Introduction

The activity developed in this area was essentially divided between the following items: 1) radiocarbon dating, 2) provenance studies, 3) studies of ancient technologies, 4) studies of monetary history and 5) scientific examination of works of art. 6) Some attention was also paid to the study of paleodiet in order to prospect the possibilities of developing some activity in this field, in collaboration with anthropologists.

Research Team

Researcher - 1 (PhD)
(+ staff from Earth Sciences group)

Publications:
Journals - 7
Proceedings - 4
Special Publ. - 3
Conf Commun.: 1
1. Radiocarbon Dating

Dating Methods

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Abstract
An approach to dating methods used in archaeology and their relation to Portuguese contexts. Climatic parameter based methods and physic and chemical methods (namely radiometric methods) are explained to the archaeologists.


Radiocarbon dating

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Abstract
Basic principles of radiocarbon dating and interpretation of laboratory results, which are important in the preparation of archaeological publications. Presentation of the Radiocarbon Dating Unit of the Instituto Tecnológico e Nuclear, as part of the Environmental Isotopes Laboratory, that supports various scientific areas, among them Archaeology.


Absolute dating of the Neolithic structure near St. George Church (Vila Verde de Ficalho, Serpa)

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Abstract
An exhaustive study of the ceramic remains found in the undisturbed filling of a partially dug neolithic feature discovered in the yard of the St. George Church, at Vila Verde de Ficalho (Serpa), is presented. The artefacts recovered from the feature are typological ascribed to the Late Neolithic. Radiocarbon dating (AMS) allowed to determine an absolute age for the artefact assemblage – the middle of the second half of IV Millenium B.C.

2 Studies of Ancient Technologies

The site of Misericórdia (left bank of the Guadiana River, Serpa). Human occupation and metallurgical remains

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Abstract
The site of Misericórdia is situated close to the Guadiana River, in its left bank. Metallurgical debris accumulated in the site, including a furnace in situ apparently in an excellent state of preservation, show that some archaeometallurgical activities were carried out at the Misericórdia settlement. Based on the pottery, the site was occupied for two periods: southwestern Late Bronze Age and Second Iron Age. S.E.M. analysis of slags associated with the furnace shows that it was dedicated to the smelting of iron ores. On the other hand, a stone mould also discovered at the settlement points out that other metallurgical activities, not related with iron, were also at use. Archaeological excavation are necessary to get a chronological framework where to put the different archaeometallurgical activities found in the Misericórdia settlement.


3. Studies of monetary history

Application of XRF spectrometry to the study of Visigothic coinage

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Abstract
No historical evidence concerning the metrology of Visigothic coinage has ever been discovered nor, on the other hand, has much experimental work on the analysis of these coins been carried out in modern times. Some measurements were done by Grierson in 1953 with a series of 49 specific gravity determinations, which was extended to 119 and the results ascertained by Oddy in 1986. Twenty-three coins were analysed by Metcalf and Schweizer, in 1970, using X-ray fluorescence (XRF), and a further 24 sixth-century coins from Portuguese collections were analysed by Metcalf, Cabral and Alves, in 1991, using PIXE. Based on the information available in 1986, Grierson and Blackburn draw an evolutionary picture of the fineness of the Visigothic coinage that, unfortunately, was too sketchy and from some points of view misleading. In this work 238 Visigothic tremisses from Portuguese collections, either public or private, representing the coinage of eighteen Visigothic rulers from Leovigild to Roderick, were analysed by XRF. The results obtained permitted to improve the definition and correct some distortions of the picture referred to above.

Metallurgy in Numismatics 4 (in press)
4. Scientific examination of works of art

A short history of pigments: 1 - of pre-historic art

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Abstract
The physical and chemical characterization of pigments used by pre-historic artists is reviewed. The results obtained have shown that some of the pigments were deliberately mixed with certain minerals before use. On the other hand, direct dating of carbon containing pigments by the radiocarbon method has indicated that the recipes employed by the artists to prepare the pictorial matter seem to have varied with time. Occasionally, evidence has also been found of the existence of underdrawings.


5. Study of paleodiets

Characterization of archaeological material: 1 - food residues and reconstruction of human diet

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Abstract
The application of chemical and physical methods of analysis for identifying food residues and investigating prehistoric diet is briefly reviewed. The basis of some of those methods, particularly gas chromatography (GS) and mass spectrometry (MS), is discussed. As far as MS is concerned, examples are given in order to show how this method can be very useful in identifying compounds as well as in isotopic analysis of carbon and nitrogen.