Carroll, F.A.; Fenech, K.; Bonanno, A.; Hunt, C.; Jones, A.M. & Schembri, P.J. (2003) [published 2004] The past environment of the Maltese Islands: the Marsa cores. [as PDF file; 10pp] In: Eneix, L.C. [Ed.] *Exploring the Maltese prehistoric temple culture (EMPTC)*. Papers and presentations from the EMPTC 2003 Conference, Valletta, Malta, 24-27 September 2003. Sarasota, Florida: OTS Foundation [Compact Diskette].

The Past Environment of the Maltese Islands:

The Marsa Cores

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After retiring from the British Services, Frank Carroll studied Geography and Environmental Sciences at the University of Huddersfield, where he graduated 2001, while Katrin Fenech studied Archaeology and Geography at the University of Malta and graduated in Archaeology also in 2001. Their shared interest in the various reasons for environmental changes led to an intense collaboration for the here presented poster. Part of this study forms for both the subject for a PhD thesis with the collaboration and supervision from the University of Huddersfield and the University of Malta.

INTRODUCTION

Prior to the arrival of the first settlers in the Neolithic, the environment of the Maltese Islands is generally thought to have been extensively forested. The introduction of agriculture by these first settlers is believed to have been accompanied by intensive tree felling through slash-and-burn to gain precious agricultural land for crops, while sheep/ goat herding would have additionally reduced the tree cover. Many writers on the Temple Period connect the sudden decline of this culture with a severe degradation of the environment. Pollen analyses from a Bronze Age cistern by David Trump (2000: 99-100) revealed that the Bronze Age environment then was "already" very much like today's: mainly open country and steppe. A similar conclusion was reached by one of us on the basis of analysis of molluscan remains from the Zebbug Period tomb at the Xaghra Stone Circle (Malone et al, 1995: 342).

A scientific study of the biological and chemical components of two cores retrieved from the Ta' Ceppuna area (Marsa) by a mechanical corer in June, 2002, which was sponsored and funded by the OTS Foundation, is aimed at providing much needed new data on the nature of the Maltese environment prior to the arrival of the first settlers and to assess the magnitude of the impact human activity has had. Although current research is only at the embryonic stage and it will be a number of years before investigations are complete, it is possible to present here some very early results from the first year's work.

PRESENT RESEARCH

The area referred to as Marsa is at the mouth the largest water catchment of the Maltese Islands, with the sediments and their components fairly representative for a very large part of the island of Malta. Ample pottery sherds found when building works for a new sports complex were started in 2002 ascertain that human activity took place in Marsa itself. Albeit unstratified and thus out of context, the earliest sherd found was dated back to the Ggantija Phase (ca. 3600-3300 BC) by the former Museum Department.

The first core extracted produced some 12.18 m of sediment and it is this core, Marsa No 1, which is reported upon here. This core was sectioned into 5 cm samples and these were subsequently split for both a zoological analysis, based mainly on Mollusca at the University of Malta, and a palynological analysis at the University of Huddersfield. Here, the changes within and between land and marine deposits visibly reflect the changing environmental history of the Maltese Islands. So far, there is unfortunately no absolute date that can be attached to any of the results, despite the presence of two pottery sherds within the core, which are undiagnostic even for a relative date for these two samples.

FIGURES

Figures 1a shows a map of the Maltese Islands, with the coring area boxed, whilst Figure 1b provides a more detailed map of the coring area at Ta' Ceppuna at Marsa.

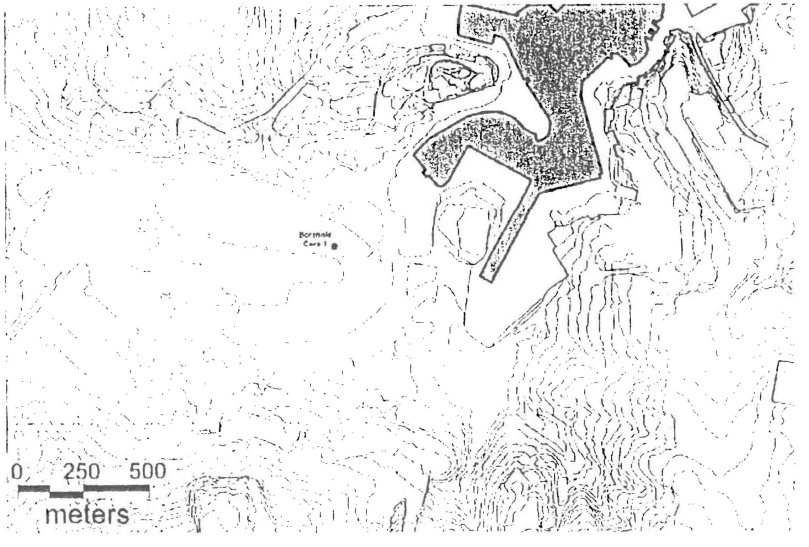
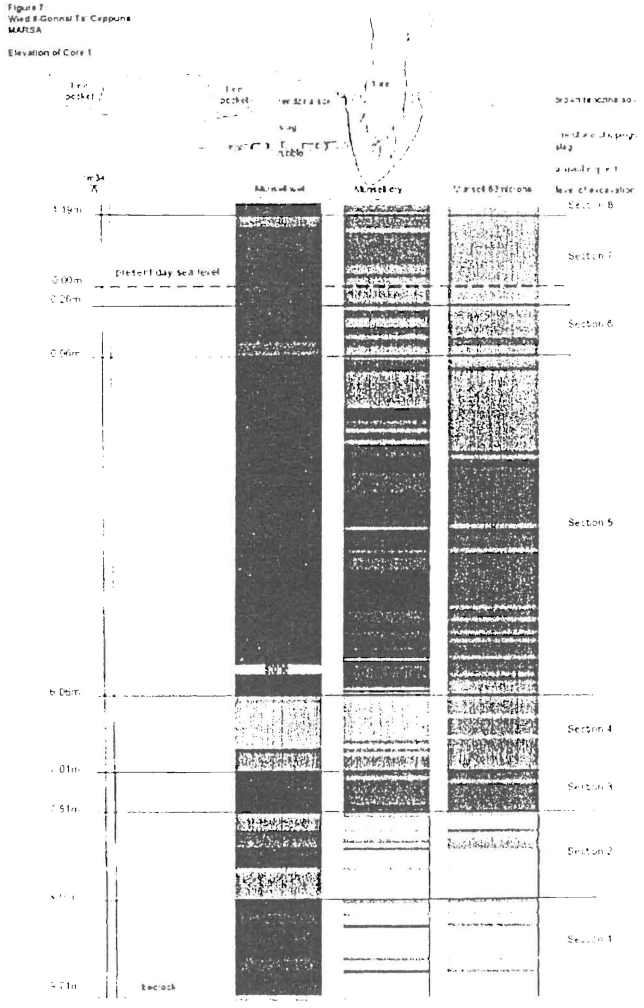
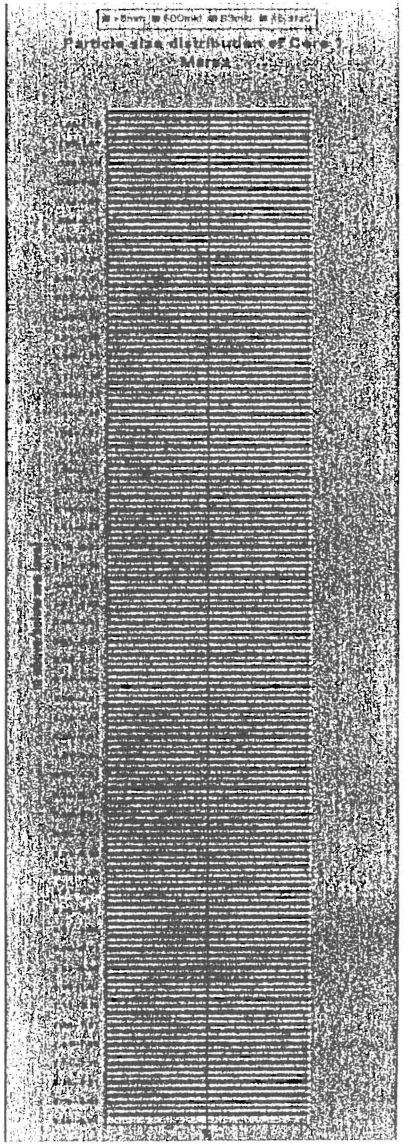


Fig. 1

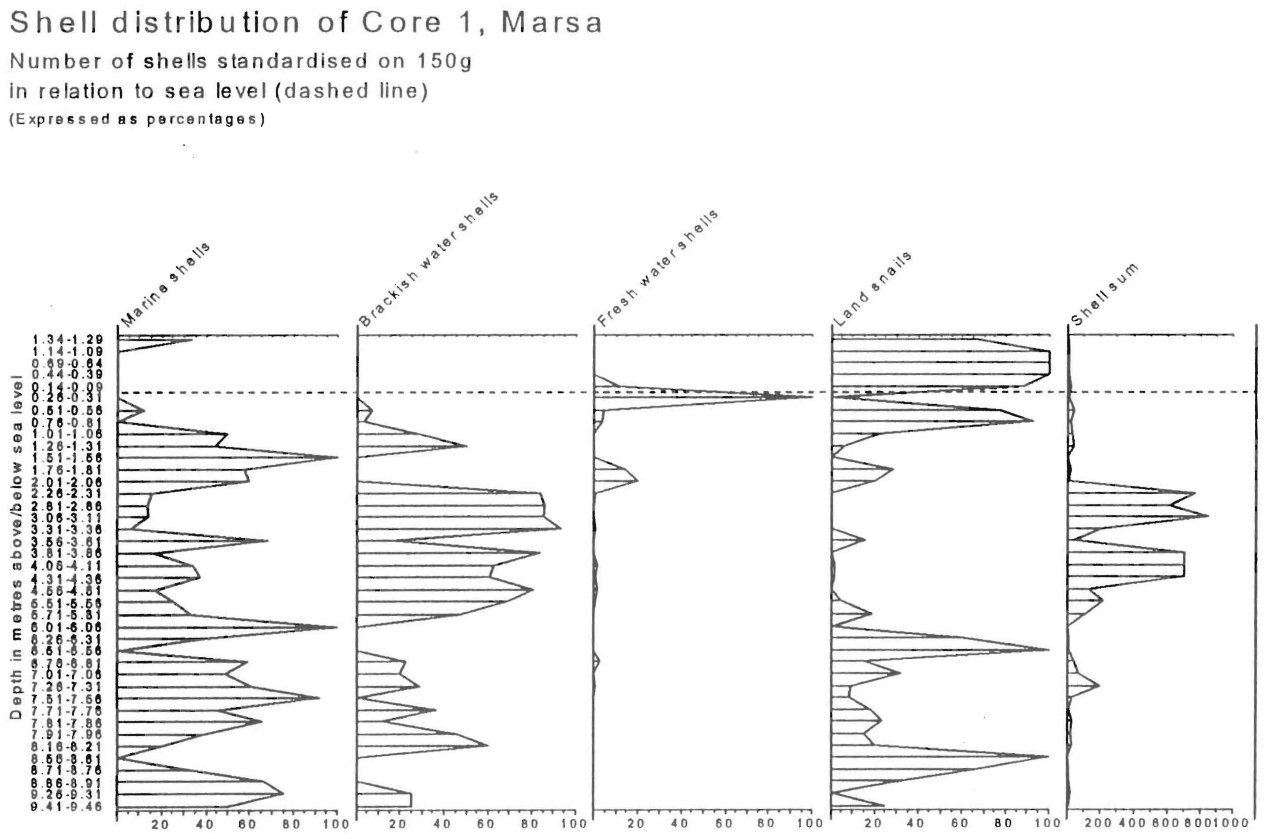
A soil colour profile and pictorial representation of the coring site is shown at Figure 2 together with Munsell colours for wet and dry material, and colouring of sediment at 63-micron size.



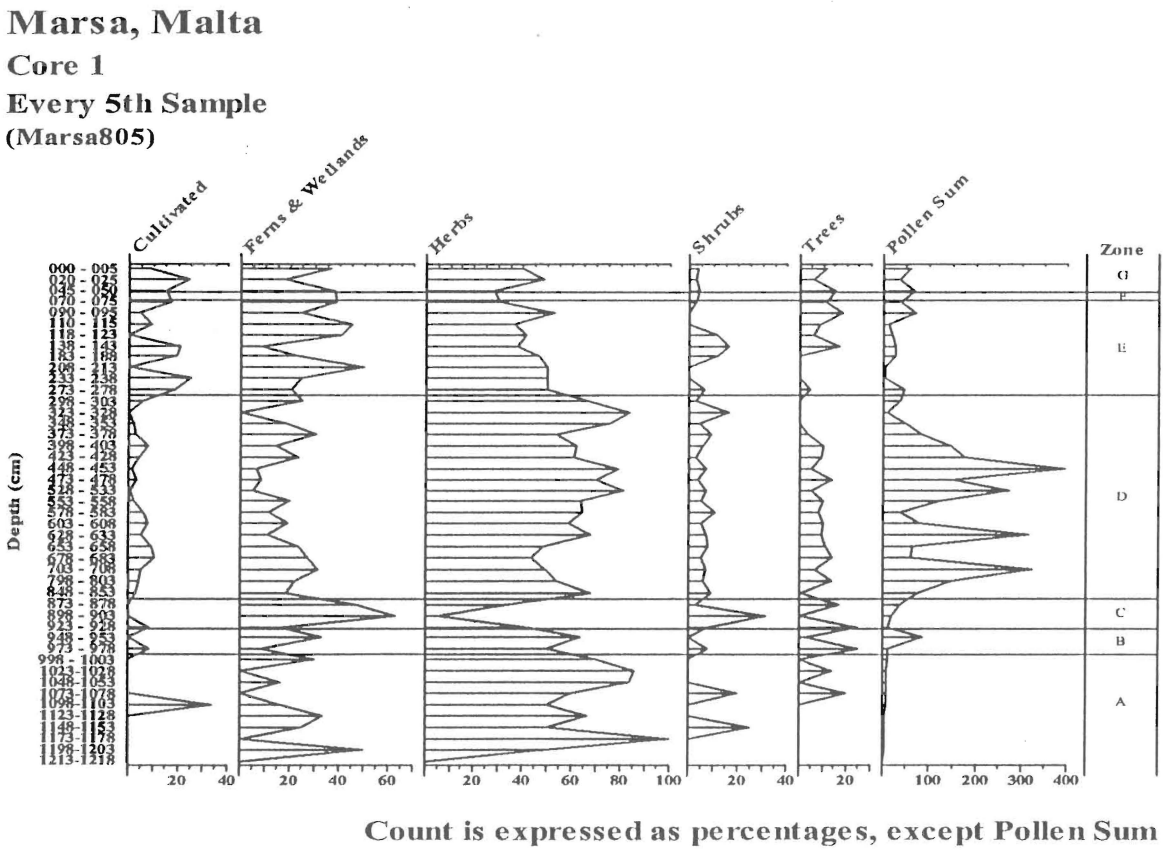
At Figure 3, a graphic of the granulometry of the core, the particle size distribution is shown to vary throughout the core. A continuously high presence of silt/clay and the absence of pebbles or even larger stones indicate a calm and stable environment whilst the sudden appearance of particles larger than 8mm denotes a sudden change in the environment. The nature of the change still needs to be investigated and put into context.



Molluscs preserve well in alkaline soils and marine sediments. The shells, depicted at Figure 4, were analysed for every fifth sample, except in the lowermost part of the core, where they were analysed according to the rate of change in sediment colour. The molluscan remains found in the various sediments represent shells that were washed in and shells that died in situ. All land snails found within these samples indicate open country and steppe/garigue vegetation, despite the presence of a perennial fresh water supply, which could have easily supplied a tree cover. Today no longer extant, this perennial fresh water stream formed an estuarine environment. At times the marine/freshwater transition zone appears to have moved further inland and then again towards the sea – fresh water shells are only found at varying density between 0.09cm above present day sea level and 7.31m below present day sea level.

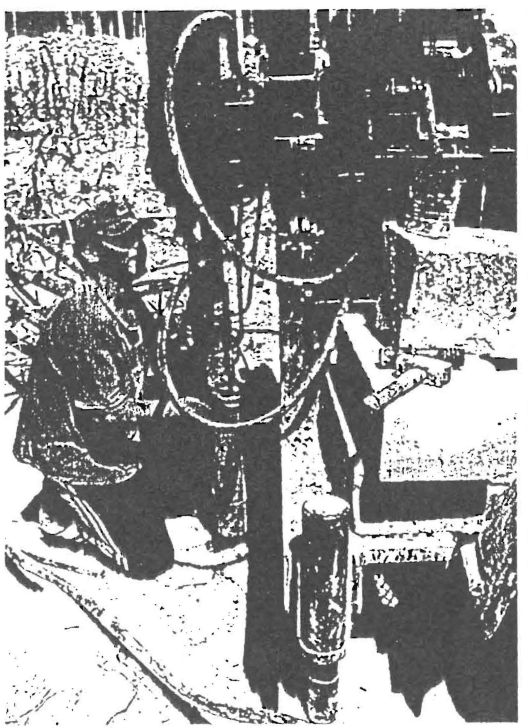


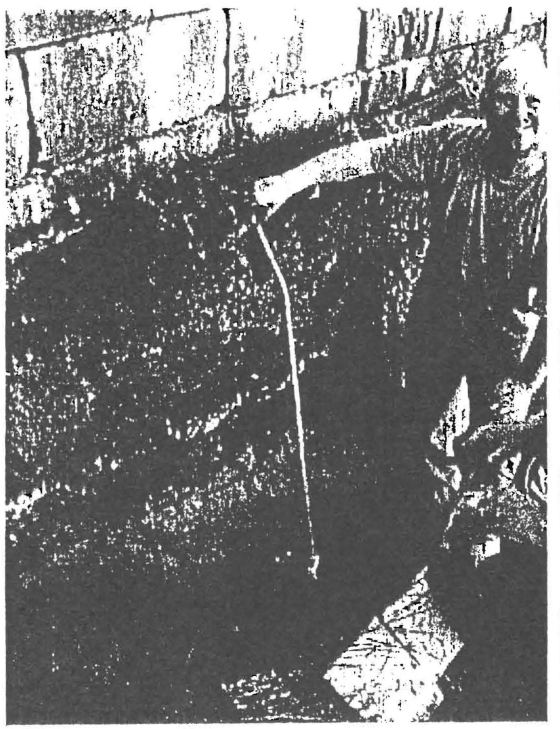
The pollen diagram, Figure 5, represents the summation of the palynological analysis of the top, bottom and every fifth sample, with the depths given representative of core length. Near the top of the core, in Zone F between 50 and 70 cm, there is a solid layer of clinker that is thought to have come from a number of sources, including local coal-fired power stations, gas plants or steam ships, about 130 years ago. This clinker level has been overlain with topsoil and results displayed on the graph in Zone G, between 0 and 50 cm, may not be representative of local conditions at Marsa, as it is possible this soil was transported from elsewhere. The remainder of the core can be divided into four distinct Zones.

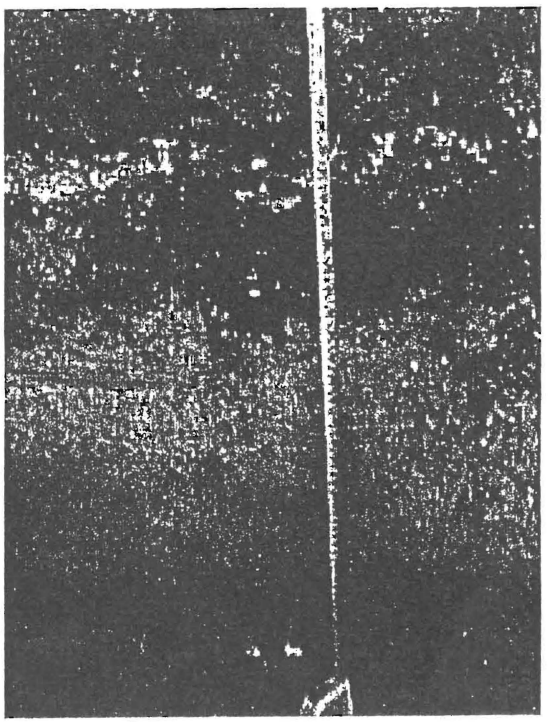


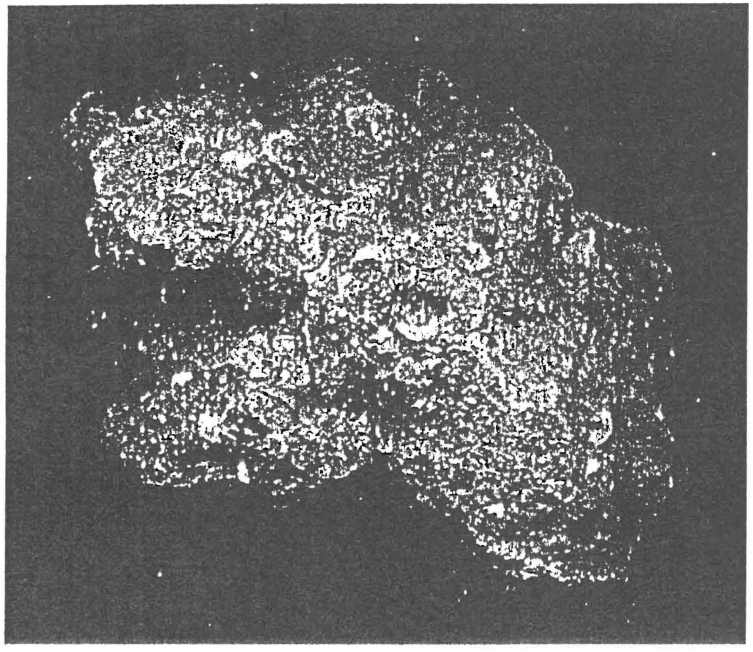
PHOTOGRAPHS

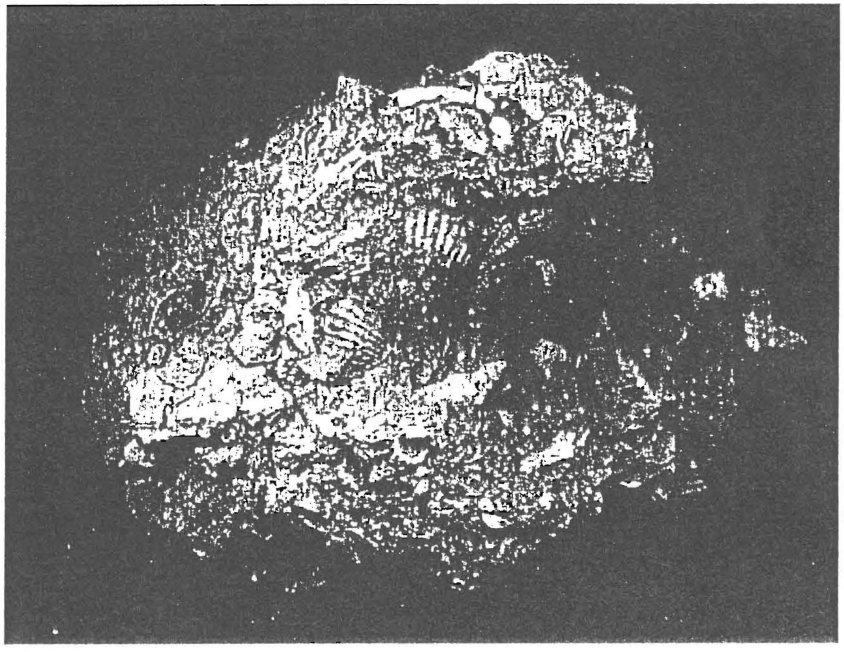
The photographs show various aspects of the current research, including coring, some site soil conditions, sediment, pollen and marine/freshwater microscopic organisms.



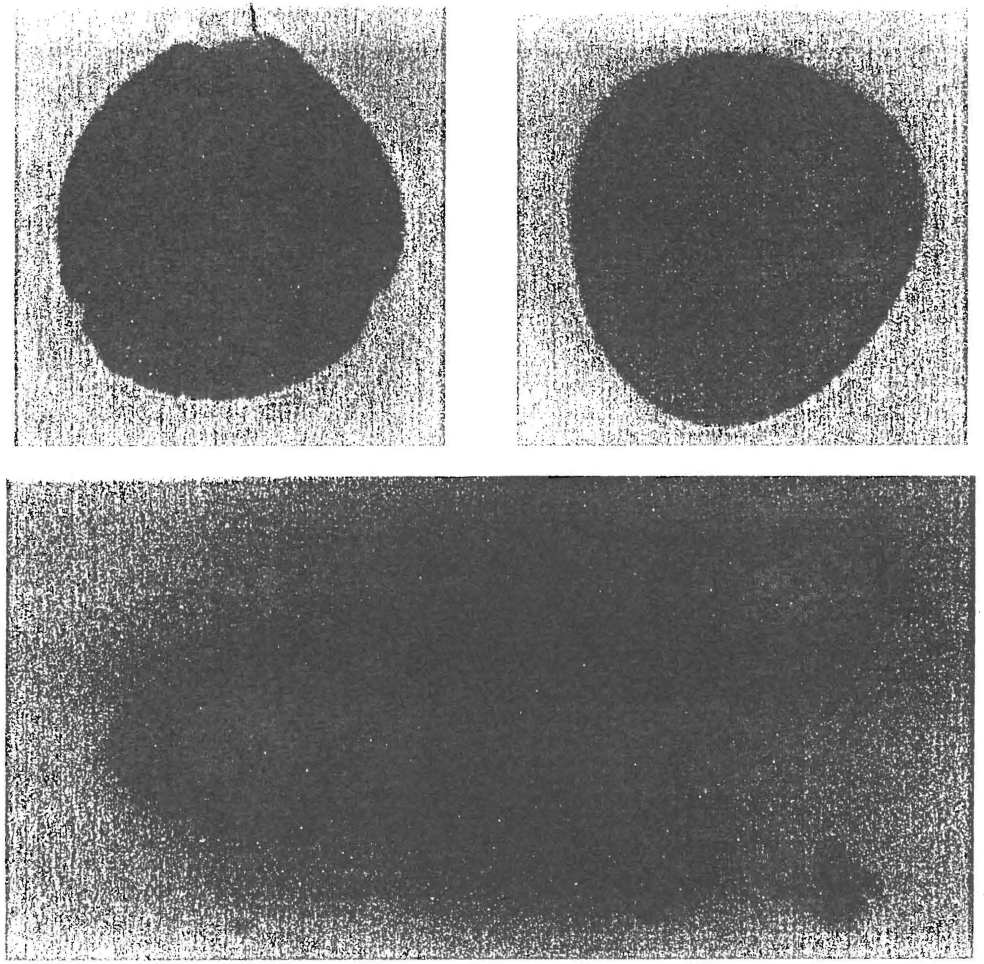




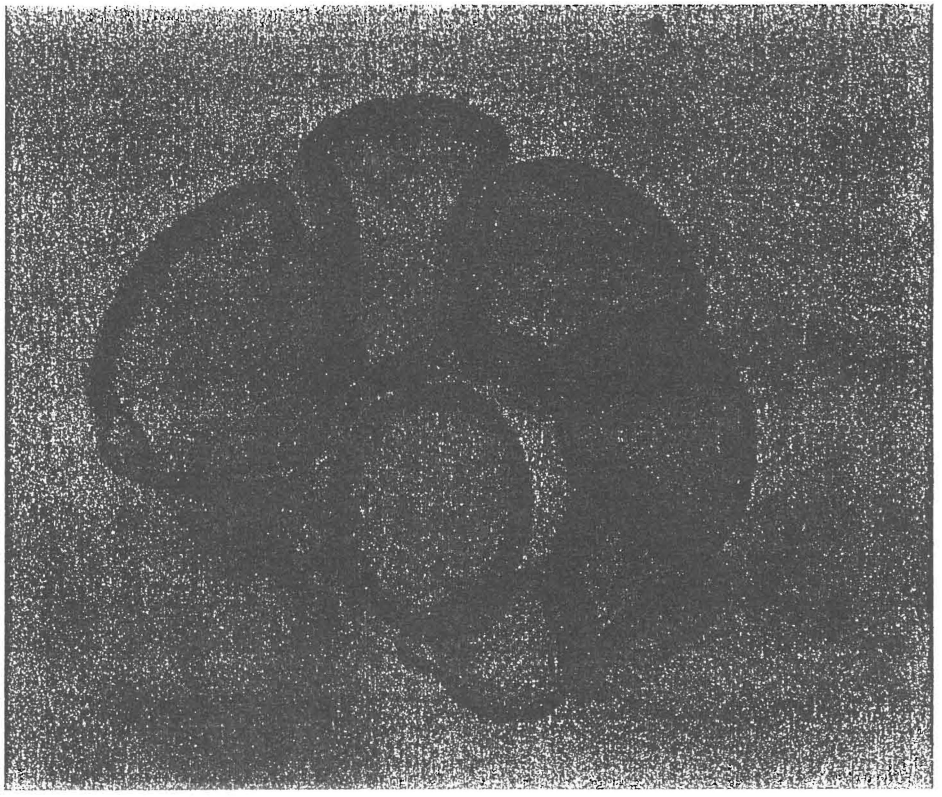




Sediment



pollen



Organisms

Zone A, which represents the bottom two metres of the core, is scarce of pollen, whilst Zones B and D are two marine clay segments. The presence of this marine clay suggests that the sea covered the area on at least two occasions in the past and, with the pollen peaks displayed within these two Zones, reflects the qualities of marine clay to preserve pollen grains and other bio-inclusions. Zones C and E comprise alluvial material washed down the catchment area and have sparse pollen, which is unsurprising given the low preservation potential in these environments. Herbaceous plants dominate the diagram with Artemisia (wormwood), Chenopodiaceae (glasswort and fat hen group), Lactuceae (dandelion group) and Poaceae (grasses) prominent. Unsurprisingly, given that the environment at the core site represents the mouth region of a wied (valley) subject to inundation by both marine and freshwater, ferns and wetland vegetation are the second largest group and these are present throughout the core. Shrubs, trees and cultivated species are also visible within the core but first appear mid-way through Zone A. This may be more a reflection of poor pollen preservation conditions rather than an absence of these types of vegetation

Within the tree species, Pinus, in small quantities, is present through all Zones whilst the only other tree taxon of note is the Oleaceae (ash family), which appears in small quantities at different levels above the base of Zone B. The other tree species present are likely to have been the result of blown-in pollen to the Islands from Central and Southern Europe and North Africa as they are present in extremely low numbers. It is likely, however, that most of the pollen and spores were washed into the deposition site from the catchment, including the surrounding fields, by the annual rains. Preservation in the alluvial and terrestrial deposits of Zones A, C and E was probably because of extremely rapid burial.

A summary of the conditions prevailing for the time this core represents would suggest an open landscape, dominated by people who cultivated crops within the Marsa catchment area. In other words, for much of the last several thousand years, including, probably, the Temple Period, the Maltese landscape was floristically rather similar to the modern landscape, though without the recent introductions.

FUTURE PLANS

Work on this core continues with further palynological, zoological, sediment and chemical analysis. Dating of samples is urgently required and it is hoped that in future funds will become available to put this most promising data into a timeframe. However, it is again stressed that this brief picture of Malta's environmental history, altered by man and natural factors, is preliminary and cores taken from other locations around the Islands, which should provide additional environmental data, have yet to be analysed.

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