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THE PREHISTORIC SANCTUARY OF SON MAS 1995:
A RADIOCARBON ANALYSIS SURVEY

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ABSTRACT.- *This paper deals with radiocarbon, chronometric survey of the Prehistoric Sanctuary of Son Mas, Valldemosa, Mallorca, Baleares, Spain with correlation to the Taula Sanctuary of Torralba de Salort, Alayor, Menorca. It discusses the Mallorcan site artefacts, architecture and dating results of this survey carried out from 1988 to the present and in Menorca from 1975 to 1985. It presents comprehensive lists of dates for the sanctuary and other related sites.*

RESUMEN.- *Este artículo trata de la investigación cronométrica radiocarbónica del santuario prehistórico de Son Mas, Mallorca en correlación con el santuario de la Taula de Torralba de Salort, Alayor, Menorca. Se discuten los materiales, arquitectura y fechas mallorquinas, resultado de la investigación llevada a cabo desde 1988 hasta la actualidad, y en Menorca desde 1975 a 1985. Se presentan extensas tablas de datos para el santuario y otros yacimientos relacionados.*

KEY WORDS: *Western Mediterranean Prehistory, Balearic Sanctuaries, European Chalcolithic, Bronze and Iron Ages, Radiocarbon Site Surveys, Bell Beaker Cultural Contacts,* circa *2450 cal BC to* circa *1300 cal BC, Correlation with Similar Sites and Open Air Settlement.*

PALABRAS CLAVE: *Prehistoria del Mediterráneo occidental, Santuarios de Baleares, Calcolítico europeo, Edad del Bronce y del Hierro, Investigaciones radiocarbónicas, Contactos culturales campaniformes, 2450 cal BC a 1300 cal BC, Correlaciones con lugares similares y yacimientos al aire libre.*

This publication presents the results of a series of 40 calibrated radiocarbon dates associated with a prehistoric architectural structure from the Spanish Balearic Island of Mallorca: the Prehistoric Sanctuary of Son Mas. The sanctuary is located near the mountain village of Valldemossa in the island's Northern Jurassic Sierras at the far eastern end of a Pliocene alluvial intermontane basin or plain, known as El Pla del Rei or Plain of the King (Figure 5). The sanctuary served as the ritual, social and commercial centre for the area of the plain during two millennia of prehistory.

The aim in this paper is to examine the calibrated absolute dates within the various contexts of the sanctuary's stratigraphy and demonstrate its chronological origin and duration. As well as the conditions in which they were found, it discusses the strategy and methodology used in the collection of the radiocarbon samples. It demonstrates how the strategy and techniques employed have made it possible to determine the age of the structure and various stages of occupation, transitions and final abandonment. It does this by first examining a similar structure, the Taula Sanctuary of Torralba d'en Salort on the sister island of Menorca, where the dating and collection methods used were first developed. For comparative purposes and refrence, several related radiocarbon inventories from nearby sites where contemporaneity and interaction have taken place are also presented. Finally, some of the larger, local issues, of chronology, typology and the function of such structures, are discussed, along with selected artefact evidence, including Beaker cultural elements associated with the sanctuary.

1. INTRODUCTION

The calibrated radiocarbon lists are individual site inventories, each, open-ended and capable of being periodically enlarged. The majority of dates have been published individually and collectively in site reports and larger, more comprehensive radiocarbon publications (Waldren 1980, 1982, 1986;

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Waldren, Ensenyat and Cubi 1990, 1992; Waldren 1990, 1992; Waldren and Van Strydonck 1994-95). When combined, these independent, intersite inventories form a single, large, on-going master inventory of more than 320 dates for this area of Mallorca and the Balearic Islands generally.

The large number of analyses available for the Son Mas Prehistoric Sanctuary (currently 40 dates) are of particular interest and importance. As a single, comprehensive body of dates for a single site, they reveal an unusual regional chronometric continuity that spans over two thousand years of local prehistory. Such a body of chronometric data, as well as the continuity it represents, not only, opens new avenues of inquiry that are regionally important but are, equally, valuable in assessing social, economic and religious developments over that period on a broader geographical scale. At the same time, it serves as a testing ground for new excavational strategies and chronological methodology, as well as in forming a useful model of sorts. Besides delineating a relatively long regional continuity, it documents and details a single site that had a special function, influence and meaning for the individuals occupying the area. In so doing, it contributes new data and formation regarding local settlement organisation and religious sanctuaries generally, opening new avenues for broader hypotheses in this direction.

	Site Context Reference	bc Dates	bp Dates	cal BC/ cal BP		Lab. No
1.	SMSS-12W9	1825 ± 35 bc	3775 yrs	2170 BC	4119 BP	UtC4676
2.	SMSS-8O9	1630 ± 70 bc	3580 yrs	1903 BC	3852 BP	IRPA909
3.	SMSS-9O5	1620 ± 65 bc	3570 yrs	1875 BC	3824 BP	IRPA908
4.	SMSS-7Q7	1560 ± 60 bc	3510 yrs	1818 BC	3767 BP	UtC2020
5.	SMSS-6N5	1070 ± 60 bc	3020 yrs	1272 BC	3221 BP	UtC2756
6	SMSS-6L4	1040 ± 50 bc	2990 yrs	1172 BC	3121 BP	IRPA1052
7.	SMSS-12L5	1020 ± 70 bc	2970 yrs	1162 BC	3111 BP	UtC2747
8.	SMSS-6L7	1020 ± 40 bc	2970 yrs	1162 BC	3111 BP	IRPA 1053
9.	SMSS-7N2	1010 ± 60 bc	2960 yrs	1160 BC	3109 BP	IRPA976
10.	SMSS-8L8	980 ± 40 bc	2930 yrs	1120 BC	3069 BP	IRPA984
11.	SMSS-6K6	930 ± 40 bc	2880 yrs	1030 BC	2981 BP	UtC3044
12.	SMSS-12J6	880 ± 80 bc	2830 yrs	957 BC	2906 BP	UtC2736
13.	SMSS-8L5	750 ± 60 bc	2700 yrs	827 BC	2776 BP	UtC1256
14.	SMSS-10S5	750 ± 50 bc	2700 yrs	827 BC	2776 BP	IRPA1058
15.	SMSS-5M5	740 ± 70 bc	2690 yrs	820 BC	2769 BP	UtC2759
16.	SMSS-8J6	705 ± 35 bc	2655 yrs	809 BC	2758 BP	UtC4675
17.	SMSS-10L2	650 ± 70 bc	2600 yrs	791 BC	2740 BP	UtC1255
18.	SMSS-18U9	640 ± 50 bc	2590 yrs	790 BC	2739 BP	UtC4170
19.	SMSS-19V1	640 ± 35 bc	2590 yrs	790 BC	2739 BP	UtC4166
20.	SMSS-13U9	570 ± 80 bc	2520 yrs	788 BC	2737 BP	IRPA1051
21.	SMSS-7N8	570 ± 25 bc	2520 yrs	678 BC	2637 BP	UtC1002
22.	SMSS-5L6	570 ± 70 bc	2520 yrs	678 BC	2637 BP	IRPA1025
23.	SMSS-9K6	560 ± 45 bc	2510 yrs	677 BC	2626 BP	IRPA1257
24.	SMSS-8M6	550 ± 45 bc	2500 yrs	606 BC	2655 BP	IRPA836
25.	SMSS-19V1	540 ± 35 bc	2490 yrs	604 BC	2653 BP	UtC4167
26.	SMSS-16S2	520 ± 25 bc	2470 yrs	602 BC	2651 BP	UtC3190
27.	SMSS-5L6	490 ± 75 bc	2440 yrs	594 BC	2543 BP	QL4246
28.	SMSS-13U8	490 ± 90 bc	2440 yrs	594 BC	2543 BP	UtC1258
29.	SMSS-18Y1	480 ± 60 bc	2430 yrs	407 BC	2356 BP	UtC3188
30	SMSS-13U8	450 ± 70 bc	2400 yrs	405 BC	2356 BP	UtC1066
31.	SMSS-16V2	405 ± 50 bc	2360 yrs	405 BC	2354 BP	UtC3933
32.	SMSS-10L2	290 ± 50 bc	2240 yrs	399 BC	2348 BP	UtC1003
33.	SMSS-17Y4	270 ± 70 bc	2220 yrs	284 BC	2233 BP	UtC3189
34.	SMSS-8M6	260 ± 90 bc	2210 yrs	280 BC	2229 BP	UtC1001
35.	SMSS-7O7	260 ±110 bc	2210 yrs	279 BC	2228 BP	QL4200
36.	SMSS-17Y7	190 ± 70 bc	2140 yrs	279 BC	2228 BP	UtC3045
37.	SMSS-18Y6	100 ±150 bc	2050 yrs	169 BC	2118 BP	UtC3046
38.	SMSS-7O7	10 ± 40bc	1960 yrs	24 BC	1973 BP	QL4201
39.	SMSS-18Y2			46 AD	1905 BP	IRPA1026
40.	SMSS-8L3			1414 AD	535 BP	IRPA1024

Only cal BC dates are quoted in the text to simplify discussion. Tables (1-4) give further cal BP and lab origins for reference. All dates are middle two sigma ranges for condensed presentation and are derived from the use of the programme CALIB ver 4.0 Fortran (Stuiver and Reimer 1993) Sample contextual details are minimal, due to the question of space and not lack of data. Precise details as to the location and nature of samples, along with sigma ranges, can be found in the pertinent references and site literature. The cal BC dates quoted are middle two sigma ranges for condensed presentation.

Table 1.- Calibrated radiocarbon results. Balearic Pretalayotic, Talayotic and Post Talayotic Periods. Prehistoric sanctuary of Son Mas (Valldemosa, Mallorca, Baleares, Spain).

Although local open-air settlements and Mallorcan sanctuaries have undergone extensive and periodic excavation, few have been studied from the standpoint of absolute dating or heavy chronometric survey (Waldren 1987b, 1992b). Apart from the few sites selected and examined here, radiocarbon dating generally has not been used by local investigators. In fact, except for the radiocarbon documentation available in the sites found in this paper, both on Mallorca and Menorca, the method has been rarely used. Most chronological matters as well as interpretation, until recently, have been evaluated in terms of relative chronology and by artefact or typological comparison.

In the rare cases, where radiocarbon dating has been used in the contexts of settlements and other situations, like rock shelters and caves, both in Mallorca and Menorca, it has been successful in dating the various stages of development within those sites. It has detailed and delineated such aspects as social, economic organisation and ritual structure. It has succeeded in defining landmarks, dealing with these aspects and others along the full extent of the island's prehistoric cultural sequence of over six thousand years. In turn, it has added essential aspects, not only, to our understanding of settlement, but, our knowledge of technological developments and natural resources as well.

2. ON BALEARIC SANCTUARIES IN GENERAL

On the adjacent island of Menorca, similar sanctuaries to those on Mallorcan are found in the form of the Taula sanctuary (named for its large T shaped centre pillar). On Menorca, these monuments are much more numerous and well preserved than on Mallorca (where only 7 sanctuaries are known), and in certain respects have been better studied. This is undoubtedly due to the greater number and better preservation of Menorcan sanctuaries (37 in all exist), making them more interesting to investigators over the years. Like Mallorca, none of Menorca's settlements and only one of its many Taula sanctuaries have undergone serious radiocarbon surveying.

To appreciate more fully the present inventory of dates for the Son Mas sanctuary (above) and the other radiocarbon reference lists, used for discussion and comparison (below), a brief history is given concerning the way these various inventories took shape. Some points regarding the strategy and the methodology used are given. Some space is also given to the examination and direct comparison of chronometric evidence from one of the Menorcan sanctuaries where certain innovations were first used: the Taula Sanctuary of Torralba den Salort (Fernández-Miranda, Waldren and Sanders 1994; Waldren and Van Strydonck 1994; Waldren and Fernández-Miranda in preparation). The present paper, in this respect, is a comprehensive as well as descriptive account of the strategies and procedures used, and by which all of the inventories or dates found in the tables (1-5) were originally compiled.

3. THE SITE INVENTORY LISTS: BACKGROUND

When radiocarbon method was first used as an archaeological and chronological tool on Mallorca, it was employed far more simplistically and straightforward than at present. The individual dates as they were received, merely, established specific points of contextual reference, to define specific events within the various site stratigraphies, usually focusing on the location and assessment of artefacts and their particular context. Little by little, these single dates formed linked segments of data and information within larger series that could be eventually correlated and compared with other more distantly related stratigraphical and artefact evidence. As the number of individual dates began to grow within a particular site (building up at first smaller, linked, internal contextual lists, pin-pointing and verifying specific prehistoric landmarks), they became extensive individual site inventories, implying and demonstrating interaction between each other.

Such focus of interest and research on a limited number of closely related sites have a specific advantage in that they can be studied, either as a collective large unit, or as in the present case, on a strictly individual site basis (a closed series or collective body of independent site data). In short, one that is in essence representative of the whole, and one that in itself may serve as a single, well defined regional model. Another advantage is that, forming as they do a solid body of data, they can be continually added to, either as individual units, where the data is relate to a specific context or added to the collective whole, giving us an on-going, larger reference inventory.

The intrinsic value of such individual site inventories is I believe obvious in that they serve as badly needed reference site examples. Such examples, the authors feels, are necessary in more local sites, as well as in other key regional areas throughout the Iberian Peninsula and elsewhere. The need to establish such extensively studied regional sites or environmental models are needed in as many areas as possible to give us broader basis for more accurate interpretation and correlation (Waldren 1984, 1992).

It is important to note that the chronometric inventories and sites examined are, not only, geographically, but, geologically idiosyncratic as well. The sites are made up of cave, rock shelter and open-air settlements as well as ritual areas; each having their own quite distinctive environments, function and variety of different physical and stratigraphic characteristics, as well as proven, individually long, prehistoric sequences. This variation in type of site geography, geology, chronology and use or function offers us an interesting cross-section and assortment of individual physical conditions, ranging from deep, vertically closed stratigraphy in caves and rock shelters to open-air, highly eroded, horizontal stratigraphy found in open-air settlement and ritual sites. This has offered us different test grounds on which to develop, assess and demonstrate the use of various methodological and strategical techniques.

4. RADIOCARBON DATING IN THE BALEARIC ISLANDS: A BRIEF OVERVIEW

Since the method was first introduced extensively into the Balearics by the author in 1962, the increase in the number of radiocarbon dates has been little short of prodigious. The overall inventory significantly changes from year to year, the total number, at times, altering almost on a monthly basis. This has resulted in the formation of separate inventories (Tables 1-4). The dates themselves are more meaningful and manageable individually. The lists can be added to in the form of on-going site inventories, which are more functionally informative for comparative and reference purposes. For more general reference, there is a complete inventory of Balearic radiocarbon dates already published (Waldren 1992) which consists of both calibrated and uncalibrated dates and their full sigma ranges, as provided by the Stuiver-Pearson (1986) University of Washington calibration programme and currently numbers in the neighborhood of well over three hundred dates, including those recently from independent research in the Balearics.

Initially introduced as response to answering a number of specific questions that were the result of new discoveries in the Cave of Muleta, Soller, Mallorca (Waldren 1982). Until that time, early hu-

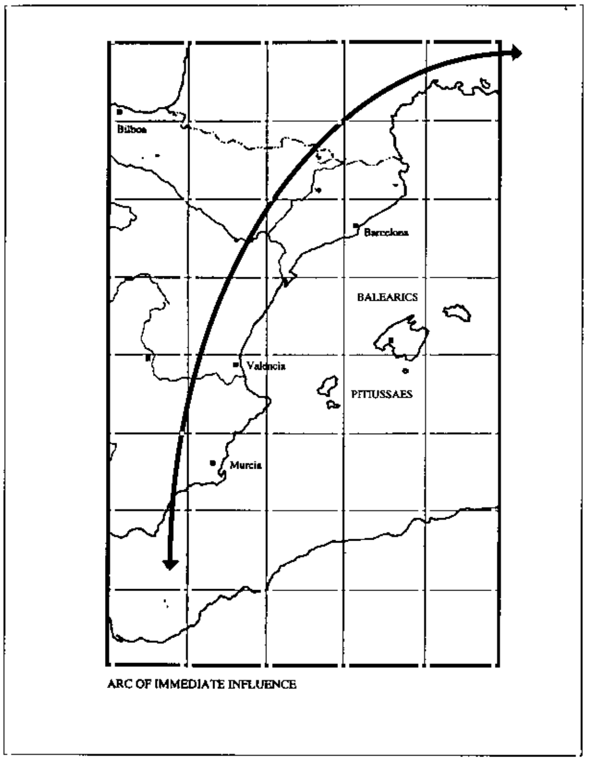


Figure 1.- Map of the Balearic Islands and Iberian coastal regions showing the Balearic Arc of Immediate Influence.

man settlement of the Balearics was believed not to have occurred prior to 1800-2000 BC. Radiocarbon method was first used in this case to date and verify the age of new evidence from the Muleta cave, pointing to an earlier arrival of man, *circa* 4500BC (Waldren 1982).

Another major issue in the Muleta deposit concerned the fact that the human remains in question were directly associated with the islands' oldest mammalian species, an endemic, extinct and oddly evolved antelope-gazelle, *Myotragus balearicus* (Bate 1909). The animal was thought prior to this to have become extinct, like so many other Pleistocene species, because of global climatic changes, during the last Glaciation some 20,000 to 40,000 years ago.

The method was used successfully to establish, among the data (1) the age of the collected human specimens; (2) the late survival of the *Myotragus* (both by then creditable to the 4-5th Millennia BC) and (3) the extent of the coexistent relationship that was suggested between the two (Waldren 1982). The original two analyses results later became the nucleus of some 45 absolute dates and the beginning of the first significant site list and also the beginning of three major dating programmes at Muleta carried out between 1972 and 1884, including several smaller ones, all using the cave deposit as a test reservoir. The principal of these were: (a) Racemisation of Aspartic Acids Dating of Bone (Bada and Schroeder 1973); (b) Uranium Thorium Dating of Bone (Rae, Ivanovich and Sweeting 1984); (c) Radiocarbon Dating of the Muleta Deposit (Waldren 1972) and finally analytical studies including (d) Palynological Analysis in the Muleta Deposit (Gottesfeld, Martin and Waldren 1968), (e) Stalagmite Calcium Carbonate Dating (Stuiver and Waldren 1968).

The question of still earlier human occupation of the islands along with other evidence of the later survival of the *Myotragus balearicus* were further demonstrated through a similar use of radiocarbon technique in 1968 in the Rock Shelter of Son Matge, Valldemossa, Mallorca. In this site, radiocarbon method has provided us with an even earlier accounting of man in the Balearics, along with giving us additional details concerning his relationship with *Myotragus*, *circa* the 6th Millennium; which from the evidence suggests attempts at domestication of the animal and its even latter survival date of *circa* 2700 BC (Waldren 1982; Burleigh and Clutton-

	Site Context Reference	bc Date	bp Date	cal BC/cal BP		Lab. No.
1.	SFO-OS- EW	2080 ± 100 bc	4030 yrs	2468 BC	4417 BP	BM1843R
2.	SFO-OS-NW	1840 ± 90 bc	3790 yrs	2239 BC	4188 BP	QL1636
3.	SFO-WOS-W17	1750 ± 30 bc	3700 yrs	2090 BC	4039 BP	QL1592
4.	SFO-WOS-W40	1690 ± 100 bc	3640 yrs	2030 BC	3979 BP	BM1981R
5.	SFO-OS-EWF	1600 ± 110 bc	3550 yrs	1884 BC	3833 BP	UtC2742
6.	SFO-OS-CHI	1540 ± 80 bc	3490 yrs	1829 BC	3778 BP	QL4042
7.	SFO-OS-ATI-2	1540 ± 30 bc	3490 yrs	1829 BC	3778 BP	QL1859
8.	SFO-OS-SW	1520 ± 50 bc	3470 yrs	1819 BC	3768 BP	QL4100
9.	SFO-OS-CH1	1500 ± 110 bc	3450 yrs	1749 BC	3698 BP	QL4043
10.	SFO-OS-WC	1440 ± 100 bc	3390 yrs	1710 BC	3659 BP	BM2313R
11.	SFO-OS-EXW1	1400 ± 100 bc	3350 yrs	1673 BC	3622 BP	BM1698R
12.	SFO-OS-H4	1350 ± 60 bc	3300 yrs	1563 BC	3512 BP	UtC3192
13.	SFO-OS-WCS	1330 ± 120 bc	3280 yrs	1550 BC	3499 BP	QL1896
14.	SFO-OS-WC	1290 ± 30 bc	3240 yrs	1519 BC	3468 BP	QL?
15.	SFO-OS-SWF	1230 ± 80 bc	3180 yrs	1445 BC	3394 BP	QL4191
16.	SFO-OS-C2	1120 ± 50 bc	3070 yrs	1357 BC	3306 BP	HAR3490
17.	SFO-OS-CHS	1040 ± 160 bc	2990 yrs	1261 BC	3210 BP	QL4044
18.	SFO-OS-SWS	800 ± 120 bc	2830 yrs	998 BC	2947 BP	QL4041
19.	SFO-YS-T1	1020 ± 55 bc	2970 yrs	1238 BC	3187 BP	IRPA1041
20.	SFO-YS-T1	1010 ± 35 bc	2960 yrs	1160 BC	3170 BP	UtC4731
21.	SFO-YS-T1ENTa	1000 ± 35 bc	2950 yrs	1150 BC	3099 BP	UtC4575
22.	SFO-YS-T1ENTb	1000 ± 25 bc	2950 yrs	1150 BC	3099 BP	UtC4363
23.	SFO-YS-T1	940 ± 100 bc	2910 yrs	1100 BC	3059 BP	QL1531
24.	SFO-YS-T1E	880 ± 100 bc	2830 yrs	998 BC	2947 BP	IRPA813
25.	SFO-YS-T4	865 ± 60 bc	2815 yrs	975 BC	2924 BP	IRPA907
26.	SFO-YS-T1	780 ± 30 bc	2730 yrs	897 BC	2846 BP	QL4190
27.	SFO-YS-WT	750 ± 30 bc	2700 yrs	838 BC	2787 BP	QL4074
28.	SFO-YS-T4	730 ± 60 bc	2680 yrs	828 BC	2777 BP	IRPA880
29.	SFO-YS-WT	720 ± 60 bc	2670 yrs	823 BC	2772 BP	BM1511
30.	SFO-YS-HH1	710 ± 30 bc	2660 yrs	818 BC	2767 BP	QL4075
31.	SFO-YS-T2	670 ± 60 bc	2625 yrs	806 BC	2755 BP	IRPA1044
32.	SFO-YS-T4	660 ± 70 bc	2610 yrs	801 BC	2750 BP	UtC1155
33.	SFO-YS-XM	650 ± 70 bc	2600 yrs	801 BC	2750 BP	IRPA1262
34.	SFO-YS-T2	630 ± 30 bc	2580 yrs	793 BC	2742 BP	QL4098
35.	SFO-YS-T4	630 ± 60 bc	2580 yrs	793 BC	2742 BP	IRPA881
36.	SFO-YS-T1	610 ± 80 bc	2560 yrs	793 BC	2742 BP	IRPA1012
37.	SFO-YS-T4	590 ± 45 bc	2540 yrs	790 BC	2739 BP	IRPA1016
38.	SFO-YS-T1	590 ± 60 bc	2540 yrs	786 BC	2735 BP	HAR3458
39.	SFO-OS-T1	570 ± 50 bc	2520 yrs	770 BC	2719 BP	IRPA986
40.	SFO-YS-T2	550 ± 50 bc	2500 yrs	687 BC	2636 BP	IRPA1045
41.	SFO-YS-T1	550 ± 40 bc	2500 yrs	687 BC	2636 BP	QL1533
42.	SFO-YS-T1	550 ± 40 bc	2500 yrs	687 BC	2636 BP	IRPA1046
43.	SFO-YS-T1	540 ± 50 bc	2490 yrs	681 BC	2630 BP	IRPA989
44.	SFO-YS-T4	540 ± 80 bc	2490 yrs	681 BC	2630 BP	UtC1154
45.	SFO-YS-T4	525 ± 40 bc	2475 yrs	653 BC	2602 BP	IRPA1015
46.	SFO-YS-T2	510 ± 110 bc	2460 yrs	646 BC	2595 BP	HAR3458
47.	SFO-YS-T1	510 ± 80 bc	2430 yrs	516 BC	2465 BP	BM1842
48.	SFO-YS-T2	480 ± 230 bc	2400 yrs	408 BC	2357 BP	I5398
49.	SFO-YS-T2	450 ± 60 bc	2400 yrs	408 BC	2357 BP	IRPA782
50.	SFO-YS-HHE	450 ± 60 bc	2150 yrs	129 BC	2078 BP	IRPA885
51.	SFO-YS-T1	150 ± 65 bc	1990 yrs	8 BC	1957 BP	IRPA776
52.	SFO-YS-T2	40 ± 55 bc	580 yrs	1270 AD	579 BP	IRPA885

Table 2.- Radiocarbon results. Balearic Pretalayotic, Talayotic and Post Talayotic Periods. Ferrandell-Oleza prehistoric settlement complex (Valldemosa, Mallorca, Baleares, Spain).

Site Context Reference		bc Dte	bp date	cal BC/ cal BP		Lab. No
1.	ABSM-ESP	4730 ± 120 bc	6680 yrs	5591 BC	7540 BP	QL29
2.	ABSM-ESP	3870 ± 360 bc	5820 yrs	4722 BC	6671 BP	CSIC176
3.	ABSM-ESP	3800 ± 115 bc	5750 yrs	4632 BC	6581 BP	I5516
4.	ABSM-PRT	2700 ± 120 bc	4650 yrs	3375 BC	5324 BP	QL988
5.	ABSM-PRT	2143 ± 398 bc	4093 yrs	2735 BC	4684 BP	BM1408
6.	ABSM-EBP	2070 ± 50 bc	4020 yrs	2539 BC	4488 BP	QL23
7.	ABSM-EBP	2030 ± 120 bc	3980 yrs	2523 BC	4472 BP	CSIC178
8.	ABSM-EBP	2020 ± 100 bc	3970 yrs	2483 BC	4432 BP	QL5B
9.	ABSM-EBP	1870 ± 120 bc	3820 yrs	2288 BC	4237 BP	Y2359
10.	ABSM-EBP	1820 ± 100 bc	3770 yrs	2214 BC	4163 BP	BM1995
11.	ABSM-EBP	1750 ± 60 bc	3700 yrs	2090 BC	4039 BP	IRPA835
12.	ABSM-EBP	1720 ± 100 bc	3670 yrs	2075 BC	4024 BP	QL24
13.	ABSM-LBP	1620 ± 80 bc	3570 yrs	1923 BC	3872 BP	CSIC179
14.	ABSM-LBP	1530 ± 80 bc	3480 yrs	1833 BC	3782 BP	CSIC180
15.	ABSM-LBP	1470 ± 80 bc	3420 yrs	1740 BC	3689 BP	QL5A
16.	ABSM-LBP	1400 ± 60 bc	3350 yrs	1673 BC	3622 BP	QL5
17.	ABSM-LBP	1250 ± 100 bc	3200 yrs	1485 BC	3434 BP	Y2667
18.	ABSM-MBA	870 ± 50 bc	2820 yrs	993 BC	2942 BP	QL986
19.	ABSM-EIA	780 ± 100 bc	2730 yrs	897 BC	2846 BP	QL7
20.	ABSM-EIA	750 ± 170 bc	2700 yrs	838 BC	2787 BP	QL11
21.	ABSM-EIA	700 ± 60 bc	2650 yrs	813 BC	2762 BP	IRPA811
22.	ABSM-EIA	690 ± 100 bc	2640 yrs	809 BC	2758 BP	QL27
23.	ABSM-EIA	670 ± 160 bc	2620 yrs	800 BC	2749 BP	IRPA695
24.	ABSM-EIA	620 ± 100 bc	2570 yrs	795 BC	2744 BP	IRPA790
25.	ABSM-EIA	620 ± 100 bc	2570 yrs	795 BC	2744 BP	QL20
26.	ABSM-EIA	610 ± 60 bc	2560 yrs	793 BC	2742 BP	IRPA803
27.	ABSM-EIA	600 ± 60 bc	2550 yrs	791 BC	2740 BP	IRPA676
28.	ABSM-EIA	600 ± 60 bc	2550 yrs	791 BC	2740 BP	IRPA751
29.	ABSM MIA	590 ± 80 bc	2540 yrs	786 BC	2735 BP	QL24
30.	ABSM-MIA	590 ± 80 bc	2540 yrs	786 BC	2735 BP	QL4
31.	ABSM-MIA	590 ± 60 bc	2540 yrs	786 BC	2735 BP	IRPA752
32.	ABSM-MIA	570 ± 80 bc	2520 yrs	770 BC	2719 BP	QL6
33.	ABSM-MIA	530 ± 70 bc	2480 yrs	655 BC	2604 BP	QL10
34.	ABSM-MIA	450 ± 80 bc	2400 yrs	408 BC	2357 BP	Y2669
35.	ABSM-MIA	400 ± 55 bc	2350 yrs	400 BC	2349 BP	IRPA710
36.	ABSM-LIA	340 ± 100 bc	2290 yrs	391 BC	2330 BP	QL5C
37.	ABSM-LIA	310 ± 60 bc	2260 yrs	379 BC	2328 BP	QL22
38.	ABSM-LIA	290 ± 70 bc	2240 yrs	370 BC	2319 BP	QL1A
39.	ABSM-LIA	250 ± 100 bc	2200 yrs	295 BC	2244 BP	QL9
40.	ABSM-LIA	130 ± 90 bc	2080 yrs	105 BC	2054 BP	QL8
41.	ABSM-LIA	120 ± 120 bc	2070 yrs	101 BC	2050 BP	QL7A
42.	ABSM-LIA	15 ± 55 bc	1965 yrs	25 AD	1974 BP	IRPA710

Table 3.- Calibrated radiocarbon results. Balearic Pretalayotic, Talayotic and Post Talayotic Periods. Rock Shelter of Son Matge (Valldemosa, Mallorca, Baleares, Spain).

Brock 1980). Also, the wide scale use of the method in the Matge deposit has given us what amounts to a number of important dated landmarks in the prehistoric cultural sequence of the islands (Figure 10).

5. RADIOCARBON METHOD AT PRESENT

Since 1968, the method has been used with increasing frequency and in different ways to answer specific questions, most of them dealing with chronology of some sort. As such, it has consequently been used almost to the point of overindulgence. As the prime requirement in the development of any new method, there is a need for testing it on extensive bases. There is no other way in which to know its shortcomings or benefits except by putting a tool to trial in as many ways as possible. Hence, for the best results, its use as a interpretative tool should become a common practice as any of the other on site evidence retrieval routines.

One of the main obstacles in the interpretation of prehistory in any geographic area is the lack of reliable or functionally working chronological frameworks or working hypotheses. No matter how we

Site Context Reference		bc Date	bp Date	cal BC/ cal BP		Lab. No
1.	ABSM-ESP	4730 ± 120 bc	6680 yrs	5591 BC	7538 BP	QL29
2.	SM-ESP	3985 ± 109 bc	5935 yrs	4848 BC	6797 BP	KNB640
3.	ABSM-ESP	3870 ± 360 bc	5820 yrs	4722 BC	6671 BP	CSIC176
4.	ABSM-ESP	3800 ± 115 bc	5750 yrs	4633 BC	6582 BP	I5516
5.	AMG-PRT	3210 ± 100 bc	5160 yrs	3972 BC	5921 BP	BM1994R
6.	ABSM-PRT	2700 ± 120 bc	4650 yrs	3375 BC	5324 BP	QL988
7.	ABSM-PRT	2143 ± 398 bc	4093 yrs	2735 BC	4704 BP	BM1408
8.	SFO-OS-EBP	2080 ± 110 bc	4030 yrs	2549 BC	4498 BP	BM1843R
9.	ABSM-EBP	2070 ± 50 bc	4020 yrs	2539 BC	4488 BP	QL23
10.	ABSM-EBP	2030 ± 120 bc	3980 yrs	2522 BC	4471 BP	CSIC178
11.	ABSM-EBP	2020 ± 100 bc	3970 yrs	2483 BC	4432 BP	QL5B
12.	SM-EBP	1960 ± 120 bc	3910 yrs	2459 BC	4408 BP	Y2389
13.	ABSM-EBP	1870 ± 120 bc	3820 yrs	2368 BC	4398 BP	Y2359
14.	SFO-OS-EBP	1840 ± 90 bc	3790 yrs	2239 BC	4188 BP	QL1636
15.	AMG-EBP	1840 ± 80 bc	3790 yrs	2239 BC	4188 BP	Y1789
16.	ABSM-EBP	1820 ± 100 bc	3770 yrs	2214 BC	4163 BP	BM1995
17.	SMSS-EBP	1825 ± 35 bc	3775 yrs	2170 BC	4119 BP	UtC4676
18.	CX-EBP	1800 ± 115 bc	3750 yrs	2168 BC	4117 BP	I5515
19.	SFO-OS-EBP	1750 ± 30 bc	3700 yrs	2090 BC	4039 BP	QL1592
20.	ABSM-EBP	1750 ± 60 bc	3700 yrs	2090 BC	4039 BP	IRPQA835
21.	ABSM-EBP	1720 ± 100 bc	3670 yrs	2076 BC	4025 BP	QL24
22.	SFO-OS-EBP	1690 ± 100 bc	3640 yrs	2046 BC	4056 BP	BM1981R
23.	SMSS-EBP	1630 ± 65 bc	3580 yrs	1958 BC	3907 BP	IRPA909
24.	SMSS-EBP	1620 ± 70 bc	3570 yrs	1923 BC	3873 BP	IRPA908
25.	ABSM-EBP	1620 ± 80 bc	3570 yrs	1999 BC	3948 BP	CSIC179
26.	SFO-OS-SWF	1600 ± 110 bc	3550 yrs	1884 BC	3833 BP	UtC2742
27.	SMSS-EBP	1560 ± 60 bc	3510 yrs	1818 BC	3767 BP	UtC2020
28.	SFO-OS-EBP	1540 ± 80 bc	3490 yrs	1829 BC	3778 BP	QL4042
29.	SFO-OS-EBP	1540 ± 30 bc	3490 yrs	1828 BC	3777 BP	QL1859
30.	ABSM-EBP	1530 ± 80 bc	3480 yrs	1824 BC	3773 BP	CSIC180
31.	SMRG-LBP	1520 ± 80 bc	3470 yrs	1819 BC	3768 BP	Y1856
32.	SFO-OS-LBP	1520 ± 50 bc	3470 yrs	1819 BC	3768 BP	QL4100
33.	SFO-OS-LBP	1500 ± 110 bc	3450 yrs	1749 BC	3698 BP	QL4043
34.	ABSM-LBP	1470 ± 80 bc	3420 yrs	1740 BC	3689 BP	QL5A
35.	SFO-OS-LBP	1440 ± 100 bc	3390 yrs	1713 BC	3662 BP	BM2312R
36.	ABSM-LBP	1400 ± 60 bc	3350 yrs	1673 BC	3622 BP	QL5
37.	SFO-OS-LBP	1400 ± 360 bc	3350 yrs	1673 BC	3622 BP	BM1998R
38.	SFO-OS-LBP	1350 ± 60 bc	3300 yrs	1563 BC	3512 BP	UtC3192
39.	SFO-OS-LBP	1330 ± 120 bc	3280 yrs	1549 BC	3498 BP	QL1896
40.	CNC-LBP	1320 ± 80 bc	3270 yrs	1526 BC	3475 BP	BM1667
41.	SFO-OS-LBP	1310 ± 100 bc	3260 yrs	1523 BC	3472 BP	QL4040
42.	SFO-OS-LBP	1290 ± 30 bc	3240 yrs	1516 BC	3465 BP	BM??
43.	ABSM-LBP	1250 ± 100 bc	3200 yrs	1485 BC	3434 BP	Y2667
44.	SFO-OS-LBP	1230 ± 80 bc	3180 yrs	1450 BC	3399 BP	QL4191
45.	SFO-OS-LBP	1140 ± 70 bc	3090 yrs	1400 BC	3349 BP	BM1698
46.	SFO-OS-LBP	1120 ± 50 bc	3070 yrs	1357 BC	3306 BP	HAR3490
47.	SMSS-EBA	1070 ± 60 bc	3020 yrs	1272 BC	3221 BP	UtC2756
48.	SMSS-EBA	1040 ± 50 bc	2990 yrs	1262 BC	3211 BP	IRPA1053
49.	SMSS-EBA	1010 ± 45 bc	2960 yrs	1252 BC	3201 BP	IRPA976

** all calibrated dates are middle two sigma ranges for condensed presentation.

Table 4.- Conventional & calibrated radiocarbon results. Balearic Early Settlement and Pre-Talayotic Periods. Sites with bell beaker contexts as of 1995 (Valldemosa, Mallorca, Baleares, Spain).

try to rationalise or otherwise avoid the fact that among the many questions asked: Where? When? How? and Why? a good part of the discipline of archaeology and prehistory in particular concern questions of chronology. Without satisfactorily knowing when? The questions, where, how and why are of small value. Age, both in relative and absolute terms, is certainly the single most frequent and pertinent question asked in these disciplines; one with which we are continually trying to create some form of factual framework or data base. For as Gordon Childe, openly recognised toward the end of his life: '*Unless we create some functional framework for prehistory, all is chaos*'.

As pointed out by one authority some years ago (Almagro 1978), their are few areas in the Iberian Peninsula where radiocarbon analysis has been used more successfully than in the Balearics Islands. If that were so over a decade ago, the present day record leaves little room for doubt as to the effectiveness of the method. Over the years, it has given us dates numerous important landmarks in the local prehistoric sequence. It has helped to establish the age as well as suggest such events as: cultural arrivals and transition, causes of extinction and detail regarding the exploitation of indigenous animal species, introduction of domesticated animal species and technological skills, such as lithic, metal and pottery making. In more recent years, it has been used in conjunction with especially developed and innovative techniques such as *bracket* and *series* dating (see below), used in dating architectural construction, occupation and other activity contexts (Waldren, Ensenyat and Cubì 1990). It has helped not only to define the parameters of larger divisions of the various chronological periods in absolute terms, but also to suggest their more elusive phasic subdivisions or interfaces, along with better delineating a good number of other minor chronological problems (see Figure 10, for a more graphic representation of the chronological divisions, interfaces and established landmark events).

6. THE CHRONOLOGICAL FRAMEWORK USED IN THIS PUBLICATION

The chronological scheme used in the present publication is a pentapartite division of Balearic prehistory (Waldren 1991, 1992) (Figure 10). It has been constructed around an original tripartite system devised early in the century by J. Colominas Roca and E. Cartaillac (1915), who named the Talayotic Culture as the Balearic Island's mother culture. The term Talayotic is based on an Arabic word, atalaya, meaning sentinel or watchtower, with the local derivative of ot. It is equally used as a descriptive term for the most characteristic structure of the Balearic prehistoric architectural assemblage, the Talayot: a round or square, tower-like megalithic building, with a stone roof supported by a large stone central pillar, similar to and roughly contemporary with the Nuraghi or Torreanos of Sardinia and Corsica.

The divisions of Colominas Roca and Cartaillac consisted of (1) a Pretalayotic Period (Culture of the Caves), (2) a Talayotic Period (Bronze Age) and (3) a Post Talayotic Period (Iron Age) (generally associated with the arrival of Classical and Celtic influences). The Pentapartite divisional framework used in this paper has added two additional periods to this original three, in the form of a (4) Presettlement Period and (5) an Early Settlement Period, both at the beginning of the earlier tripartite order (Waldren 1982).

The pentapartite divisional framework is based on the most recent radiocarbon surveys and an inventory rapidly approaching 300 analyses. This large number has made it possible to assign reliable dates to particular landmarks in the prehistoric sequence, as illustrated in the schematic. Some of these landmark dates undoubtedly will be subject to change as more data becomes available and in this respect, they should be considered provisional. Although other versions of this pentapartite divisional framework have been published in uncalibrated and calibrated form as a matter of comparison and to illustrate the differences between calibrated dates and uncalibrated ones (Fernández-Miranda and Waldren 1979; Waldren 1982, 1986), the current version (Figure 10) is shown for the first time only in calibrated form. It is presented here for reference in respect to the text, as well as to comply with the current trend to calibrate all radiocarbon dates.

7. ON THE RADIOCARBON DISTRIBUTION

As can be seen from the distribution map (Figure 2), the majority of Balearic dates originate from a very limited number of sites, spread over a very small geographical area, along the mountainous northern coastal region of the island of Mallorca. There are a number of reasons for this. The general guidelines rest in the premise that by concentrating on a few sites and dealing with these extensively, a more detailed and coherent perspective than otherwise might be gained from more superficial study of a greater number of sites. Another reason lies in the fact that the mountainous northern regions of the island contain a number of small, fertile alluvial mountain basins or plains, ideal for early agricultural exploitation. Consequently, there is ample reason to believe that these self-contained areas or catchment are better suited for prehistoric studies than the flatter regions of the island, where modern agricultural activities have been much more intensified over the millennia. This thinking is further supported by the fact that abundant caves are found in the surrounding foothills of these northern mountainous regions, some of which have had early human occupation (e.g. Muleta cave and Matge rock shelter, see below). There is usually an abundant supply of spring water in these mountainous regions, provided by a high rate of seasonal rainfall. Because of the natural resources of arable land and abundant water, it is logical to expect the first emergence of agricultural communities to have evolved out of such condusive environmental surroundings. As an outcome, we have an un-

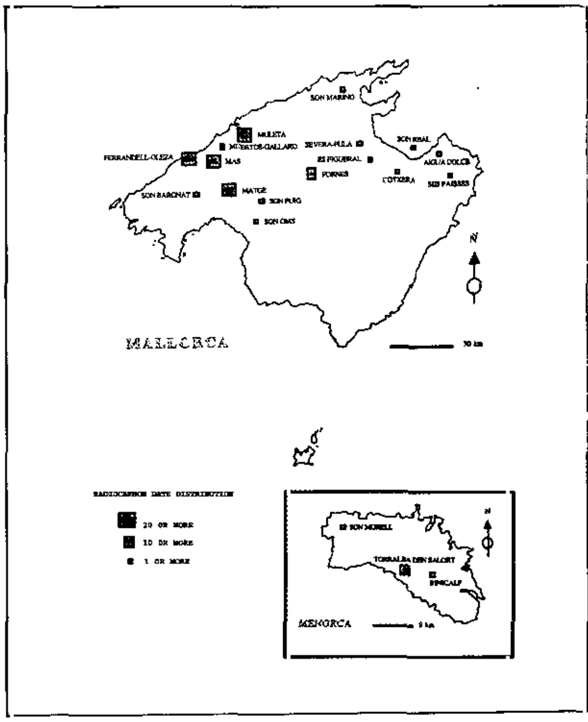


Figure 2.- Map showing distribution of radiocarbon dates at prehistoric sites in the Balearic Islands.

usually large number of dates available for a small number of sites in these areas.

To get the most out of any analytical technique or method, it has to be well tested before reliable results can be expected. A few dates spread out over a large geographic area are of minimal value and end up telling us little of a specific nature, linking areas only in the most tentative way, compared to a large number of dates in a few well selected and critical areas. Neither do a small number of dates give us a true idea of the full chronology of an area, giving at best a generalised and sketchy one. Nor do they offer much regarding the solution of excavational problems such as complicated stratigraphical contexts in open-air sites. Experience shows that in surveys like the present one, where dating has been centralised and used in blanket form, applying innovative techniques, the method has proved to be highly informative, reliable and productively rewarding.

The radiocarbon inventories are from the following sources: (1) Prehistoric Sanctuary of Son Mas, (2) the Chalcolithic Old Settlement of Son Oleza and the Bronze and Iron Age Younger Settlements of Son Ferrandell and (3) the Rock Shelter of Son Matge. A penultimate list (4) consists of a series of dates that originates from an assortment of sites. A final radiocarbon inventory (5) from the Taula Sanctuary of Torralba den Salort on the sister island of Menorca (Figure 3, inset) is included as this was the site where the collection methods and overall dating strategy were first developed.

8. THE METHODOLOGY

Description of the general methodology is offered in the hope of giving a clearer and more graphic understanding of the strategies and procedures behind the different collection and dating techniques. Descriptive details of this nature are not often given in sit reports or clearly enough illustrated when reporting on radiocarbon dating in excavation generally. This is to say that the immediate objectives behind the dating strategies used or the collection methods themselves are not often given in very clear or simple terms. This is particularly evident when there are large numbers of dates from a site and their contexts particularly variable. In such cases, they are usually listed as briefly as possible in table form, or treated as isolated data briefly ascribed to contextual associations. With a large the number of dates, along with the way they are interwoven throughout a site's various contexts, a concise explanation and description of the particular collection and dating techniques used and why they are pertinent are required. This can only be done clearly by graphic representation. At the same time, often the reasons for using Carbon 14 dating become obscure in our desire to simply know the age of an object or the particular context from which it originated. As a result such single dates are little more than isolated data, interesting more as exercises in physics than informative and which remain detached and alienated from the whole in which they are irrevocably a part.

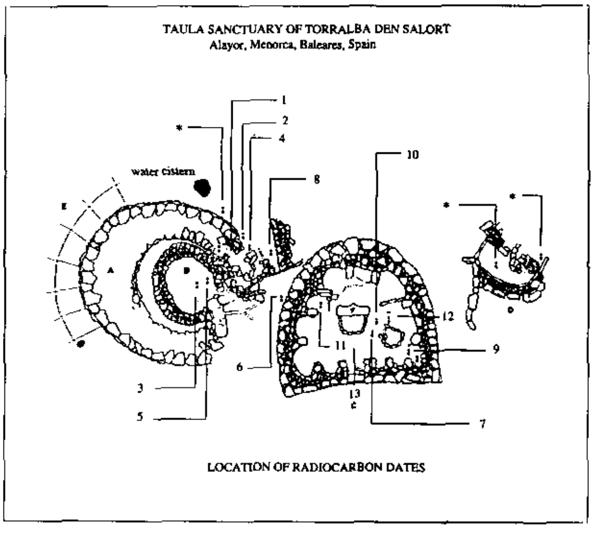
At times, there can be considerable differences in age between two objects in the same level. There is also no guarantee that the age of the object or set of objects and the age of the context in which they are found are one in the same thing. They can have been displaced and even completely separated one from the other, once or many times, during their history, through redistribution. Still, we should not lose sight of the fact that they are, despite their possibly varied depositional history, part of a complex environmental unit; one, in which it is our task to unravel, analyse and interpret. As part of such uncertainties, it is also essential to consider the fact that radiocarbon dating, whether used in singular contexts or closely interrelated ones, can only best be relied on when it is used with discernment, innovation and well planned strategical application. All the time keeping well in mind that singular dates are at most minimally informative. If we can do all of this, the value of the method and the reasons it is being used will remain in perspective and the meaning of the dates we receive both valuable and informative.

In the collection techniques used to determine origin, age and temporal sequence in the Son Mas sanctuary, there are no real differences from those originally applied in the Menorcan sanctuary. Nor do they significantly vary from other similar dating surveys undertaken over the last few years in other sites, where radiocarbon dating has played an equally important role in the interpretation of stratigraphical and activity sequences and developmental stages within the caves, rockshelters settlements and ritual sites (e.g. Chapman, Waldren and Van Strydonck in press; Waldren and Van Strydonck 1992b; Waldren, Ensenyat and Cubi 1991, 1992).

However before we undertake the subject of contextual, sequential (series and bracket) dating in the Son Mas sanctuary, we will first briefly discuss and describe the collection and dating techniques as they were initially used in the Taula of Torralba den Salort on Menorca (above). The examination of these techniques will be followed by a brief general history concerning sanctuary structures generally, giving the reader an idea of the relative age of such sanctuaries, and the way they have been interpreted relatively, on both islands of the Balearic Group, along with some of the problems involved in their interpretation, before the advent of radiocarbon dating.

9. BRACKET AND SERIES TECHNIQUES: PHASIC AND CONTEXTUAL DATING

The techniques of bracket and series collection/dating (below) were introduced as a response to the frequently poor stratigraphical conditions found in the local open-air sites. As working techniques they have become an integral part of the overall dating survey strategy and the basis of the results. The techniques have developed from their use in two, distinctly different types of physical environment: (1) the closed contexts of deep, vertical stratigraphy: characteristic of cave and rock shelter deposits, and (2) in the open environment of shallow, horizontal stratigraphy: representative of eroded open-air settlements. Each of these environments have their particular characteristics and special natures. As experience shows no two stratigraphical situations are



CALIBRATED RADIOCARBON DATES

	Lab. No.	Quadrant	Date BP	Date BC
1.	UtC 1263	TT-NT-CG	3456 BP	1516 BC
2.	QL 1433	TT-CO	3259 BP	1310 BC
3.	HAR 1876	TT-EX	3233 BP	1284 BC
4.	HAR 2908	TT-EX	3184 BP	1234 BC
5.	BM 1897	TT-CO	2970 BP	1021 BC
6.	QL 1089	TT-IN	2952 BP	1003 BC
7.	QL 1164	TT-IN	2947 BP	998 BC
8.	QL 1165	TT-X	2947 BP	843 BC
9.	CSIC 143	TT-AB	2190 BP	843 BC
10.	BM 2297	TT-IN	2135 BP	272 BC
11.	CSIC 144	TT-IN	2083 BP	129 BC
12.	BM 2003	TT-AIV	2059 BP	110 BC
13.	BM 2004	TT-MIV	1837 BP	113 BC

Figure 3.- Plan and table of Torralba den Salort.

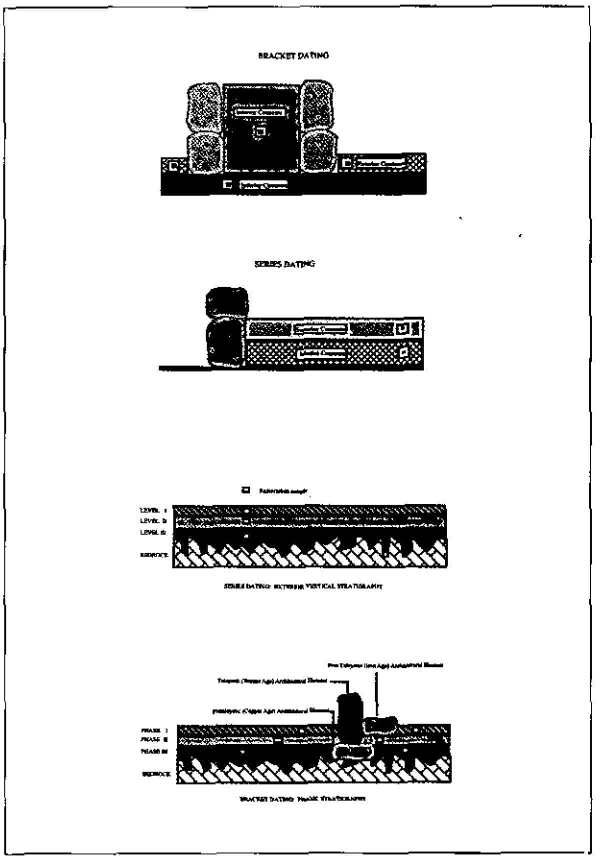


Figure 4.- Schematic of series bracket dating.

ever exactly alike and that each situation has to be treated as unique. This has led to the need for innovation and special thinking, particularly where poor soil conditions are concerned; although complicated stratigraphical situations equally require innovative treatment in most cases.

Phasic dating, as the term is used here, is concerned with establishing cultural divisions and subdivisions within stratigraphical contexts. It implies a situation in which the problem is to understand a sequence of broad events within a relatively larger known context. It has been mainly used for determining phasic changes in building or occupation sequences. Although it can be used otherwise, and as a combination of both bracket and series collection/ dating techniques.

Contextual dating is concerned with establishing the age of specific, closely related contexts and stratigraphical relationships. This implies direct dating of objects or series of objects in vertical succession and/or the contexts in which they are found, although like Phasic dating both bracket and series collection/dating techniques can be used in conjunction with it. Both Phasic and Contextual dating are less techniques and more overall strategies and imply the presence of a problem or question that is being asked across a particular spectrum. Whereas Bracket and Series collection/dating/dating are methods or techniques of collecting and dating singular or multiple contexts (above).

Of the two types of stratigraphical conditions commonly encountered in excavation, as field archaeologists, it is the poor soil contexts found in badly eroded, open-air settlement environments that give us the most difficulty. Compared to the better known multi-sequential soil conditions of closed environments, as found in caves and rock shelters, those sites with open-air contexts, especially in the Western Mediterranean Basin, are the most problematic. It is in the case of eroded stratigraphical conditions where the tightest excavational controls possible are necessary; controls that are carried out on a meter by meter basis and in some cases over smaller ground surfaces. The potential for good interpretation and accurate dating of badly eroded contexts are difficult to deal with under the best of conditions, especially where severe agricultural intervention and poor preservation over the millennia have taken place. Therefore, new ways of tackling the situation as well as development of alternative techniques suitable to the circumstances become most necessary; if any reliable results from dating are to be expected.

Attention has to be paid to thin stratigraphical interfaces in the soil, even if the soil is eroded and subjected to heavy agricultural activities by the seasonal use of the plow. Contrary to what would be expected, in rocky soil and especially where bedrock is close to or emerging from the surface, the effects of the plow are not always as thorough in its destruction and redistribution of surface materials in modern day levels. It has been observed that large quantities of artefacts can become trapped or deposited up against larger rocks or in bedrock crevices and under growing trees. In which case, they are well preserved and likely not to have moved very far from their original place of deposition. Under such circumstances, if details of their contextual environments are carefully recorded.linear or horizontal deposition and distribution of materials are reasonably reliable.

Essentially, it is series dating technique used in the deep stratigraphies that is most familiar —as this follows the principal of dating successive vertical strata— it is bracket dating technique which is normally the least used and which has been devised to come to terms with dating difficult contexts. The forms in which bracket dating has been used in the sites under discussion consist of dating individual architectural features, where vertical stratigraphy is either shallow and linear or horizontal in character, especially where architectural elements are badly preserved and alternative strategies of phasic or contextual dating need to be adopted. The method of bracket dating architectural features consists of dating (1) post constructional, (2) constructional and (3) preconstruction contexts directly associated with a site's various architectural features and activity zones. This is done by carefully collecting organic materials for dating and artefacts from (a) an area adjacent to or otherwise directly associated with some architectural feature or other distinguishing object (exterior contexts), from (b) within the wall fill of a particular architectural feature (interior contexts), where debris has been used with dry stone fill (hence dating material available) and from (c) bedrock fissures, crevices and bedding soils beneath the wall fill and the architectural element itself (inferior contexts). Results of such bracketed dating, like serial dating itself, if carefully carried out can quite accurately date an architectural element, both by deduction and inference, as well as contribute to the general chronological interpretation by forming a chain of informative data suitable for a more detailed picture.

10. BALEARIC PREHISTORIC SANCTUARIES: GENERAL HISTORY AND AGE

The Balearic prehistoric sanctuary while numerous in the form of Taula Sanctuaries on the Island of Menorca are found far less frequently on Mallorca. Those that have been well excavated and systematically investigated on either island are few in number. Of the 37 odd known sanctuaries on Menorca, the Taula sanctuaries of Trepuco and Torreta excavated by M. Murray in 1938; Torralba d'en Salort excavated by M. Fernández-Miranda and W. Waldren from 1975 to 1987 (Fernández-Miranda, Waldren and Sanders 1995); Fernández-Miranda and Waldren, in preparation; Torre d'en Gaumes excavated by G. Rossello Bordoy from 1975 to 1986 (Rossello Bordoy 1987) and Sanctuaries of So Na Casana recently excavated by Plantalamor (Plantalamor Massanet 1986) are those that have been the most extensively studied.

In only one of these, the Menorcan Taula Sanctuary of Torralba d'en Salort, has there been any radiocarbon dating carried out. Here, a series of 15 radiocarbon dates are available for contexts within the sanctuary as well as its immediately adjacent areas (Figure 3). Several of these Carbon 14 samples were collected with the express aim of dating the Taula's construction; an objective that met with some success and proven particularly informative, not only, regarding the site's age, but has also helped to set procedures used later in dating other stratigraphical horizons elsewhere.

11. RADIOCARBON BRACKET DATING AT TORRALBA DE SALORT

During the excavations and dating surveys at Torralba in 1975-1978, two radiocarbon samples were collected and subsequent dates established for sub-construction levels of the sanctuary and its precincts). These dates in uncalibrated terms are: 880 bc ± 40 yrs (QL-1164) and 890 bc ± 30 yrs (QL-1089) (*circa* 1000 cal BC in calibrated radiocarbon age) (Figure 3). (Note: to distinguish uncalibrated radiocarbon dates from calibrated dates, designations of bc and cal BC are used and cited for comparative and descriptive purposes).

Both uncalibrated radiocarbon dates for Torralba, one taken from a bedrock crevice in the northeastern corner of the interior of the Taula and the other collected from beneath the exterior southwestern wall of the precinct, strongly indicate construction of the Taula of Torralba d'en Salort after 900 bc (*circa* 1000 cal BC) (Table 5: Figures 9 & 17). These dates are further substantiated by findings made in zones outside and adjacent to the Taula precinct which enable us to pinpoint the construction of the Taula precinct still more accurately.

The readings from zones outside the Taula precinct are in the form of several carefully selected and dated occupational levels found beneath a Naviform Talayot constructed earlier alongside the Taula sanctuary (Figure 9). This earlier Talayotic structure showed signs of being partly dismantled for stone elements which were reutilised in the final construction of the Taula sanctuary precinct after 900 bc. The dates for construction or preconstruction of the Naviform Talayot are: 1080 bc ± 70 yrs (1310 cal BC) (QL-1433), 1070 bc ± 60 yrs (1284 cal BC) (HAR-2908b) and 1020 bc ± 70 yrs (1234 cal BC) (HAR-2980a), dates predating not only the Taula sanctuary but the Naviform Talayot itself, placing the dismantling of the stone elements of the naviform structure for the construction of the Taula sanctuary precinct two or more centuries after the construction of the Naviform Talayot.

This established at most a relative dating with some radiocarbon bracketing of the Taula sanctuary construction dates. However, the probability of a still more accurate date of construction of the Taula precinct comes from an occupational radiocarbon date collected at the base of a radial wall built off but attached at the eastern end to the southwest wall of the Taula precinct, cited earlier at *circa* 880 and 890 bc (1000 cal BC) (QL-1164 and QL-1089), dates for pre construction or constructional levels. This later level, an occupation one, is dated at 760 bc ± 50 yrs (QL-1165) (900 cal BC) and demonstrates the Taula precinct already built and in full use. It brackets the preconstruction dates of *circa* 880 and 890 bc (1000 BC) for the Taula's inner northeast corner and the precinct's southwest wall and that of the radial wall built onto the outer wall of the Taula precinct of *circa* 760 bc (*circa* cal 843 cal BC), indicating a construction date for the Taula Sanctuary of Torralba d'en Salort of *circa* 900 bc in uncalibrated terms, or 1000 cal BC as a calibrated date. This is further substantiated when we consider the other earlier dates for the Naviform Talayot and its adjacent areas.

While this dating series demonstrates the bracket collection technique in operation, giving solid constructional parameters to the Taula of Torralba d'en Salort, it does little but infer the probable dates for the construction of the other excavated and unexcavated Taula sanctuaries. While most of the Menorcan Sanctuaries were probably largely contemporary in their use at some time over the full scale of their chronology, a wide range of construction dates eventually can be expected, as there is no reason or evidence to believe that they were all built within a short period of time, some even being of late construction. The case of Torralba is cited here as a case in point and the dates offered are by no means given as an indication of the age of all such structures. Before an accurate range of construction dates is possible, concerted efforts to date the sanctuaries using similar means, will have to be undertaken in other Menorcan sanctuaries. Regarding stratigraphy, each archaeological station will have its own set of problems and responses regarding sample collection, as well as the choices to be made concerning the best strategies to use in view of the particular questions asked.

Similar collection and dating techniques can be demonstrated however to have been equally as effective when used in answering questions of age, construction and utilisation in other sites examined in the current study. Meanwhile, the Menorcan dates cited and the approaches used have been examined to give the reader some idea, if only a small one, as to the way radiocarbon method and the techniques were used and applied on the dating of the Taula, and at the same time give an idea of what we might expect in dating ranges for such structures in the future. Also they have been given in order to set future guidelines and show the development of the techniques, since their first application in Torralba.

12. THE MALLORCAN SANCTUARIES

In all, on Mallorca only 7 prehistoric sanctuaries are known. Of these, most have been dated, as quoted from the existing literature, to be late in chronology, *circa* 500 BC to 200 AD. This has been mainly interpreted from and determined by the wide range of imported classical pottery together with late indigenous wares found during excavations. At this point, it should be mentioned that similar imported and indigenous pottery, obviously of the same chronology, are found almost as a matter of routine in the upper occupational and abandonment levels of not only the Menorcan Taula sanctuaries but in almost every prehistoric settlement context on both islands as well. On the basis of their known age, they are reliable dating materials only for late occupation and abandonment dates in such sites, but little else. Moreover, such materials, on their own and taken at face value, are highly deceptive and do little to speak for the true age of the sanctuaries, their duration of use, function or the various activities that took place throughout their history.

There has been a tendency to evaluate the age of Mallorcan Late Bronze and Iron Age (Talayotic and Post Talayotic) sanctuary monuments, as well as their Menorcan counterparts, to their late or ultimate use as ritual sites, rather than to make any attempt to date their construction or preconstruction contexts. Nor has there been much effort spent to date the adjacent structures or areas around the sanctuaries in order to determine their true age by association and inference. When estimates of their construction and duration of age have been made, such assessment have been a relative estimate and for the most part a matter of guesswork. This has been equally true for other buildings in the Balearic architectural assemblage. In the case of sanctuaries, there has been very little attempt to study or integrate them into a general architectural scheme, other than in the most rudimentary way, again in relative terms. Furthermore, there has been even less effort to place them in proper perspective within the general sphere and activity of the social and economic organisation of the settlements; of which they were so obviously an integral and important part. To do so has been one of the main aims and long term objectives of the current investigations.

The Mallorcan prehistoric sanctuaries regarded as being of late date, based on an artefact typology of indigenous and imported classical pot sherd evidence, are the Sanctuaries of Son Oms (Rossello Bordoy and Camps 1971) and the Sanctuary Group of Almallutx (Fernández-Miranda, Enseñat and Enseñat 1971). While 5 of the 8 known Mallorcan sanctuaries do have the somewhat general horseshoe plan with an apsidal shaped rear aspect, characteristic of the Menorcan Taula sanctuaries, most bear little other similarity in construction to the Taula sanctuaries of Menorca. This is basically because of the missing central 'T' shaped taula stone and concave frontal aspect so indicative of the Menorcan sanctuaries. In the place of the one massive central Taula element, the Mallorcan counterparts have 4 or more short, cylindrical, drum-like stone units placed at cardinal points within the interior of the sanctuary. These are thought by some investigators (the authors included) to have been used as altars upon which to place offerings or to make sacrifices rather than acting as roof supporting pillars.

Those considered as earlier types are the Sanctuary of Son Mari (Guerrero Ayuso 1983, 1995), Sanctuary of Ses Antigors (Colominas 1915-20) and the Sanctuaries of S'Illot (Rossello Bordoy and Frey 1966). The consensus of opinion regarding the age of these earliest Mallorcan sanctuaries ranges from the V-VI centuries BC. This places them much later than their Menorcan counterparts, which some authorities believe are as early as 1800 BC; although there is no empirical evidence whatsoever for such antiquity (e. g. Torralba den Salort construction dates) other than their similarity of form to the Maltese Temples, to which they have often been compared. Once again, we need remind ourselves that up until now estimates as to age have rested on the relative dating of the materials encountered within the precincts of the sanctuaries (materials representing their last use and not possible earlier contexts) or estimates based on architectural comparisons. Until recently nothing has been done by more methodological means to determine age by the use of absolute dating strategies, such as those described here.

We should also bear in mind that these monuments undoubtedly were periodically cleared out and purged of earlier debris and other signs of earlier occupation in the long course of their history. Little would remain of these earlier materials, apart from occupational debris on which they were built, incorporated into their building, or walked into the floor during occupation or even later redistributed by agricultural activity, once outside the precincts of the sanctuaries.

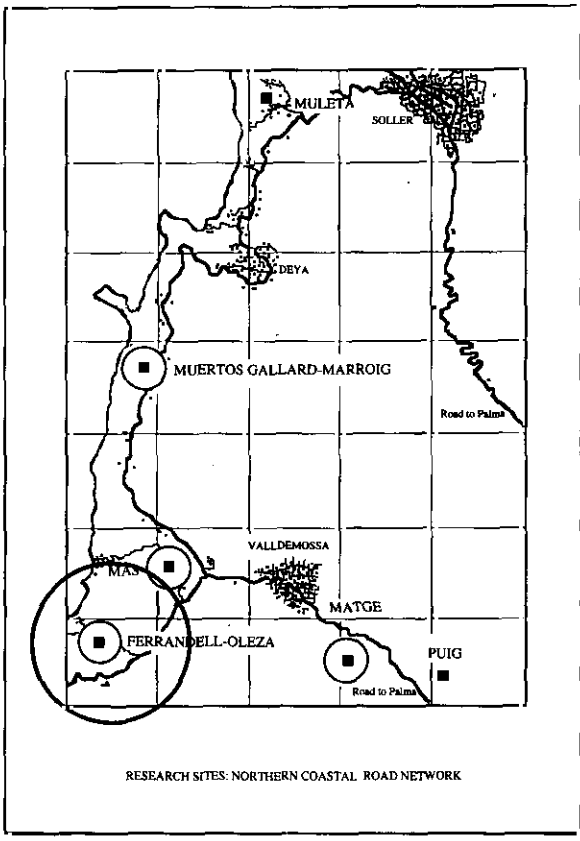


Figure 5.- Map of the coastal chain of sites, the Pla del Rei and vicinity showing the research sites and their location within the catchments.

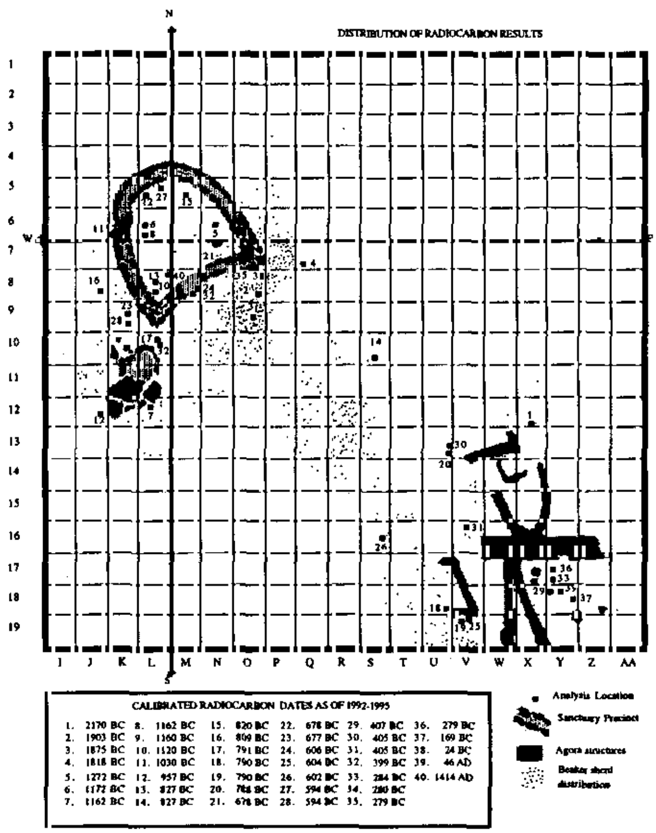
13. THE PREHISTORIC SANCTUARY OF SON MAS

The Son Mas sanctuary is situated at the extreme eastern end of a Pliocene alluvial flatland known locally as the Pla del Rei (Plain of the King) (39°, 45' N, 6°, 66' E), near the mountain village of Valldemossa in Mallorca's northern, coastal Jurassic limestone sierras. The plain on which the sanctuary is located lies at an altitude of 400 meters overlooking the sea and is the result of water shed and soil erosion. The flatlands are part of an extremely fertile intermontane basin created by soils that have been eroded down from the surrounding hills and mountain range known as the Teix Range, which enclose the eastern and southern sides of the alluvial flatland. The rich alluvial soils of the basin are exploited today by four major residence-estates, known locally as fincas: Son Mas and Son Moragues at the eastern end of the plain and Son Ferrandell and Son Oleza on the western end (Figure 5).

The Prehistoric Sanctuary of Son Mas, with its separate inventory of absolute datings, is one of three sites making up a single catchment area currently referred to as the Ferrandell-Oleza-Mas Prehistoric Settlement Complex. Each site in the catchment has its particular dating series, which form smaller, individual catchment areas that overlap to create the chronologically complex and spatially larger one. In turn, this larger complex has been used to make up the nucleus of a still more extensive site catchment area that includes and incorporates still other small adjacent sites, as illustrated above and Tables 1-4.

Discovered in 1987, the Son Mas Prehistoric Sanctuary forms a very recent part of a more extensive excavational and research programme underway since 1968, which not only comprises the immediate catchment area of the alluvial plain but, also, adjacent peripheral areas within a 4 kilometer radius, including the Ferrandell-Oleza Prehistoric Settlement Complex, discovered in 1978 (Waldren 1982, 1986), and the Rock Shelter of Son Matge, discovered in 1968; reports of which have in the interim years been published in a number of accounts (Waldren 1982, 1984, 1986, 1987).

Excavations and other evidence collected to



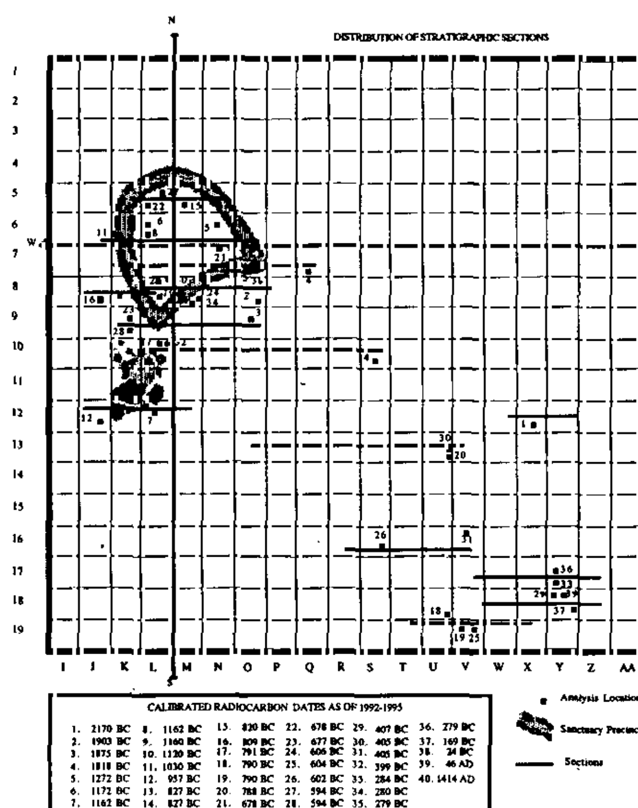


Figure 6.- Survey & excavation extension quadrants & grids. Prehistoric sanctuary of Son Mas (Valldemossa, Mallorca, Baleares, Spain). Distribution of radiocarbon results and Distribution of stratigraphic sections.

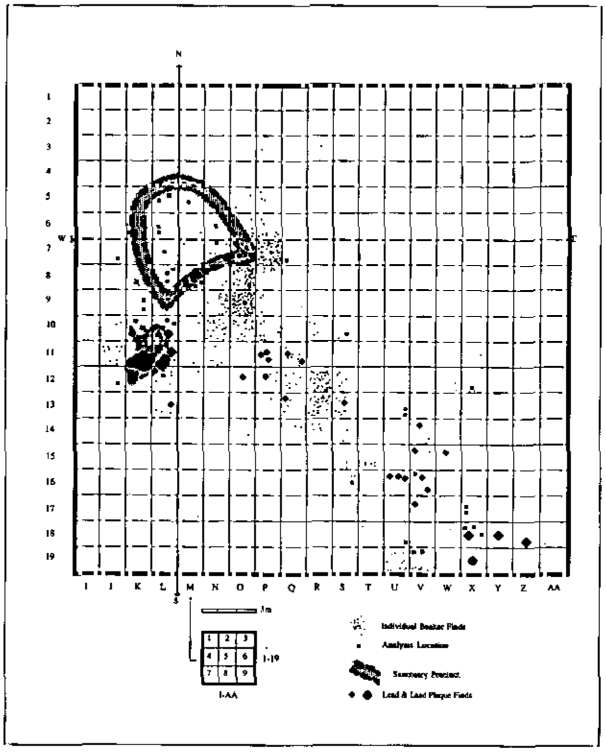


Figure 6A.- Survey & excavation extension quadrants & grids. Prehistoric sanctuary of Son Mas (Valldemossa, Mallorca, Baleares, Spain). Distribution of bell beaker pottery.

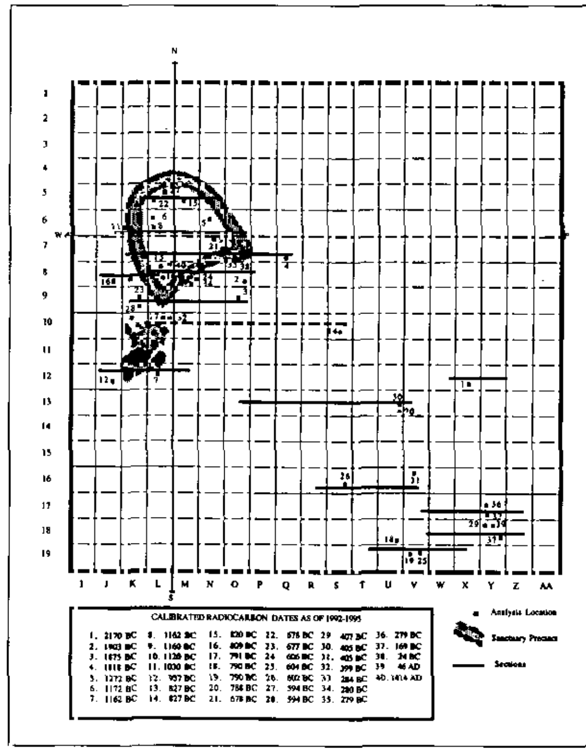


Figure 6B.- Survey & excavation extension quadrants & grids. Prehistoric sanctuary of Son Mas (Valldemossa, Mallorca, Baleares, Spain). Distribution of stratigraphic sections.

date strongly suggests that exploitation of the rich alluvial soils of the basin as well as areas adjacent to it took place, perhaps in a similar manner as at present, in ancient times from as early as the Third Millennium and from evidence in nearby cave contexts even earlier (Fourth to Sixth Millennium). Each of these residence-estates or fincas presently exploiting the plain have closely associated prehistoric architectural features and activity zones on them, which strongly supports a occupational continuum, one that is not too dissimilar to the present day exploitation and settlement pattern of the plain. One of the aims of the current research has been to understand to what degree occupational continuum may or may not have taken place.

While there are 28 recorded prehistoric sites found within a four kilometer radius of the plain, the more pertinent of these are located within a smaller geographic zone or catchment, that of a two kilometer radius. Of the two catchment areas, it is the smaller on, made up of the Pla del Rei as a pivot point, that forms the nucleus of the larger four kilometer catchment (Figures 6 and 7). This smaller group of sites form a series of what is referred to as individual environmental catchments within the large one. These have proven over time to be both contemporary in chronometry and archaeological contexts and combined, they can be studied as a single large environmental model; one that demonstrates an interactive prehistoric continuity for the area. During the last ten years, it is these commonly shared environmental characteristics and the way they correlated along the whole of their spatial and temporal deployment that have been the focal point of investigations and research throughout the plain. These relationships, spanning a four thousand year exploitation of the fertile plain, offer us an unusual study opportunity. One where the individual, interrelated activity zones form not only a whole but more importantly reveal important details of the social, economic and religious conditions during the different periods, so giving further insight into the lives of the inhabitants.

14. THE ARCHITECTURAL FEATURES

The foundations of the Son Mas Sanctuary are made up of large well shaped, tightly fitted (nested) limestone blocks as large as 2m by 1.75m in the exterior walls to 1m by 1.5m stones in the interior walls, forming a horse-shoe shaped precinct roughly 12 by 13 meters in area (Plate I). It has an apsidal or naviform rear wall in the northwest and a concave

Plate 1.- Prehistoric sanctuary of Son Mas (Valldemosa, Mallorca). Excavations of 1991.

frontal wall with an entrance in the middle, facing the southeast. The two meter wide entrance is flanked by massive upright stones and at one time probably had equally massive lintel stones, spanning the uprights. It is the concave front wall and entrance that bears the most striking similarity in plan to the Menorcan Taula Sanctuaries, as well as in certain respects a rèsemblance to the considerably older temples of Malta. Son Mas is the only Mallorcan sanctuary so far to have this distinctive concave frontal aspect, all the others having their fronts squared off. Whether or not this particular feature is an indication of chronological age or architectural influence on the part of the builders of the Menorcan sanctuaries is not known. As the radiocarbon and artefact evidence shows, there is strong argument for the existence of a much older structure having been on the spot earlier than the one visible at present.

While most of the excavational work has been carried out on the inside sectors of the sanctuary precinct and areas immediate outside the walls, the outer fields have been every bit as informative as excavations on the interior and, perhaps, even more so in certain respects. Recent excavations have shifted emphasis to dating surveys and retrieval of materials and other data from the outer fields, to the south and southeast of the sanctuary. This has been done to ascertain the type and range of activity in these sectors (Figure 6). Evidence shows that not only were the inner sectors of the sanctuary periodically cleaned out and the materials disposed and redeposited by different means in the surrounding fields. Evidence also shows that the outer sectors were arenas for various exterior activities. These exterior areas are at present giving us richer and more varied information than the inner sectors, especially as to the true age of the structure and ritual areas, the function(s) and the extent of the different types of activity carried out over time. These sectors are also giving us a very good idea of the way various religious and social activities were carried out, detailing the site's ritual and other uses during the different prehistoric periods.

Through the various dating strategies and techniques used, it has been possible to test their effectiveness a well as construct a stratigraphical and phasic chronometric sequence for each of these sites. Profiles in which we can recognise sets of stratigraphical conditions that are similar to one another and which are in themselves predictable and that reoccur within certain variation throughout most of the sites (Figure 7). One can veritably predict and expect certain conditions in advance, in areas as yet unexcavated due to these recurrent characteristics. This has given one the sense of being able to approach unexcavated areas with a kind of foreknowledge, based on experience gained from previous sectors already excavated. This needless to say can be advantageous, in that any deviation from contextual norm during excavation is almost immediately recognised, thus giving us the opportunity to test and perfect some of the techniques within various environment.

Descriptions of the various collection methods used are best illustrated in the sample sections in Figure 7, where they were employed on dating walls, other building elements and in individual contexts in more open areas. The schematics give us a graphic or schematic representation of the various kinds of stratigraphic conditions encountered, both in the sanctuary and its surrounding fields. They also give an account of the location of the numerous test samples and analytical results in the stratigraphy, exemplifying, as they did in the case of the Menorcan Taula Sanctuary of Torralba den Salort, the value of using radiocarbon method strategically and innovatively, not only, to solve contextual and chronological problems, but also to single out specific activities in the history of the structure. Most of all they demonstrate the kind of results possible with a dedicated use of the method. In fact, on the basis of their success in the Torralba site, they were permanently adopted as part of general on-site methodology in all of the research sites examined.

Equally interesting is the fact that despite the eroded and often disturbed stratigraphical conditions present in Mediterranean stratigraphies, the radiocarbon dates received from open-air environments correlate remarkably well with the sequences from the deep closed stratigraphies of rock shelters and caves (Table 4). This has allayed some doubts as to possible differences between the two contrasting environments of caves and open-air conditions, from the standpoint of specimen contamination by rainwater and other natural agencies. The dates compared here show no significant difference whatsoever between the two. The main change that occurs in specimen preservation and condition takes place in artefacts such as bone and pottery found in open-air situations, where surface alteration in these objects are mainly brought about by movement in the soil over time; actions which can notably and seriously alter their state of preservation and superficial appearance.

15. THE SITE EVIDENCE

The exceptional antiquity of the Son Mas sanctuary is certainly one of the most interesting aspects of the latest chronometric surveys. The importance of its antiquity is shared by the site's duration of use as a ritual centre during a period of several millennia and the insights it gives us in terms of social and economic conditions. Radiocarbon dates show that this span of time began in the local Pretalayotic Period (Chalcolithic-Initial Bronze Age), *circa* 2000 cal BC to 1250 cal BC, and continued through the ensuing Talayotic and Post Talayotic Periods (Bronze and Iron Ages), *circa* 1200 cal BC to 200 cal BC, with occasional use as late as 200 AD. This is a duration of use as a sanctuary or ritual site of remarkably long length can be demonstrated as a chronological duration of some 2300 years. This factor more than just suggests that the site was a centre of ritual and religious use during that time but probably was used by the entire region of the alluvial plain over that period.

The various radiocarbon analyses results were provided by the Koninklijk Instituut voor het Kunstpatrimonium, Brussels, Belgium (Dauchot-Dehon and Van Strydonck 1979; Van Strydonck and Van der Borg 1991). The Pretalayotic radiocarbon results, demonstrating the oldest levels of the sanctuary are four charcoal sample dates, 4119 cal BP (2170 cal BC (UtC4676); 3852 cal BP (1903 cal BC) (IRPA 909) and 3824 cal BP (1875 cal BC) (IRPA 908) and 3767 cal BP (1818 cal BC) (UtC2020) (Figures 7, 8 and 9), taken from inferior levels in different archaeological sectors outside the sanctuary's precincts (Figure 6). These were taken from strata containing unusually large quantities of geometrically decorated Bell Beaker pottery and other decorated and undecorated fine wares, as well as other artefacts of Pretalayotic origin and typology.

Several later Pretalayotic non-Beaker radiocarbon dates on charcoal, associated with pottery of the period, all from different sectors and inferior levels inside the sanctuary, have given us dates of 3221 cal BP (1272 cal BC) (Utc2756); 3121 cal BP (1172 cal BC) (IRPA 1053); 3111 cal BP (1162 cal BC) (IRPA 1052); 3111 cal BP (1162 cal BC) (IRPA 976) 3109 cal BP (1160 cal BC) (IRPA 976 and mark a strata laid down just prior to the construction of the later Bronze Age sanctuary structure (see Figure 11). These results are interpreted as interface dates between the upper contexts of the Pretalayotic Period and those of the ensuing Talayotic levels.

Other lower Talayotic levels (Level II), representing the constructional phase of the Bronze Age sanctuary foundations, have given us several dates: 3069 cal BC (1120 cal BC) (IRPA 984), two identical dates from different sectors: 2776 cal BP

(827 cal BC) (IRPA 1058) and 2776 BP (827 cal BC) (UtC 1256) and one date of 2740 cal BP (791 cal BC) (UtC 1255) see Table 1 for complete list). What is interesting about these dates is that they coincide perfectly with age assessments based on similar pottery typology and other organic samples radiocarbon dated from early Talayotic contexts in the nearby Son Ferrandell Talayotic Younger Settlement (Table 2), as well as the funerary levels at the Son Matge rock shelter (Table 3).

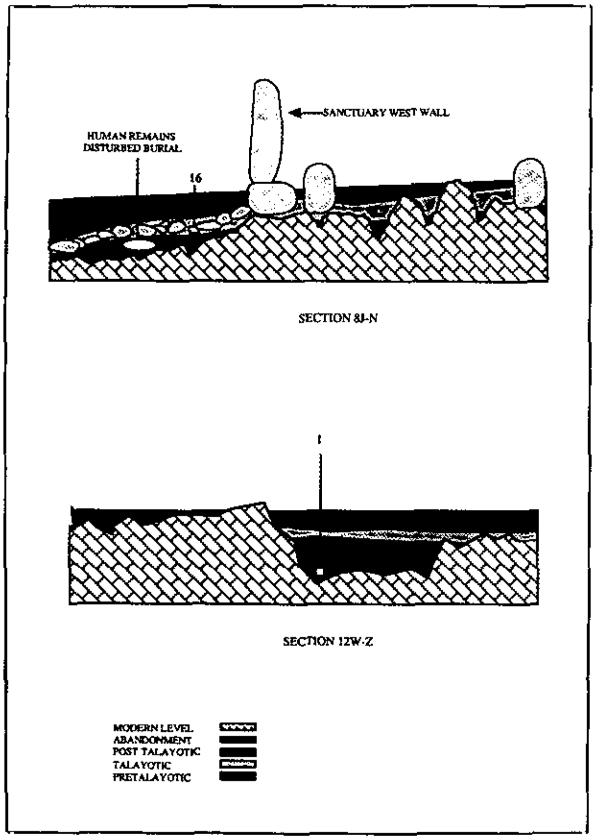
The contemporaneity of these dates is further substantiated again by the Ferrandell-Oleza settlement site's construction and occupation dates, where several similar contexts with similar date ranges are found for two of the site's four Talayots. For example, Talayot 1 (T1) of that site has provided us with two preconstruction dates, one interior and one exterior reading of 3120 cal BP (1170 cal BC) (IRPA 1041) and 2915 cal BP (965 cal BC) (IRPA 813) and an interior construction date of 3038 cal BP (1088 cal BC) (QL 1531). Both set of contexts contained similar pottery evidence. Recently other results have been obtained from Talayot 4 (T4) of the site for three interior occupational/constructional levels with dates of 2924 cal BP (975 cal BC) (IRPA 907), 2777 cal BP (828 cal BC) (IRPA 880) and 2739 cal BP (790 cal BC) (IRPA 1016), again having identical artefact materials (Chapman, Waldren and Van Strydonck 1993). These further support the relative age assessments for the sanctuary's occupation and construction during a similar age range *circa* 800 cal BC to *circa* 1000 cal BC.

In the Son Mas sanctuary, similar contexts and materials to those of the Son Ferrandell Younger Settlement have also given us several comparable dates. The Son Mas sanctuary dates are: 2776 cal BP (827 cal BC) (UtC 1256), 2740 cal BP (791 cal BC) (UtC 1255). A number of dates later than 800 BC from the sanctuary associated exclusively with indigenous wares can be found in Table 1, all of which pre-date the classically known date of 654 BC for the Carthaginian settlement and colonisation of the adjacent island of Ibiza. This would all but rule out the possibility of strong Carthaginian involvement in the Mallorcan Talayotic sanctuaries as suggested by one local investigator (Guerrero Asuyo 1982, 1983, 1995).

There is however very little doubt that Carthaginian trade items as well as later commercial connections with the Punic colony of Ibiza did occur in the later stages of the Late Talayotic Period and all through the Post Talayotic Period on Mallorca. Evidence of this is found in quantity and almost as a matter of routine in sites of this age. None of these trade goods however appear in any of the sites examined in levels dated earlier than the 5th century BC; although one must not rule out the possibility of some casual classical trade earlier than this. On the other hand, there are strong signs of trade and other connections with the Celtic mainland and even earlier Hallstatt influences as early as *circa* 850 BC-1250 BC (Waldren 1984). Whether or not Phoenician and Carthaginian commercial and maritime activities were responsible for the arrival of these continental cultural influence and classical trade goods into the Balearics are matters for more detailed inspection elsewhere.

After 650 BC, however, there is ample proof of trade and other influence from the Punic colony of Ibiza continuing until the Roman acquisition of Carthaginian interests in the Balearics in the 2nd century BC. Proof of this trade abounds in all the indigenous sites investigated, just as there is ample proof in the quicklime burials of the same period of strong Celtic influences (Waldren 1984). Evidence of these later connections is found in the abundant iron artefacts of Celtic typology and probable manufacture that appear in the inhumation in quicklime burials dated from *circa* 650 BC until *circa* 100 AD (also see Waldren 1984: 409-451) as well as other burial practices such as the construction of the stone tomb necropolis of Son Real, Mallorca (Tarradell and Woods 1976).

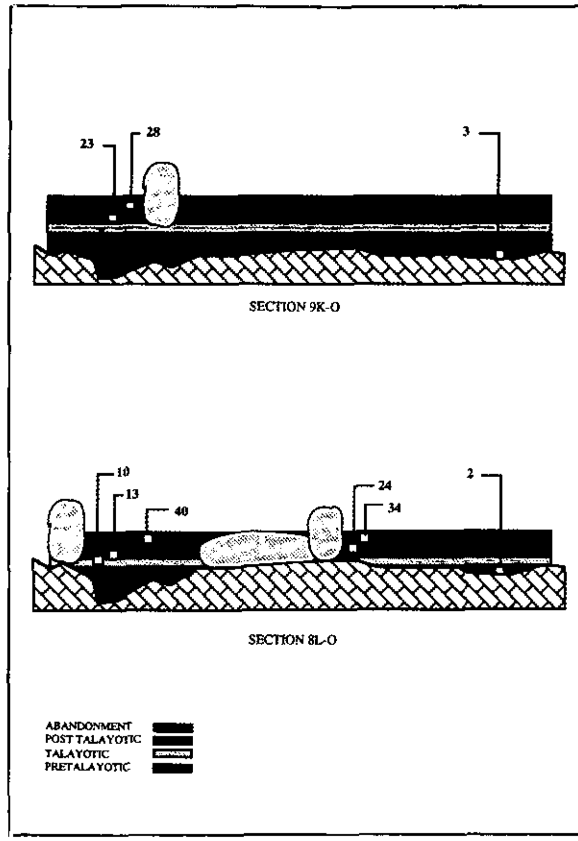
For the latter stages of the Post Talayotic Iron Age from 450 BC forward, the Son Mas radiocarbon dates are more in number than formerly and are represented by 2354 cal BP (405 cal BC) (UtC 3933), 2356 cal BP (407 cal BC) (UtC 3188), 2356 BP (405cal BC) (UtC 1066) and 2348 cal BP (399 cal BC) as well as other late dates up until the First Century (Table 1). There are many dates available for burial contexts elsewhere for this very same period. The reason for this has been one of a matter of priority in the collection and dating of samples, the strategy being one centering radiocarbon survey on the Pretalayotic and Talayotic contexts rather than the later phases of the site, where the presence of classical pottery does not require radiocarbon dating. The great abundance of classic trade goods of known age in the upper levels of the site leaves little doubt of their age and the easy access to such goods by the local populace accounts for their presence. It has seemed more informative to use radiocarbon dating where it will give the most results and answer the widest range of questions. Although an extensive series of samples have been collected from late levels and scheduled for analysis as contextual chronological checks rather than confirmation of the date of classi-



CALIBRATED RADIOCARBON DATES

Anal No.	Lab.No.	Quadrant	Date BP	Date BC
1.	UtC 4676	12W9	4119 BP	2170 BC
16.	UtC 4675	8J6	2758 BP	809 BC

Figure 7.- Example of schematical stratigraphic section.



CALIBRATED RADIOCARBON DATES

Anal No.	Lab. No	Quadrant	Date BP	Date BC
2.	IRPA 909	8O9	3852 BP	1903 BC
3.	IRPA 908	9O5	3824 BP	1887 BC
10.	IRPA 984	8L8	3069 BP	1120 BC
13.	UtC1256	8L5	2776 BP	827 BC
23.	IRPA 1257	9K6	2626 BP	677 BC
24.	IRPA 836	8M6	2655 BP	606 BC
28.	UtC1258	9K6	2549 BP	594 BC
34.	UtC 1001	8M6	2229 BP	280 BC
40.	IRPA 1024	8L3	536 BP	1414 AD

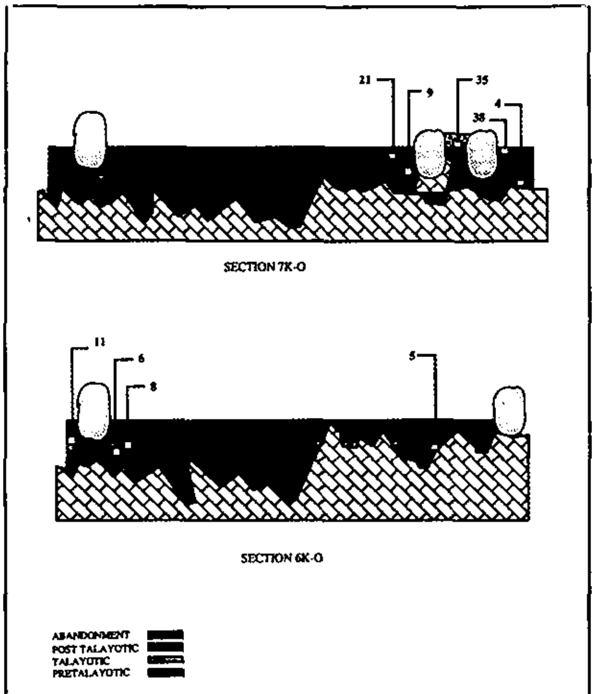
Figure 8.- Example of schematical stratigraphic section.

cal pottery.

The classical trade goods are mainly of pottery, consisting of Greek Attic wares of the 5th century BC, a great deal of early, middle and late Roman Campanian pottery creditable to the 5th to 2nd century BC and Punic wares of the same ages. This latter series of indigenous dates and the classical trade goods of known typological age confirm the VIIth to IVth century BC contexts of the sanctuary. Still other dates confirm the final use, destruction and abandonment of the Son Mas sanctuary in the IIIrd to IInd century BC, as well as occasional use as late as 200 AD. This ultimate phase is reflected in the broad variety of Roman Terra Sigillate and later fine wares found, both, inside and outside the sanctuary in the upper most levels.

Based on the evidence so far, no notable typological gaps appear either in the late or early classical pottery assemblages, especially within the very last stages in the sanctuary. Every style of classical ceramic is present, from the very ornate to the most common wares. This goes for quality glass objects and other trade goods as well. There can be very little doubt concerning the wealth and probable status of these items, particularly as they are in the contexts of a sanctuary, where one would expect to find them. At the same time, one is continually reminded of the apparent easy availability of such items of trade, which reached well into the most remote mountainous areas of the island.

While it is essential to understand more about the economic and social importance that these trade goods held among the indigenous population in general, for the moment, there are other more pressing problems. What mainly concerns the immediate research is a better understanding concerning the sequence of events both in and outside the sanctuary, during its transitional stages of development, where little or no classical trade goods are present, for example. This is equally true for the stages involving



CALIBRATED RADIOCARBON DATES

	Lab. No	Quadrant	Date BP	Date BC
4.	UtC2020	7Q7	3767 BP	1818 BC
5.	UtC2756	6N5	3221 BP	1272 BC
6.	IRPA 1053	6L4	3121 BP	1172 BC
8.	IRPA 1053	6L7	3111 BP	1162 BC
9.	IRPA 976	7N2	3109 BP	1160 BC
11.	UtC3044	6K6	2981 BP	1030 BC
21.	UtC 1002	7N8	2637 BP	678BC
35.	QL 4200	7O7	2228 BP	279 BC
38.	QL 4201	7O7	1970 BP	24 BC

Figure 9.- Example of schematical stratigraphic section.

the earliest phases of the site's use as a ritual area, where there is a similar lack of detail. By and large, it is these transitional and earlier contexts that need much more clarification, chronologically and not so much their correlation and continuity with the later more historical evidence and contexts. These latter stages, which deal with highly datable classical trade goods, will be much easier to interpret when the time comes to do so.

Certainly, the evidence and dates received so far show an overall continuity in the function of the site as a ritual centre, as well as its contemporaneity with other nearby occupational sites. However, as pointed out, there is still a great deal to be learned concerning the interaction between the various sites and their stages of development in chronological terms, as well as social and economic terms. Especially those intermediate stages that link the latest and earliest evidence together, without which a better understanding and clearer picture of events would not be possible.

16. THE SANCTUARY'S SECTORS, STRATIGRAPHIES AND DATES

A full account of the site's different stratigraphies can be found in the appropriate literature (e. g. Waldren and Van Strydonck 1995 and 1996). Because of the lack of necessary space, only a small selection of site's excavational sections are illustrated. These few and those in the more comprehensive accounts are ilustrated in order to demonstrate more clearly the location of the many test samples. This is done to give the reader a better idea of the contexts and environment from which they originated.

The site was surveyed along two base lines: one running north-south, the other east-west. The area has been divided along these base lines into 3 metre by 3 metre (9 m^2) master letter/number quadrants in the form of columns (letters, G-V), running north-south, and rows (numbers, 1-20), running east-west, forming an overall area of 2736 m^2 (Figure 5). Each of the master letter/number quadrants are further subdivided into 9 individual 1 meter sub quadrants, 1-9. This meter by meter division assures the best of control, in the form of small and highly manageable units, giving us a detailed record of the deposition and distribution of the artefacts and other important materials and data points. A little over one third of the surveyed area (890 m^2) has been excavated to date.

17. CONCLUSIONS

The dating surveys are still simplistic by nature. The basic belief that radiocarbon dating is of little value other than done extensively and with a clear idea of what they are to serve is still formost, as is the belief that the method provides us with the best tool for archaeological and chronological interpretation, providing that it is used properly. There is also the conviction that the enclosed data and information is the best example of what the method can do when used in the proper conditions and with clear objectives in mind.

The results of the various radiocarbon dating surveys have provided us with the Pentapartite Chronological Framework illustrated (Figure 10). As it is represented there, the illustration outlines the prehistoric landmarks and larger chronological issues as suggested by the current master inventory of more than three hundred radiocarbon dates, the majority originating site reservoirs discussed. While this framework serves to delineate dramatically the chronology of the Balearics in general periodic and phasic terms, it is still a tentative scheme, in need of much more details on a broader geographic scale. It represents a working hypothesis, one which is based in chronometry and not in relative chronology as so many scheme before have provided. The individual dating or site surveys found in the present publication have been devised to cope with more immediate needs.

In the text, we have seen how the various methods of collection and strategical dating have come about, how they have been used and some of the results derived to present. The value of the present investigations is found in the manner in which we are able to compare the evidence obtained from one site with that of others, both in and out of the geographic catchment examined. It is obvious that these sites are closely linked geographically, chronologically and culturally.

In the case of the Prehistoric Sanctuary of Son Mas, we are able to group the data into five separate categories or phasic contexts (with a final incipient occupational phase) on the basis of the dates from the sanctuary's stratigraphical conditions, site areas and artefacts. Each of these groups broadly corresponds with a one or two contextual phases of larger chronological periods and deal with the various activities in the history of the sanctuary structure. These overlap each other and the divisions as they appear here are arbitrary for discussion and the sake of brevity and simplification.

In broad contexts the following categories are Preconstructional, Subconstructional, Constructional, Occupational and Abandonment used in connection with and discription of the remaining present day architectural elements. These overlap the chronological periods of the local Pretalayotic, Talayotic and Post Talayotic Periods, equivalent to the European Copper, Bronze and Iron Ages. The sequence begins with the oldest dates for the Son Mas sanctuary and continue through to classical to include the final incipient use of the site. These are described as follows:

· *Preconstruction Phase: Pretalayotic, c 2170 cal BC to 1250 cal BC*

There are at present four dates representing the phase in the history of the sanctuary. These originate from several sectors and section: 12W-Z , Sample 1, 2170 cal BC; 8L-O, Sample 2, 1903 cal BC; 9K-O, Sample 3, 1887 cal BC and 7K-O, Sample 4, 1818 cal BC. These represent the Pretalayotic Period or dates prior to the present day remains of the structure and predate its construction as we know it from the existing architecture.

· *Subconstruction Phase: Late Pretalayotic & Talayotic, c 1250 cal BC to 800 cal BC*

This phase is represented by eight dates covering the period of 1272 cal BC to 809 cal BC: Section 6KO: Sample 5, 1272 cal BC; Sample 6, 1172 cal BC; Sample 8, 1162 cal BC. Section 7KO: Sample 9, 1160 cal BC; Sample 11, 1030 cal BC. Section 12J-M: Sample 7, 1162 cal BC; Sample 12, 957 cal BC and Section 8L-O, Sample 10, 1120 cal BC. The Son Mas Sanctuary was probably built during the latter part of this phase and certainly toward the beginning of the next.

· *Construction, Occupation Phase: Talayotic/ Post Talayotic, c 800 cal BC to 700 cal BC*

This phase is consists of twenty-eight dates covering the period of 827 cal BC to 46 AD. While no absolute dates are really needed for the levels containing highly datable classical trade goods from around 400 BC, some dating has ben done as a control issue up to the IInd Century abandonment of the site with absolute dates for contexts dated 169 cal BC, Sample 37, Section 17-18W-Z. Eleven of the more important dates within this range are the earliest group in Sections 9K-O and 8L-O (Sample 13, 827 cal BC, Sample 23, 677 cal BC, four times in Sections 10K-S ,13K-U and 8J-N (Sample 14, 827 cal BC, Sample 16, 809 cal BC; Sample 17, 791 cal BC and Sample 20, 788 cal BC), two times in Sections 12J-M and 5K-O (Sample 15, 820 cal BC; Sample 22, 678 cal BC) and twice in Section 18U-W (Sample 18, 790 cal BC and Sample 19, 790 cal BC) and finally once in Section 7K-O (Sample 21, 678 cal BC). All these dates represent constructional and occupational dates.

· *Occupation and Abandonment Phase: Post Talayotic, c 700 cal BC to 200BC*

This last phase consist of the remaining 17 late dates from Section 8L-O, Sample 24, 606 cal BC; Sample 34, 280 cal BC. Section 9K-O, Sample 23, 677 cal BC and Sample 28, 594 cal BC. Section 7K-O, Sample 35, 279 cal BC and Section 18U-W, 604 cal BC. Section 16Q-X, Sample 26, 602 cal BC and Sample 31, 405 cal BC. Section 17-18,W-Z, Sample 29, 407 cal BC; Sample 33, 284 cal BC; Sample 36, 279 cal BC and Sample 37, 169 cal BC. This presntly ends the series, although the dating of other contexts are still in progress.

As it is at present there is a about a 600 year difference between the earliest calibrated dates and the oldest intermediate ones. This of course is not acceptable, but it is understandable. There are a number of reasons for this, that can be summed up in the possibilities of either (1) a break in the continuity of six centuries (2170-1818 cal BC-1272 cal BC), as indicated by the radiocarbon dates, or (2) that not yet enough intermediate Pretalayotic chronometrical data has been collected representing the six hundred year period in question. The author believes that it is a matter that not enough samples have been collected and analyses results available from the lower levels. To date most of the emphasis has been placed on the contexts leading up to the intermediate date ranges and not the deeper ones.

The distribution of the date ranges are not only consistent within the sections examined but, also, cross-correlate stratigraphically with similar data, physical conditions and artefacts found in other excavated areas of the site. Also, part of the problem may actually be the result of the calibrated sigma ranges for each of the readings; especially those of the intermediate dates (Samples 5-9). A closer examination of the calibration ranges for these intermediate dates will show us, for example, that the calibrated two sigma ranges for the oldest of these intermediate dates (Sample 5: 1272 cal BC) gives us an age of up to 1610 BC. On the other hand with one sigma ranges, the date is 1430 BC. These two (sigma 1 and sigma 2 dates) in themselves would not place them within the lower one sigma ranges of the oldest calibrated dates of 2170 BC, 1903 BC, 1883 and 1818 BC (Samples 1, 2, 3 and 4), which are 2270 BC and lower of which is 1668 BC for their lower calibrated two sigma ranges.

On the basis of these, we will see that there is still a break of about 300 years, even using the full calibration sigma ranges. As a result, the gap of several hundred years between the two contexts is quite evident on solely the bases of radiocarbon dates. It is a matter of determining if the gap in the dates is really a break in the continuity of the site or whether it is, as believed, a question of insufficient radiocarbon documentation.

If we take into account the larger radiocarbon inventory that exists for the nearby Ferrandell-Oleza Settlement Complex (Table 2), where 47 dates are available, we see that the settlement shows absolutely no break in its continuity; especially in the dates of the intermediate range from *circa* 1000 BC (Sample 18, Table 2) through to *circa* 2468 BC (Sample 1, Table 2). There is at least one date for every century, over a period of 1400 years. If we can accept the contemporaneity of the sanctuary and the nearby settlement, then there is every reason to believe that eventually there will be more dates for these ranges in the sanctuary, as more analyses are conducted on materials from the site's earliest levels. It remains merely that these be carried out.

Regarding the artefact evidence from the sanctuary, on the basis of their typology, they coincide exactly with the Ferrandell-Oleza Prehistoric Settlement Complex (Old and Younger Settlements) and other stations like the Rock Shelter of Son Matge. However, an example can be made here in regard to a rather exclusive and controversial issue. This is one dealing directly with the period involving the Bell Beaker pottery, creditable to the period from 1250 BC to 2500 BC and found in great abundance in the Pretalayotic contexts of all the sites examined (Table 3). Statistically and chronometrically these dates and the materials representing them are well defined by the amounts of Bell Beaker and Pretalayotic pottery encountered in the sites.

At present, there are over 875 Beaker sherds, representing over 80 vessels (based on different rim fragments) from the Ferrandell-Oleza Chalcolithic Old Settlement, where over 1700m^2 have been excavated. In this site, radiocarbon dating covers the whole of the duration of use of the site from *circa* 1250 BC to *circa* 2500 BC, which covers the whole of the Pretalayotic Period in 15 radiocarbon readings. At present, there are over 590 Beaker sherds, representing over 45 vessels from the Prehistoric Sanctuary of Son Mas, where only approximately 890m^2 have been excavated. In the sanctuary, radiocarbon dating covers its duration of use during Pretalayotic times from *circa* 1272 cal BC to *circa* 2170 cal BC BC, with only 5 radiocarbon readings covering the period. While these statistics do not solve the chronometric gap in the continuity in the sanctuary, the comparison of materials with that of the more plentiful settlement and rock shelter data (Tables 1-4) strongly supports a similar continuity in the sanctuary. Furthermore, the Beaker pottery from the sanctuary matches the stylistic changes in the Beaker ware of the settlement and rock shelter.

The same close correlation of dates exists when we examine the separate inventories from later Talayotic contexts of sites outside the catchment areas in certain areas in the central zones of Mallorca, creditable to the period from 1250 cal BC to 200 BC, and as far away as the Menorcan Taula Sanctuary of Torralba d'en Salort (Figure 3).

In the centre of Mallorca, interesting chronometric comparisons can be made between the Talayotic Prehistoric Settlement of Son Fornes and the Talayotic Younger Bronze and Iron Age Settlement Complex of Son Ferrandell (Waldren 1989), where similar problems and similar dating techniques have been employed in response to architecture and eroded landscapes. The Son Fornes Talayotic dates (Gasull, Lull and Sanahuja 1984) compare favourably with two Talayotic structures (Table 2) from Talayot 1 (T1) and Talayot 2 (T2) from the Son Ferrandell-Oleza Younger Settlement (Waldren and Van Strydonck 1992; Chapman, Waldren and Van Strydonck 1992). In each of these sites the associated artefacts and architecture compare exactly; the fact that about 40 kilometers separates two sites seems of little import.

These chronological results best demonstrate the type of correlation and comparison that can be made when similar strategies and sufficient radiocarbon documentation are available. It also demonstrates how a small number of well documented sites, even if they are some distance apart, can be useful in bringing less as well extensively documented and spatially separated ones into better focus.

Finally, the author believes that the radiocarbon documentation and other evidence demonstrates the unusual antiquity and functional duration of the sanctuary as well as the fact that it was a ritual centre for the area. It also shows an exceptional continuity and contemporaneity with all of the other sites used for comparison. Furthermore, it demonstrates a few of the practical and innovative ways that radiocarbon dating can be used to solve and answer archaeological problems and questions.

While the present paper does not discuss issues of social, economic or religious importance in any great detail, a great deal is suggested however as to the economic wealth, social success and well being of the people of the area during more than two millennia. The intensity, mechanisms and difficulties involved in these issues will require more space and time than is currently possible and the lack of this is well recognised. A future, detailed examination of these questions will certainly be forthcoming, once these chronological problems are further clarified.

In the final analysis, what we are dealing with at present is an attempt at establishing a workable and informative chronological model (Figure 10) and a plausible history of the activities in the Prehistoric Sanctuary of Son Mas. The more archaeological and environmental model will eventually emerge. One which in itself is self-perpetuating and which can be used practically as a focal point and reference example locally and elsewhere.

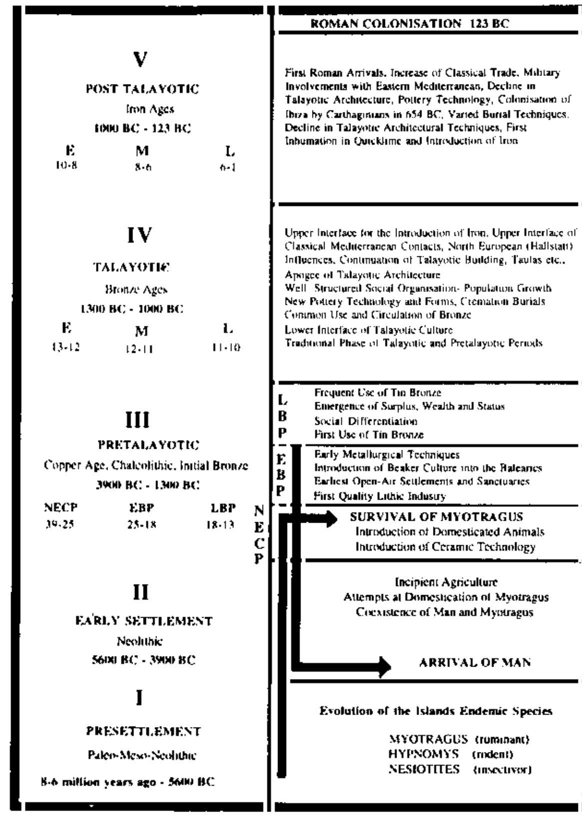


Figure 10.- Pentapartite division of Balearic Prehistory (after Waldren).

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