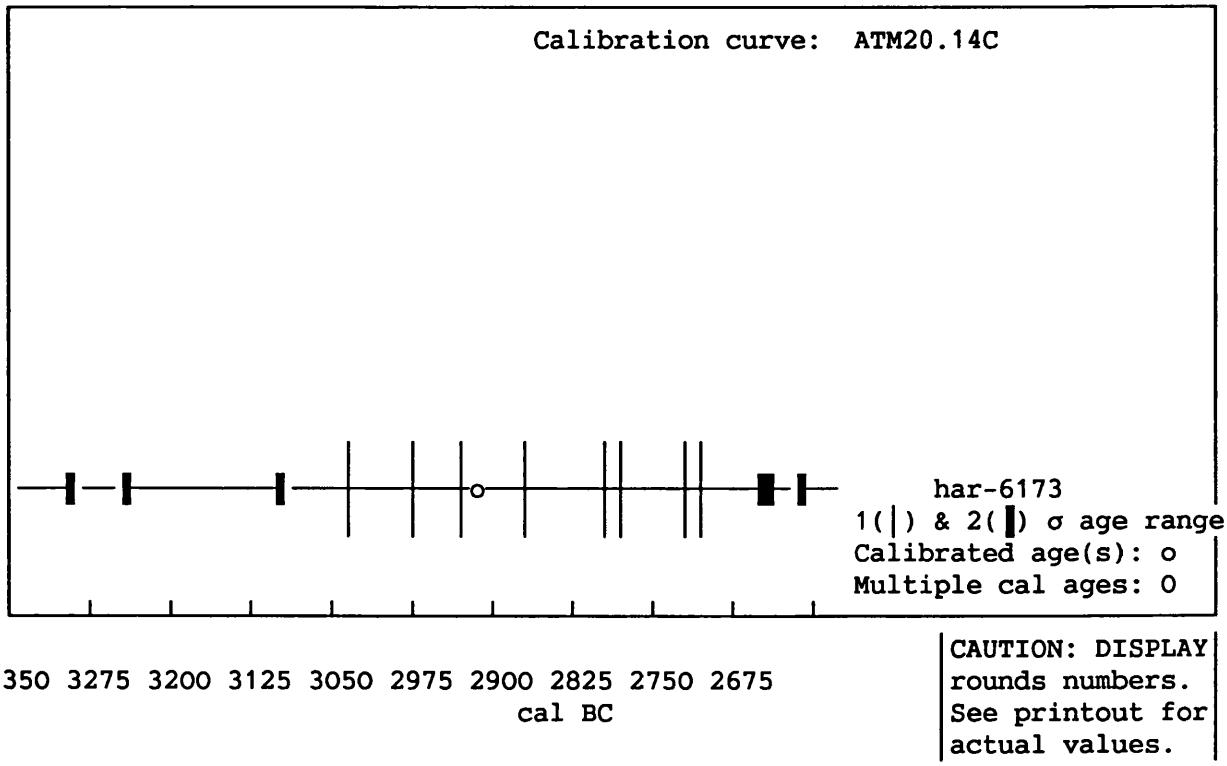
har-6173
Radiocarbon Age BP 4280.0 ±100.0† Reference(s)
Calibrated age(s) cal BC 2911 (Pearson et al. 1986)
cal BP 4860
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 3028-2982(4977-4931) 2930-2874(4879-4823)
2802-2778(4751-4727) 2715-2706(4664-4655)
two Sigma** cal BC 3297-3241(5246-5190) 3100-2650(5049-4599)
2648-2611(4597-4560)
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 3028 (2911) 2706
cal BP 4977 (4860) 4655
two sigma cal BC 3297 (2911) 2611
cal BP 5246 (4860) 4560

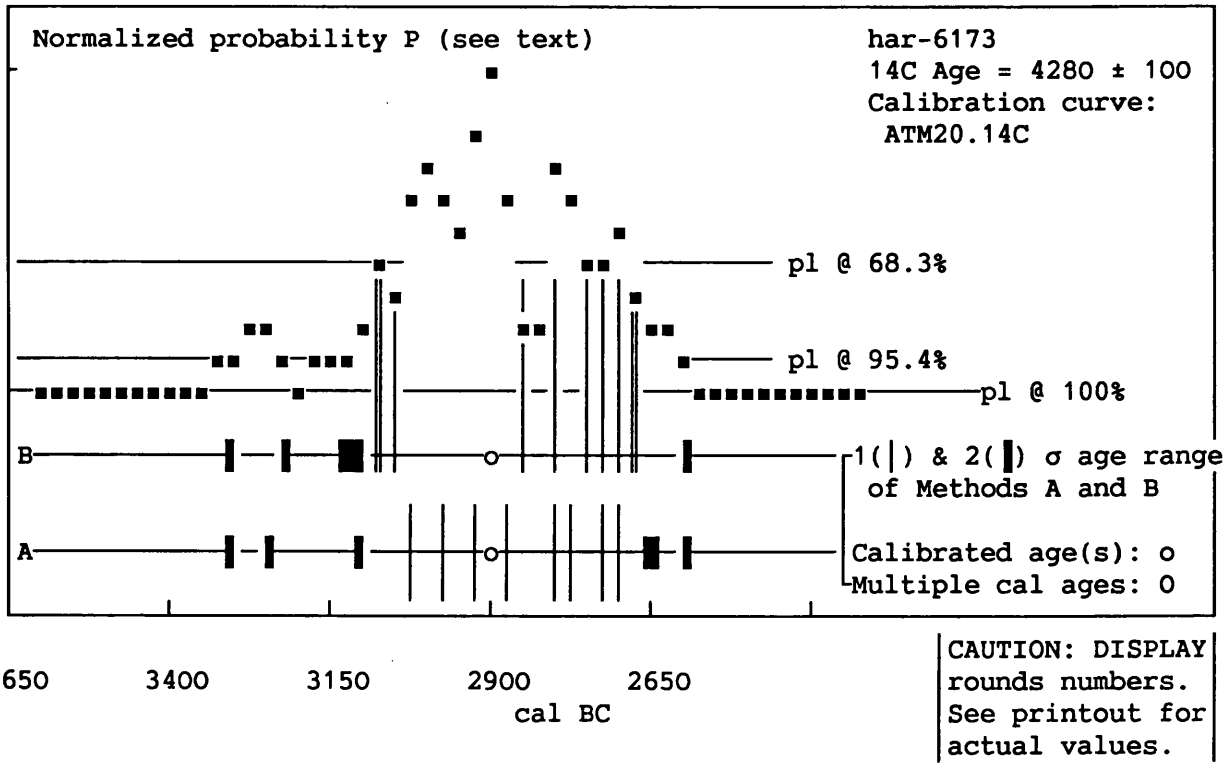
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 3077-3069(5026-5018)	.02
	3040-2860(4989-4809)	.67
	2811-2745(4760-4694)	.20
	2726-2697(4675-4646)	.09
	2675-2667(4624-4616)	.02
95.4 (two sigma)	cal BC 3306-3236(5255-5185)	.04
	3133-3113(5082-5062)	.01
	3110-2590(5059-4539)	.94

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
har-6173
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3350 3275 3200 3125 3050 2975 2900 2825 2750 2675
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
har-6173
14C Age = 4280 ± 100
Calibration curve:
ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3650 3400 3150 2900 2650
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: P/085 lemba 1.00
bm-1542 4090.0 90.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: ll1542.txt
Plot file: ll1542.plt

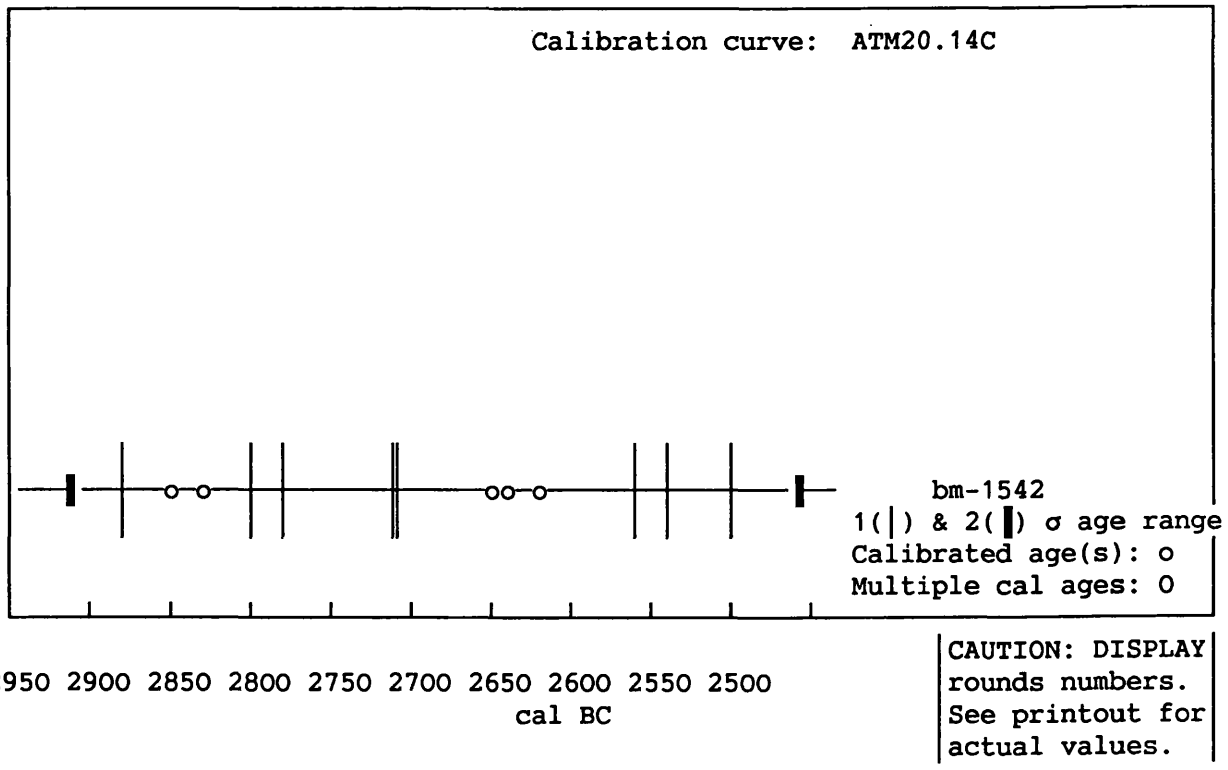
bm-1542
Radiocarbon Age BP 4090.0 ± 90.0† Reference(s)
Calibrated age(s) cal BC 2853, 2828, 2655 (Pearson et al. 1986)
2644, 2615
cal BP 4802, 4777, 4604
4593, 4564
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 2875-2801(4824-4750) 2778-2715(4727-4664)
2706-2563(4655-4512) 2542-2498(4491-4447)
two Sigma** cal BC 2910-2460(4859-4409)
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 2875 (2853, 2828, 2655, 2644, 2615) 2498
cal BP 4824 (4802, 4777, 4604, 4593, 4564) 4447
two sigma cal BC 2910 (2853, 2828, 2655, 2644, 2615) 2460
cal BP 4859 (4802, 4777, 4604, 4593, 4564) 4409

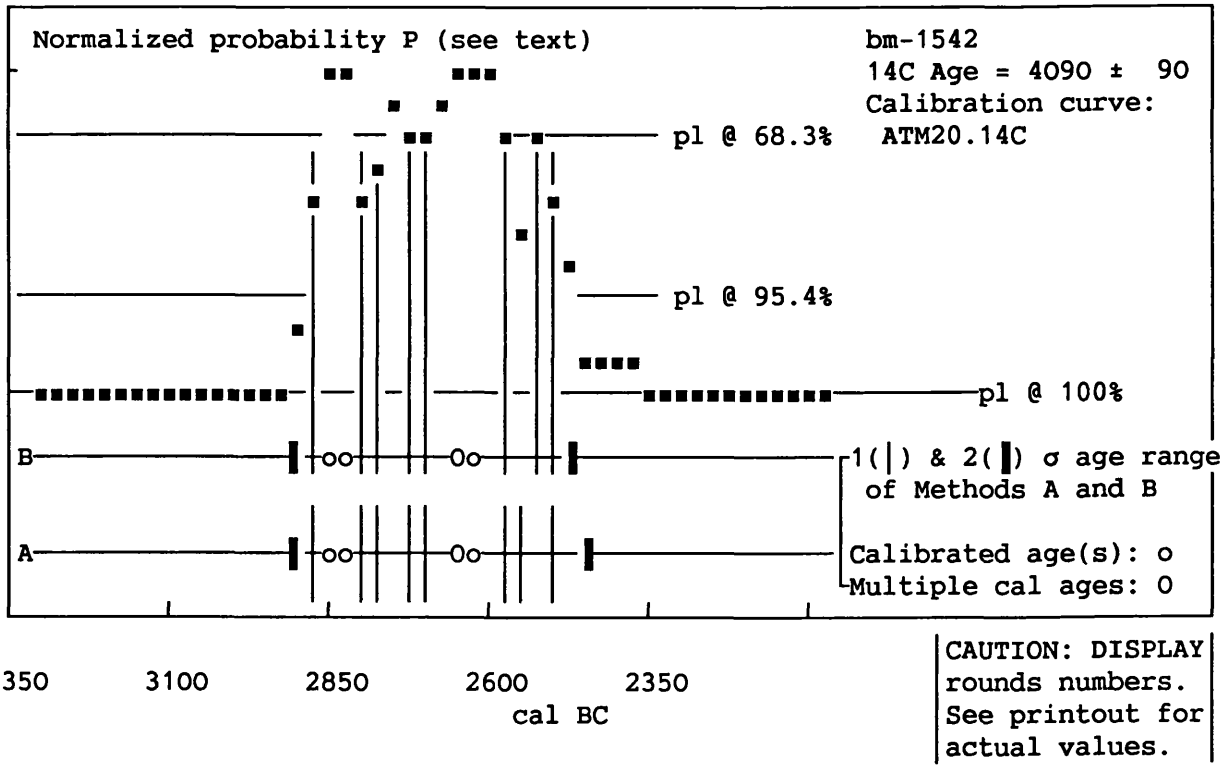
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 2867-2808(4816-4757)	.24
	2772-2722(4721-4671)	.19
	2700-2576(4649-4525)	.49
	2532-2510(4481-4459)	.08
95.4 (two sigma)	cal BC 2892-2466(4841-4415)	1.00

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1542
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: O
2950 2900 2850 2800 2750 2700 2650 2600 2550 2500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1542
14C Age = 4090 ± 90
Calibration curve: ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: O
3350 3100 2850 2600 2350
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

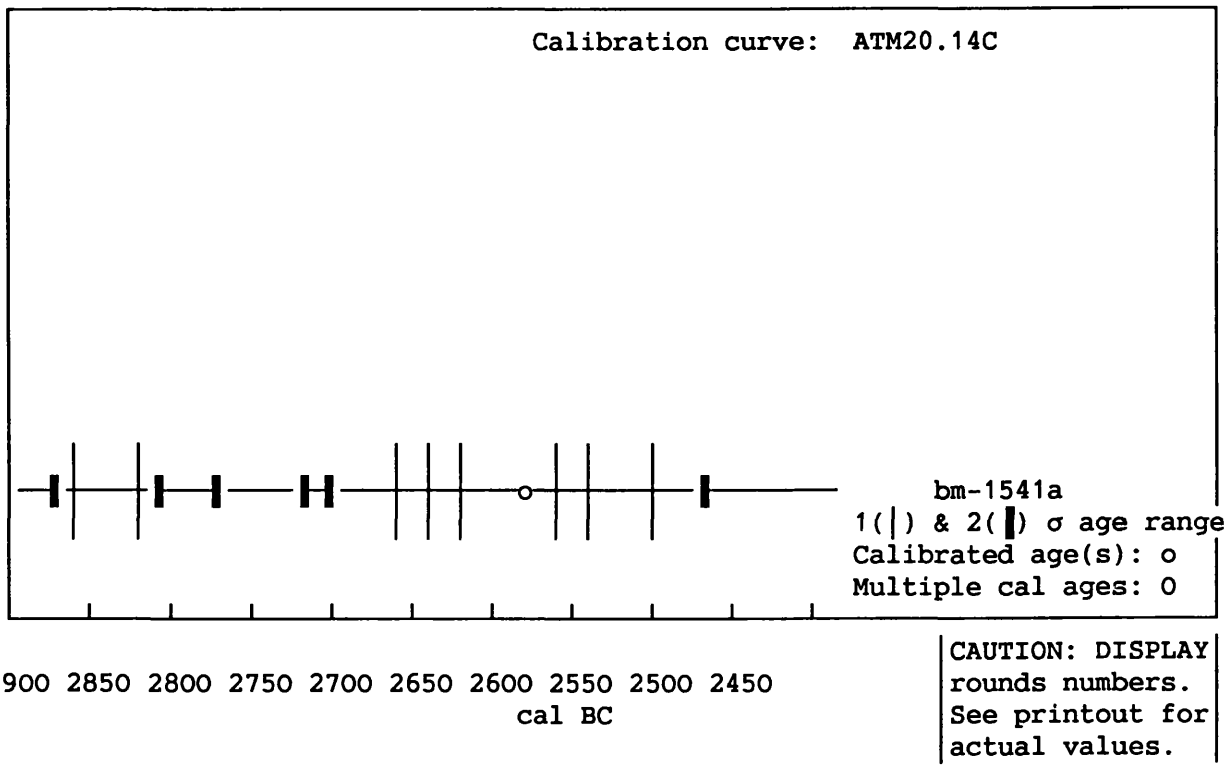
```
Site ID: P/085 lemba  1.00
bm-1541a             4050.0   50.0       .0      .0  100.0      .0
xx
Calibration file(s): ATM20.14C
Listing file: ll1541a.txt
Plot file: ll1541a.plt

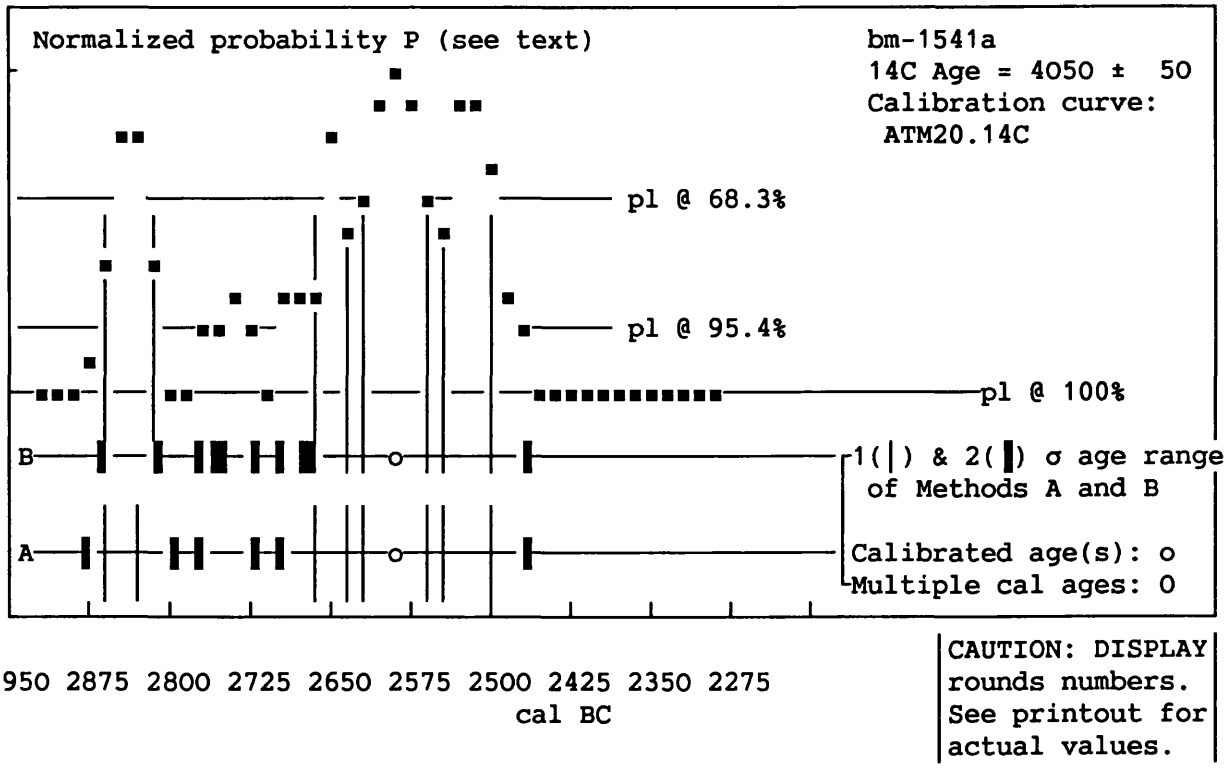

bm-1541a
 Radiocarbon Age BP  4050.0  ± 50.0†                          Reference(s)
  Calibrated age(s) cal BC  2584                          (Pearson et al. 1986)
                    cal BP  4533
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 2856-2823(4805-4772) 2658-2640(4607-4589)
                 2620-2563(4569-4512) 2542-2498(4491-4447)
   two Sigma**   cal BC 2868-2807(4817-4756) 2773-2722(4722-4671)
                 2700-2470(4649-4419)
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 2856 ( 2584) 2498
                  cal BP 4805 ( 4533) 4447
      two sigma   cal BC 2868 ( 2584) 2470
                  cal BP 4817 ( 4533) 4419

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 2857-2822(4806-4771)              .20
                              2659-2638(4608-4587)              .12
                              2622-2560(4571-4509)              .39
                              2544-2497(4493-4446)              .29
    95.4 (two sigma)   cal BC 2865-2809(4814-4758)              .18
                              2771-2754(4720-4703)              .02
                              2748-2725(4697-4674)              .04
                              2698-2673(4647-4622)              .05
                              2668-2470(4617-4419)              .71
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1541a
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2900 2850 2800 2750 2700 2650 2600 2550 2500 2450
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1541a
14C Age = 4050 ± 50
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2950 2875 2800 2725 2650 2575 2500 2425 2350 2275
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: P/085 lemba  1.00
bm-1541              4000.0   45.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: ll1541.txt
Plot file: ll1541.plt

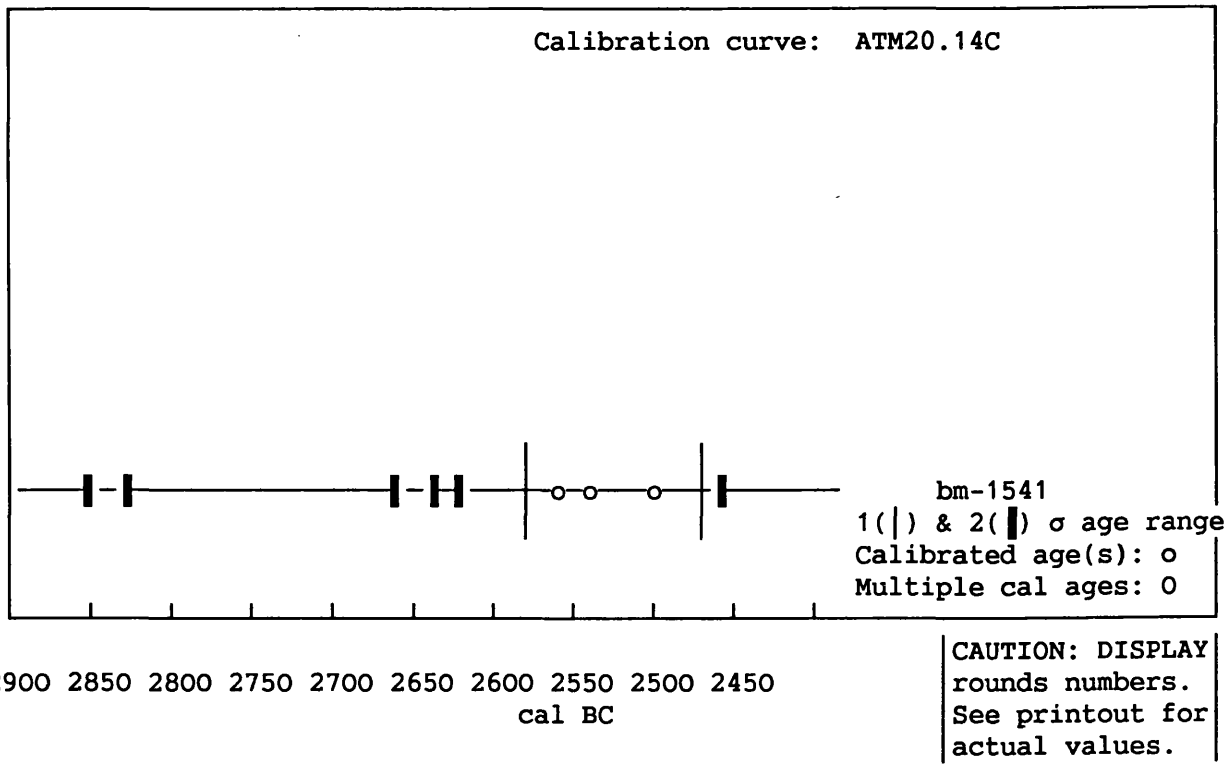

bm-1541
 Radiocarbon Age BP  4000.0  ± 45.0†                          Reference(s)
  Calibrated age(s) cal BC  2564, 2541, 2499              (Pearson and Stuiver)
                    cal BP  4513, 4490, 4448              (Pearson et al. 1986)
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 2583-2468(4532-4417)
   two Sigma**   cal BC 2854-2826(4803-4775) 2656-2642(4605-4591)
                 2617-2458(4566-4407)

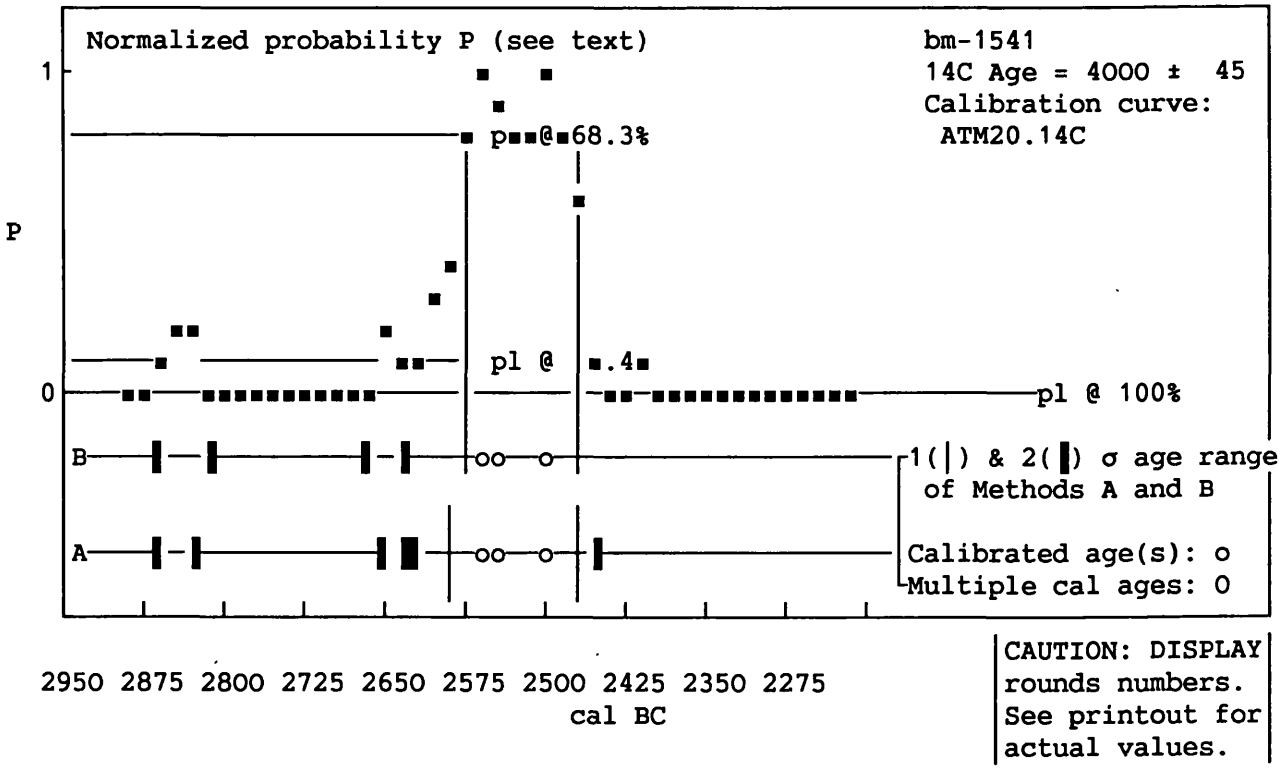
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 2583 ( 2564, 2541, 2499) 2468
                  cal BP 4532 ( 4513, 4490, 4448) 4417
      two sigma   cal BC 2854 ( 2564, 2541, 2499) 2458
                  cal BP 4803 ( 4513, 4490, 4448) 4407

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 2578-2477(4527-4426)            1.00
    95.4 (two sigma)   cal BC 2858-2821(4807-4770)             .05
                              2660-2637(4609-4586)             .03
```

References for datasets [and intervals] used:
Pearson, GW and Stuiver, M, 1986, Radiocarbon, 28, 839-862.
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1541
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2900 2850 2800 2750 2700 2650 2600 2550 2500 2450
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1541
14C Age = 4000 ± 45
Calibration curve:
ATM20.14C
P
1
0
p■■@■68.3%
pl @ ■.4■
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2950 2875 2800 2725 2650 2575 2500 2425 2350 2275
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: P/085 lemba 1.00
bm-1354 3970.0 45.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: lll354.txt
Plot file: lll354.plt

bm-1354
Radiocarbon Age BP 3970.0 ± 45.0† Reference(s)
Calibrated age(s) cal BC 2483 (Pearson and Stuiver)
cal BP 4432
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 2571-2536(4520-4485) 2505-2462(4454-4411)
two Sigma** cal BC 2588-2453(4537-4402) 2425-2397(4374-4346)

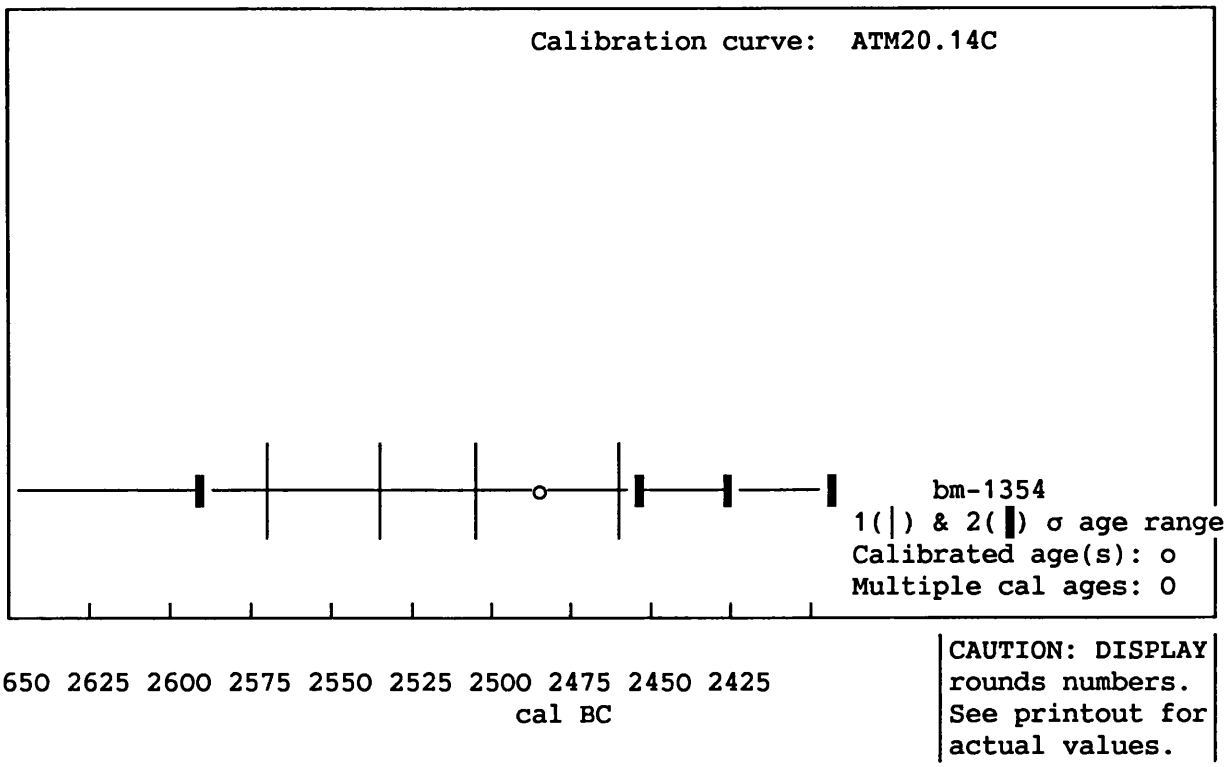
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 2571 (2483) 2462
cal BP 4520 (4432) 4411
two sigma cal BC 2588 (2483) 2397
cal BP 4537 (4432) 4346

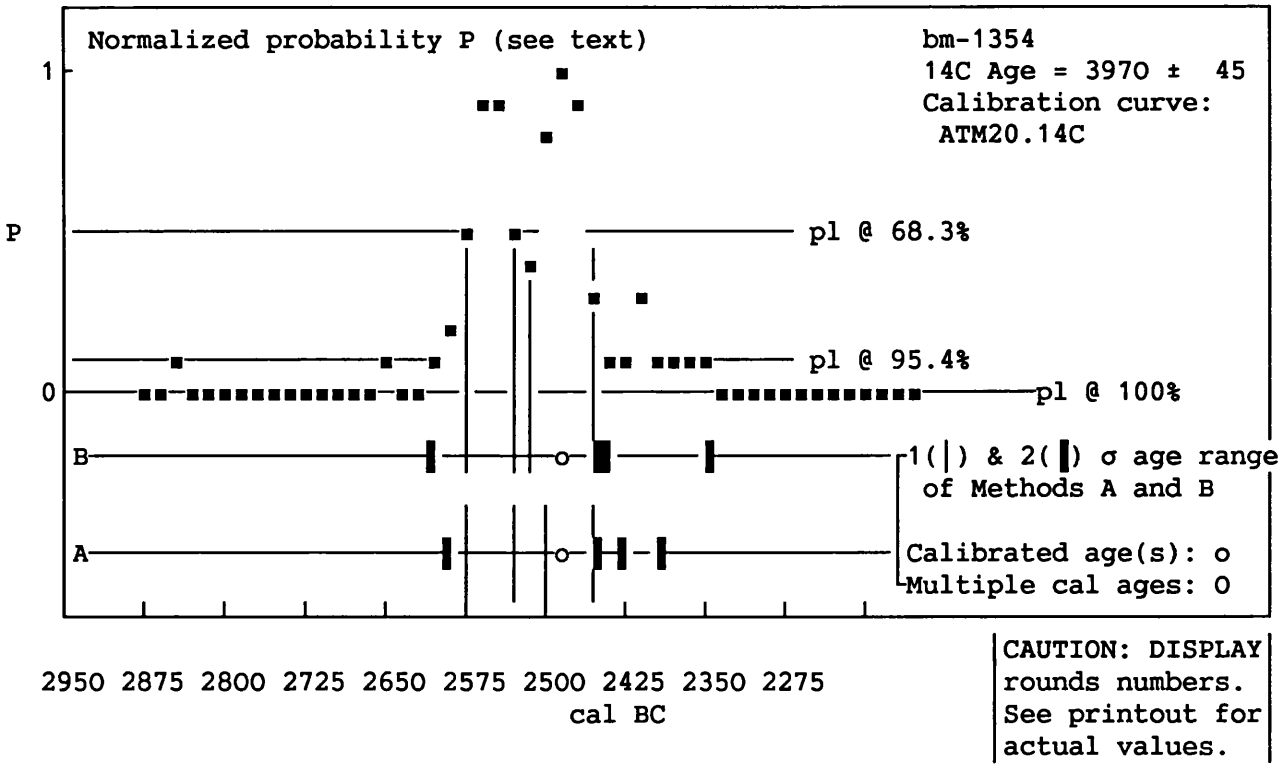
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 2576-2531(4525-4480)	.46
	2510-2460(4459-4409)	.54
95.4 (two sigma)	cal BC 2611-2450(4560-4399)	.87
	2447-2348(4396-4297)	.13

References for datasets [and intervals] used:
Pearson, GW and Stuiver, M, 1986, Radiocarbon, 28, 839-862.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1354
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2650 2625 2600 2575 2550 2525 2500 2475 2450 2425
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1354
14C Age = 3970 ± 45
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2950 2875 2800 2725 2650 2575 2500 2425 2350 2275
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: P/085 lemba 1.00
bm-2278 3930.0 100.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: ll2278.txt
Plot file: ll2278.plt

bm-2278◆
Radiocarbon Age BP 3930.0 ±100.0† Reference(s)
Calibrated age(s) cal BC 2464 (Pearson and Stuiver)
cal BP 4413
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 2577-2531(4526-4480) 2510-2300(4459-4249)
two Sigma** cal BC 2863-2813(4812-4762) 2739-2727(4688-4676)
2695-2678(4644-4627) 2670-2140(4619-4089)

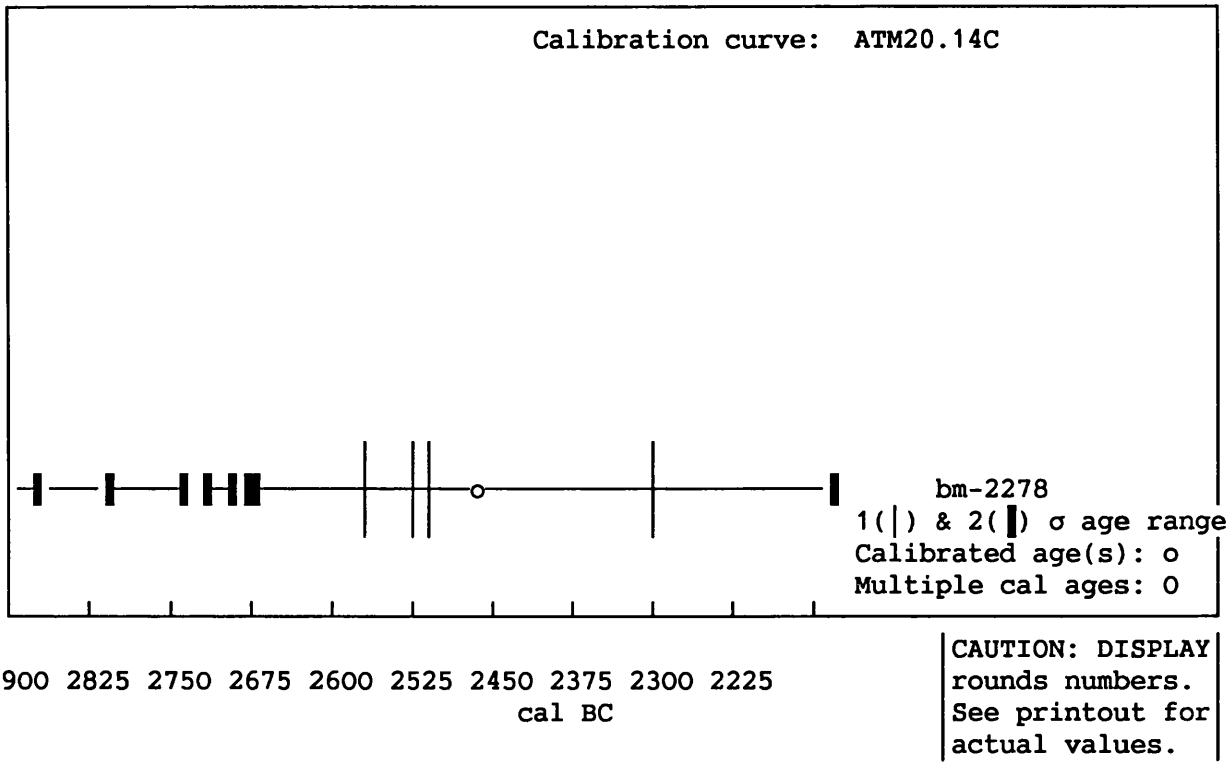
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 2577 (2464) 2300
cal BP 4526 (4413) 4249
two sigma cal BC 2863 (2464) 2140
cal BP 4812 (4413) 4089

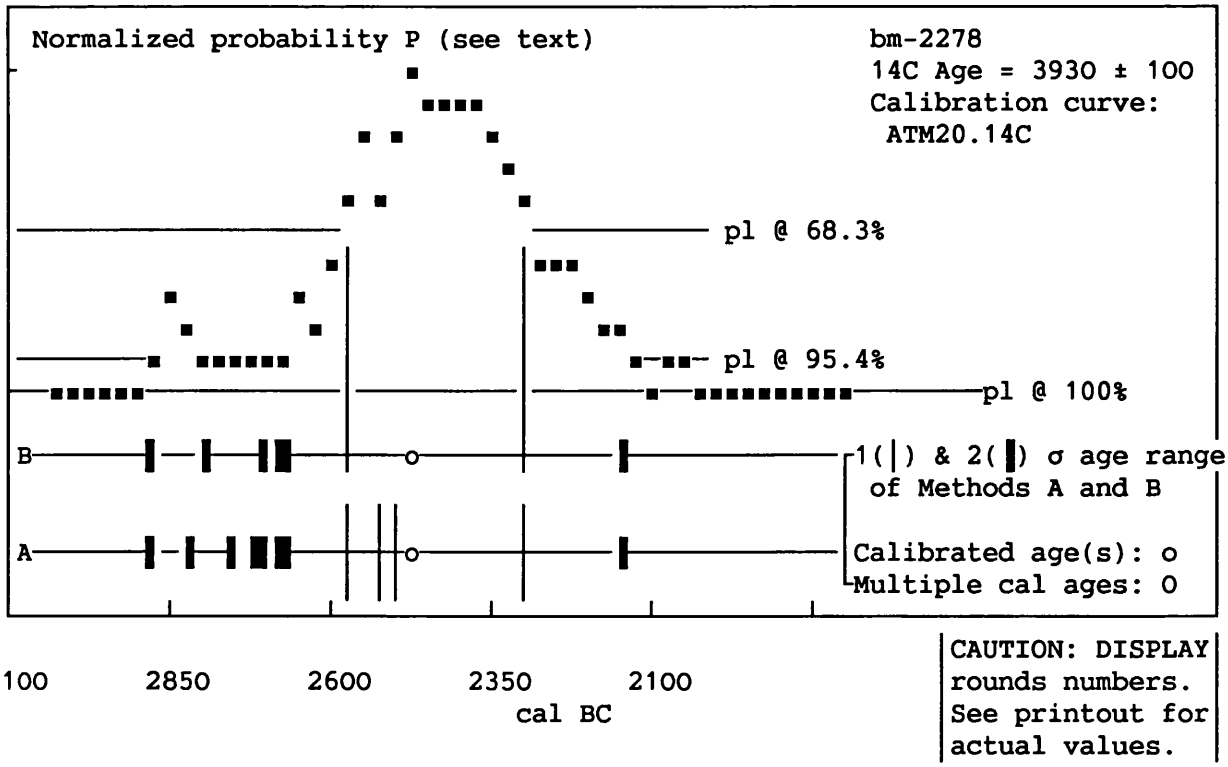
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 2580-2290(4529-4239)	1.00
95.4 (two sigma)	cal BC 2864-2811(4813-4760)	.04
	2697-2676(4646-4625)	.01
	2670-2140(4619-4089)	.94

References for datasets [and intervals] used:
Pearson, GW and Stuiver, M, 1986, Radiocarbon, 28, 839-862.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-2278
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2900 2825 2750 2675 2600 2525 2450 2375 2300 2225
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-2278
14C Age = 3930 ± 100
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3100 2850 2600 2350 2100
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: P/085 lemba 1.00
bm-1353 3890.0 50.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM10.14C
Listing file: lll353.txt
Plot file: lll353.plt

bm-1353
Radiocarbon Age BP 3890.0 ± 50.0† Reference(s)
Calibrated age(s) cal BC 2459, 2440, 2434 (Stuiver and Becker)
2420, 2406
cal BP 4408, 4389, 4383
4369, 4355
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 2471-2329(4420-4278) 2326-2310(4275-4259)
two Sigma BEYOND CALCULABLE RANGE

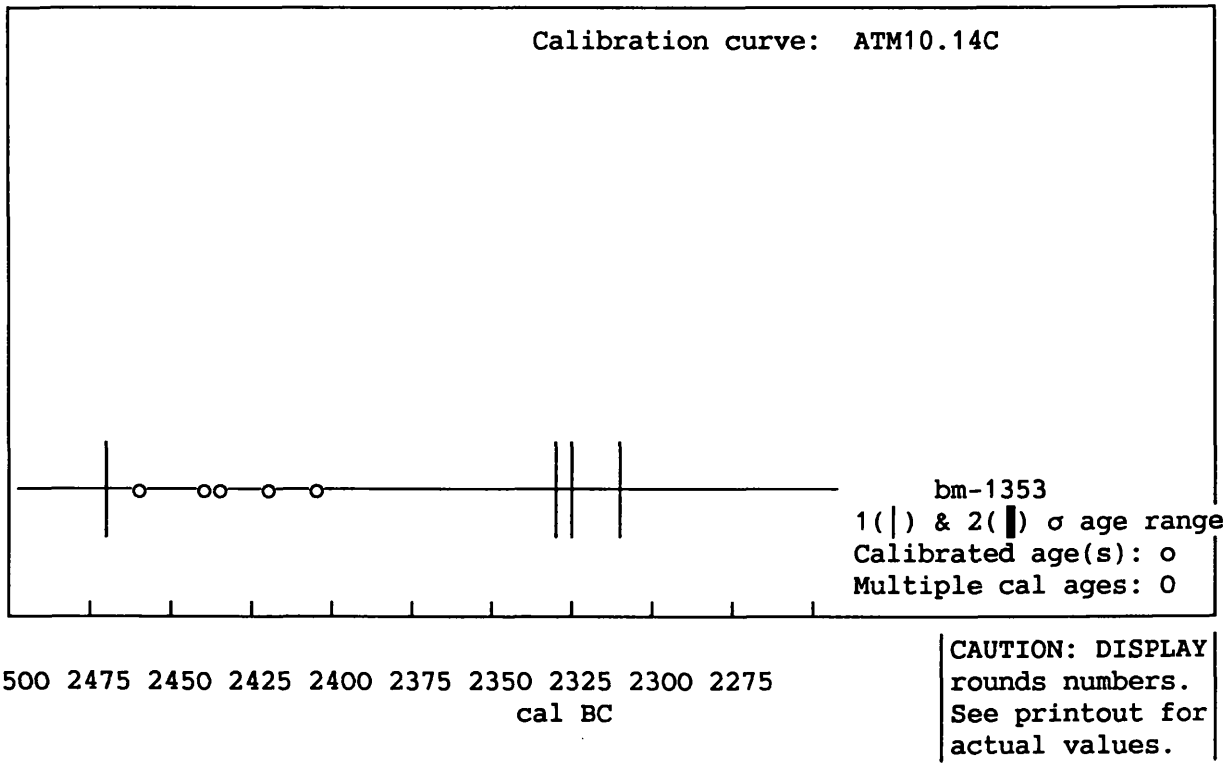
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 2471 (2459, 2440, 2434, 2420, 2406) 2310
cal BP 4420 (4408, 4389, 4383, 4369, 4355) 4259

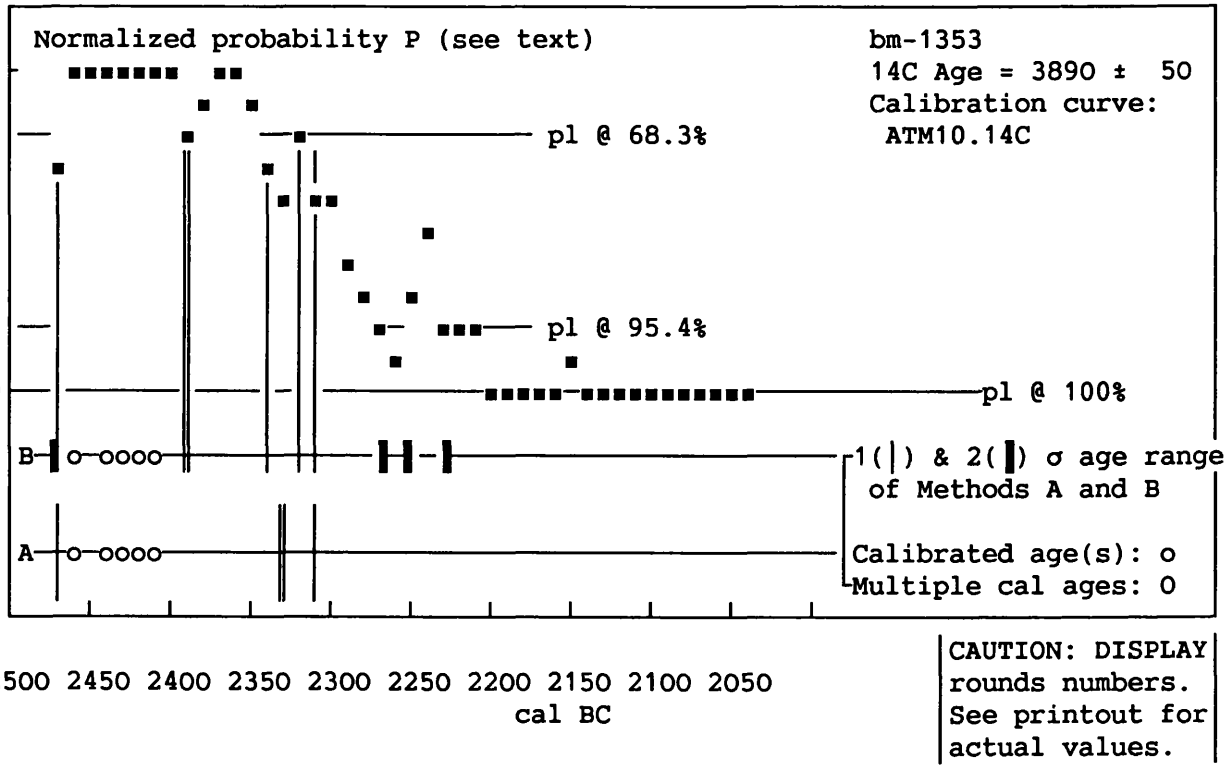
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 2470-2389(4419-4338)	.63
	2386-2342(4335-4291)	.34
	2319-2314(4268-4263)	.03
95.4 (two sigma)	cal BC 2472-2271(4421-4220)	.95
	2253-2230(4202-4179)	.05

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
bm-1353
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2500 2475 2450 2425 2400 2375 2350 2325 2300 2275
cal BC
CAUTION: DISPLAY
rounds numbers.
See printout for
actual values.


Normalized probability P (see text)
bm-1353
14C Age = 3890 ± 50
Calibration curve:
ATM10.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2500 2450 2400 2350 2300 2250 2200 2150 2100 2050
cal BC
CAUTION: DISPLAY
rounds numbers.
See printout for
actual values.

```
Site ID: P/084 mylouthkia  1.00
bm-1475              4815.0   60.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: kmyl1475.txt
Plot file: kmyl1475.plt

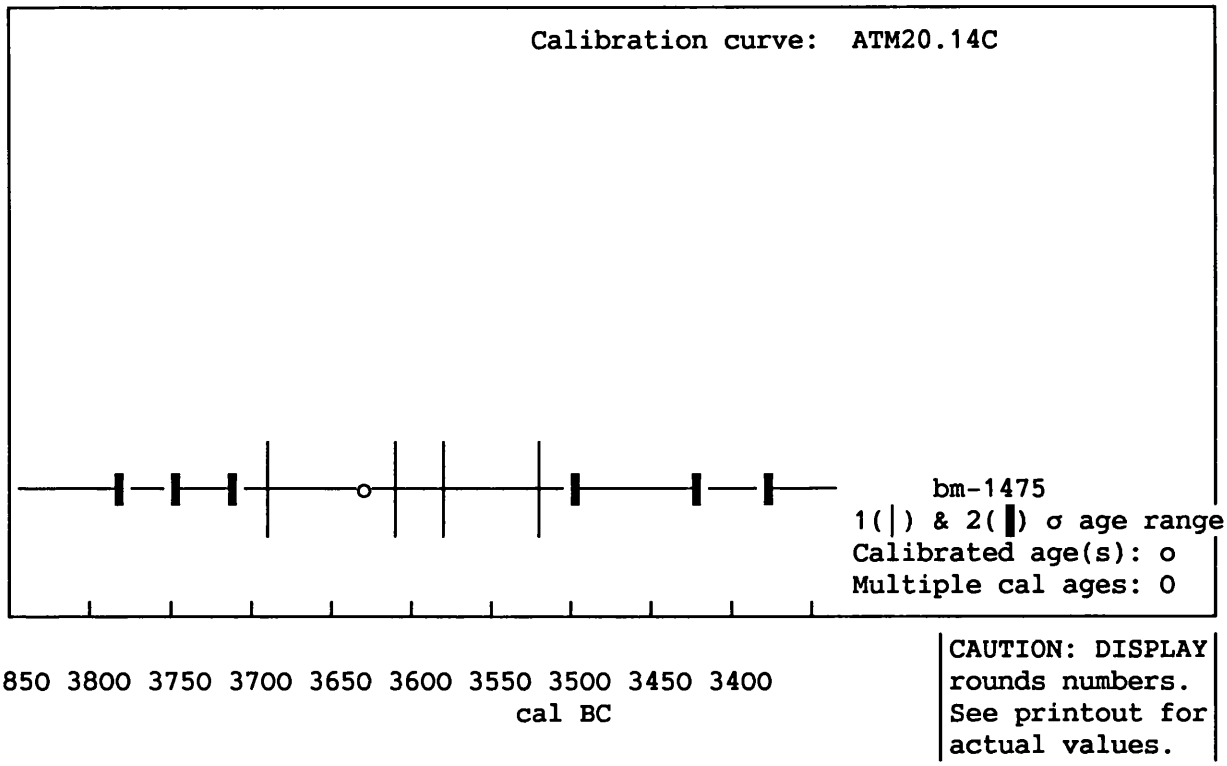

bm-1475
 Radiocarbon Age BP  4815.0  ± 60.0†                          Reference(s)
  Calibrated age(s) cal BC  3634                          (Pearson et al. 1986)
                    cal BP  5583
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3693-3611(5642-5560) 3582-3523(5531-5472)
   two Sigma**   cal BC 3776-3747(5725-5696) 3710-3500(5659-5449)
                 3415-3381(5364-5330)

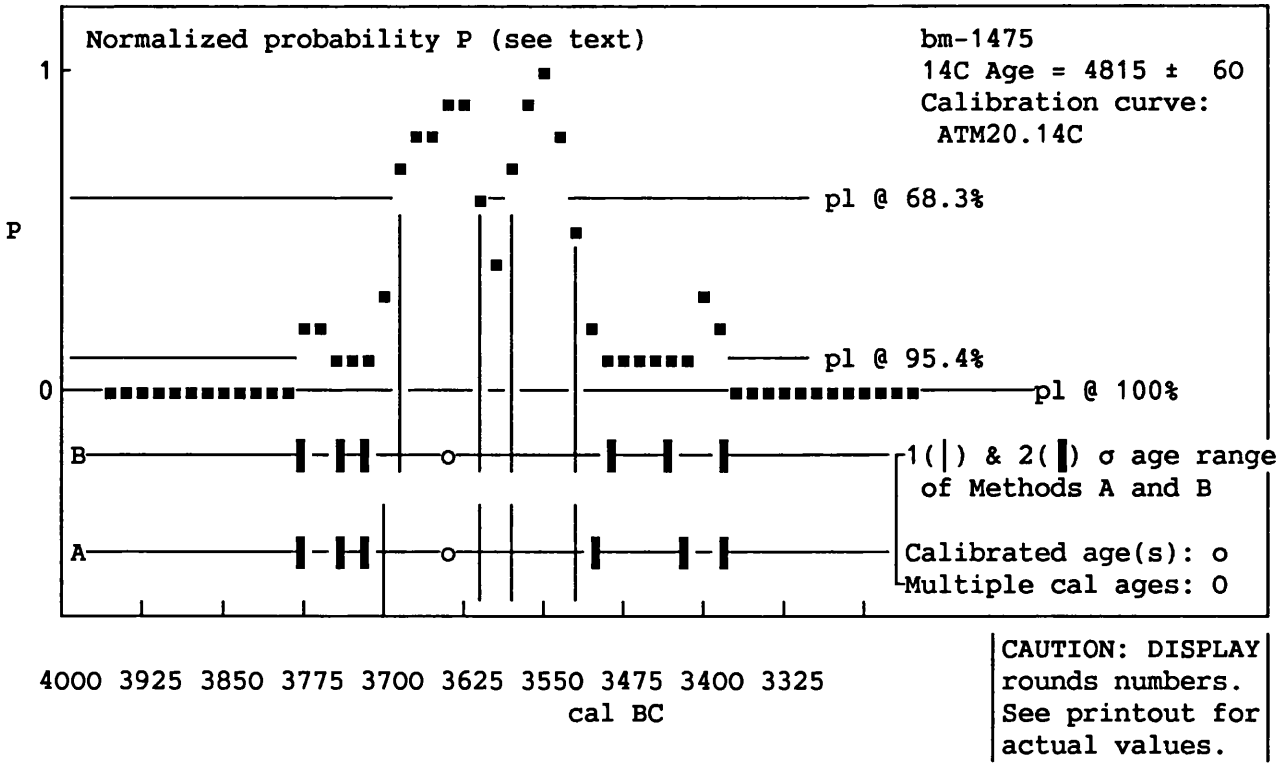
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3693 ( 3634) 3523
                  cal BP 5642 ( 5583) 5472
      two sigma   cal BC 3776 ( 3634) 3381
                  cal BP 5725 ( 5583) 5330

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3692-3612(5641-5561)              .56
                              3581-3524(5530-5473)              .44
    95.4 (two sigma)   cal BC 3777-3741(5726-5690)              .04
                              3709-3497(5658-5446)              .90
                              3423-3380(5372-5329)              .06
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1475
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3850 3800 3750 3700 3650 3600 3550 3500 3450 3400
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1475
14C Age = 4815 ± 60
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4000 3925 3850 3775 3700 3625 3550 3475 3400 3325
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: P/084 mylouthkia  1.00
bm-1539              4790.0   80.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: kmyl1539.txt
Plot file: kmyl1539.plt

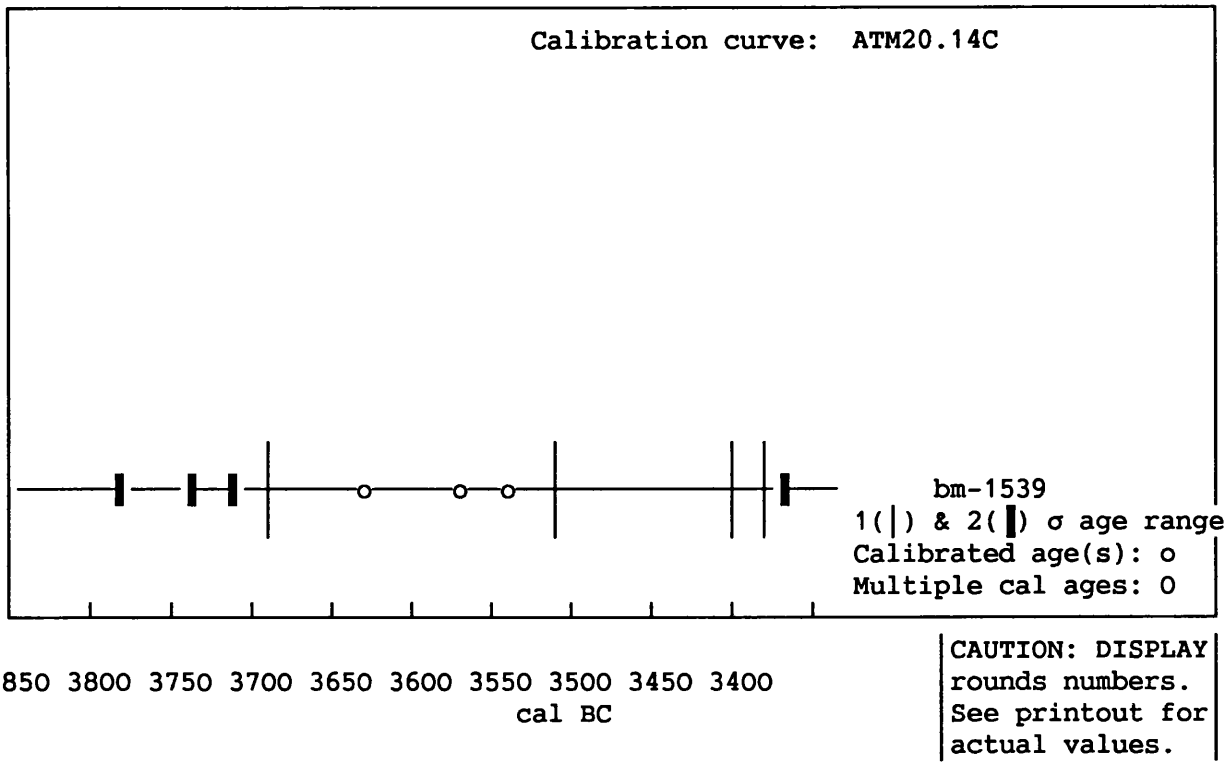

bm-1539
 Radiocarbon Age BP  4790.0  ± 80.0†                          Reference(s)
  Calibrated age(s) cal BC  3626, 3568, 3540            (Pearson et al. 1986)
                    cal BP  5575, 5517, 5489
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3691-3506(5640-5455) 3402-3385(5351-5334)
   two Sigma**   cal BC 3778-3740(5727-5689) 3710-3370(5659-5319)

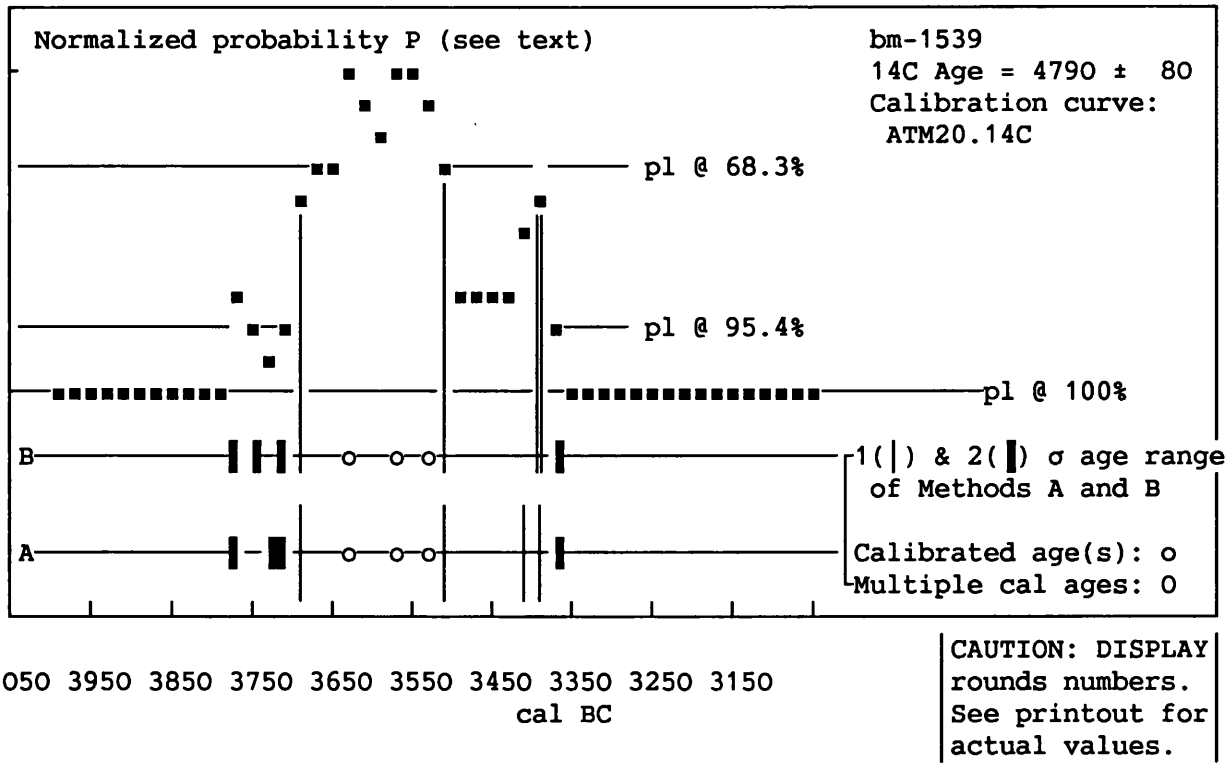
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3691 ( 3626, 3568, 3540) 3385
                  cal BP 5640 ( 5575, 5517, 5489) 5334
      two sigma   cal BC 3778 ( 3626, 3568, 3540) 3370
                  cal BP 5727 ( 5575, 5517, 5489) 5319

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 3686-3508(5635-5457)              .95
                               3398-3387(5347-5336)              .05
    95.4 (two sigma)   cal BC 3775-3750(5724-5699)              .03
                               3706-3373(5655-5322)              .97
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1539
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3850 3800 3750 3700 3650 3600 3550 3500 3450 3400
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1539
14C Age = 4790 ± 80
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4050 3950 3850 3750 3650 3550 3450 3350 3250 3150
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: P/084 mylouthkia  1.00
bm-1473              4765.0   55.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: kmyl1473.txt
Plot file: kmyl1473.plt

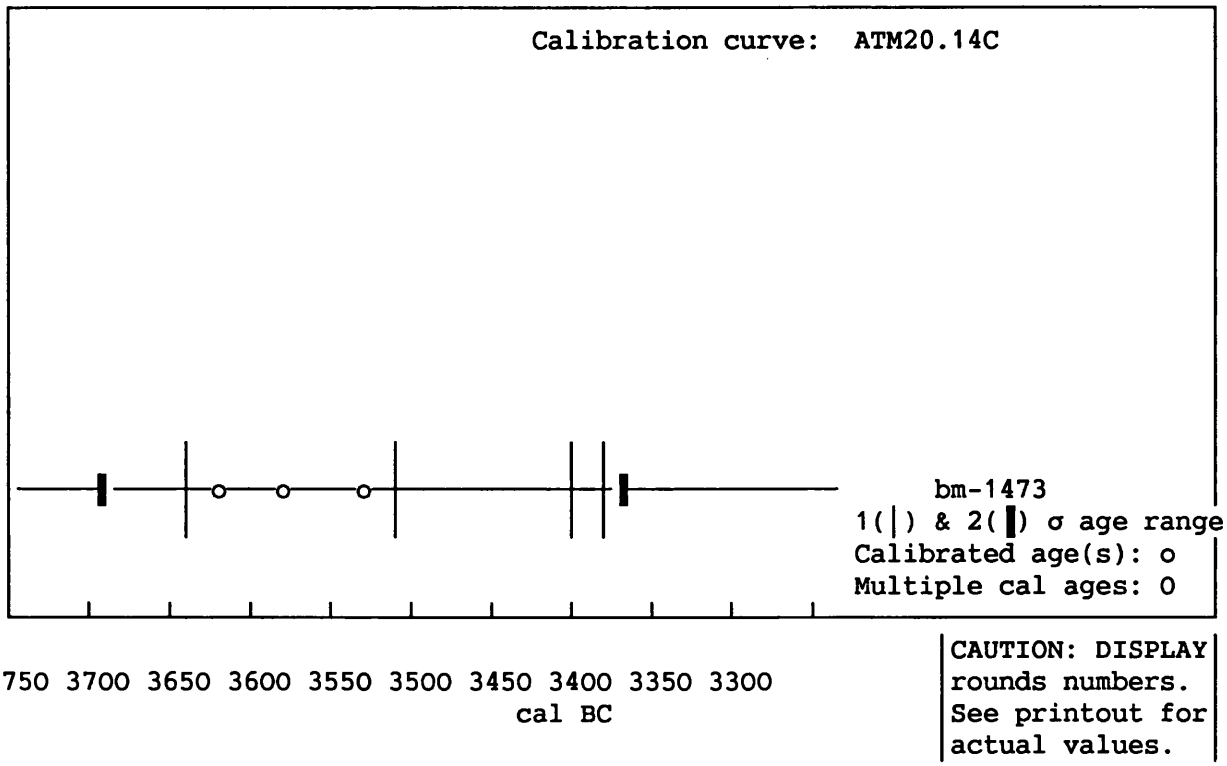

bm-1473
 Radiocarbon Age BP  4765.0  ± 55.0†                        Reference(s)
  Calibrated age(s) cal BC  3617, 3577, 3529            (Pearson et al. 1986)
                    cal BP  5566, 5526, 5478
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3637-3506(5586-5455) 3403-3385(5352-5334)
   two Sigma**   cal BC 3690-3370(5639-5319)

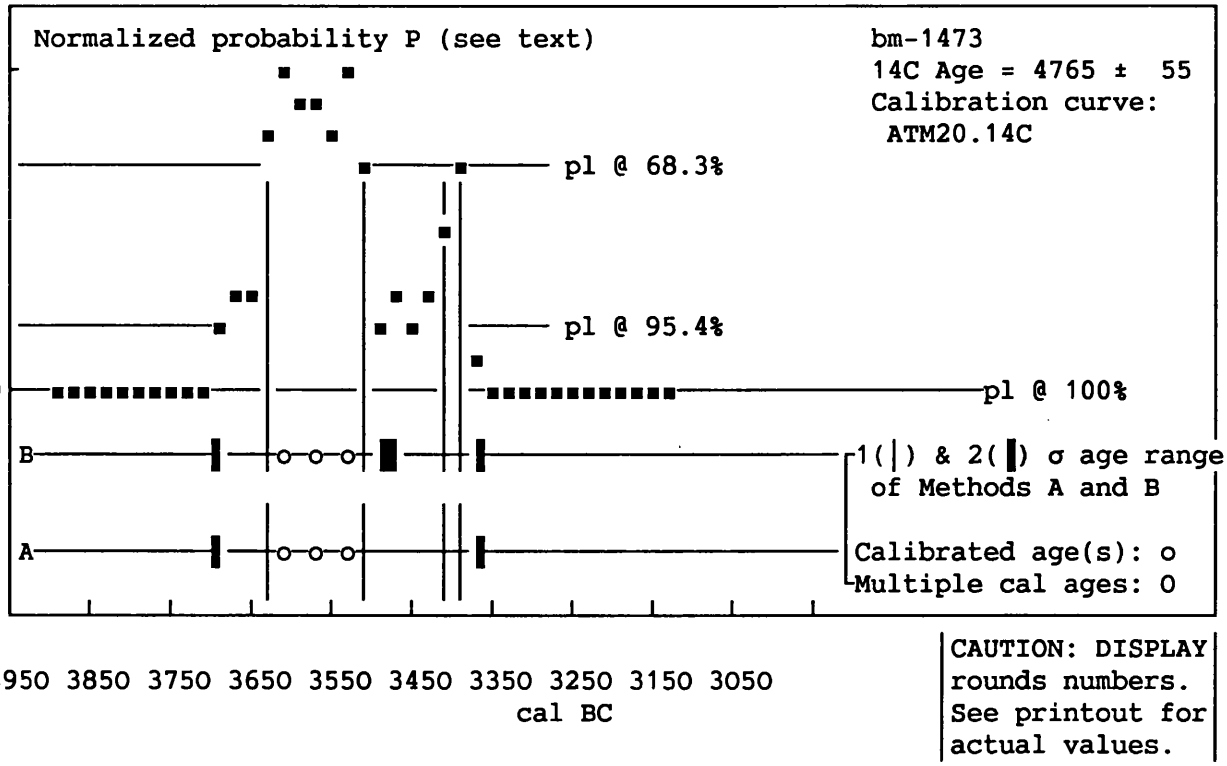
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3637 ( 3617, 3577, 3529) 3385
                  cal BP 5586 ( 5566, 5526, 5478) 5334
      two sigma   cal BC 3690 ( 3617, 3577, 3529) 3370
                  cal BP 5639 ( 5566, 5526, 5478) 5319

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3636-3507(5585-5456)              .91
                              3400-3386(5349-5335)              .09
    95.4 (two sigma)   cal BC 3685-3494(5634-5443)              .78
                              3474-3378(5423-5327)              .22
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1473
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3750 3700 3650 3600 3550 3500 3450 3400 3350 3300
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1473
14C Age = 4765 ± 55
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3950 3850 3750 3650 3550 3450 3350 3250 3150 3050
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: P/084 mylouthkia  1.00
bm-1540              4740.0   50.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: kmyl1540.txt
Plot file: kmyl1540.plt

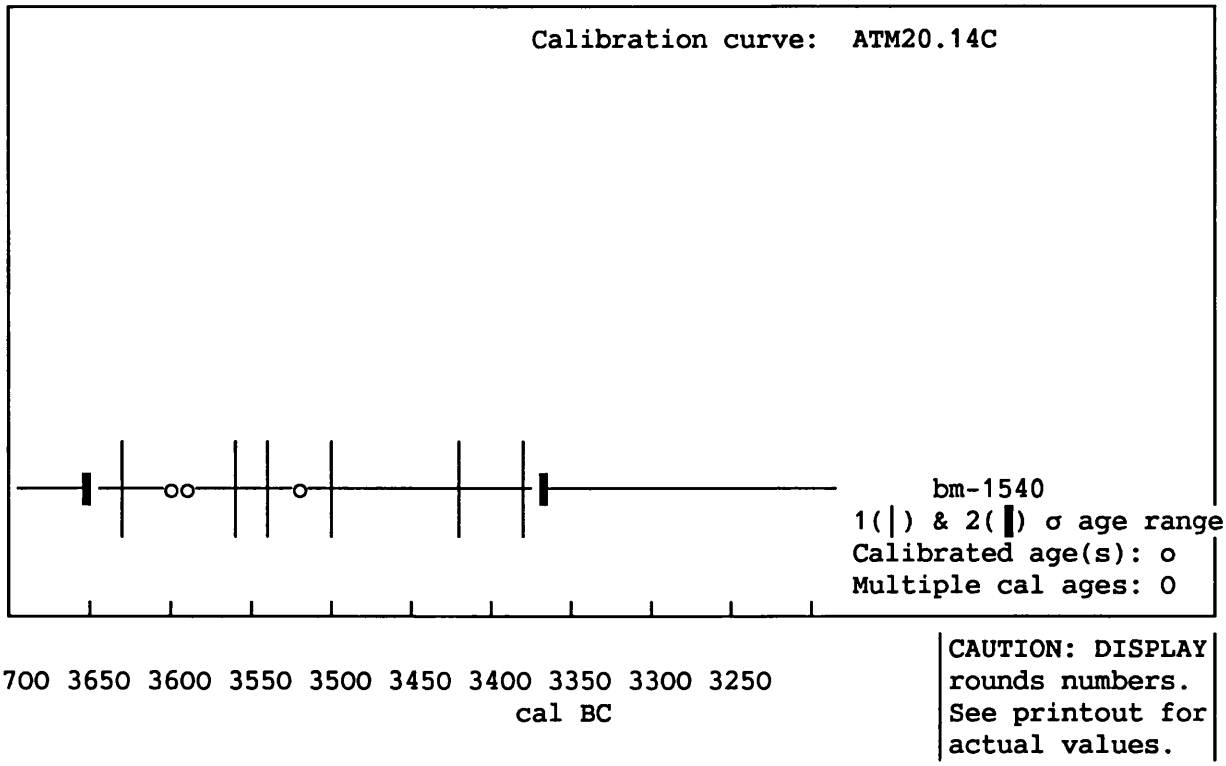

bm-1540
 Radiocarbon Age BP  4740.0  ± 50.0†                          Reference(s)
  Calibrated age(s) cal BC  3604, 3585, 3518             (Pearson et al. 1986)
                    cal BP  5553, 5534, 5467
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3628-3563(5577-5512) 3542-3500(5491-5449)
                 3415-3381(5364-5330)
   two Sigma**   cal BC 3650-3370(5599-5319)

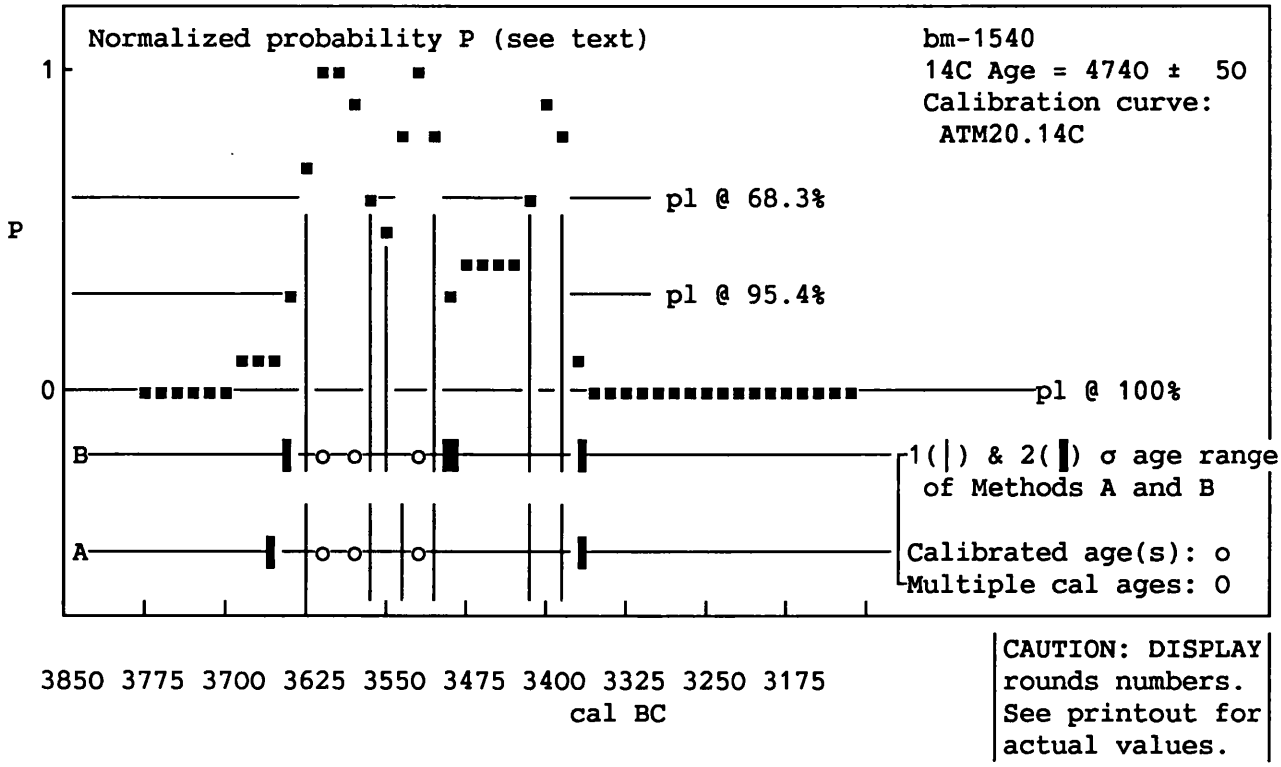
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3628 ( 3604, 3585, 3518) 3381
                  cal BP 5577 ( 5553, 5534, 5467) 5330
      two sigma   cal BC 3650 ( 3604, 3585, 3518) 3370
                  cal BP 5599 ( 5553, 5534, 5467) 5319

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3629-3562(5578-5511)              .47
                              3543-3499(5492-5448)              .30
                              3416-3381(5365-5330)              .23
    95.4 (two sigma)   cal BC 3638-3491(5587-5440)              .65
                              3488-3376(5437-5325)              .35
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1540
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3700 3650 3600 3550 3500 3450 3400 3350 3300 3250
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1540
14C Age = 4740 ± 50
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3850 3775 3700 3625 3550 3475 3400 3325 3250 3175
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: P/084 mylouthkia 1.00
bm-1474 4665.0 50.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kmyl1474.txt
Plot file: kmyl1474.plt

bm-1474
Radiocarbon Age BP 4665.0 ± 50.0† Reference(s)
Calibrated age(s) cal BC 3494, 3474, 3378 (Pearson et al. 1986)
cal BP 5443, 5423, 5327
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 3510-3396(5459-5345) 3388-3364(5337-5313)
two Sigma** cal BC 3620-3574(5569-5523) 3530-3340(5479-5289)

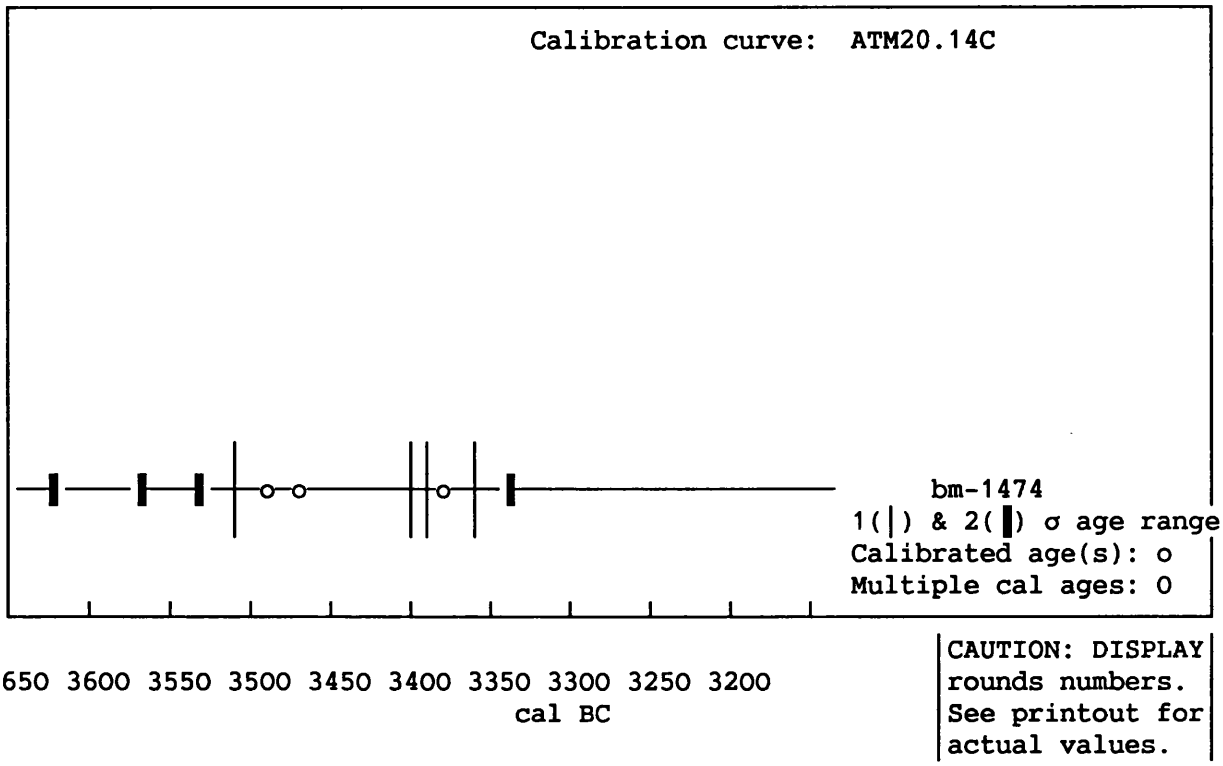
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 3510 (3494, 3474, 3378) 3364
cal BP 5459 (5443, 5423, 5327) 5313
two sigma cal BC 3620 (3494, 3474, 3378) 3340
cal BP 5569 (5443, 5423, 5327) 5289

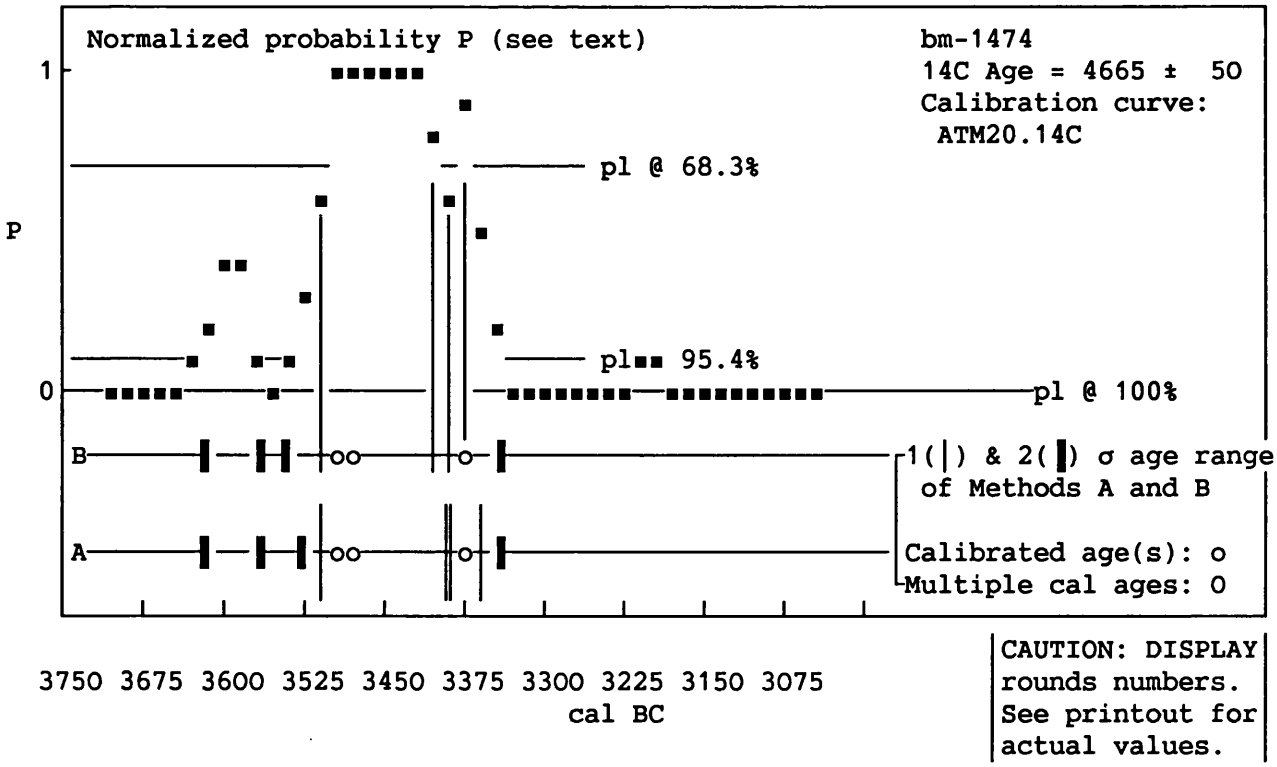
cal AD/BC age ranges (cal ages as above) from probability distribution (Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 3507-3401(5456-5350)	.87
	3386-3369(5335-5318)	.13
95.4 (two sigma)	cal BC 3622-3572(5571-5521)	.10
	3535-3343(5484-5292)	.90

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1474
1(|) & 2(▌) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3650 3600 3550 3500 3450 3400 3350 3300 3250 3200
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1474
14C Age = 4665 ± 50
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl▪▪ 95.4%
pl @ 100%
B
A
1(|) & 2(▌) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3750 3675 3600 3525 3450 3375 3300 3225 3150 3075
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: P/084 mylouthkia  1.00
bm-1476              4650.0   50.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: kmyl1476.txt
Plot file: kmyl1476.plt

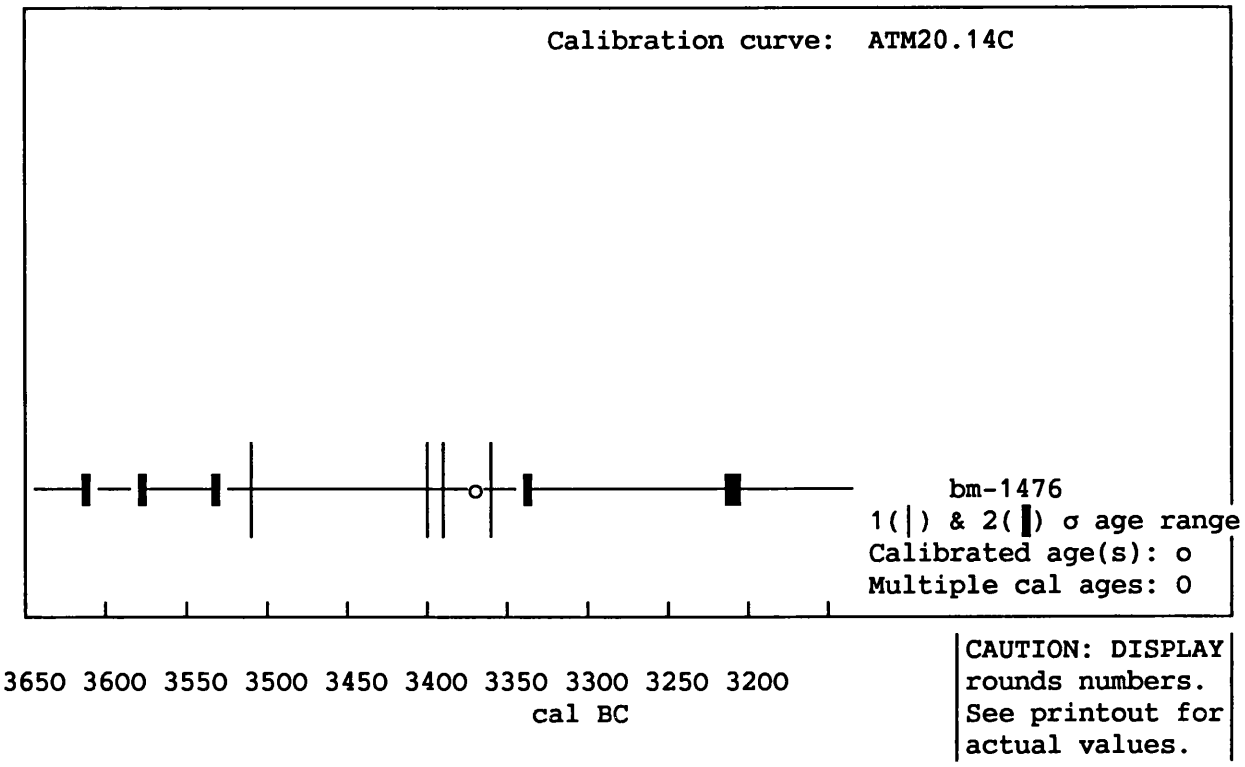

bm-1476
 Radiocarbon Age BP  4650.0  ± 50.0†                          Reference(s)
  Calibrated age(s) cal BC  3375                          (Pearson et al. 1986)
                    cal BP  5324
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3505-3403(5454-5352) 3385-3358(5334-5307)
   two Sigma**   cal BC 3614-3579(5563-5528) 3530-3340(5479-5289)
                 3212-3206(5161-5155)

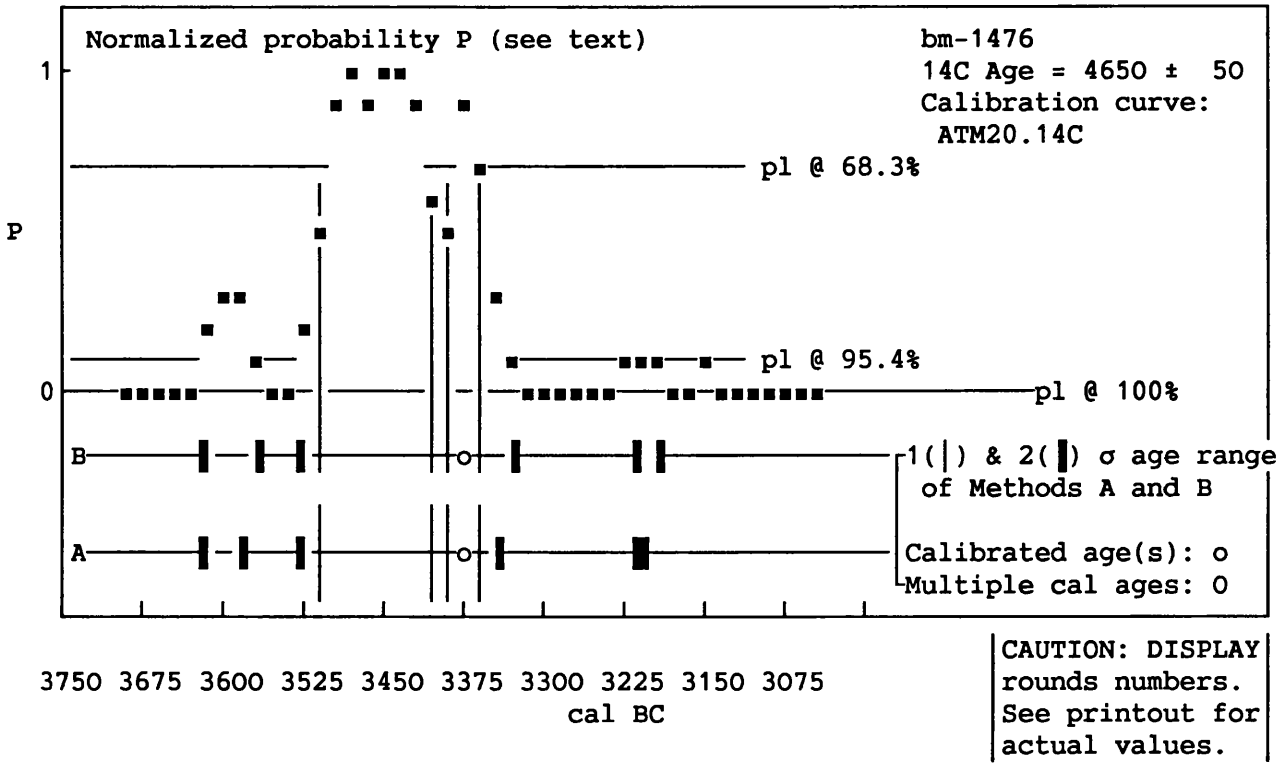
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3505 ( 3375) 3358
                  cal BP 5454 ( 5324) 5307
      two sigma   cal BC 3614 ( 3375) 3206
                  cal BP 5563 ( 5324) 5155

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3504-3407(5453-5356)              .81
                               3384-3361(5333-5310)              .19
    95.4 (two sigma)   cal BC 3620-3575(5569-5524)              .07
                               3531-3336(5480-5285)              .91
                               3217-3191(5166-5140)              .02
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1476
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3650 3600 3550 3500 3450 3400 3350 3300 3250 3200
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1476
14C Age = 4650 ± 50
Calibration curve: ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3750 3675 3600 3525 3450 3375 3300 3225 3150 3075
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: R/059 ayious  1.00
bm-1832r             5040.0  110.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: ka1832r.txt
Plot file: ka1832r.plt

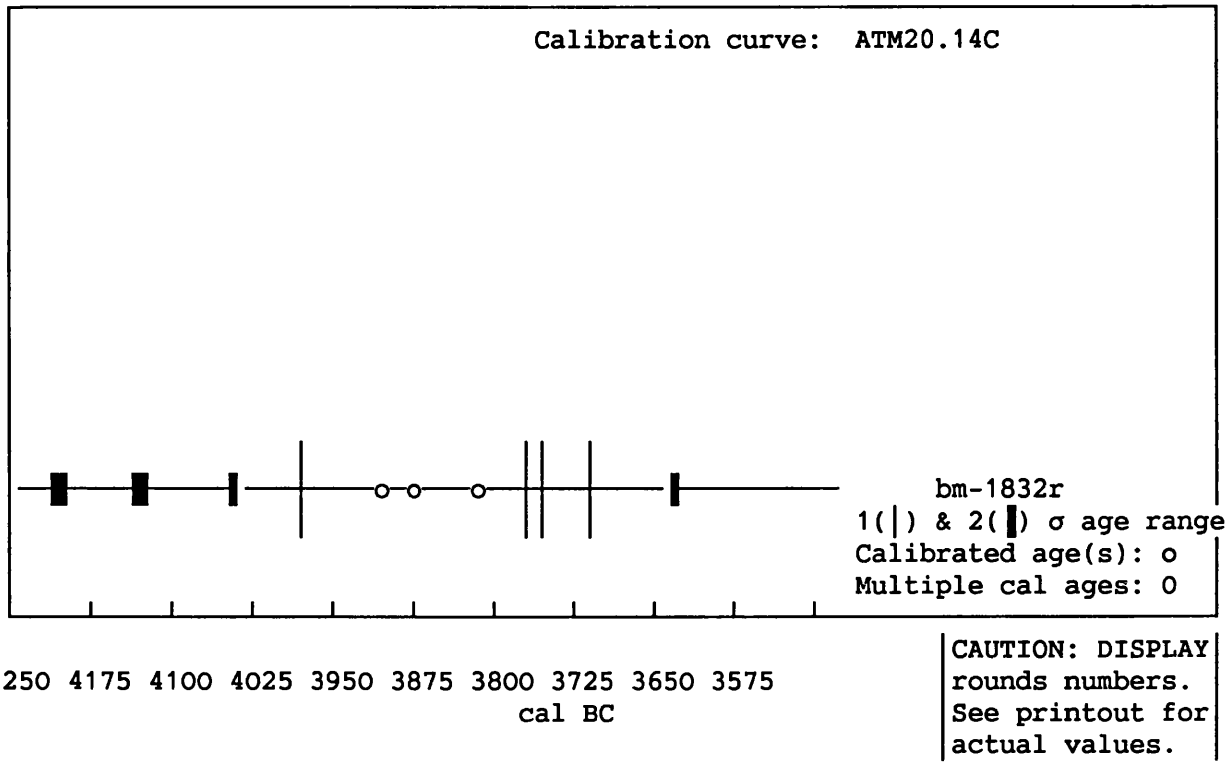

bm-1832r∫
 Radiocarbon Age BP  5040.0  ±110.0†                          Reference(s)
  Calibrated age(s) cal BC  3910, 3878, 3814              (Pearson et al. 1986)
                    cal BP  5859, 5827, 5763
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3980-3770(5929-5719) 3758-3703(5707-5652)
   two Sigma**   cal BC 4211-4209(6160-6158) 4131-4129(6080-6078)
                 4040-3630(5989-5579)

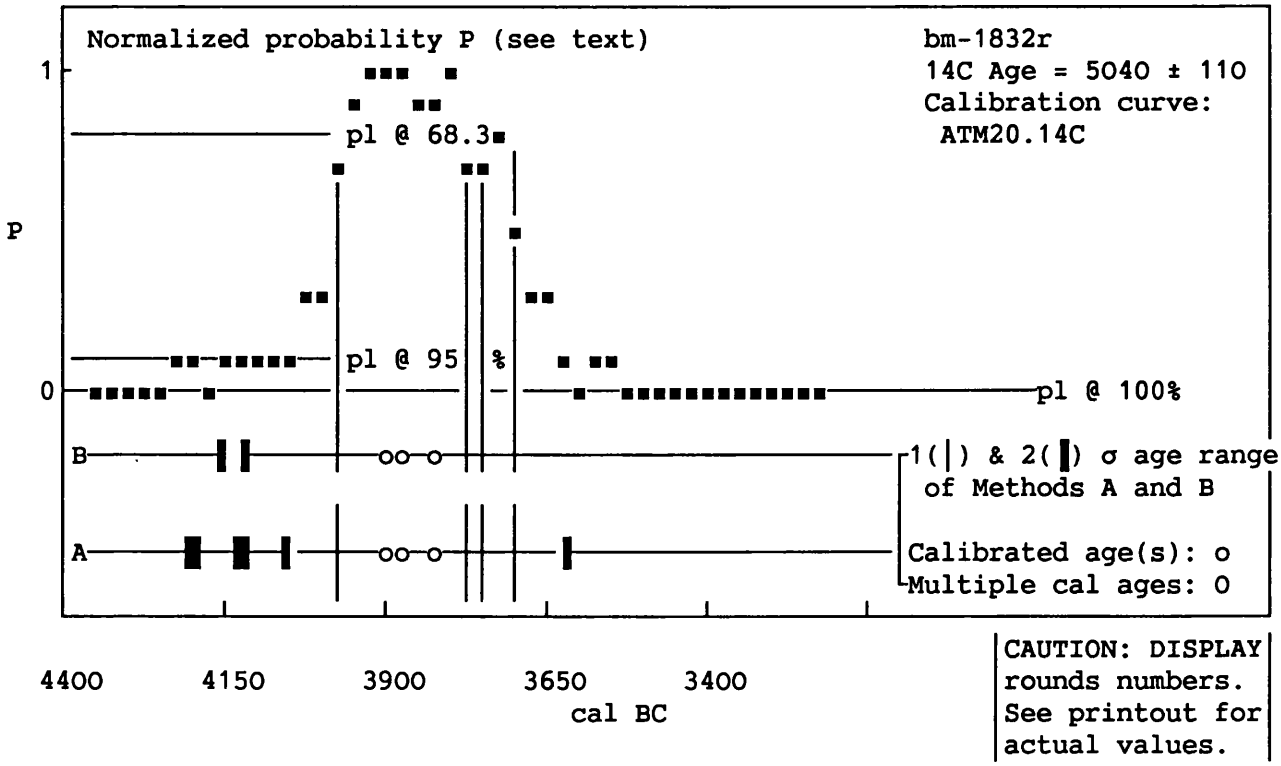
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3980 ( 3910, 3878, 3814) 3703
                  cal BP 5929 ( 5859, 5827, 5763) 5652
      two sigma   cal BC 4211 ( 3910, 3878, 3814) 3630
                  cal BP 6160 ( 5859, 5827, 5763) 5579

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3970-3780(5919-5729)              .87
                              3741-3709(5690-5658)              .13
    95.4 (two sigma)   cal BC 4141-4117(6090-6066)              .01
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1832r
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4250 4175 4100 4025 3950 3875 3800 3725 3650 3575
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1832r
14C Age = 5040 ± 110
Calibration curve:
ATM20.14C
P
1
0
pl @ 68.3%
pl @ 95 %
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4400 4150 3900 3650 3400
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/059 ayious 1.00
bm-1834r 5030.0 120.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: ka1834r.txt
Plot file: ka1834r.plt

bm-1834r∫
Radiocarbon Age BP 5030.0 ±120.0† Reference(s)
Calibrated age(s) cal BC 3902, 3883, 3812 (Pearson et al. 1986)
3792, 3790
cal BP 5851, 5832, 5761
5741, 5739
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 3980-3700(5929-5649)
two Sigma** cal BC 4214-4207(6163-6156) 4135-4124(6084-6073)
4040-3620(5989-5569) 3570-3538(5519-5487)

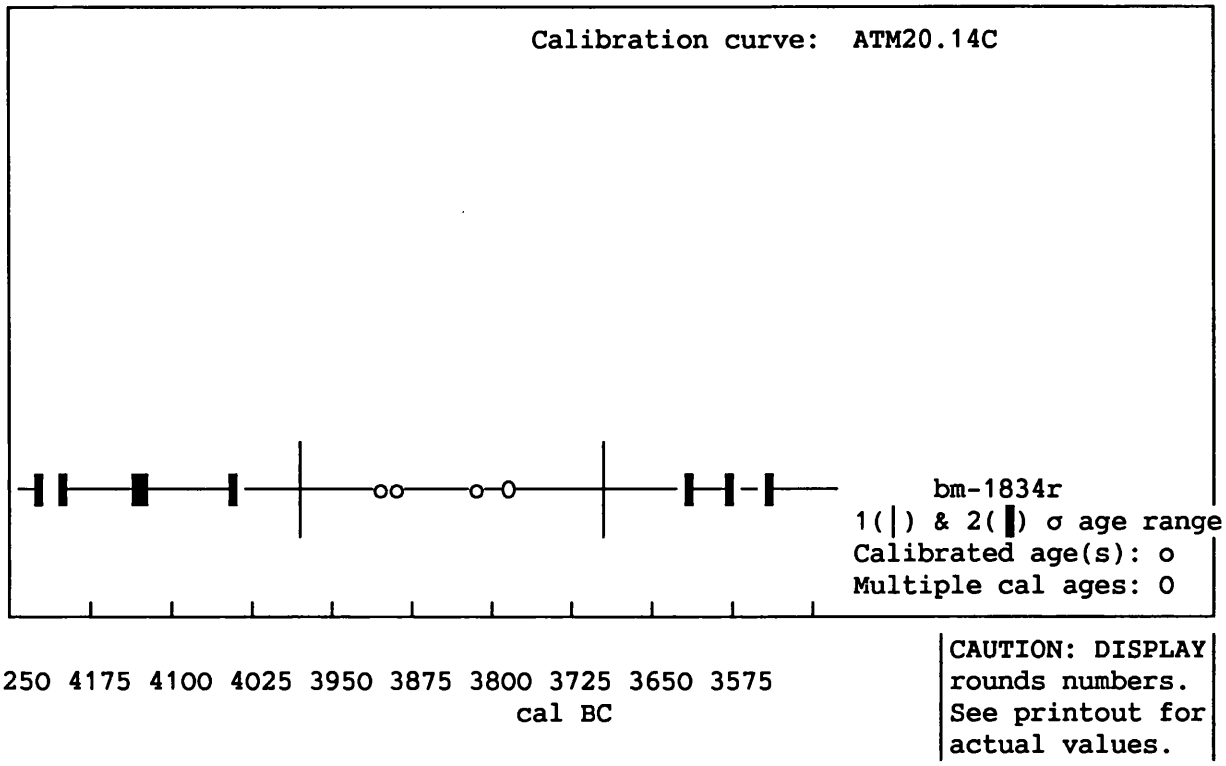
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 3980 (3902, 3883, 3812, 3792, 3790) 3700
cal BP 5929 (5851, 5832, 5761, 5741, 5739) 5649
two sigma cal BC 4214 (3902, 3883, 3812, 3792, 3790) 3538
cal BP 6163 (5851, 5832, 5761, 5741, 5739) 5487

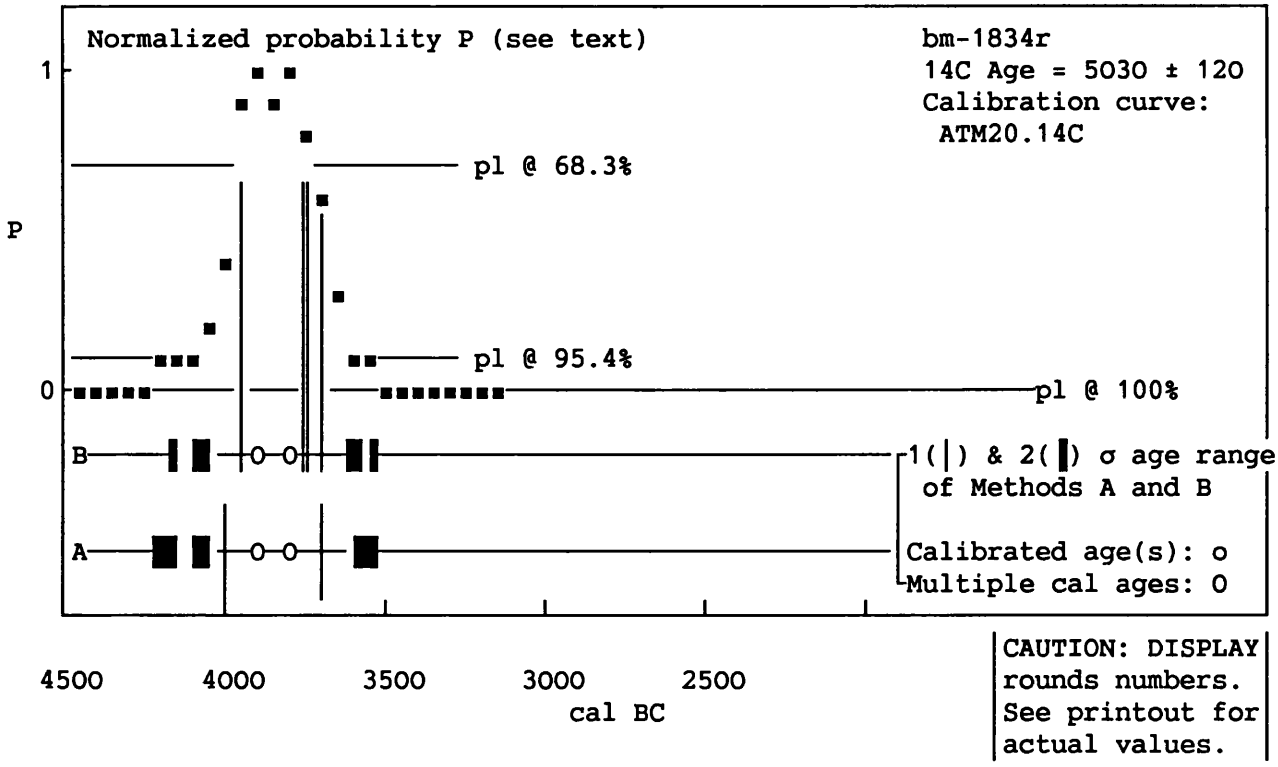
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 3970-3770(5919-5719)	.82
	3753-3705(5702-5654)	.18
95.4 (two sigma)	cal BC 4145-4113(6094-6062)	.01
	4050-3620(5999-5569)	.95
	3578-3529(5527-5478)	.02

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1834r
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4250 4175 4100 4025 3950 3875 3800 3725 3650 3575
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1834r
14C Age = 5030 ± 120
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4500 4000 3500 3000 2500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: R/059 ayious  1.00
bm-1833r             5000.0  170.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: ka1833r.txt
Plot file: ka1833r.plt

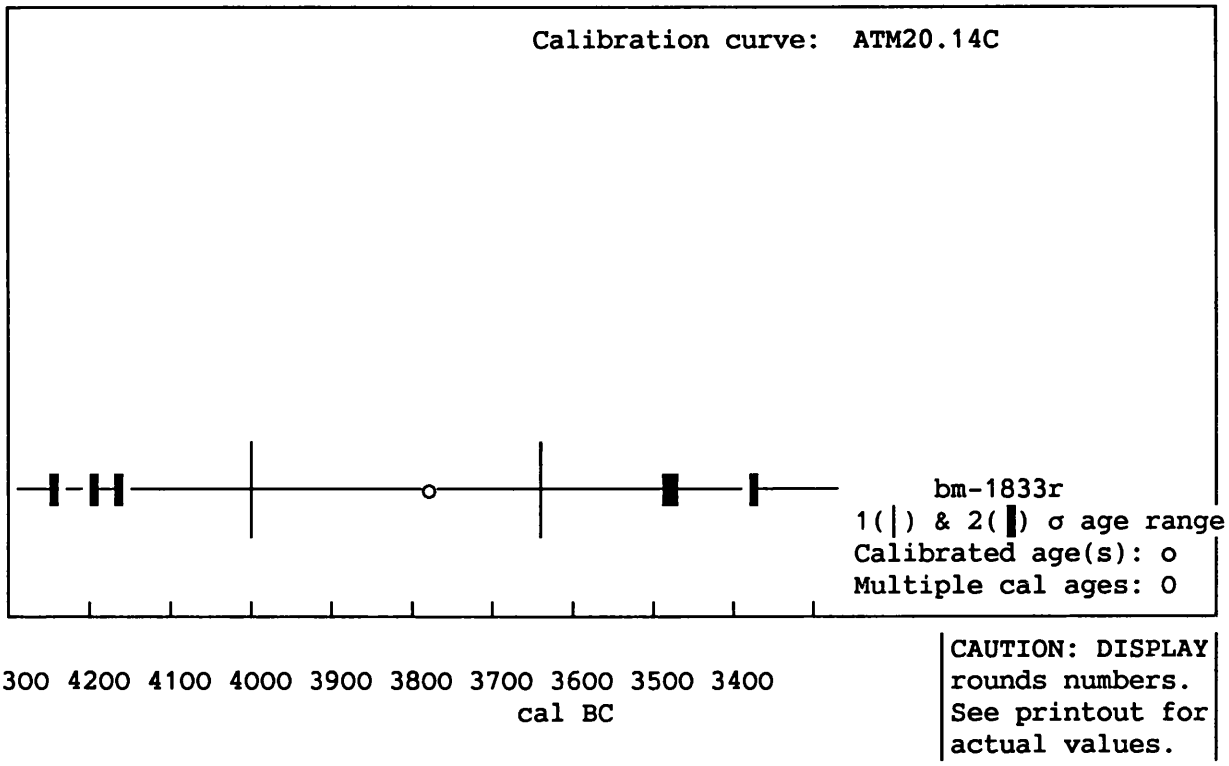

bm-1833r⌠
 Radiocarbon Age BP  5000.0  ±170.0†                          Reference(s)
  Calibrated age(s) cal BC  3785                          (Pearson et al. 1986)
                    cal BP  5734
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3990-3640(5939-5589)
   two Sigma**   cal BC 4231-4191(6180-6140) 4160-3490(6109-5439)
                 3480-3380(5429-5329)

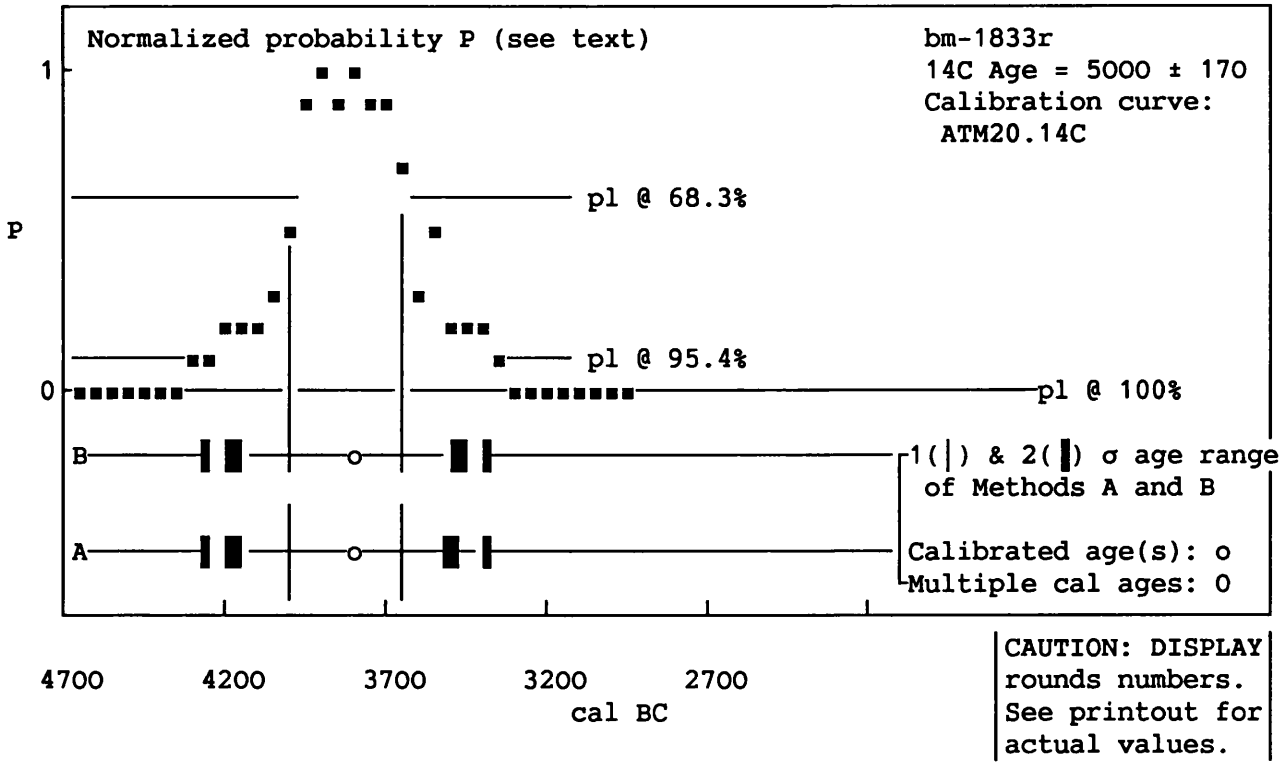
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3990 ( 3785) 3640
                  cal BP 5939 ( 5734) 5589
      two sigma   cal BC 4231 ( 3785) 3380
                  cal BP 6180 ( 5734) 5329

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3990-3630(5939-5579)            1.00
    95.4 (two sigma)   cal BC 4229-4193(6178-6142)             .02
                              4160-3490(6109-5439)             .94
                              3474-3378(5423-5327)             .04
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1833r
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4300 4200 4100 4000 3900 3800 3700 3600 3500 3400
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1833r
14C Age = 5000 ± 170
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4700 4200 3700 3200 2700
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: R/059 ayious 1.00
bm-1836r 4700.0 310.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: ka1836r.txt
Plot file: ka1836r.plt

bm-1836r∫
Radiocarbon Age BP 4700.0 ±310.0† Reference(s)
Calibrated age(s) cal BC 3504, 3406, 3384 (Pearson et al. 1986)
cal BP 5453, 5355, 5333
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 3790-3030(5739-4979) 2968-2939(4917-4888)
two Sigma** cal BC 4226-4196(6175-6145) 4160-2650(6109-4599)
2648-2611(4597-4560)

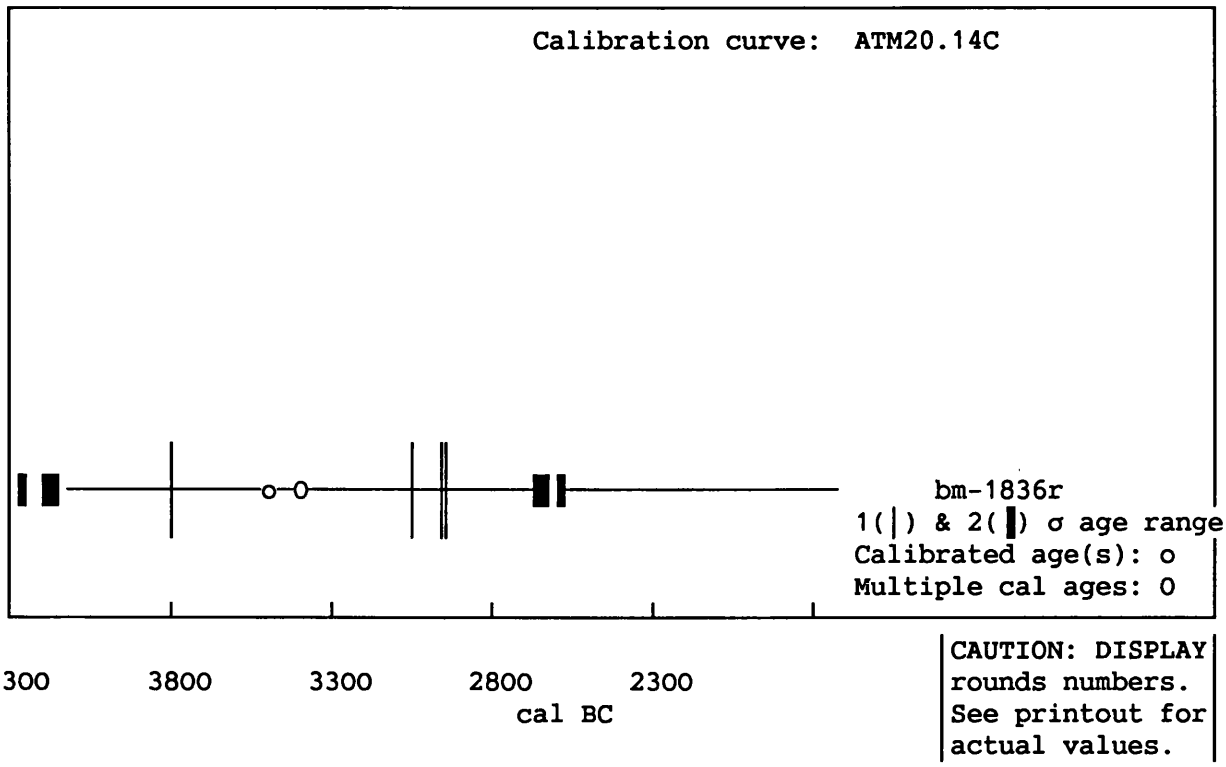
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 3790 (3504, 3406, 3384) 2939
cal BP 5739 (5453, 5355, 5333) 4888
two sigma cal BC 4226 (3504, 3406, 3384) 2611
cal BP 6175 (5453, 5355, 5333) 4560

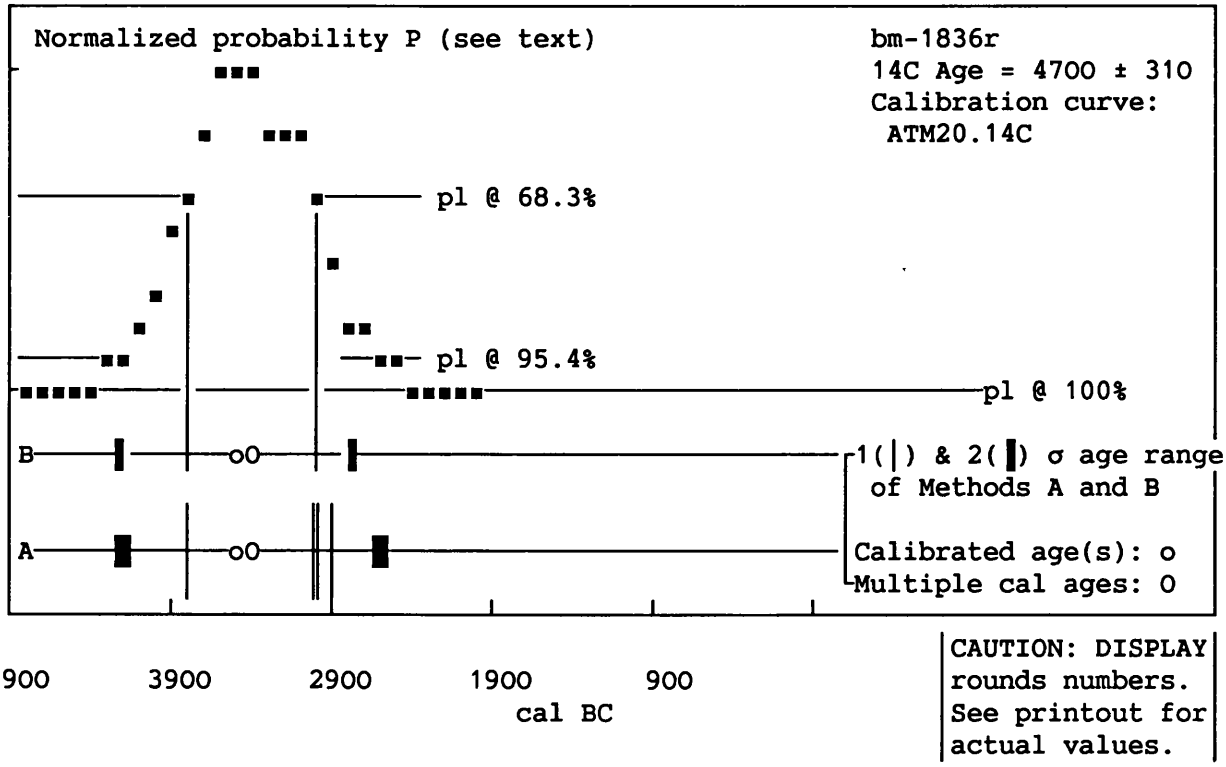
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 3790-3030(5739-4979)	.99
95.4 (two sigma)	cal BC 4150-2850(6099-4799)	.95

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-1836r
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
4300
3800
3300
2800
2300
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-1836r
14C Age = 4700 ± 310
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4900
3900
2900
1900
900
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: S/075 erimi  1.00
st-202              4575.0   80.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: erp202.txt
Plot file: erp202.plt

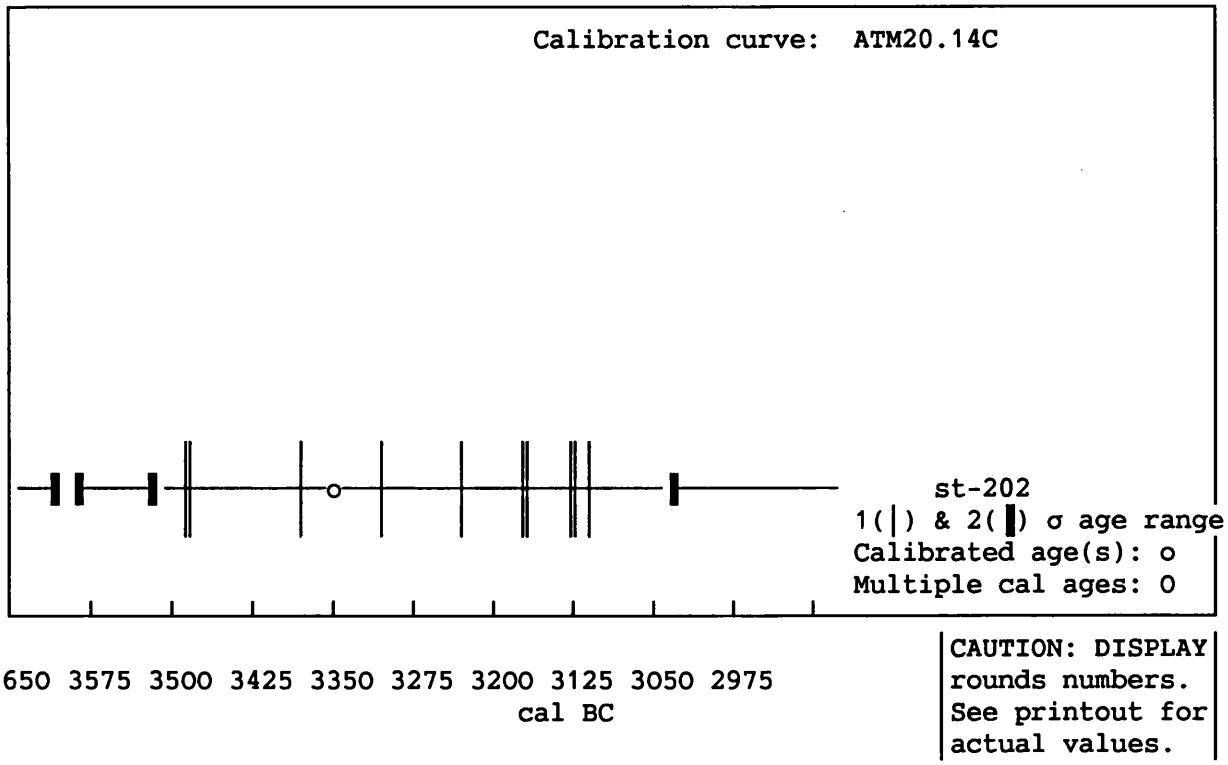

st-202
 Radiocarbon Age BP  4575.0  ± 80.0†                          Reference(s)
  Calibrated age(s) cal BC  3349                          (Pearson et al. 1986)
                    cal BP  5298
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3492-3484(5441-5433) 3376-3303(5325-5252)
                 3237-3174(5186-5123) 3166-3131(5115-5080)
                 3127-3108(5076-5057)
   two Sigma**   cal BC 3603-3586(5552-5535) 3520-3040(5469-4989)

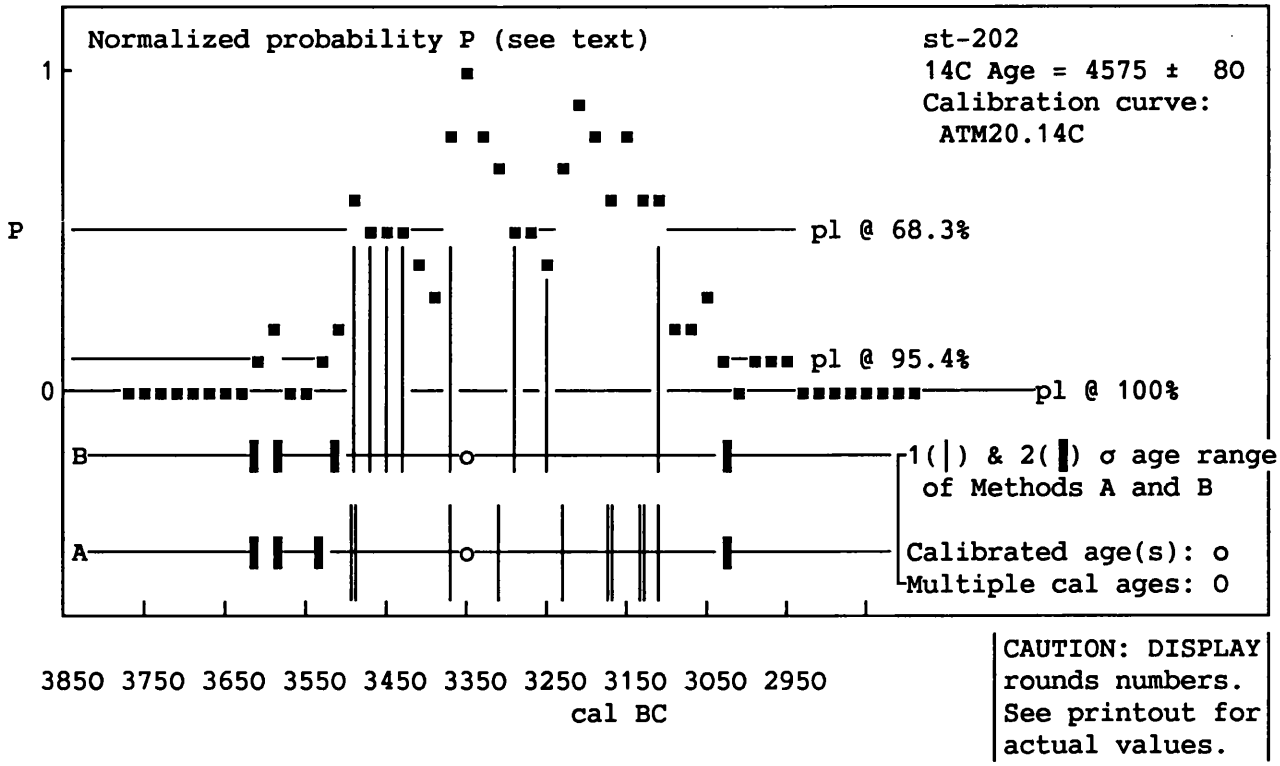
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3492 ( 3349) 3108
                  cal BP 5441 ( 5298) 5057
      two sigma   cal BC 3603 ( 3349) 3040
                  cal BP 5552 ( 5298) 4989

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3495-3472(5444-5421)              .07
                               3458-3429(5407-5378)              .08
                               3378-3298(5327-5247)              .33
                               3241-3105(5190-5054)              .51
    95.4 (two sigma)   cal BC 3605-3585(5554-5534)              .01
                               3518-3038(5467-4987)              .99
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
st-202
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3650 3575 3500 3425 3350 3275 3200 3125 3050 2975
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-202
14C Age = 4575 ± 80
Calibration curve: ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3850 3750 3650 3550 3450 3350 3250 3150 3050 2950
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: S/075 erimi  1.00
st-203              4485.0   80.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: erp203.txt
Plot file: erp203.plt

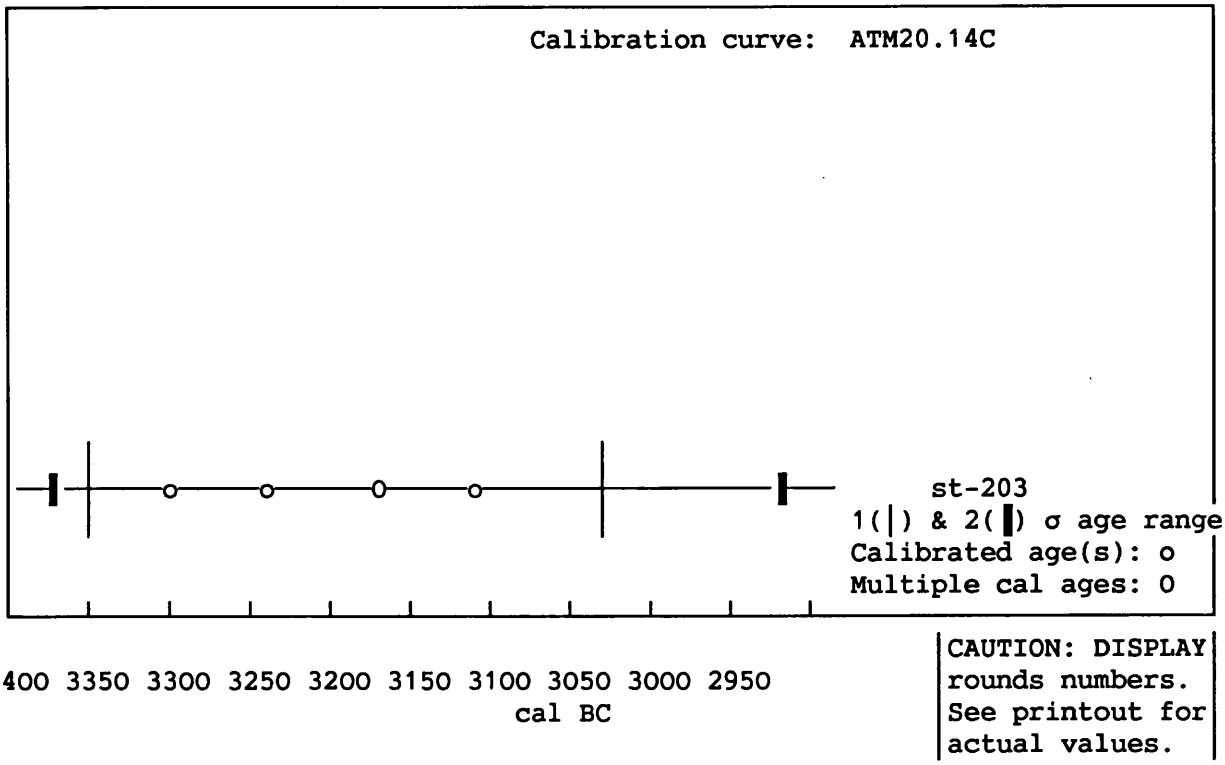

st-203
 Radiocarbon Age BP  4485.0  ± 80.0†                        Reference(s)
  Calibrated age(s) cal BC  3298, 3240, 3171            (Pearson et al. 1986)
                            3169, 3106
                    cal BP  5247, 5189, 5120
                            5118, 5055
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3347-3035(5296-4984)
   two Sigma**   cal BC 3370-2920(5319-4869)

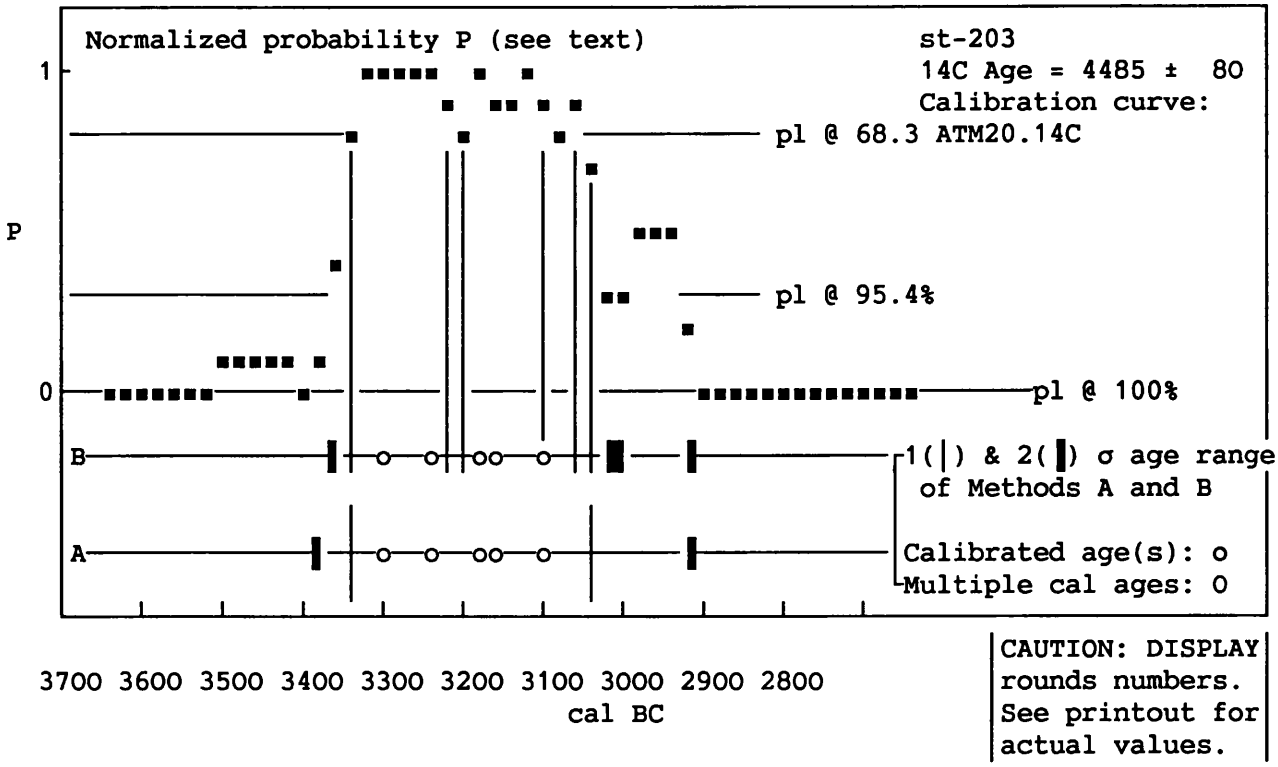
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3347 ( 3298, 3240, 3171, 3169, 3106) 3035
                  cal BP 5296 ( 5247, 5189, 5120, 5118, 5055) 4984
      two sigma   cal BC 3370 ( 3298, 3240, 3171, 3169, 3106) 2920
                  cal BP 5319 ( 5247, 5189, 5120, 5118, 5055) 4869

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3337-3213(5286-5162)              .49
                               3202-3091(5151-5040)              .43
                               3064-3043(5013-4992)              .08
    95.4 (two sigma)   cal BC 3367-3014(5316-4963)              .89
                               3005-2925(4954-4874)              .11
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
st-203
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3400 3350 3300 3250 3200 3150 3100 3050 3000 2950
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-203
14C Age = 4485 ± 80
Calibration curve:
pl @ 68.3 ATM20.14C
pl @ 95.4%
pl @ 100%
1
P
0
B
A
1(|) & 2(|) σ age range of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3700 3600 3500 3400 3300 3200 3100 3000 2900 2800
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: S/075 erimi  1.00
st-338              4425.0  150.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: erp338.txt
Plot file: erp338.plt

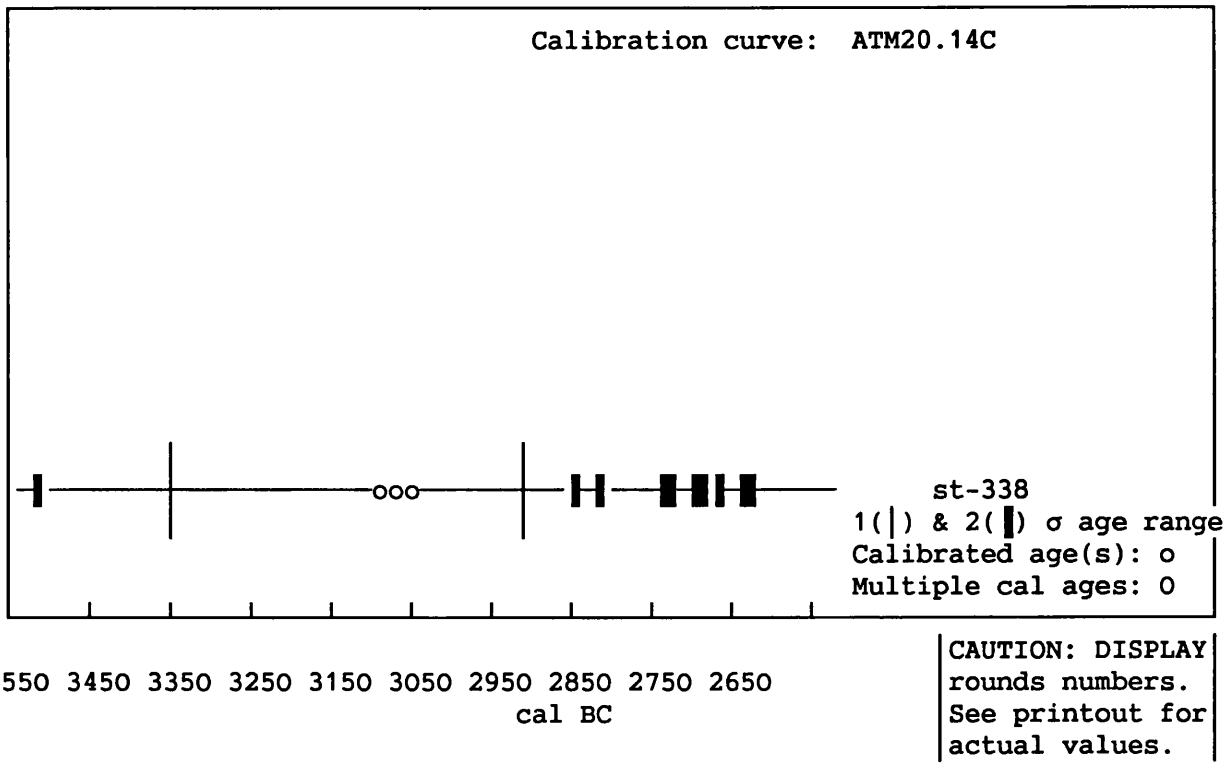

st-338
 Radiocarbon Age BP  4425.0  ±150.0†                          Reference(s)
  Calibrated age(s) cal BC  3083, 3068, 3041              (Pearson et al. 1986)
                    cal BP  5032, 5017, 4990
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3350-2910(5299-4859)
   two Sigma**   cal BC 3510-2860(5459-4809) 2816-2732(4765-4681)
                 2729-2693(4678-4642) 2682-2663(4631-4612)
                 2632-2627(4581-4576)

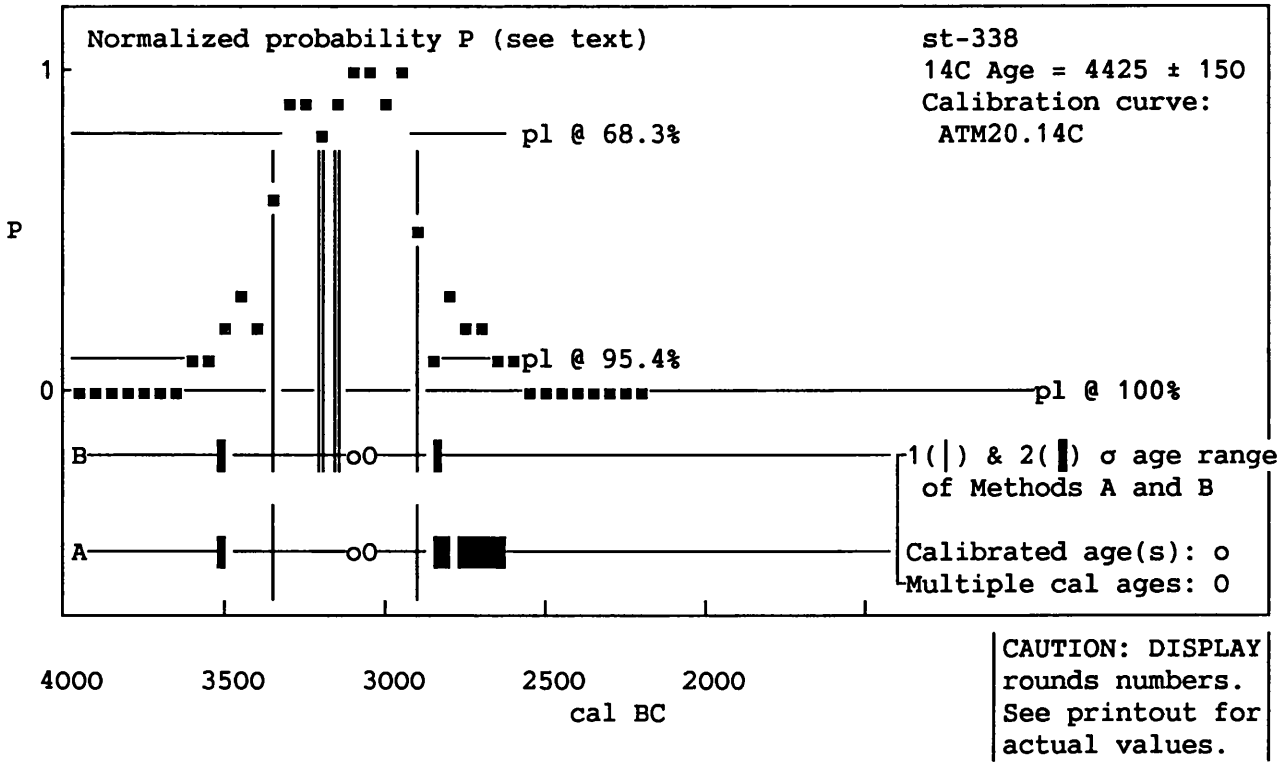
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3350 ( 3083, 3068, 3041) 2910
                  cal BP 5299 ( 5032, 5017, 4990) 4859
      two sigma   cal BC 3510 ( 3083, 3068, 3041) 2627
                  cal BP 5459 ( 5032, 5017, 4990) 4576

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 3330-3220(5279-5169)              .29
                               3189-3152(5138-5101)              .09
                               3150-2920(5099-4869)              .62
    95.4 (two sigma)   cal BC 3510-2860(5459-4809)              .93
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
st-338
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
3550 3450 3350 3250 3150 3050 2950 2850 2750 2650
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
st-338
14C Age = 4425 ± 150
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
4000 3500 3000 2500 2000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: No gaz# panayia  1.00
p-2980              4330.0   80.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM20.14C
Listing file: kp2980.txt
Plot file: kp2980.plt

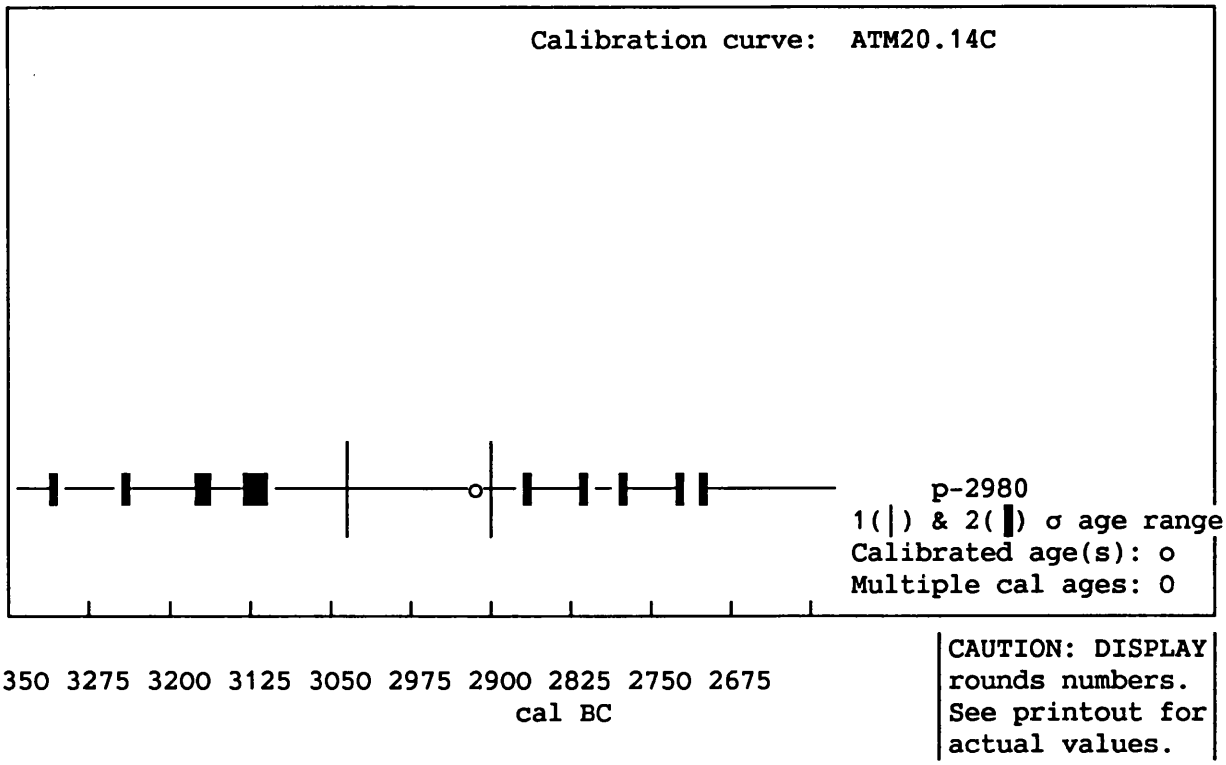

p-2980
 Radiocarbon Age BP  4330.0  ± 80.0†                          Reference(s)
  Calibrated age(s) cal BC  2921                          (Pearson et al. 1986)
                    cal BP  4870
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 3037-2897(4986-4846)
   two Sigma**   cal BC 3303-3238(5252-5187) 3174-3166(5123-5115)
                 3130-3128(5079-5077) 3110-2870(5059-4819)
                 2804-2775(4753-4724) 2718-2703(4667-4652)

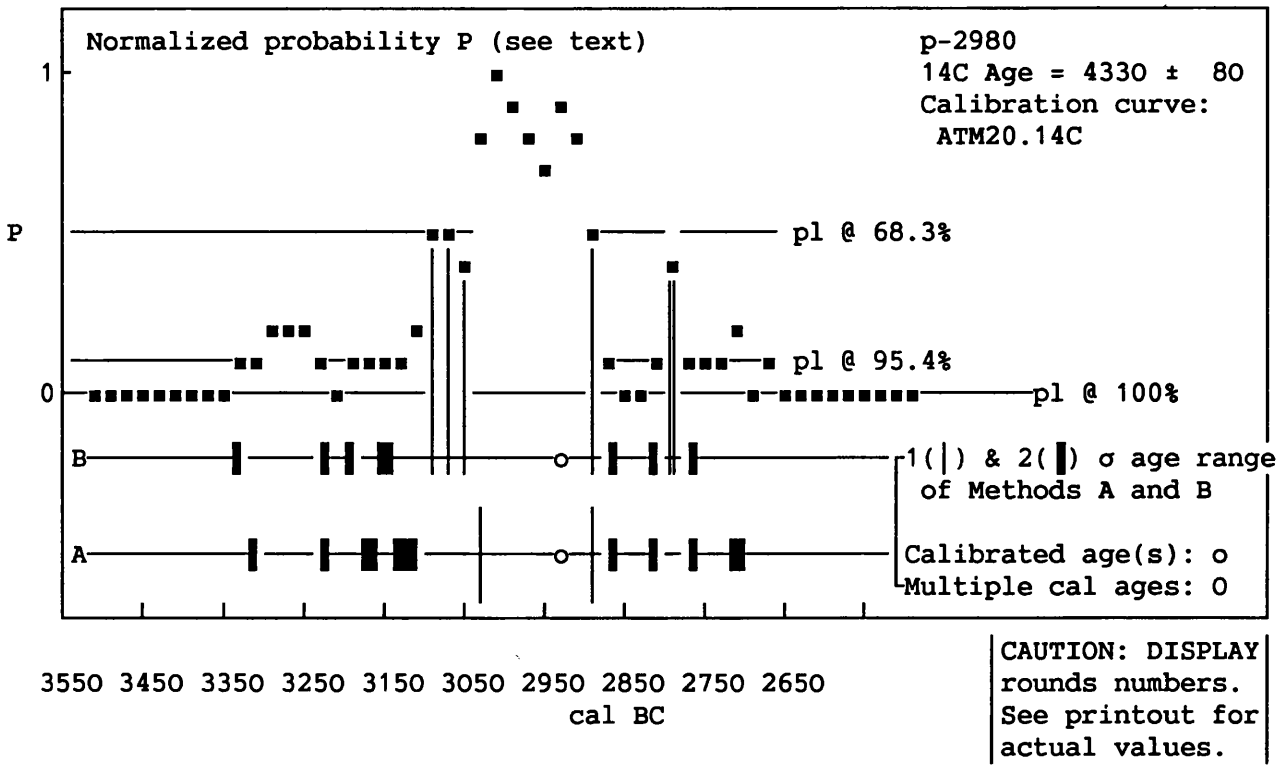
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 3037 ( 2921) 2897
                  cal BP 4986 ( 4870) 4846
      two sigma   cal BC 3303 ( 2921) 2703
                  cal BP 5252 ( 4870) 4652

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 3092-3063(5041-5012)             .11
                               3043-2887(4992-4836)             .88
                               2792-2788(4741-4737)             .02
    95.4 (two sigma)   cal BC 3330-3228(5279-5177)             .09
                               3185-3156(5134-5105)             .02
                               3142-2866(5091-4815)             .81
                               2809-2770(4758-4719)             .05
```

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
p-2980
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
CAUTION: DISPLAY rounds numbers. See printout for actual values.
3350 3275 3200 3125 3050 2975 2900 2825 2750 2675
cal BC


Normalized probability P (see text)
p-2980
14C Age = 4330 ± 80
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
CAUTION: DISPLAY rounds numbers. See printout for actual values.
3550 3450 3350 3250 3150 3050 2950 2850 2750 2650
cal BC

Site ID: P/083 mosphilia 1.00
bm-2279 4030.0 110.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM20.14C
Listing file: kmos2279.txt
Plot file: kmos2279.plt

bm-2279♦
Radiocarbon Age BP 4030.0 ±110.0† Reference(s)
Calibrated age(s) cal BC 2576, 2531, 2510 (Pearson et al. 1986)
cal BP 4525, 4480, 4459
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 2865-2810(4814-4759) 2747-2725(4696-4674)
2697-2674(4646-4623) 2670-2460(4619-4409)
two Sigma** cal BC 2900-2280(4849-4229)

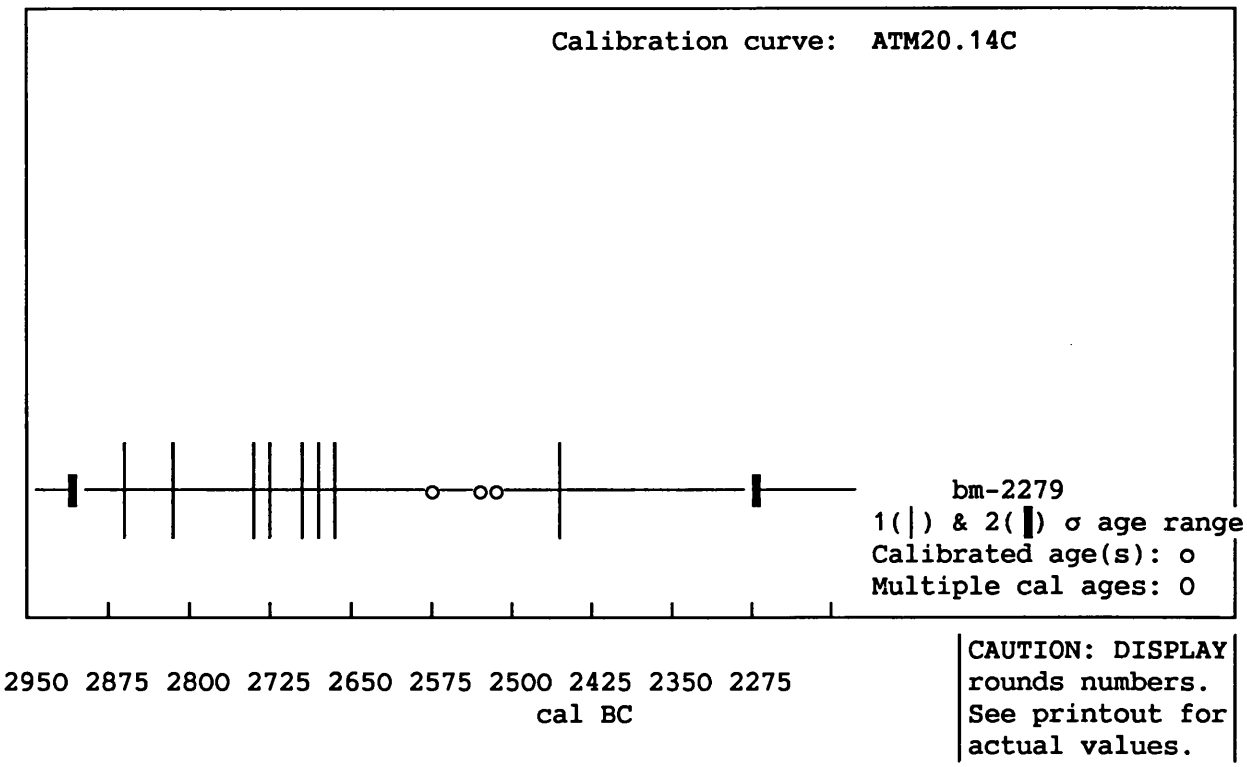
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 2865 (2576, 2531, 2510) 2460
cal BP 4814 (4525, 4480, 4459) 4409
two sigma cal BC 2900 (2576, 2531, 2510) 2280
cal BP 4849 (4525, 4480, 4459) 4229

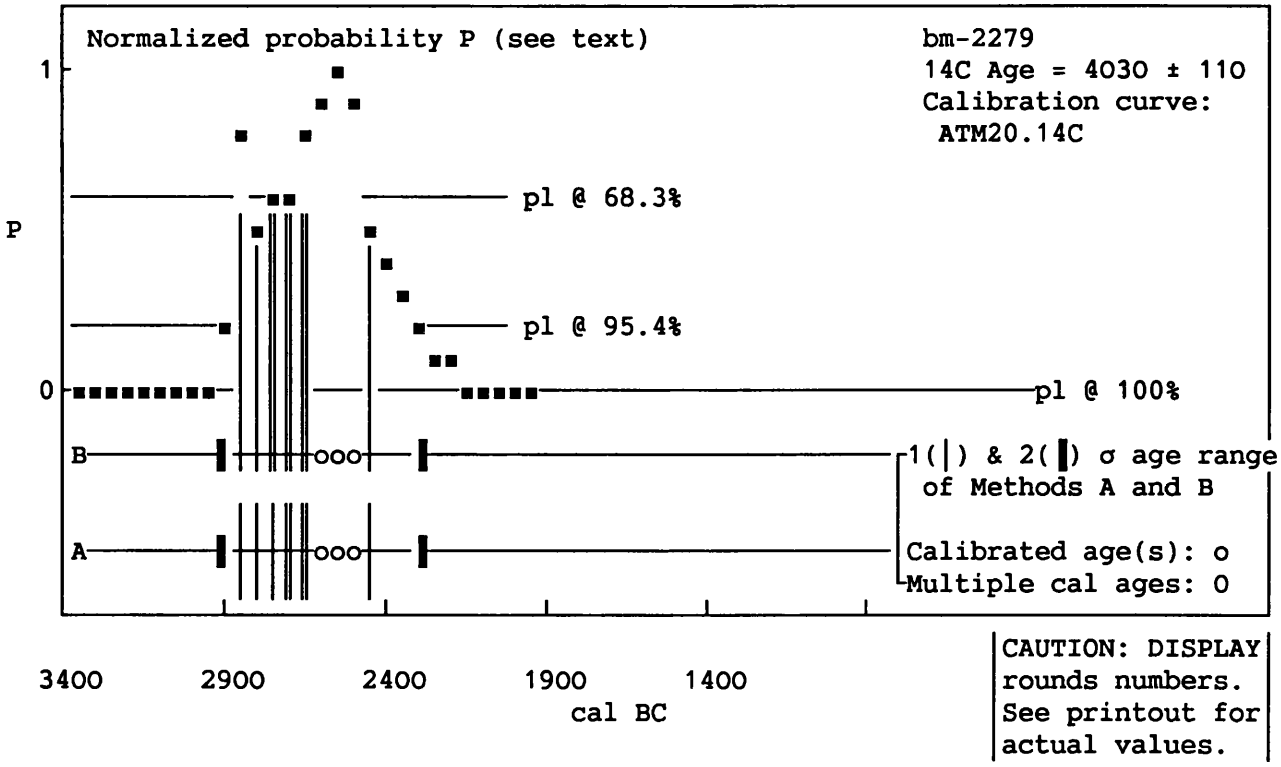
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 2865-2810(4814-4759)	.17
	2770-2765(4719-4714)	.01
	2748-2725(4697-4674)	.06
	2697-2674(4646-4623)	.06
	2670-2460(4619-4409)	.70
95.4 (two sigma)	cal BC 2890-2290(4839-4239)	1.00

References for datasets [and intervals] used:
Pearson, GW, Pilcher, JR, Baille, MG, Corbett, DM and Qua, F,
1986, Radiocarbon, 28, 911-934.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM20.14C
bm-2279
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2950 2875 2800 2725 2650 2575 2500 2425 2350 2275
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
bm-2279
14C Age = 4030 ± 110
Calibration curve:
ATM20.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
3400 2900 2400 1900 1400
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: No gaz# phaneromeni 1.00
p-2386 3720.0 70.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM10.14C
Listing file: eph2368.txt
Plot file: eph2368.plt

p-2386
Radiocarbon Age BP 3720.0 ± 70.0† Reference(s)
Calibrated age(s) cal BC 2139, 2078, 2075 (Stuiver and Becker)
2048, 2046
cal BP 4088, 4027, 4024
3997, 3995
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 2273-2253(4222-4202) 2230-2217(4179-4166)
2216-2032(4165-3981) 1988-1984(3937-3933)
two Sigma** cal BC 2396-2381(4345-4330) 2350-1920(4299-3869)

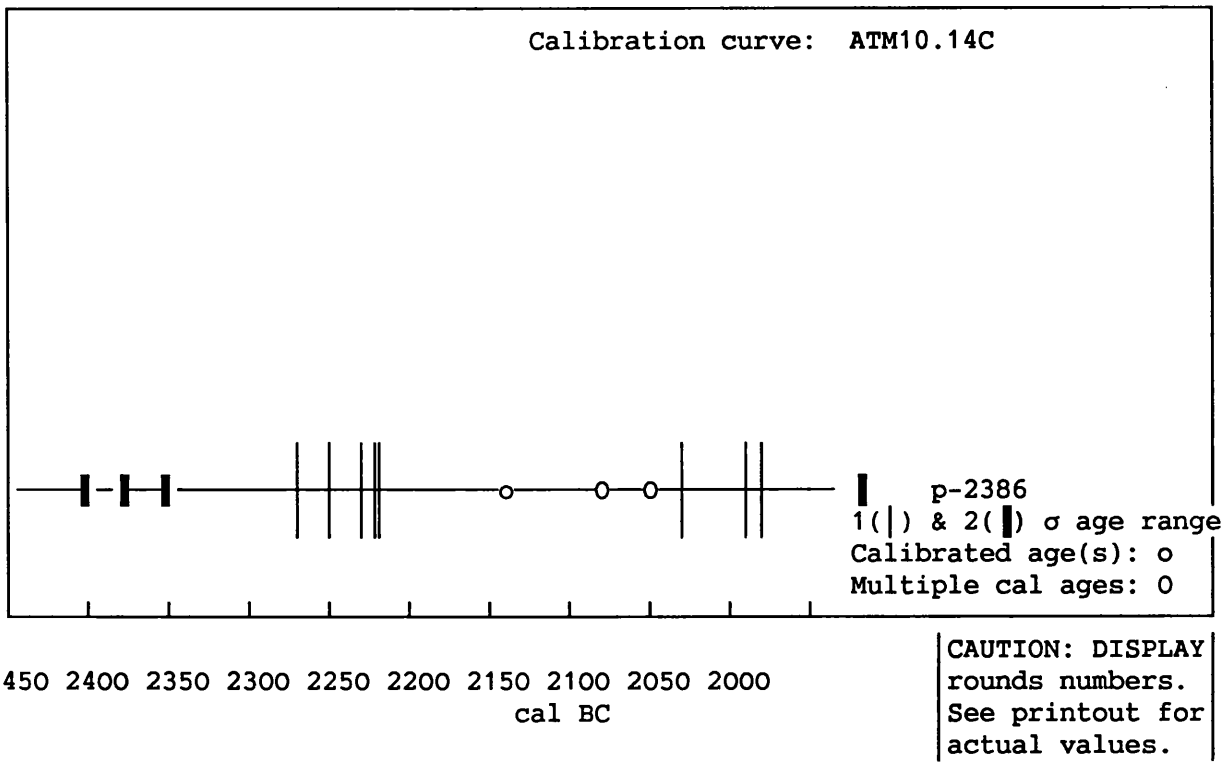
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 2273 (2139, 2078, 2075, 2048, 2046) 1984
cal BP 4222 (4088, 4027, 4024, 3997, 3995) 3933
two sigma cal BC 2396 (2139, 2078, 2075, 2048, 2046) 1920
cal BP 4345 (4088, 4027, 4024, 3997, 3995) 3869

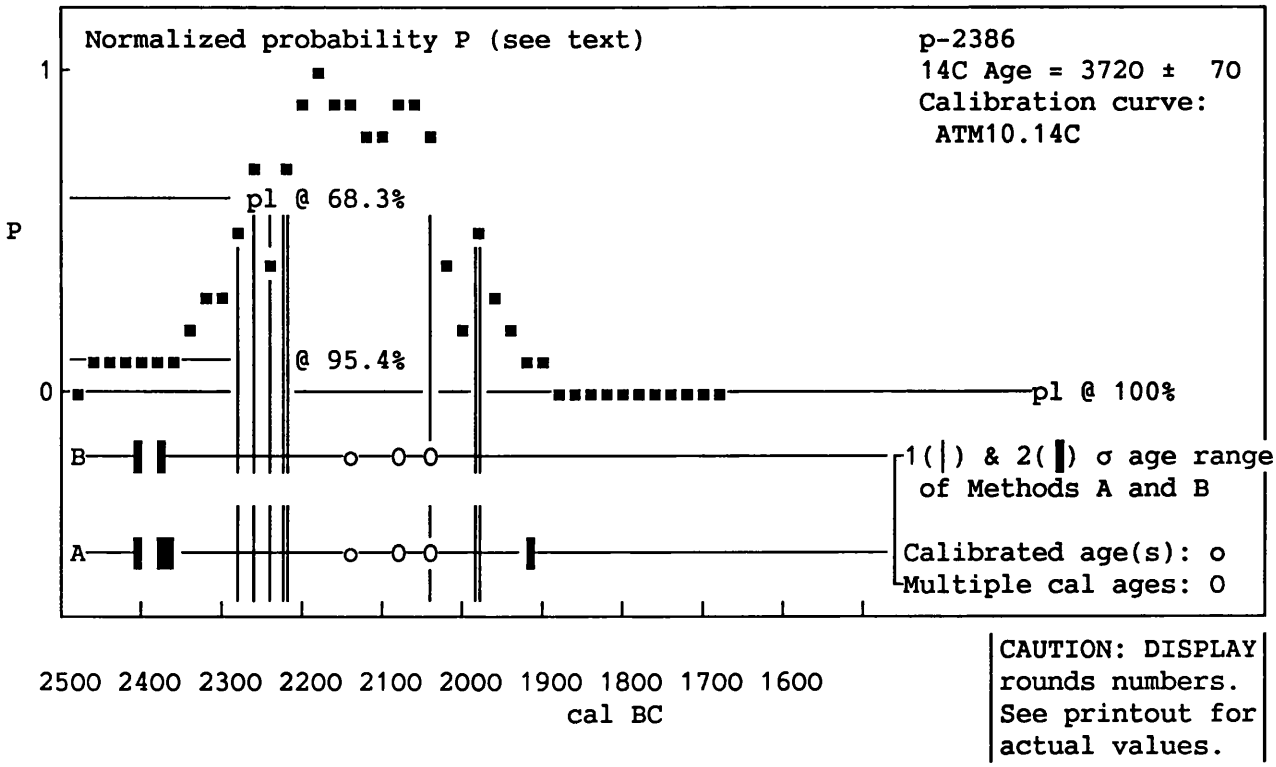
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 2273-2254(4222-4203)	.08
	2230-2218(4179-4167)	.04
	2214-2032(4163-3981)	.86
	1988-1983(3937-3932)	.02
95.4 (two sigma)	cal BC 2396-2381(4345-4330)	.01

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
p-2386
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2450 2400 2350 2300 2250 2200 2150 2100 2050 2000
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2386
14C Age = 3720 ± 70
Calibration curve:
ATM10.14C
1
P
0
pl @ 68.3%
@ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2500 2400 2300 2200 2100 2000 1900 1800 1700 1600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

Site ID: No gaz# phaneromeni 1.00
h-7073 3640.0 100.0 .0 .0 100.0 .0
xx
Calibration file(s): ATM10.14C
Listing file: eph7073.txt
Plot file: eph7073.plt

h-7073
Radiocarbon Age BP 3640.0 ±100.0† Reference(s)
Calibrated age(s) cal BC 2031, 1989, 1981 (Stuiver and Becker)
cal BP 3980, 3938, 3930
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 2198-2158(4147-4107) 2140-1880(4089-3829)
two Sigma** cal BC 2339-2321(4288-4270) 2310-1740(4259-3689)

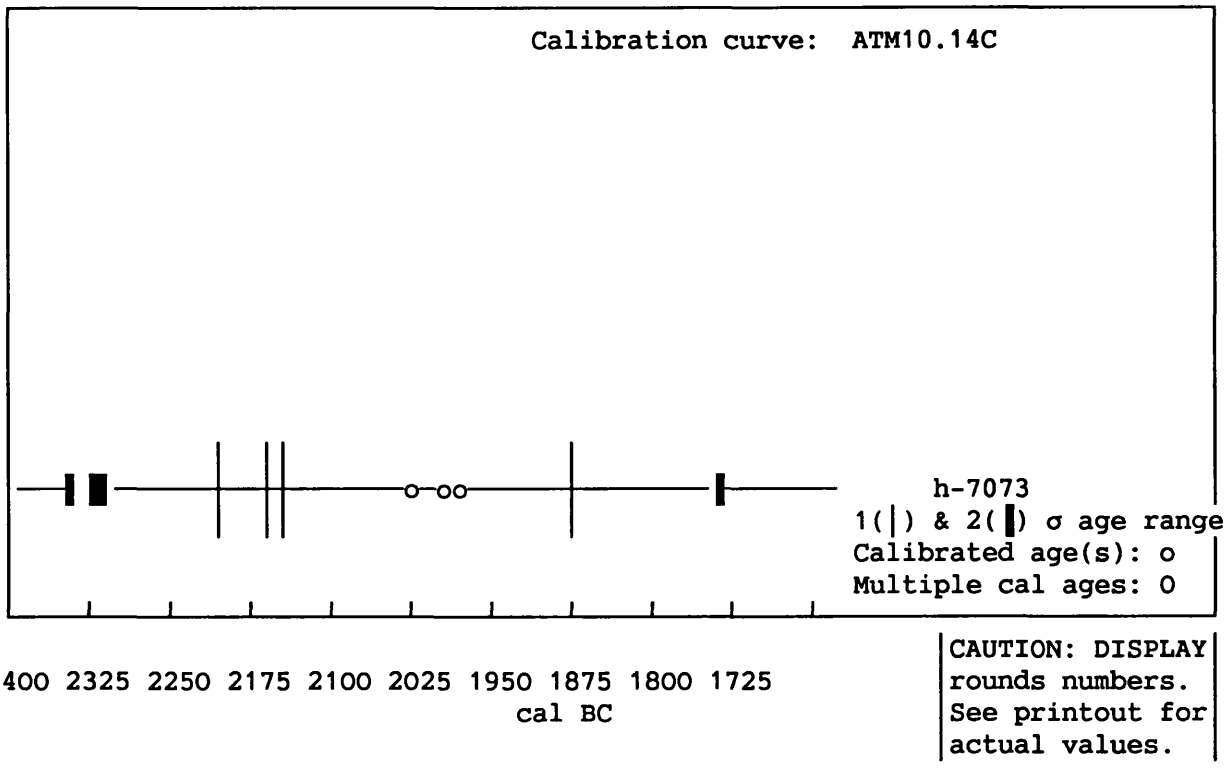
Summary of above —
minimum of cal age ranges (cal ages) maximum of cal age ranges:
one sigma cal BC 2198 (2031, 1989, 1981) 1880
cal BP 4147 (3980, 3938, 3930) 3829
two sigma cal BC 2339 (2031, 1989, 1981) 1740
cal BP 4288 (3980, 3938, 3930) 3689

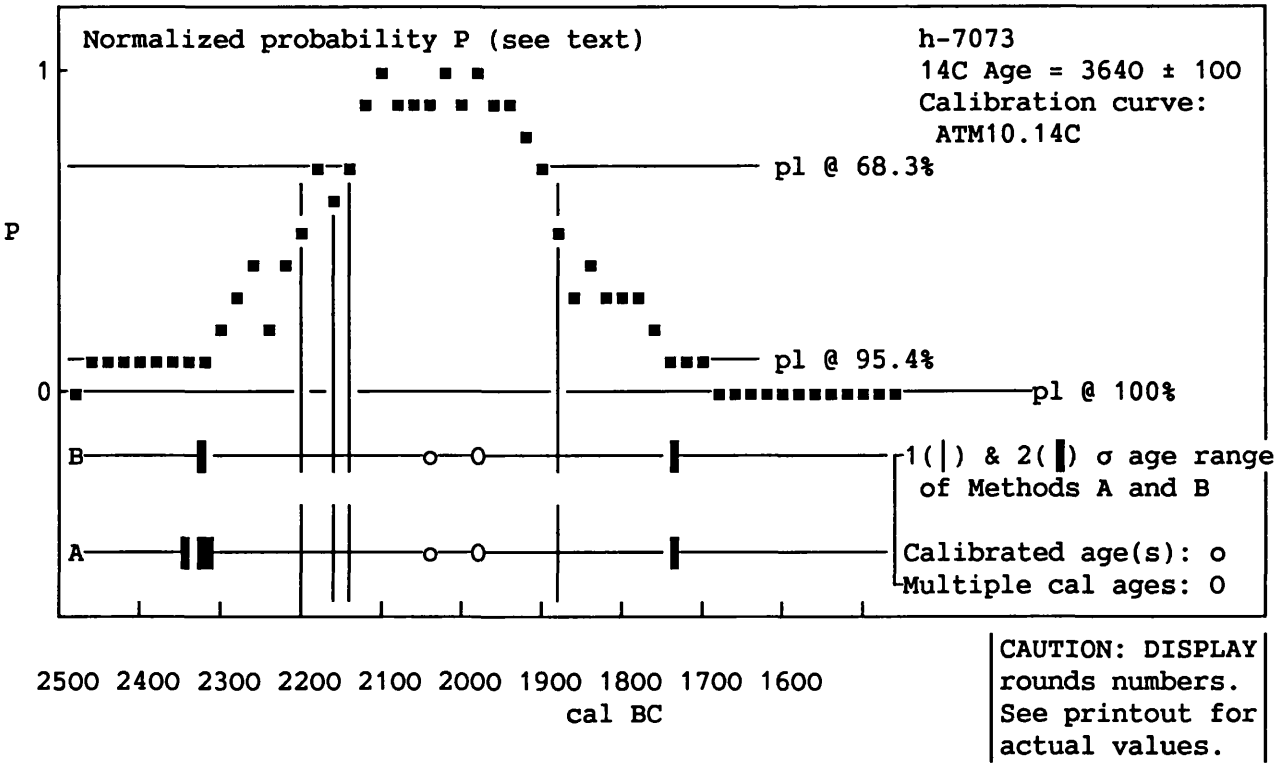
cal AD/BC age ranges (cal ages as above) from probability distribution
(Method B):

% area enclosed	cal BC (cal BP) age ranges	relative area under probability distribution
68.3 (one sigma)	cal BC 2194-2163(4143-4112)	.09
	2140-1890(4089-3839)	.91
95.4 (two sigma)	cal BC 2310-1740(4259-3689)	.99

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
h-7073
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2400 2325 2250 2175 2100 2025 1950 1875 1800 1725
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
h-7073
14C Age = 3640 ± 100
Calibration curve:
ATM10.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2500 2400 2300 2200 2100 2000 1900 1800 1700 1600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: No gaz# phaneromeni  1.00
p-2387              3620.0   60.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM10.14C
Listing file: eph2387.txt
Plot file: eph2387.plt


p-2387
 Radiocarbon Age BP  3620.0  ± 60.0†                        Reference(s)
  Calibrated age(s) cal BC  2027, 2026, 2015             (Stuiver and Becker)
                            1992, 1971
                    cal BP  3976, 3975, 3964
                            3941, 3920
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 2131-2082(4080-4031) 2070-2061(4019-4010)
                 2039-1918(3988-3867) 1904-1890(3853-3839)
   two Sigma**   cal BC 2199-2155(4148-4104) 2140-1880(4089-3829)
                 1844-1829(3793-3778) 1820-1814(3769-3763)
                 1797-1779(3746-3728)

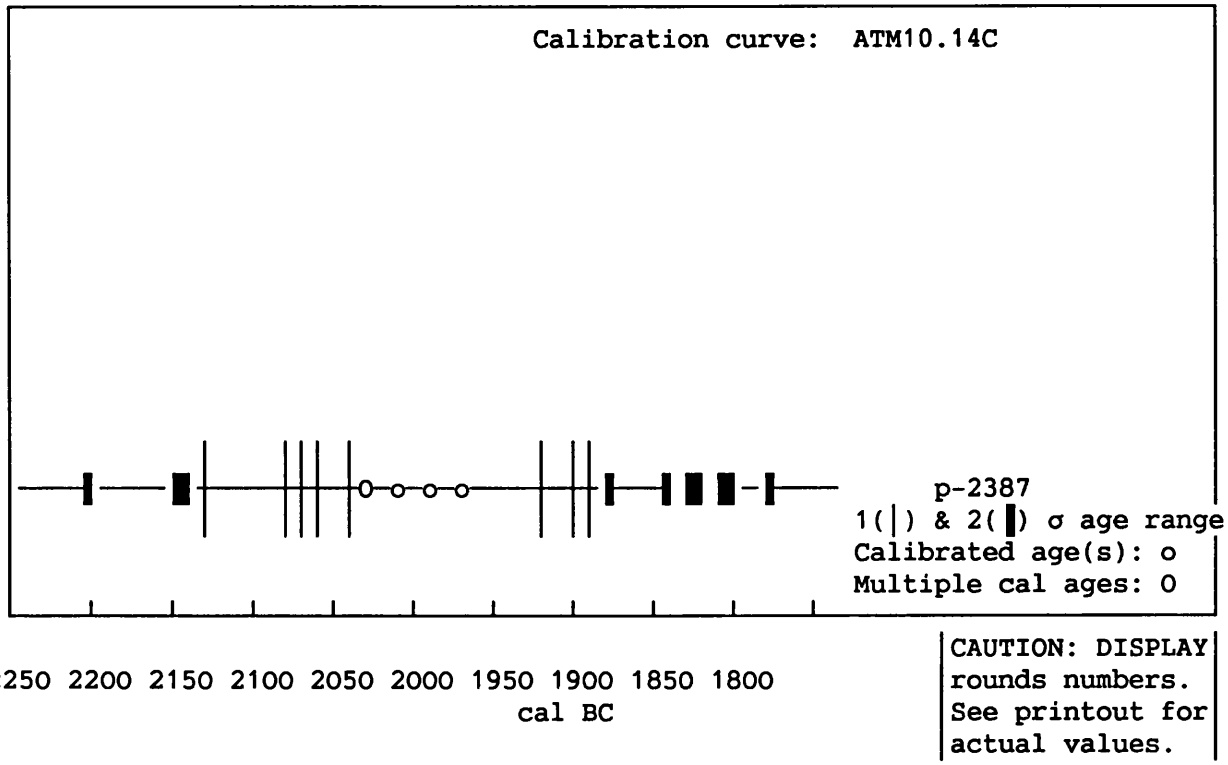
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 2131 ( 2027, 2026, 2015, 1992, 1971) 1890
                  cal BP 4080 ( 3976, 3975, 3964, 3941, 3920) 3839
      two sigma   cal BC 2199 ( 2027, 2026, 2015, 1992, 1971) 1779
                  cal BP 4148 ( 3976, 3975, 3964, 3941, 3920) 3728

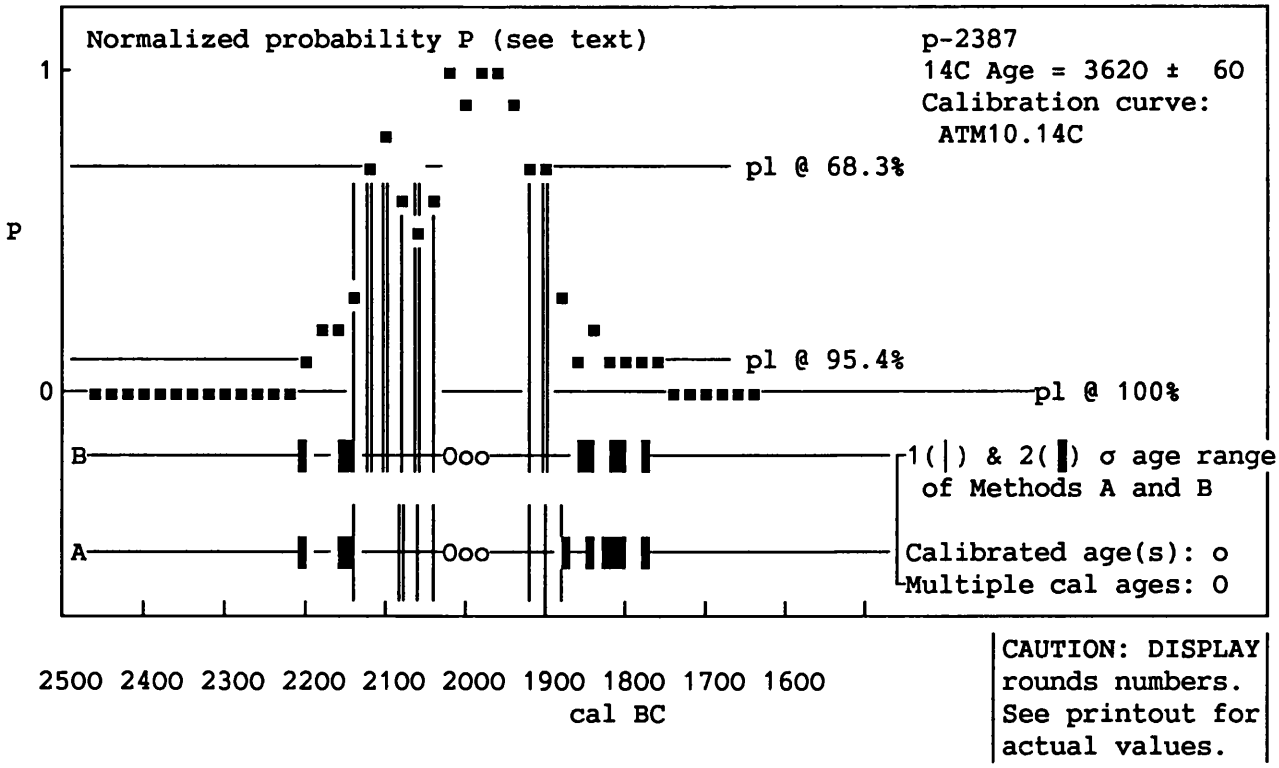
  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 2130-2119(4079-4068)            .05
                              2115-2097(4064-4046)            .09
                              2096-2083(4045-4032)            .07
                              2069-2063(4018-4012)            .03
                              2038-1919(3987-3868)            .72
                              1901-1892(3850-3841)            .04
    95.4 (two sigma)   cal BC 2199-2155(4148-4104)            .04
                              2144-1870(4093-3819)            .92
                              1845-1828(3794-3777)            .02
                              1797-1778(3746-3727)            .01



References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^2+ curve std. dev.^2)
   2 sigma = 2 x square root of (sample std. dev.^2+ curve std. dev.^2)
0* represents a "negative" age BP
1955* denotes influence of bomb C14
```


Calibration curve: ATM10.14C
p-2387
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2250 2200 2150 2100 2050 2000 1950 1900 1850 1800
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2387
14C Age = 3620 ± 60
Calibration curve:
ATM10.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2500 2400 2300 2200 2100 2000 1900 1800 1700 1600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: No gaz# phaneromeni  1.00
p-2388              3520.0   70.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM10.14C
Listing file: eph2388.txt
Plot file: eph2388.plt

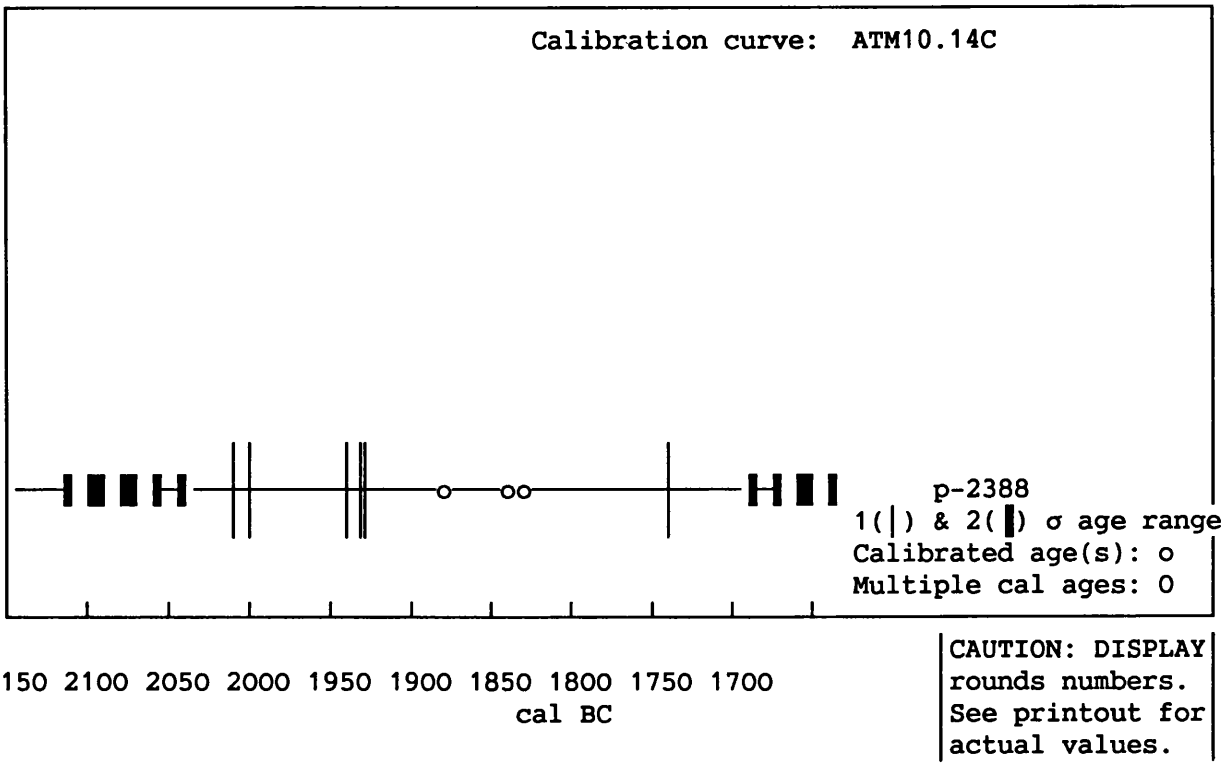

p-2388
 Radiocarbon Age BP  3520.0  ± 70.0†                          Reference(s)
  Calibrated age(s) cal BC  1882, 1840, 1833            (Stuiver and Becker)
                    cal BP  3831, 3789, 3782
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 2010-1996(3959-3945) 1944-1927(3893-3876)
                 1926-1744(3875-3693)
   two Sigma**   cal BC 2112-2100(4061-4049) 2093-2084(4042-4033)
                 2068-2065(4017-4014) 2040-1690(3989-3639)
                 1669-1662(3618-3611) 1648-1645(3597-3594)

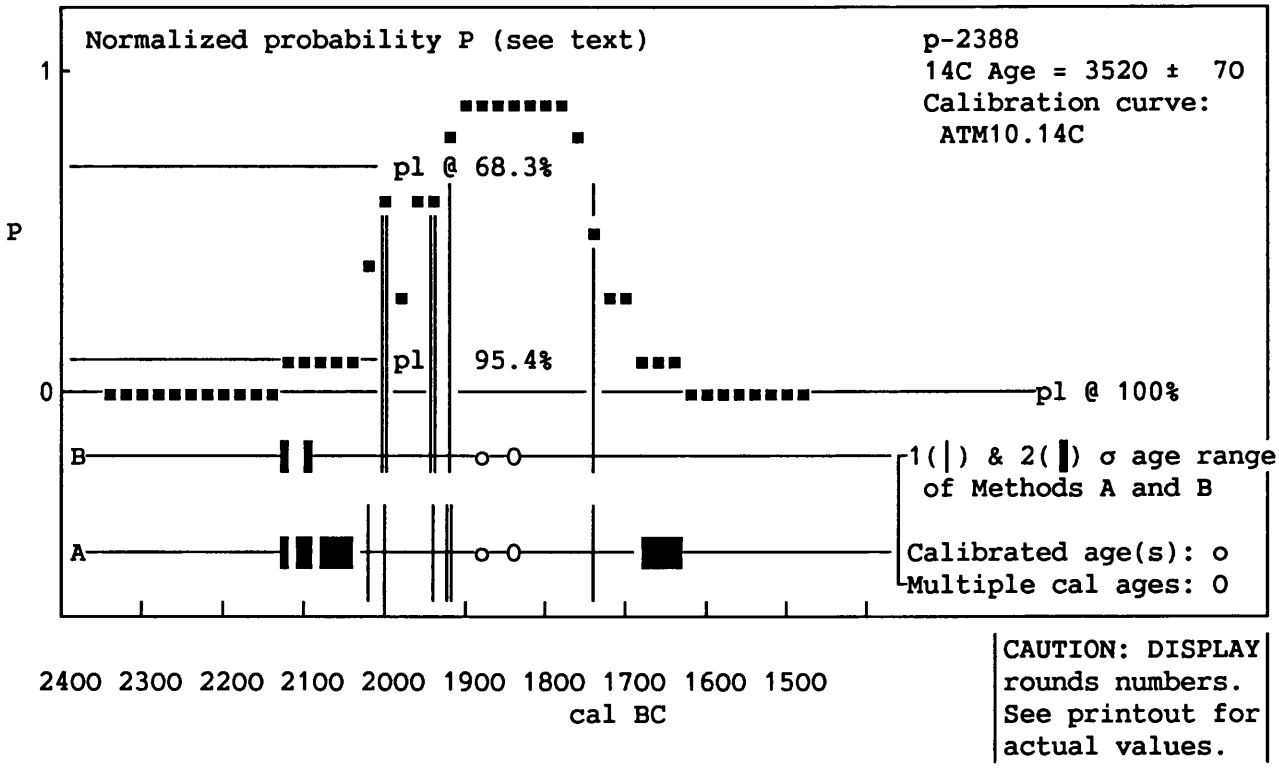
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 2010 ( 1882, 1840, 1833) 1744
                  cal BP 3959 ( 3831, 3789, 3782) 3693
      two sigma   cal BC 2112 ( 1882, 1840, 1833) 1645
                  cal BP 4061 ( 3831, 3789, 3782) 3594

 cal AD/BC age ranges (cal ages as above) from probability distribution
   (Method B):
  % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                    probability distribution
   68.3 (one sigma)   cal BC 2009-1997(3958-3946)              .05
                             1939-1934(3888-3883)              .02
                             1925-1746(3874-3695)              .93
   95.4 (two sigma)   cal BC 2112-2101(4061-4050)              .01
```

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
p-2388
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2150 2100 2050 2000 1950 1900 1850 1800 1750 1700
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
p-2388
14C Age = 3520 ± 70
Calibration curve:
ATM10.14C
1
P
0
pl @ 68.3%
pl
95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2400 2300 2200 2100 2000 1900 1800 1700 1600 1500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: No gaz# phaneromeni  1.00
h-7071              3350.0  100.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM10.14C
Listing file: eph7071.txt
Plot file: eph7071.plt

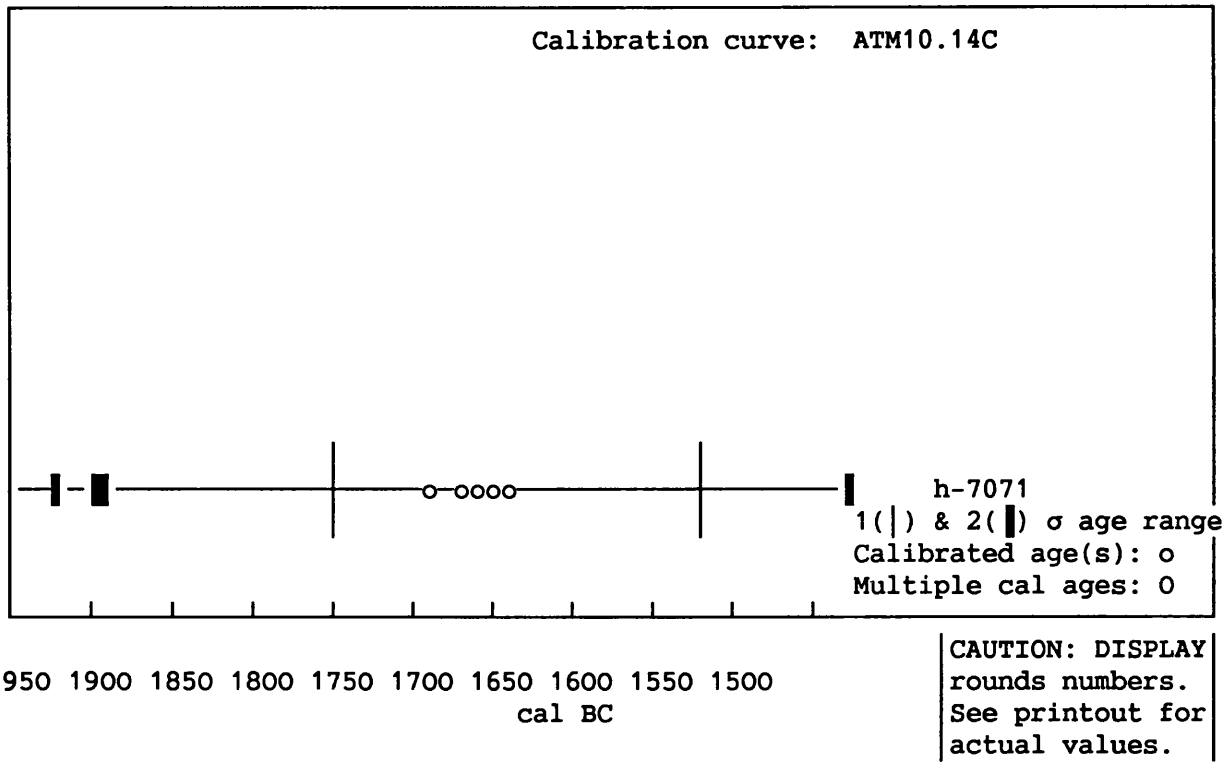

h-7071
 Radiocarbon Age BP  3350.0  ±100.0†                        Reference(s)
  Calibrated age(s) cal BC  1686, 1672, 1658            (Stuiver and Becker)
                            1654, 1639
                    cal BP  3635, 3621, 3607
                            3603, 3588
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 1750-1520(3699-3469)
   two Sigma**   cal BC 1918-1903(3867-3852) 1890-1430(3839-3379)

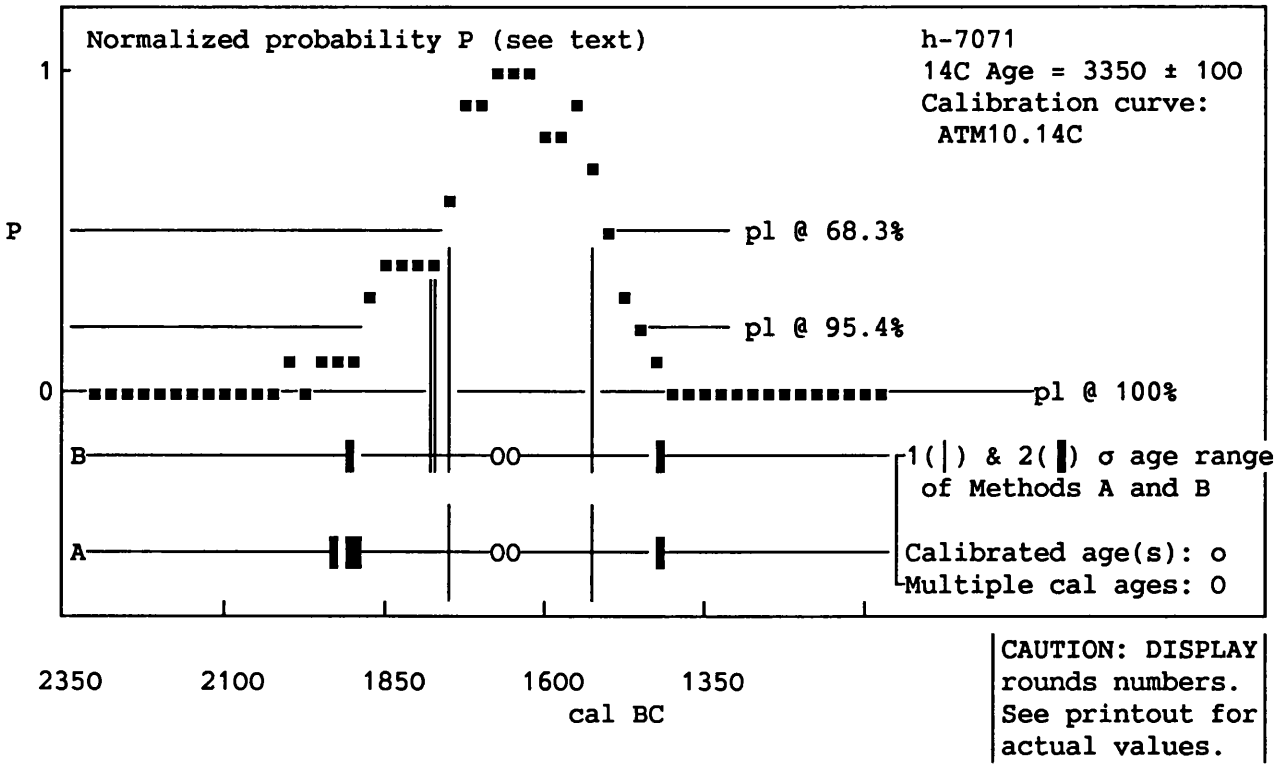
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 1750 ( 1686, 1672, 1658, 1654, 1639) 1520
                  cal BP 3699 ( 3635, 3621, 3607, 3603, 3588) 3469
      two sigma   cal BC 1918 ( 1686, 1672, 1658, 1654, 1639) 1430
                  cal BP 3867 ( 3635, 3621, 3607, 3603, 3588) 3379

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 1768-1764(3717-3713)              .01
                               1750-1520(3699-3469)              .98
    95.4 (two sigma)   cal BC 1890-1430(3839-3379)              .99
```

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
h-7071
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
1950 1900 1850 1800 1750 1700 1650 1600 1550 1500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
h-7071
14C Age = 3350 ± 100
Calibration curve:
ATM10.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2350 2100 1850 1600 1350
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: No gaz# ambelikou  1.00
lu-1694              3660.0   55.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM10.14C
Listing file: aal1694.txt
Plot file: aal1694.plt

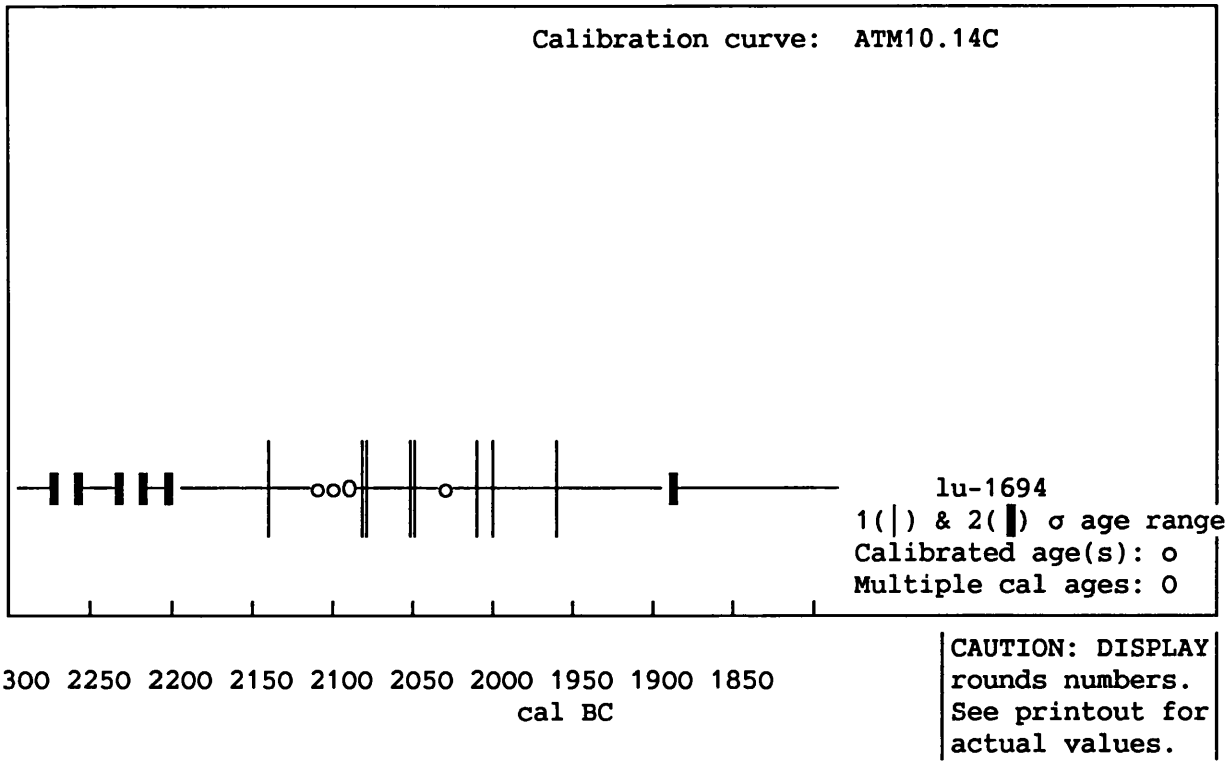

lu-1694
 Radiocarbon Age BP  3660.0  ± 55.0†                        Reference(s)
  Calibrated age(s) cal BC  2109, 2103, 2090            (Stuiver and Becker)
                            2085, 2034
                    cal BP  4058, 4052, 4039
                            4034, 3983
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 2139-2078(4088-4027) 2075-2049(4024-3998)
                 2046-2011(3995-3960) 1995-1960(3944-3909)
   two Sigma**   cal BC 2270-2258(4219-4207) 2227-2225(4176-4174)
                 2200-1890(4149-3839)

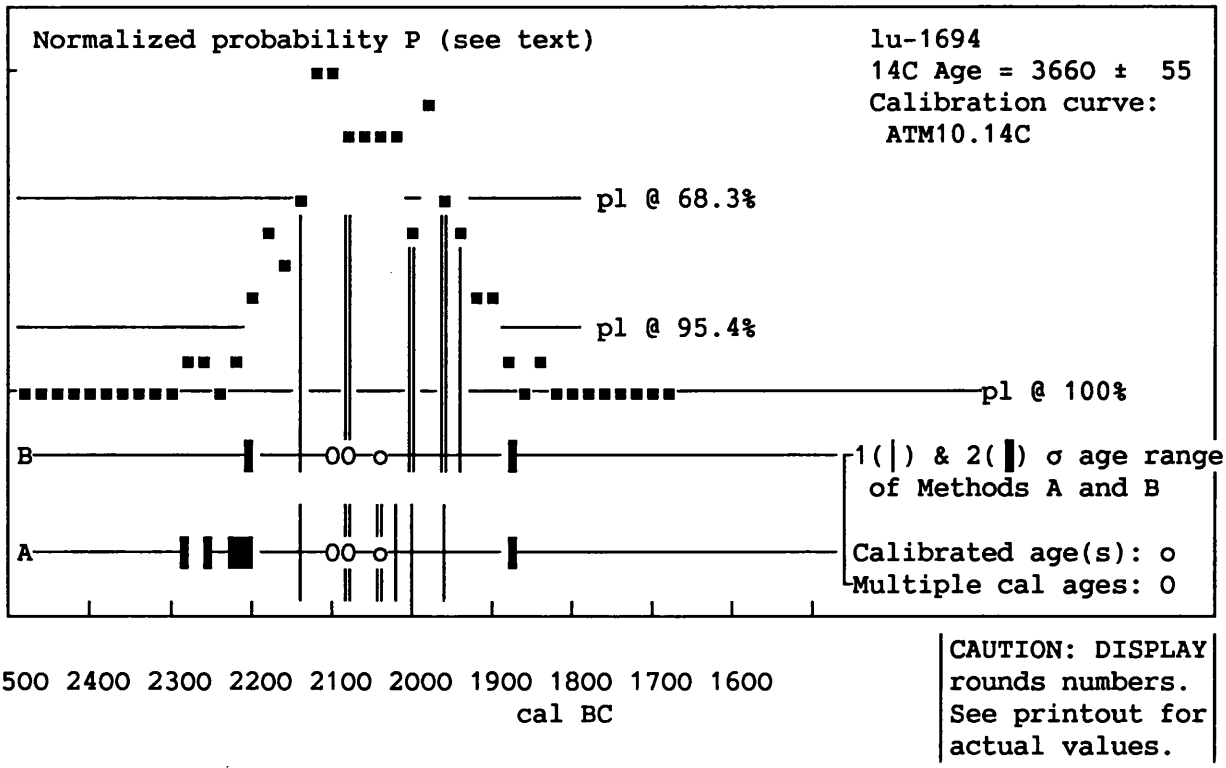
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 2139 ( 2109, 2103, 2090, 2085, 2034) 1960
                  cal BP 4088 ( 4058, 4052, 4039, 4034, 3983) 3909
      two sigma   cal BC 2270 ( 2109, 2103, 2090, 2085, 2034) 1890
                  cal BP 4219 ( 4058, 4052, 4039, 4034, 3983) 3839

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                     probability distribution
    68.3 (one sigma)   cal BC 2139-2077(4088-4026)            .39
                               2076-2010(4025-3959)            .37
                               1996-1957(3945-3906)            .21
                               1953-1946(3902-3895)            .03
    95.4 (two sigma)   cal BC 2203-1887(4152-3836)            .99
```

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
lu-1694
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2300 2250 2200 2150 2100 2050 2000 1950 1900 1850
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
lu-1694
14C Age = 3660 ± 55
Calibration curve:
ATM10.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2500 2400 2300 2200 2100 2000 1900 1800 1700 1600
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: No gaz# alambra  1.00
eth-210              3500.0  120.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM10.14C
Listing file: alm210.txt
Plot file: alm210.plt

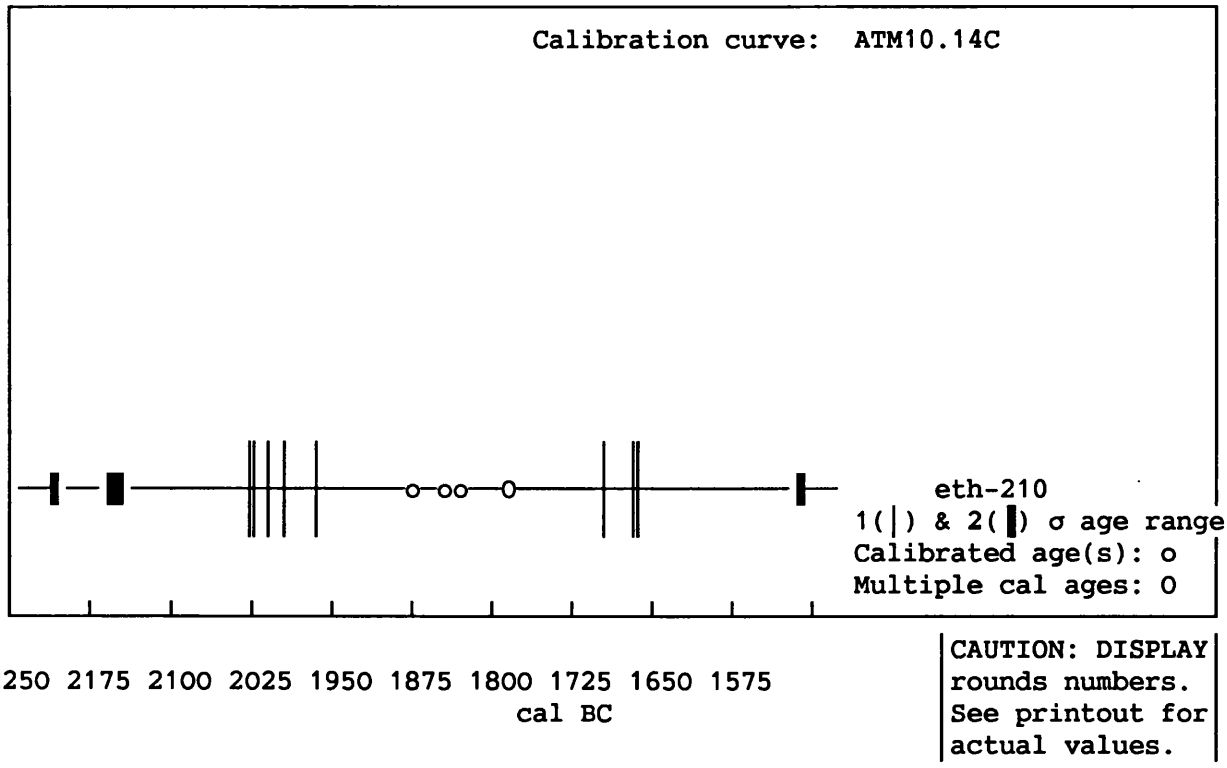

eth-210
 Radiocarbon Age BP  3500.0  ±120.0†                        Reference(s)
  Calibrated age(s) cal BC  1878, 1842, 1830            (Stuiver and Becker)
                            1789, 1785
                    cal BP  3827, 3791, 3779
                            3738, 3734
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 2027-2023(3976-3972) 2015-1991(3964-3940)
                 1970-1690(3919-3639) 1669-1663(3618-3612)
   two Sigma**   cal BC 2198-2157(4147-4106) 2140-1520(4089-3469)

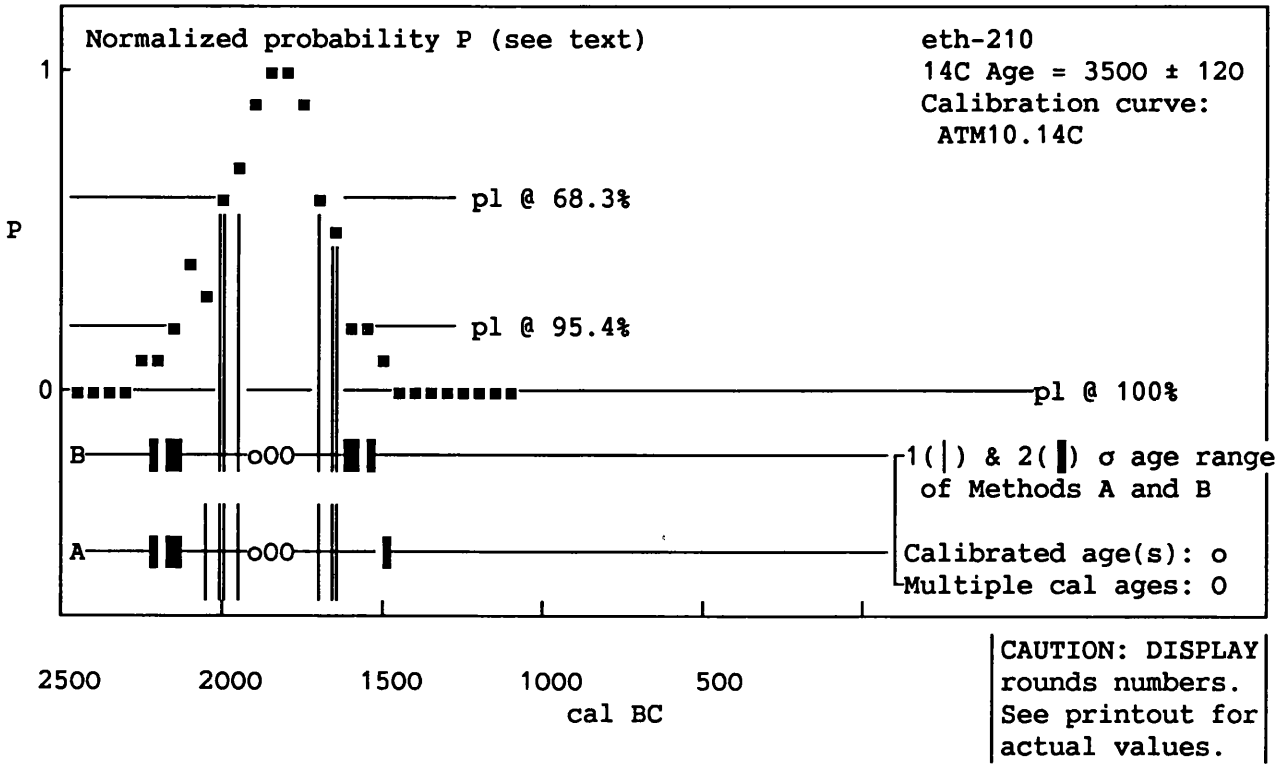
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 2027 ( 1878, 1842, 1830, 1789, 1785) 1663
                  cal BP 3976 ( 3827, 3791, 3779, 3738, 3734) 3612
      two sigma   cal BC 2198 ( 1878, 1842, 1830, 1789, 1785) 1520
                  cal BP 4147 ( 3827, 3791, 3779, 3738, 3734) 3469

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 2015-1991(3964-3940)              .07
                               1970-1690(3919-3639)              .91
                               1669-1663(3618-3612)              .01
    95.4 (two sigma)   cal BC 2191-2164(4140-4113)              .01
                               2140-1580(4089-3529)              .96
                               1576-1529(3525-3478)              .03
```

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
eth-210
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2250 2175 2100 2025 1950 1875 1800 1725 1650 1575
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
eth-210
14C Age = 3500 ± 120
Calibration curve:
ATM10.14C
P
1
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2500 2000 1500 1000 500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

```
Site ID: No gaz# alambra  1.00
eth-206              3440.0  140.0       .0     .0  100.0     .0
xx
Calibration file(s): ATM10.14C
Listing file: alm206.txt
Plot file: alm206.plt

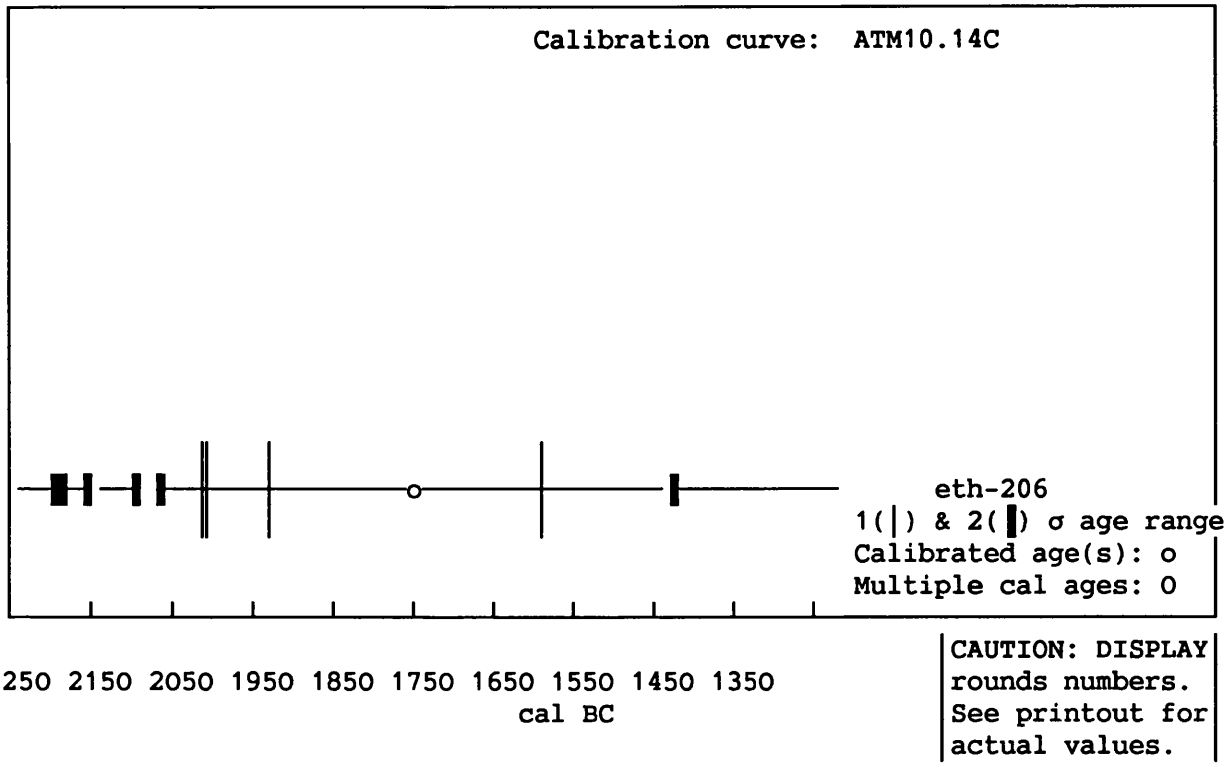

eth-206
 Radiocarbon Age BP  3440.0  ±140.0†                          Reference(s)
  Calibrated age(s) cal BC  1742                          (Stuiver and Becker)
                    cal BP  3691
  cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
   one Sigma**   cal BC 2008-2001(3957-3950) 1920-1600(3869-3549)
   two Sigma**   cal BC 2188-2183(4137-4132) 2140-2077(4089-4026)
                 2080-1430(4029-3379)

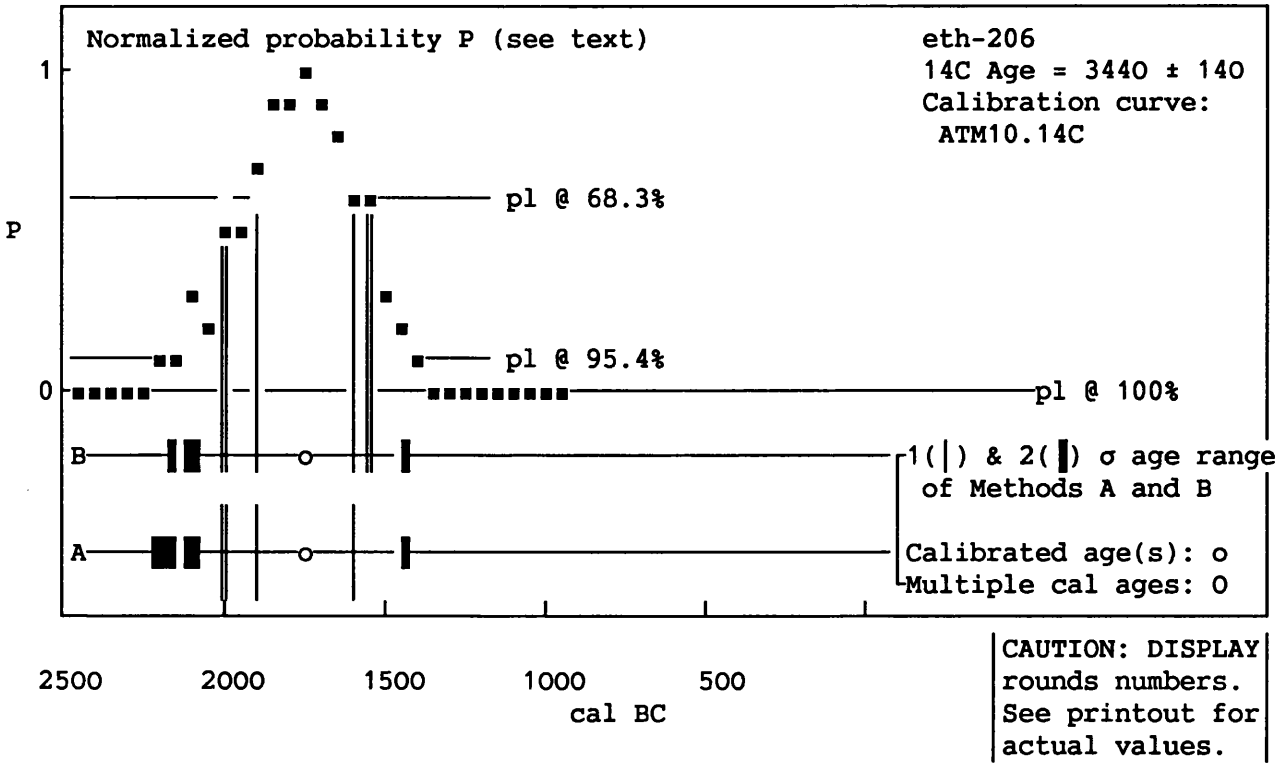
   Summary of above —
   minimum of cal age ranges (cal ages) maximum of cal age ranges:
      one sigma   cal BC 2008 ( 1742) 1600
                  cal BP 3957 ( 3691) 3549
      two sigma   cal BC 2188 ( 1742) 1430
                  cal BP 4137 ( 3691) 3379

  cal AD/BC age ranges (cal ages as above) from probability distribution
    (Method B):
   % area enclosed     cal BC (cal BP) age ranges      relative area under
                                                      probability distribution
    68.3 (one sigma)   cal BC 2009-1998(3958-3947)              .02
                              1920-1600(3869-3549)              .93
                              1560-1537(3509-3486)              .05
    95.4 (two sigma)   cal BC 2139-2078(4088-4027)              .04
                              2075-1440(4024-3389)              .96
```

References for datasets [and intervals] used:
Stuiver,M and Becker,B, 1986, Radiocarbon, 28, 863-910.

Comments:
†This standard deviation (error) may include a lab error multiplier.
IF SO SPECIFY!
** 1 sigma = square root of (sample std. dev.^{2}+ curve std. dev.^{2})
   2 sigma = 2 x square root of (sample std. dev.^{2}+ curve std. dev.^{2})
0* represents a "negative" age BP
1955* denotes influence of bomb C14


Calibration curve: ATM10.14C
eth-206
1(|) & 2(|) σ age range
Calibrated age(s): o
Multiple cal ages: 0
2250 2150 2050 1950 1850 1750 1650 1550 1450 1350
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.


Normalized probability P (see text)
eth-206
14C Age = 3440 ± 140
Calibration curve:
ATM10.14C
1
P
0
pl @ 68.3%
pl @ 95.4%
pl @ 100%
B
A
1(|) & 2(|) σ age range
of Methods A and B
Calibrated age(s): o
Multiple cal ages: 0
2500 2000 1500 1000 500
cal BC
CAUTION: DISPLAY rounds numbers. See printout for actual values.

MAP REFERENCES CITED

Maps listed below have been used and should be consulted in conjunction with this dissertation. The abbreviated titles and years of issue in the lefthand column appear as references throughout the text.

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AAPMC 1983 : *Average Annual Precipitation Map (1957-1980) of Cyprus*. Scale 1:250,000. 1st ed., 1983. Ministry of Agriculture and Natural Resources, Metereological Service, Nicosia.

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A man will turn over half a library to make one book.

— Samuel Johnson

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CONCLUSIONS

Strong inductive conclusions manage to entwine related threads of reasoning into a single rope of logical thought. Drawing together the multitudinous strands of evidence unraveled in the preceding chapters in the same manner would produce a rope of twisted logic, for like the proverbial apples and oranges the sole statement of quintessential validity which can possibly be made about them is that their subject matter relates to the early prehistory of Cyprus—tantamount to concluding that apples and oranges both are fruit. The careful reader may object, pointing out that a passing reference to a single, central topic (Binford's beloved 'Covering Issue') is embedded in the **Preface**, and that the seed for all-encompassing conclusions was thus already sown at the outset. But much purposeful research in Cypriot archaeology will have to follow that discussed here before such a covering issue can be tackled, leave alone distilled into a meaningful summary. Given the inadequacy of our current knowledge, the final remarks aim simply to recapitulate a number of pivotal inferences made in the preceding chapters. These concern:

a) An assessment of the integrity and significance of the evidence from the Eagle Cliff rockshelter,

b) Implications of the various issues discussed for the development of an early prehistoric economy in an insular setting,

c) A hypothesis concerning the chronology of the KCU-SCU transition, or, simply put, the status of the notorious radiometric gap with which that transition is customarily identified,

d) The effect of geochemical parameters on the accuracy of assays making up the present corpus of 14C-determinations, and hence the value of existing chronometric data to the task of refining the EP chronology,

and

e) New directions for early prehistoric research in which these and other issues raised throughout the present dissertation would seem to point.

As regards the new data from the Akrotiri Peninsula discussed in **Chapter 1**, it should be clear by now that questions of taphonomy lie at the heart of its archaeological interpretation, and before

the processes of its formation can be convincingly reconstructed in excavated as well as yet unexcavated areas, the possibility—however slight—of later disturbance and admixture of artifactual and organic material cannot be categorically ruled out. Judged in the same critical fashion, the chronometrics, though so far impressively consistent, need to be reinforced with samples taken from the very base of the bone midden immediately above the shelter's bedrock floor (F.3 in Level 4; see p. 53, Fig. 2), as well as from stratified deposits elsewhere at the site. Only then will it be justified to interpret the set's chronometric consistency as proof of a short-lived occupation (as was hypothesized in the discussion), and not as possibly arising from the shared geochemistry of adjacent sample material derived from the same depositional or contaminative event.

Heedful of these caveats, and after carefully weighing the nature of the data as well as the excavation method used to produce them, I consider the current balance of evidence to correspond approximately to an 80% chance that Site E is in fact what it appears to be and a 20% chance that our anthropogenic interpretation of the midden is partly or wholly erroneous—either because we have not come to grips with the extent of local stratigraphic reworking and the mechanics of postdepositional transport of the cultural residues or because the 14C samples collected and dated thus far are too localized, or both. This amounts to a conservative assessment of evidence that must remain tentative until the results of the third season are in hand. The reason why any interim assessment must be on the conservative side lies in the nature of the site: extraordinary claims require extraordinarily solid evidence, and against the dual background of the controversy surrounding Corbeddu Cave and the strong paradigmatic bias against ephemeral occupations which pervades Cypriot archaeology the burden of proof resting on Eagle Cliff is heavy. There can be little doubt, however, that the issue will be resolved stratigraphically and not on the basis of the presence/absence of butchery marks.

Assuming that further excavations will vindicate our preliminary view of a coexistence of humans and a Pleistocene relic fauna, can it be concluded that Akrotiri represents a case of prehistoric overkill in line with Martin's (1984) global model? The answer is that although proven contemporaneity would certainly implicate the site's occupants in the demise of *Phanourios minutus* and *Elephas cypriotes*, Cyprus's first colonists could not automatically be held responsible for the loss of the entire Pleistocene megafauna of the island, as two authors have recently stated (Davis 1989b:191, Swiny 1989:180). Overkill of a relic herd, or herds, of these animals *on or near Akrotiri Peninsula* is the most persuasive explanation for signs of dietary shifts apparent

in the faunal assemblage and for a short-lived butchery site in general (Held et al. 1991). However, while hunting pressure is also the most likely explanation for the *islandwide* extinction of pygmy hippopotami and dwarf elephants, it is not the only one. In light of the mounting evidence from deep-sea and ice-core samples for a catastrophic drop in average air temperatures throughout the Northern Hemisphere at the start of the Younger Dryas, i.e. approximately one millennium before the Eagle Cliff rockshelter was in use, the possibility cannot be rejected that the primary cause of extinction may have been climatic, with the overhunting of herds surviving until the end of the Younger Dryas either figuring merely as a contributive factor or lacking ecological significance beyond the Akrotiri Peninsula and its hinterland. For the time being this scenario is pure conjecture, but, as I have pointed out elsewhere (Held 1989b:10), so is any extrapolation from Site E to conditions and processes elsewhere on Cyprus.

One of the more intriguing implications of the evidence emerging at Eagle Cliff is the possibility that if the overkill hypothesis is correct on whatever scale, the early Holocene hunters literally ate themselves out of their subsistence base over a relatively short period of time. In that case, they would have faced a serious threat of starvation from the lack of alternative sources of protein in an island ecosystem dominated by an evergreen woodland biotope and marked by an extremely impoverished fauna. The remains of domesticated plants (e.g. emmer, einkorn, bread wheat, barley, oats, rye, millet, several kinds of pulses) and animals (sheep/goat, pig, and finally cattle) in later sites show that farming and herding provided the economic mainstay of the Khirokitia, Sotira, and Erimi cultures. That hunting and foraging still had a role to play is attested by the remains of *Dama mesopotamica* (in proportions varying from site to site but by and large evidencing a long-term decline during the early prehistoric period) and of a limited inventory of fruit and nuts (always present in small quantities if at all). The composite picture for the Formative is therefore that of a broad-spectrum economy that provided a much greater range of options than those available to the hippo hunters of Akrotiri. Nevertheless, such a subsistence base would not have protected populations from occasional food crises due to the detrimental effects of forest clearance, soil depletion and erosion, and a steady change towards more xeric climatic conditions during mid-Holocene times. Thus, environmental degradation, specifically the limitation placed on the availability of fertile soils by the composition of an bounded island ecosystem, may have been factors in the practice of settlement drift characteristic of Cyprus, as well as in the cultural involution postulated for the enigmatic KCU-SCU transition (see below).

The blank in the record between the Khirokitia Culture and the Sotira Culture—known variously as 'The Gap', 'Lacuna,' 'Hiatus,' or 'Chronological Hiccup'—has assumed the role of sacred cow or bogeyman in early prehistoric archaeology. It is one of those nebulous concepts occasionally enshrined in the literature for so many years that everyone ends up taking their validity for granted and no one bothers to recall the premises that led to their formulation in the first place. In **Chapter 3** I argued that from the point of view of culture process a so-called *Involution Model* makes for a much more powerful explanatory tool than the *Extinction Model* that is the often-cited alternative implied by The Gap. It was shown that the latter model is at odds with the quantitative evidence for demographic evolution which can nowadays be extracted from the pattern of site distribution, while the *Continuity Model* was rejected because it is based entirely on negative evidence—assuming, as it does, that the lacuna merely reflects a monumental sample bias. This processual argument was bolstered in **Chapter 4** by demonstrating that new radiocarbon dates as well as advances in statistical interpretation may be utilized in a way that puts the original chronometric definition of the lacuna into a very different light. And this means that the original premise of The Gap, that is, the absence from the island of 14C-dated cultural remains between ca. 5,700 BC and ca. 3,500 BC, is woefully out of date. Although putative phases of decline and development have been repeatedly used to 'nibble' at the lacuna from both ends (Dikaios himself immediately narrowed it to a hypothetical 4,950-3,700 BC in his 1961 chronology), the most important observation made in the discussion of the recent chronometric data was that the lacuna can already be reduced to as little as 300-700 calendar years. Thus, two lines of reasoning—one based on demographic and the other on chronometric evidence—lead to the conclusion that The Gap does not represent a real occupational discontinuity between the Khirokitia and Sotira cultures but more likely a *temporary dearth of settlement* in which the transition is concealed. Considering the slow rate at which Early Formative settlements have been investigated over the past 65 years, I am not surprised that such a dearth would appear in our patchy record as a formidable hole. It is a truism of astronomy that the discovery of distant stars requires powerful telescopes, and in the same way archaeology depends on keen powers of observation to peer into the depths of prehistoric space. Thus the hypothesis of chronometric continuity and cultural transformation (as opposed to replacement) is eminently testable, but only if new KCU and SCU settlements are excavated and dated (see below).

Having recalled that 'The Gap' originated in the first few radiocarbon assays obtained for Cyprus by Dikaios in the late 1950s, it is time to offer a brief evaluation of potential geochemical

constraints on the use of samples dated since then. The corpus of data presented and discussed in **Chapter 4** and **Appendix 4** testifies to the impact of chronometric dating on our understanding of the early prehistoric culture sequence and efforts to refine its chronological framework, yet recently there have been a number of problems highlighting the need for greater control of factors pertaining to the geochemistry of 14C samples. The first is the statistical disparity between marine-shell dates and terrestrial-carbon dates apparent in the set for Akrotiri *Aetokremnos* (see above, p. 225). Although there is no *a priori* reason why the shell dates should be less reliable than the other assays, one possible cause may be that the assumed Delta-R value of -690 years is incorrect for Cyprus. Another problem encountered during the last 15 years, and one to which the dating of EP settlements on Cyprus is more susceptible than to the reservoir effect, is the possible contamination of carbonaceous samples by calcium carbonate derived from the ubiquitous local hardpan, or 'kafkalla' and reservations about the effectiveness of NaOH pretreatment in removing it (e.g., Todd 1987:177, n.1). Third, as already stated in the introduction to **Appendix 4**, the majority of Cypriot samples have been reported without reference to correction for carbon isotopic fractionation. Fourth, until very recently the preferred sample material was wood charcoal, a substance not only in short supply in most Cypriot sites (and hence possibly the source of numerous undersize samples analyzed in the past by means of beta-decay detection) but also affected by the well-known 'old wood' error, despite the fact that the lifespan of native tree species seldom exceeds 200 years. While this is too short to influence the chronometry of the Early Formative, it is bound to have an impact on the increasingly detailed chronology of the Late Formative. Furthermore, due to indications of annual variation in radiocarbon concentrations in contemporary wood, dates cited with 1-sigma ranges smaller than 100 years may convey a spurious accuracy (Taylor 1978:60).

Finally, because of the drawbacks of wood charcoal, and because alternative, short-life, macroscopic plant remains such as seeds, fruit, nuts, twigs, and leaves have a low survival rate in the alkaline environment of the Cypriot soils, an attractive solution is to shift emphasis on bone collagen, since faunal remains are usually plentiful to adequate for this type of analysis. Unfortunately, preliminary results suggest that good collagen preservation (i.e., corresponding to a TNBS value of at least 10mg/g) may be the exception rather than the rule, thus increasing the risk of contamination by proteins from surrounding soils and thwarting dating efforts in this direction.

Expanding the range of dating methods and replacing intuitive with statistical interpretation is but one of many challenges facing early prehistoric archaeology on Cyprus. Others lie in the expansion of field survey and surface sampling to at least 10 specific regions, as well as in the excavation of new EF and LF settlement sites included in a list of ca. 14 promising candidates. Turning to data analysis, there is scope for further advances in lithic studies (e.g., use-wear analysis, manufacturing techniques, raw-material characterization, discard patterns), ceramic analysis (e.g., analysis of mainland and island facies of DFB ware, of the degree of ceramic variation in the southern SCU, and of Late ECU monochrome South Coast fabrics in order to determine whether they conceal pottery belonging to the start of the prehistoric Bronze Age), metallurgical and geologic analysis (metallography and the question of native vs. imported copper, petrographic characterization studies of native antigorite with regard to source differentiation), paleoekistics analysis at all four levels (micro through macro, ranging from construction techniques to nearest-neighbor analysis and site hierarchy/network studies), environmental analysis (paleoecology), and paleontological analysis (further site surveys and the obtainment of chronometric dates from existing bone collections). On the next higher level of archaeological research design, that of interpretation and explanation, the following issues can be singled out for priority treatment: the question of a Cypriot Paleolithic, a reconstruction of colonization cycles, their dates and their mechanisms and processes, the long-forgotten 'Gray Ware' at Khirokitia, the diffusion of the Khirokitia Culture, the nature of the KCU-SCU transition and the origins of ceramic technology (see above), the SCU-ECU transition and the timing and cause of the settlement of the Far West, and the interrelationship between antigorite figurine production, incipient copper-working, and the emergence of an ideational system in the course of the Erimi Culture. Behind all of these lurks our 'Covering Issue,' namely, the effect of insularity, which for brevity's sake can be summarized as the combination of isolation and physical boundedness that is characteristic of islands, on the process of Formative culture change (see above). In epistemological terms, early prehistoric research on Cyprus is in danger of becoming as insular as its subject matter, and in order to return to the mainstream of archaeological method and theory it requires a unified research design and a shift of emphasis from the reconstruction of past lifeways to a credible explanation of cultural evolution and change in an island setting. Considered together with the preceding list of tasks, this statement indicates the need for fairly profound changes and thus requires a much more substantive discussion than is possible here. A detailed prognosis of future developments will be offered elsewhere (Held 1990).

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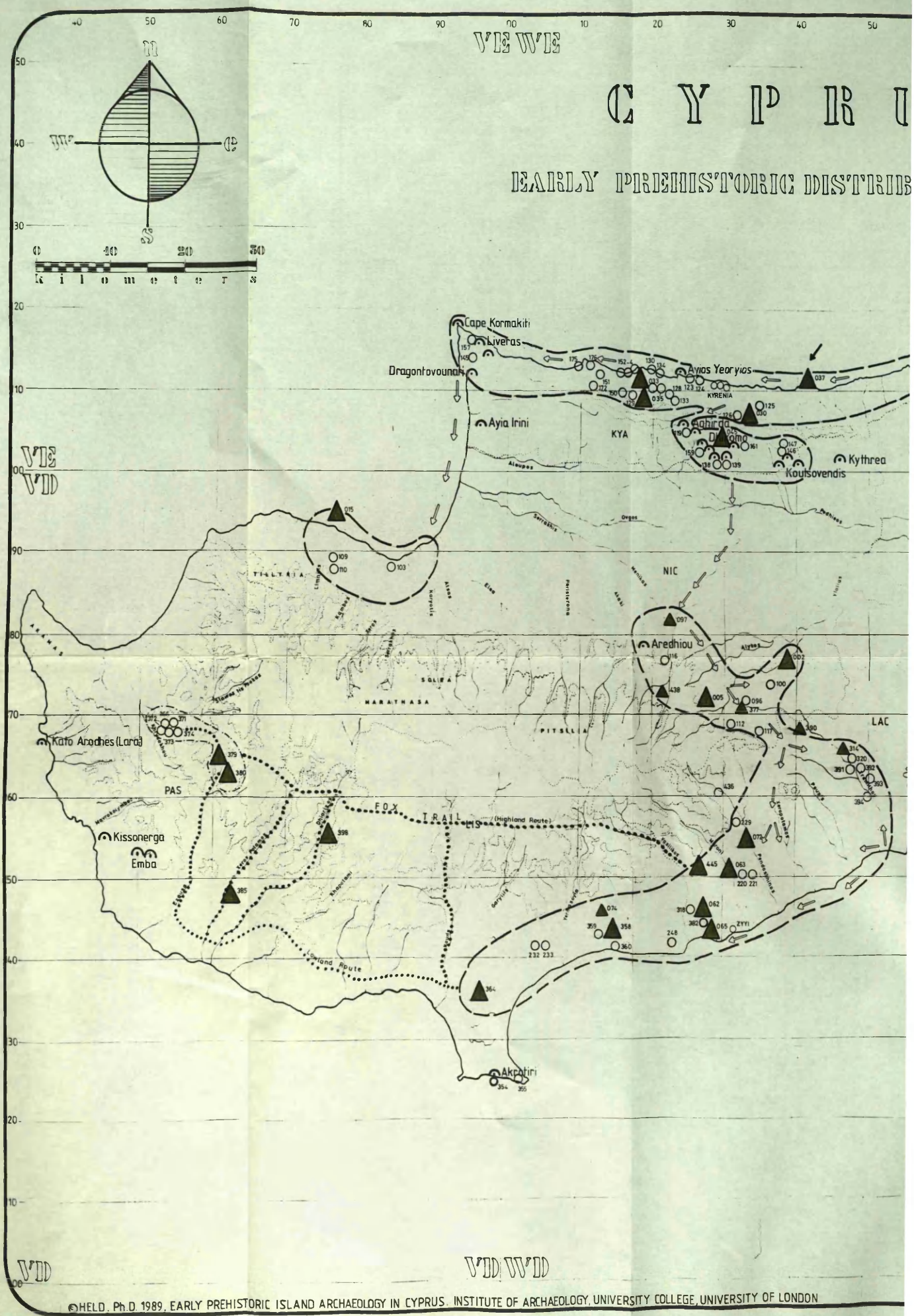
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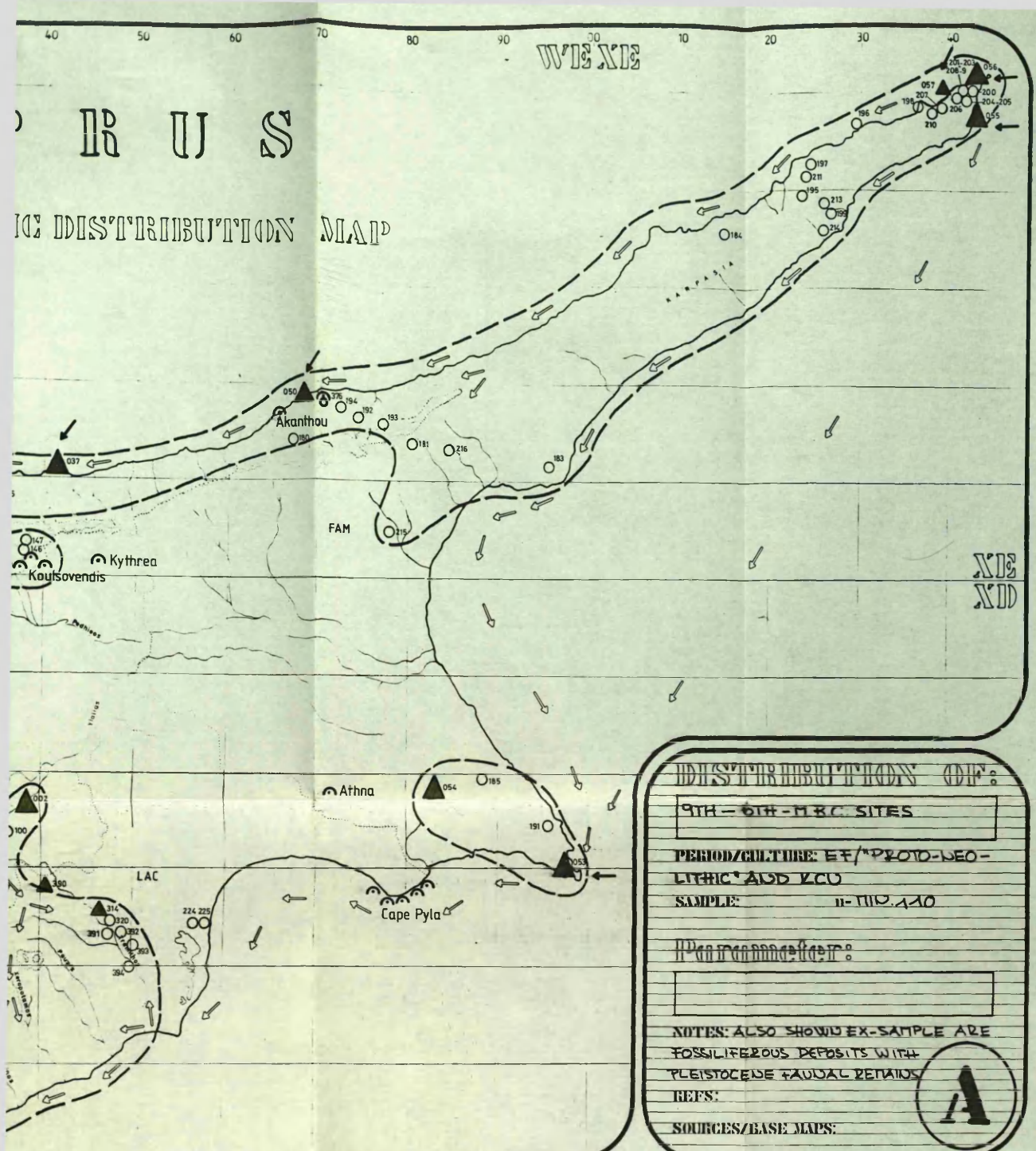
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EARLY PREHISTORIC DISTRIBUTION MAPS



©HELD, Ph.D. 1989, EARLY PREHISTORIC ISLAND ARCHAEOLOGY IN CYPRUS. INSTITUTE OF ARCHAEOLOGY, UNIVERSITY COLLEGE, UNIVERSITY OF LONDON



DISTRIBUTION OF:

9TH – 6TH - M.B.C. SITES

PERIOD/CULTURE: EF/"PROTO-NEO-LITHIC" AND KCU

SAMPLE: n- MID. 110

PARAMETER:

NOTES: ALSO SHOWN EX-SAMPLE ARE FOSSILIFEROUS DEPOSITS WITH PLEISTOCENE FAUNAL REMAINS

REFS:

SOURCES/BASE MAPS:

A

Key to symbols:

1 SITE SYMBOLS:

- DEPOSITS WITH PLEISTOC. FAUNAL REMAINS
- DITTO, WITH TOOLS/OCCUP'N LAYERS
- MAJOR KCU SITE
- PROBABLE " "
- NEO-CERAMIC MINOR SITE, POSSIBLY KCU
- REPORT OF "PRE-NEOLITHIC" ARTEFACTS

For 3-digit code key see Appendix:

2 OTHER SYMBOLS:

- HYPOTHETICAL LANDFALL SITES (IN PRIMARY STLT. REGIONS)
- DIFFUSION VECTOR (FROM PRIMARY TO SECONDARY STLT. REGIONS)
- PRIMARY AND SECONDARY STLT. REGIONS

Explanatory notes:

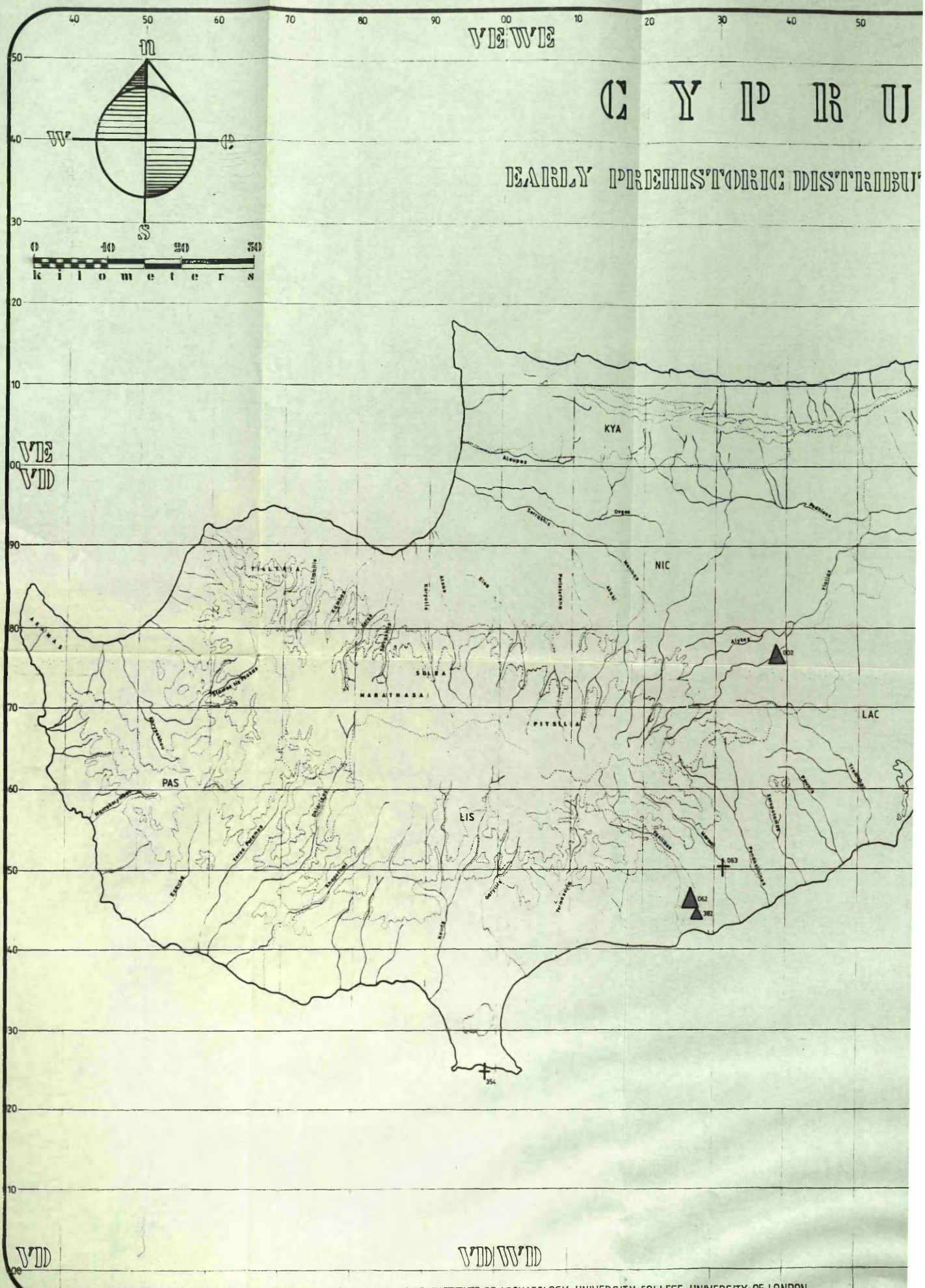
LOCATIONAL ANALYSIS SAMPLES ARE: B: 61 MAX 20 MIN; C: 18 MAX 15 MIN; D: 17 MAX 13 MIN

- POSSIBLE TERTIARY STLT. REGION (LATE KCU?)
- POSSIBLE DIFFUSION FROM SECONDARY TO TERTIARY STLT. REGION

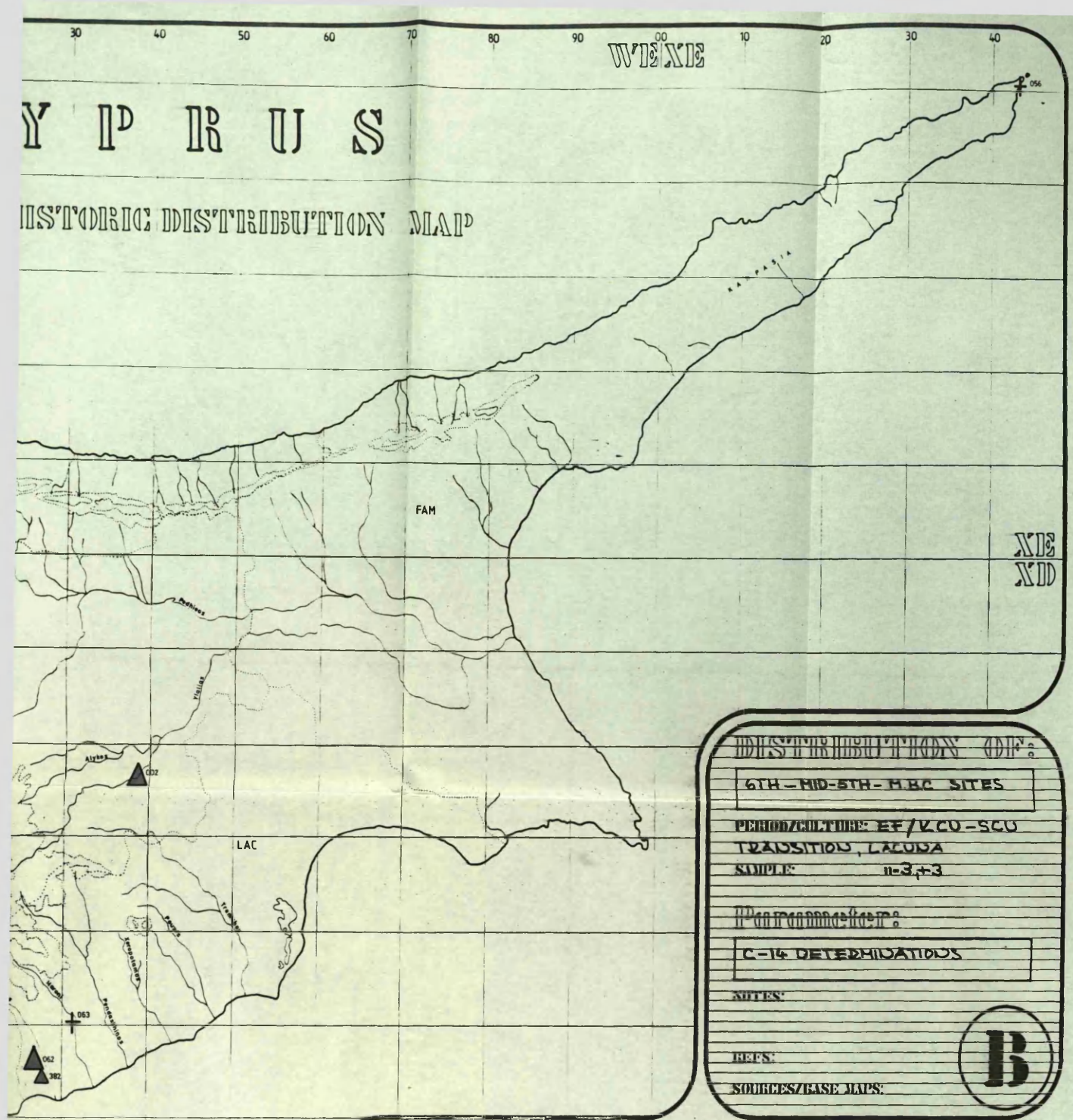
OF LONDON

C Y P R U

EARLY PREHISTORIC DISTRIBU



©HELD. Ph.D 1989 EARLY PREHISTORIC ISLAND ARCHAEOLOGY IN CYPRUS. INSTITUTE OF ARCHAEOLOGY, UNIVERSITY COLLEGE, UNIVERSITY OF LONDON.



DISTRIBUTION OF:

6TH – MID-5TH – M.BC SITES

PERIOD/CULTURE: EF/LCO–SCO TRANSITION, LACONIA

SAMPLE: n-3, +3

Reference(s) to:

C-14 DETERMINATIONS

NOTES:

REFS:

SOURCES/BASE MAPS:

B

Key to symbols:

SITE SYMBOLS:

▲ MAJOR LCO–SCO SITE WITH LACONIA DATE(S) FROM ACERAMIC CONTEXT

† SITE WITH LACONIA-DATE(S) OF LOW CREDIBILITY

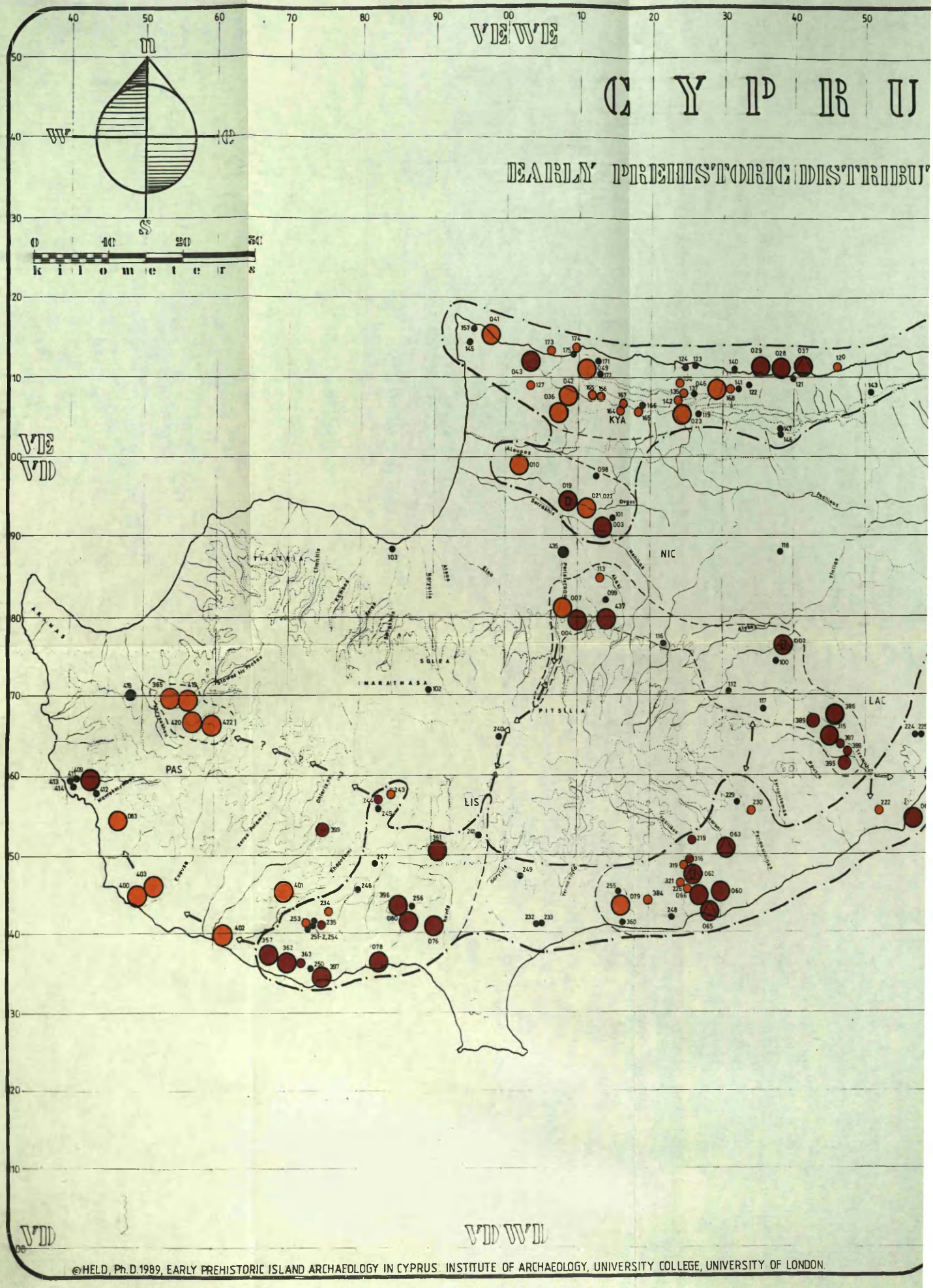
▲ MINOR LCO(?) SITE WITH LACONIA DATE

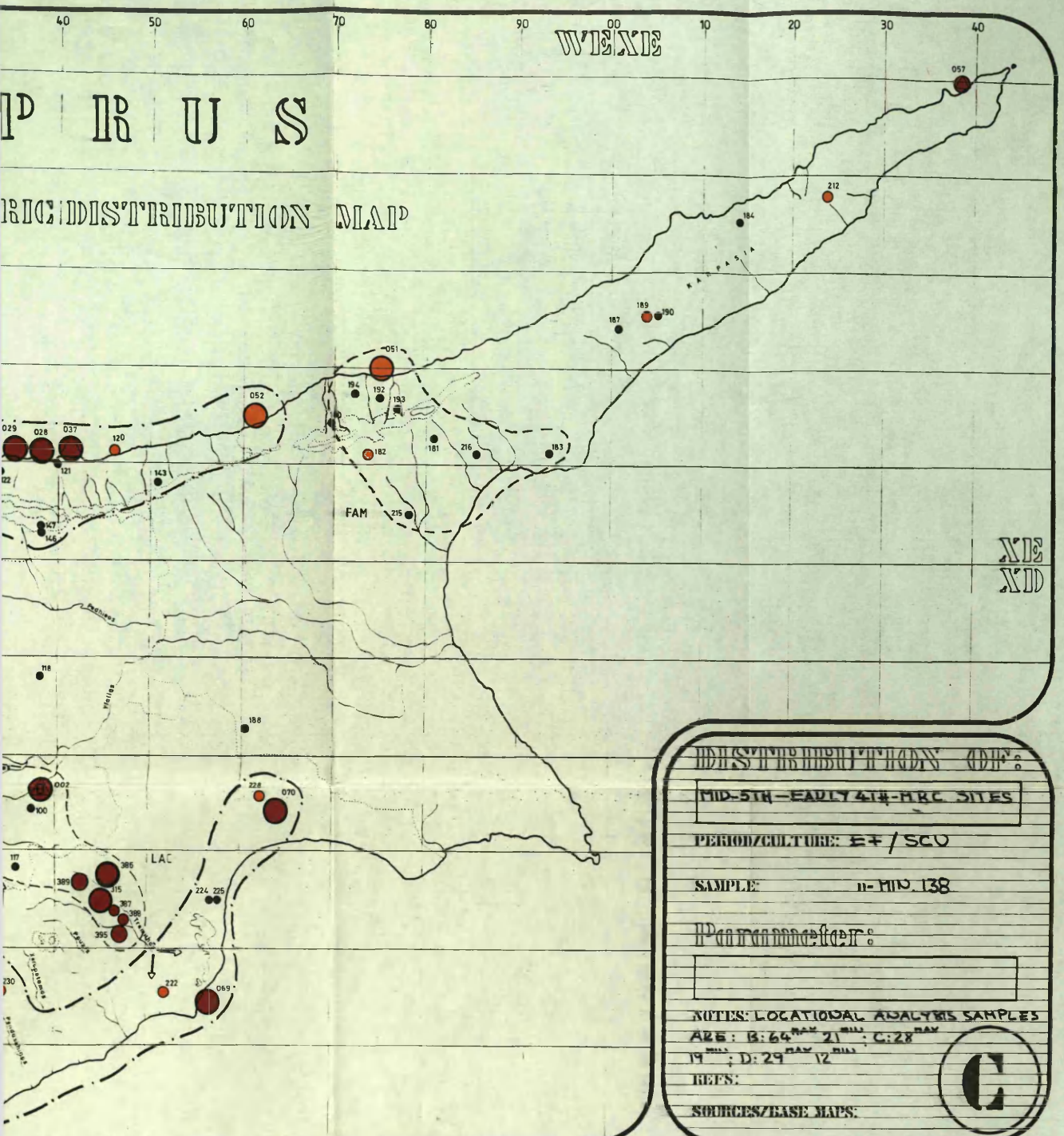
For further symbols key see Appendix

OTHER SYMBOLS:

Explanatory notes:

EGE, UNIVERSITY OF LONDON


CYPRUS
EARLY PREHISTORIC DISTRIBUT
N
W
E
S
0 10 20 30
kilometers
KYA
NIC
LAC
PAS
LIS
TILLYRIA
SOLIA
MARATHASA
PITSILIA
Olympos
Troodos
Limnitis
Kyrenia
Pentadaktylos
Dhiorios
Akhna
Yialias
Serrakhis
Ovgos
Peristerona
Alyki
Setrachos
Ezousa
Xeros
Rhyndhias
Diarizos
Arakapas
Lefkara
Vasilikos
Maroni
Kalavasos
Tremithos
Pendaskhinos
Kouris
Dhiarizos
Akrotiri Peninsula
Episkopi Bay
Akrotiri Salt Lake
Episkopi Village
Kolossi Castle
Kolossi
Limassol
Limassol Bay
Amathus
Kourion
Kourion Theatre
Sanctuary of Apollo Hylates
Paphos
Paphos Harbour
Paphos Castle
Nea Paphos
Kato Paphos
Kato Paphos Harbour
Kato Paphos Castle
Agia Kyriaki Chrysopolitissa
Agia Kyriaki Chrysopolitissa Church
Tombs of the Kings
Tombs of the Kings Archaeological Site
Tombs of the Kings Car Park
Tombs of the Kings Road
Agia Solomoni
Agia Solomoni Church
Agia Solomoni Catacombs
Agia Solomoni Catacombs Archaeological Site
Agia Solomoni Catacombs Car Park
Agia Solomoni Road
Agia Solomoni Square
Agia Solomoni Square Car Park
Agia Solomoni Square Road
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Agia Solomoni Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Catacombs Square Archaeological Site
Agia Solomoni Square Catacombs



DISTRIBUTION OF:

MID-5TH – EARLY 4TH-MRC SITES

PERIOD/CULTURE: E+ / SCU

SAMPLE: n = MID. 138

Parameter:

NOTES: LOCATIONAL ANALYSIS SAMPLES ARE: B: 64 MAX 21 MIN; C: 28 MAX 19 MIN; D: 29 MAX 12 MIN

REFS:

SOURCES/BASE MAPS:

C

Key to symbols:

1. SITE SYMBOLS:

- MAJOR SCU SITE
- MINOR SCU SITE
- MAJOR SCU/ECU OR TRANSITIONAL SITE
- MINOR SCU/ECU OR TRANS'L SITE
- POSSIBLE MAJOR SCU SITE
- MAJOR NON-CERAMIC SITE, POSSIBLY SCU.
- MINOR NON-CERAMIC SITE, POSSIBLY SCU.

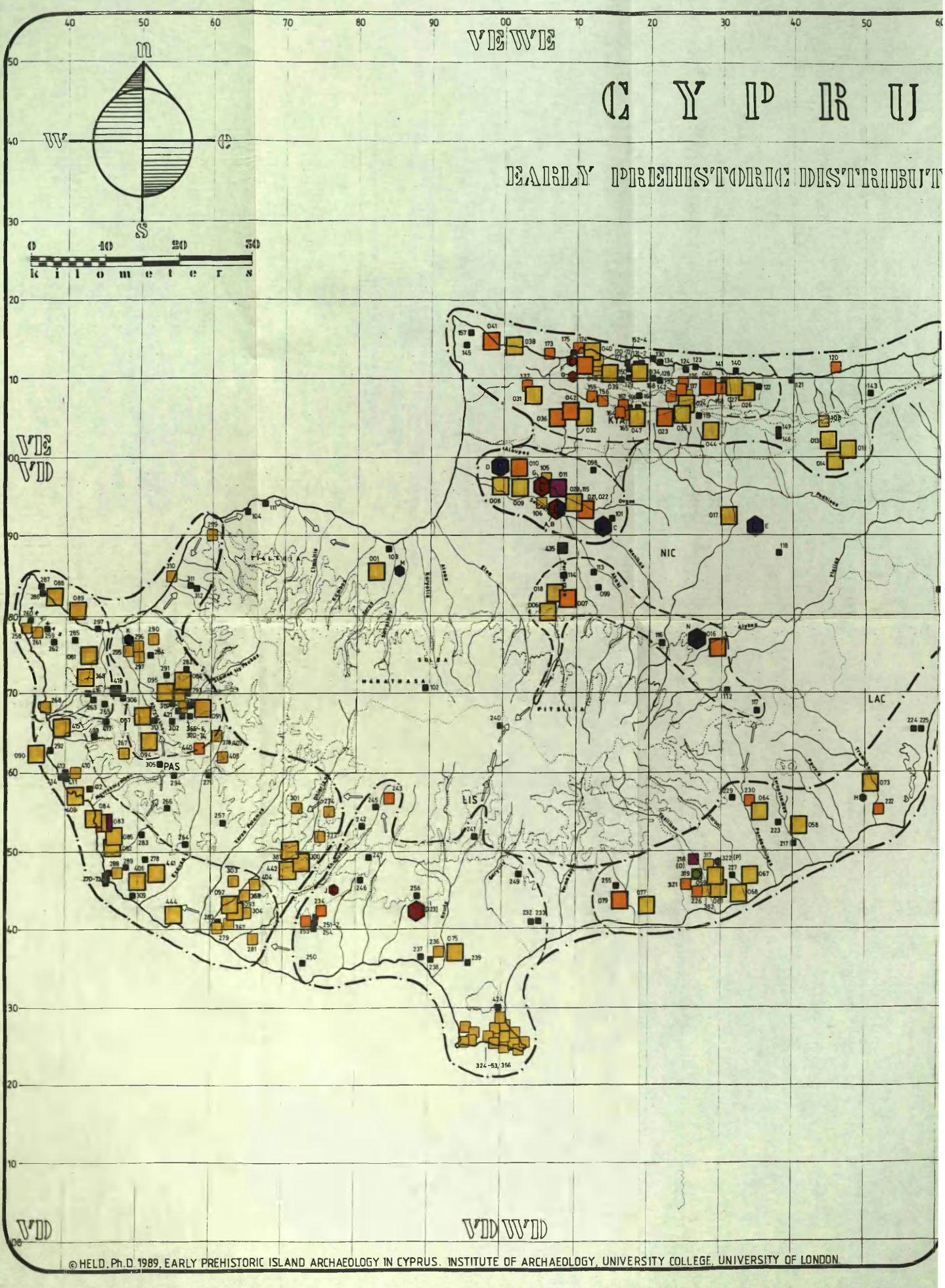
For 3-digit code key see Appendix:

2. OTHER SYMBOLS:

- MULTI-PERIOD SITE WITH MCU AND SCU OCCUPATION
- D UFB WARE PRESENT IN CERAMIC ASSEMBLAGE.
- MAIN STLT. REGIONS
- "SUB"-REGIONS
- DIFFUSION/COMMUNICATION VECTOR

Explanatory notes:

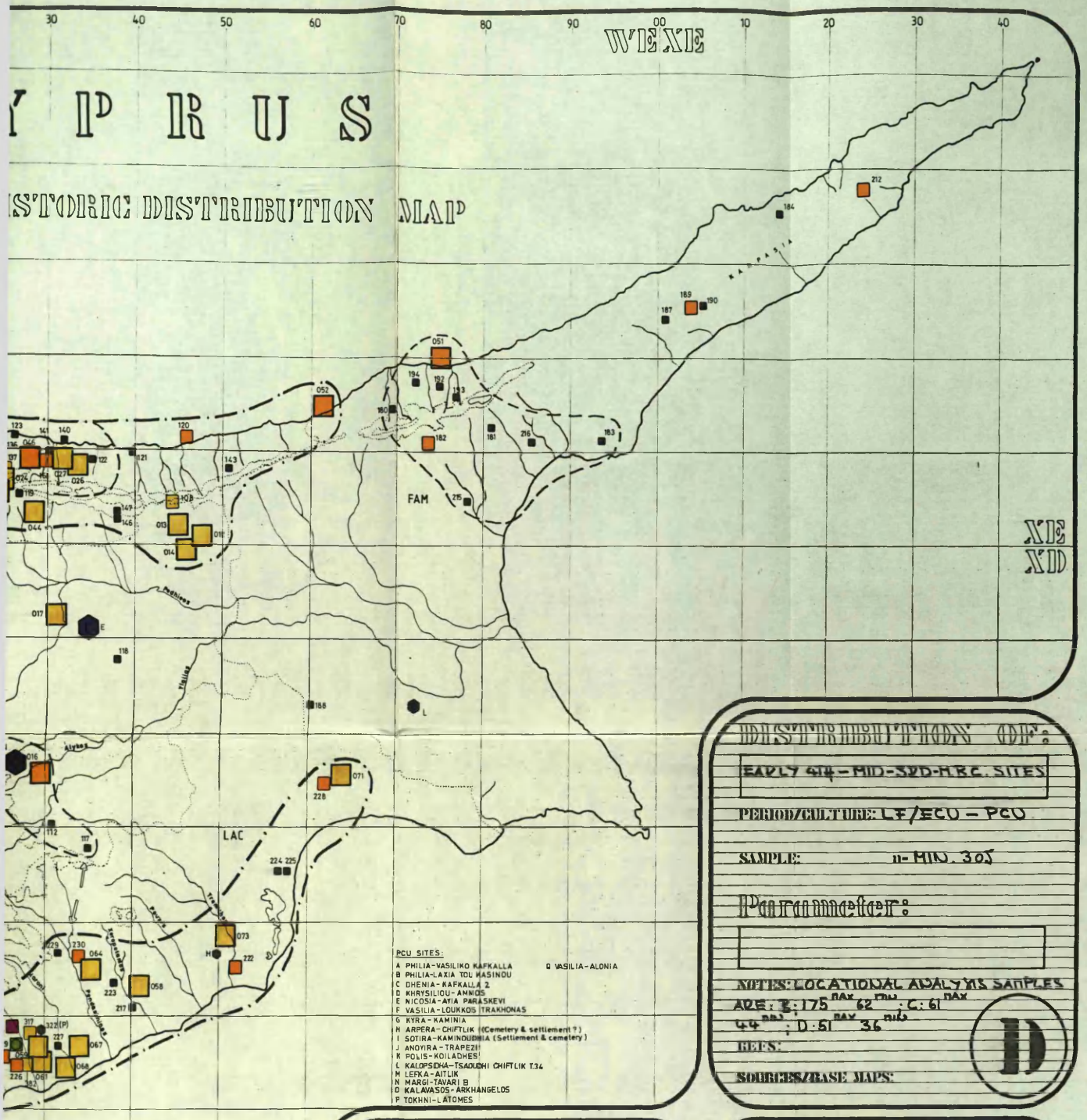
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Y P R U S

STORIC DISTRIBUTION MAP



DISTRIBUTION OF:

EARLY 4th-MID-3RD-M.B.C. SITES

PERIOD/CULTURE: LF/ECU-PCU

SAMPLE: n=MID. 30s

Parameters:

NOTES: LOCATIONAL ADALYSIS SAMPLES ARE: B: 175 MAX 62 MID; C: 61 MAX 44 MID; D: 51 MAX 36 MID

REFS:

SOURCES/BASE MAPS:

D

Key to symbols:

SITE SYMBOLS:

- MAJOR ECU SITE
- MAJOR SCU/ECU OR TRANSITIONAL SITE
- MAJOR LATE ECU SITE WITH PCU AFFINITIES (ECU-PCU TRANSITION SITE)

For 4digit code key see Appendix:

OTHER SYMBOLS: SITE SYMBOLS CONT'D.

- MINOR ECU SITE
- MINOR SCU/ECU OR TRANSITIONAL SITE
- MINOR LATE ECU SITE WITH PCU AFFINITIES (ECU-PCU TRANSITION SITE)
- MINOR SITE WITHOUT DIAGNOSTIC TRAITS POSSIBLY ECU
- MULTI-COMPONENT SITE WITH ECU AND ECU OCCUPATIONS
- MULTI-PERIOD SITE WITH SCU AND ECU OCCUPATIONS
- NATURAL SITE WITHOUT DIAGNOSTIC TRAITS POSSIBLY ECU

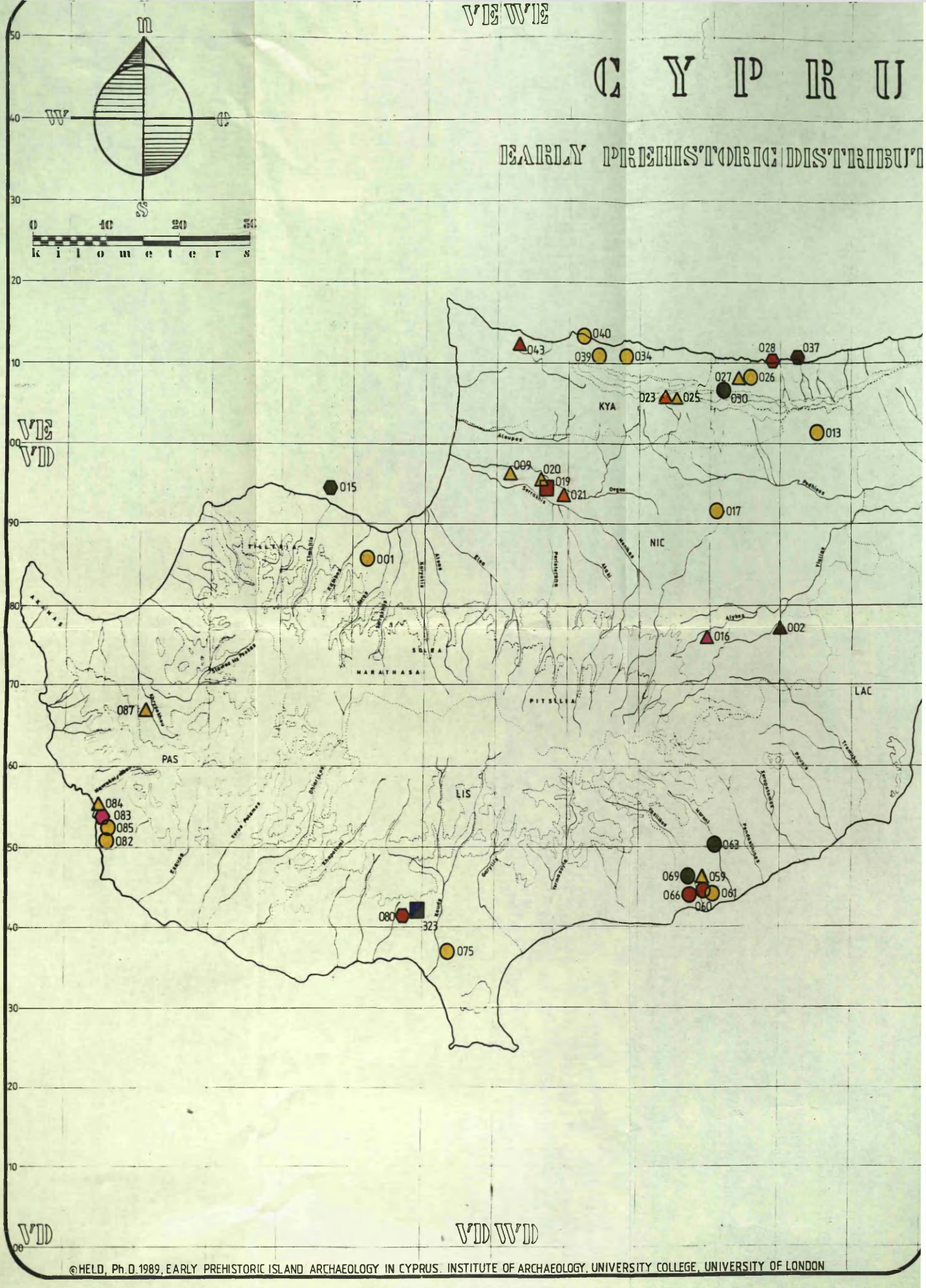
Explanatory notes:

- MAJOR PCU SITE
- MAJOR EARLY PCU SITE WITH ECU AFFINITIES (ECU-PCU TRANSITION SITE)
- MINOR PCU SITE
- MINOR EARLY PCU SITE WITH ECU AFFINITIES (ECU-PCU TRANSITION SITE)
- MINOR SITE WITH POSSIBLY PCU MATERIAL
- (PCU CEMETERY SITES
- ( ) MAIN SILT DEPOSITS
- ( ) SITE - REGIONS
- ⟷ DIRECTIONS/CONNECTIONS (USED OR

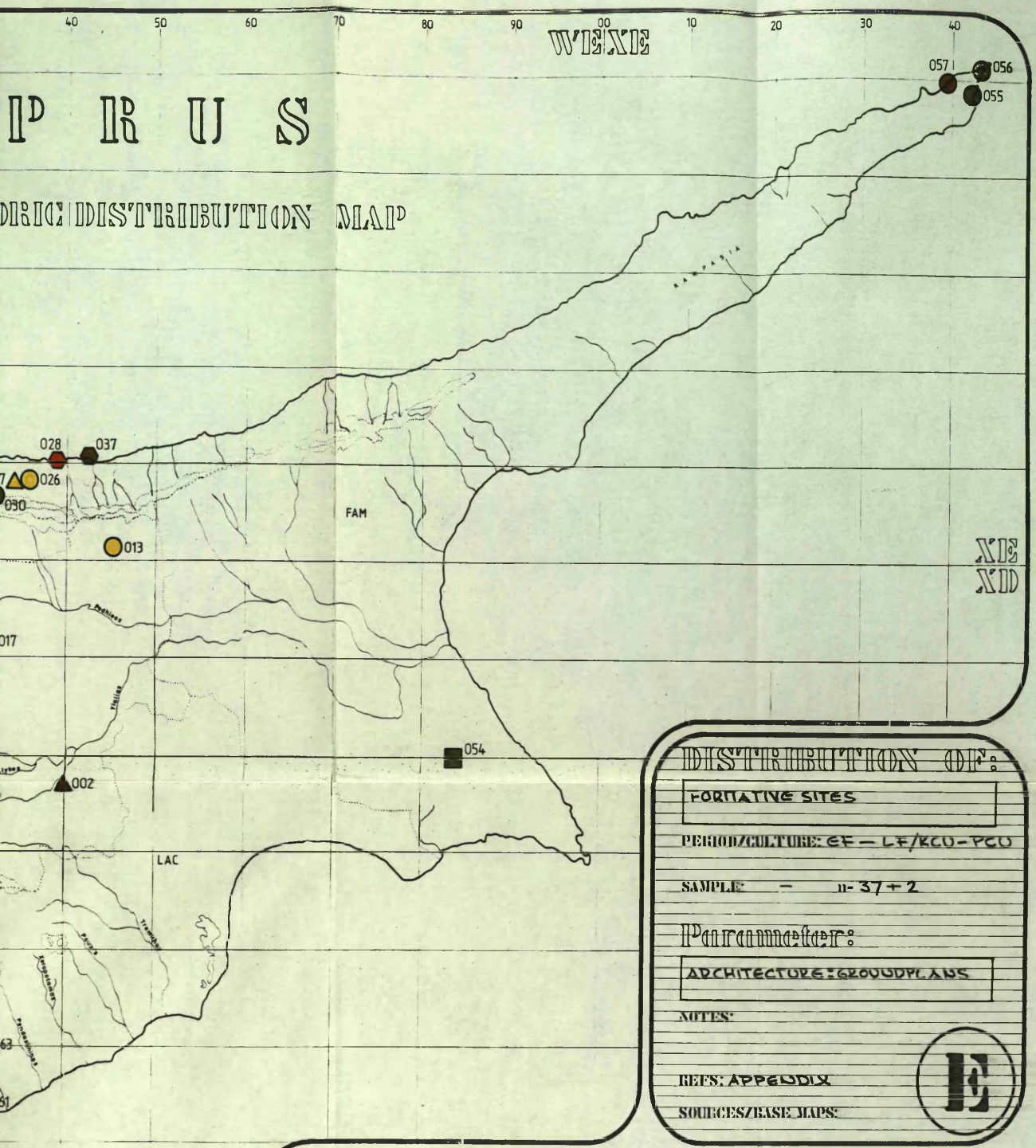
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EARLY PREHISTORIC DISTRIBUT



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DISTRIBUTION OF:

FORMATIVE SITES

PERIOD/CULTURE: EF – LF/KCU-PCU

SAMPLE: – n- 37 + 2

Parameter:

ARCHITECTURE: GROUNDPLANS

NOTES:

REFS: APPENDIX

SOURCES/BASE MAPS:

E

Key to symbols:

1. SITE SYMBOLS:

- KCU
- SCU
- KCU/SCU
- ECU
- SCU/ECU
- PCU
- ECU/PCU

For 5-digit code key see Appendix:

2. OTHER SYMBOLS:

Explanatory notes:

- ○ CIRC./SUB-CIRC./OVAL/IRREG./UNICELL
- □ SQ./RECT./SUB-SQ./SUB-RECT./UNICELL
- ⬡ CURVILIN. + RECTILIN. UNICELL
- ◪ RECTICIN. MULTICELL
- △ FLOORS, PITS ONLY/FUNCTION & ARCHITECTURAL FORM UNKNOWN/ UNCERTAIN

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