

Suggestions for a Field Sampling Guide in Archaeobotany

INTRODUCTION

Important palaeoecological information about ancient human settlements and basic cultural and socio-economic features are obtainable through paleobotanical investigations. The best known of those are the pollen analyses, the microxylotomic analyses and the analyses of seeds and fruits.

The paleobotanist with a botanic-naturalistic background, however, knows that many other investigations can be carried out and varied to suit the condition of the material to be studied and the nature of the problem to be solved. In this paper I shall discuss the best-known field standard techniques ; many others are left to the specialist's initiative and experience.

FIELD COLLECTING TECHNIQUES

If possible, field collecting should be done by the same palaeobotanist who intends to study the specimens in the laboratory.

This, however, should not be taken as an absolute rule, for many types of collecting can be done by technicians or by the archaeologists themselves, given a proper knowledge or how to go about it.

Specimen collecting should always be done in relation to the archaeological topography and stratigraphy of the excavation, so that it can be fully significant and in order to solve any problems that might arise in the course of the excavation work.

It would be unnecessary to keep the palaeobotanist on the excavation site all the time, for while it is useful for him to know the excavation, it is also true that most of his work will have to be done in the laboratory, and this work in turn will yield useful suggestions about how the excavation should proceed.

Wood and Charcoal sampling

The collection of samples of these materials requires but a few elementary precautions : it can be done by a technician or a laborer working carefully. If these materials are also to be used for ^{14}C dating, appropriate collecting methods will have to be followed. For botanic studies, it is recommended that both charcoal and wood parts sampled should not be broken up into several pieces, to save useless multiplication of laboratory work on several fragments from the same specimen. If the specimens tend to break up after collection, they should be kept in separate containers, so as to make it evident that if a container holds several fragments, they do belong to a single specimen.

Another major precaution consists in storing the collected material in sealed containers that will retain the humidity of the collection site. Such containers should not be too large for the quantity of moist material stored in them, in order to prevent the evaporation and recondensation of the moisture contained in the material. Depending on the circumstances, therefore, it is good practice to either fill containers of suitable size or wrap up in polyethylene sheeting or bags the materials that will not easily fit into the containers.

If the material comes from sites that are permanently under water, it should be immersed in water again as soon as possible, at least for the short period of study, after which the restorer will take over for the preservation of the objects.

In the case of large masses of wood or charcoal (e.g. beams or planks) which cannot be removed in their entirety, it will be desirable to remove a portion comprising their maximum thickness in a direction perpendicular to the wood grain and parallel to the growth rings, this is useful towards possible dendrochronological investigations.

Sampling of seeds, fruits and other macroscopic remains

In field collecting, the sampling of seeds and fruits can be divided into two groups : first, sizeable quantities intentionally stored in chosen places or containers ; these specimens can be easily spotted and collected by the archaeologist himself without a specialist having to come to the site. The second group consists of materials which, being scattered, cannot be readily seen by the unaided eye. These materials, which are usually overlooked, while they are of very great interest, can be isolated and recovered by the water separation process or by dry separation process. Even a non-specialist can use this process, which is useful for the recovery of minute archaeological objects or small plant and animal remains.

The water separation process consists basically in using standard volume of the excavation soil taken according to the topography indicated by the archaeologist. From each volume the finer soil fraction is separated by

Schematic sampling guide		Sampler	Size	Precautions	What can be obtained by such sampling		
macro	Plant remains referred to human settlements	archaeologist	up to min. of 0.5 cm thickness	collect from layer, place directly in polythene bag and seal this; avoid fragmenting; do not dry if taken from sediment with much water	identification of plants through wood structure	partial representation of woody plants of the epoch through selection operated by man; climatic orientations; references to more complete chronological framework	
	most frequent visible to naked eye → wood	burnt (e.g. charcoal from hearths) not burnt (objects, working chips, etc.)	archaeologist	up to min. of 0.5 cm thickness		if from soaked sediment keep submerged in water; quick journey 1-2 days wrapped in plastic without air	technology palaeoethnobotanical typology of objects
			specialist or archaeologist	up to min. of a few cm in which all the growth rings of the sample are present		for dendrochronology; sampling and immediate rapid dispatch	local chronology
micro	fairly frequent part visible to naked eye	specialist who has to study them (at least at start of sampling)	samples of sediment of 2-5 dm ³ , obtained intact from each layer and within the layer from each archaeologically differentiated area	collect from layer, place directly in plastic bag to be sealed as soon as filled, so that no wind-borne material may enter	identification of plants through seeds, fruits, leaves, fragments of cuticles, remains of mosses or ferns, etc.	recognition of cultivated plants, of plants growing wild in the area or surroundings or characterizing the anthropized regions; reconstruction of start and extent of human settlements (anthropocore plants); reconstruction of start of development of agricultural-pastoral economy	
	seeds fruits leaves etc.					burnt not burnt	
	part not visible to naked eye						
	not very frequent not visible to naked eye	in final sampling: the specialist who will be studying them (preliminary samples may be performed by the archaeologist duly instructed)	intact samples of sediment of 50 g, approx., in continuous vertical series	avoid any pollution by air, by equipment, etc.; if possible sample using horizontal sampling tubes taking a continuous series of samples; in layers of over 10 cm thickness, take more than one sample	identification of plants through pollen and spores	representation of qualitative and quantitative variations of wild, cultivated or time-induced vegetation; consequent deductions of palaeoecological, palaeoclimatic and socio-economic-cultural variations; relative chronology; possibility of correlations	

screening with 1.6 mm mesh sieves immersed in water in such way that the water level is about midway between the screen and the upper edge of the sieve. The sieve is given a rotating, back-and-forth motion, which causes the water to swirl and a certain fraction of the lighter objects to float ; they are picked up by skimming with a tea strainer with about 1 mm meshes. The residue left in the sieve is also collected. After finishing the washing, the material collected is caused to dry out gradually in a cool room without abrupt temperature changes. The dried material is then sorted out under a stereomicroscope in the palaeobotanical laboratory.

The mesh size of the sieve can vary depending on the type of soil to be screened and its contents in organic remains, which should be checked from time by small test assays.

Collecting samples for pollen analyses (paleopalynology)

The collecting of pollen analysis samples requires considerable care and constitutes itself the beginning of the laboratory process. The analysis conducted on soil samples can be distorted by sampling errors. Care should be taken to prevent every sample collected from becoming contaminated with foreign matter. If, for instance, two samples become mixed even to a very small fraction (dust from one sample blown into another), since the dimensions of pollen are in the order of dust particles, this cannot be detected by unaided visual inspection. Therefore, every precaution should always be taken to prevent this from happening.

If the soil to be sampled is compact, it will suffice to collect small blocks 5 to 10 cm thick, after removing a few cm of the external surface of the part to be sampled, so as to discard all material that could be contaminated. If the rock or soil to be sampled are loose, precautions should be greater. In this case the best sampling can be achieved by using cylindrical containers stuck horizontally into the levels to be sampled, removing horizontal soil cores which can be contaminated only on their exposed surfaces.

Given the care required by this kind of sampling, it is best left to specialist or carried out under his direct supervision. However, when preliminary tests are required, they can be carried out by the archaeologist working with great care, leaving the final sampling job for the specialist to do.

Where there are no exposed soil faces, samples for pollen analyses can be collected by a drill removing vertical cores from the thickness of the deposit to be investigated.

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