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A palaeoecological investigation of Boufferdanger Muer: preliminary report

by

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Abstract: Due to its proximity to the Treverian Oppidum of the Titelberg, 7 km away, and a previous study suggesting that it could provide suitable sediments, it was decided to re-investigate palynologically the Boufferdanger Muer with the aim of studying the vegetation history of the area with special regard to the changes in landscape and environment of the late Celtic and the Roman periods, the 'Romanisation' phase. Presented here are the preliminary results of corings made in the Muer, late October 1997, and the outline of our future plans.

Keywords: Boufferdanger Muer, sediment stratigraphy, vegetation history, pollen analysis.

Introduction

As members of the Palynology Laboratory of the Institut für Ur- und Frühgeschichte, Christian-Albrechts-Universität Kiel, we are involved in the 'Kelten, Germanen, Römer im Mittelgebirgsraum zwischen Luxemburg und Thüringen' project of the Deutsche Forschungsgemeinschaft (Haffner & von Schnurbein 1996). This large project, involving workers from a number of German research institutions together with researchers from Luxembourg is studying the transition from the Celtic Iron Age to the full Roman period in the area of the "Mittelgebirge" of Germany and Luxembourg.

Our part of this project is to reconstruct the vegetation history of this period, particularly of the areas surrounding known archaeological sites, using the technique of pollen analysis. This technique involves the study of sub-fossil pollen grains that are contained in stratified, usually waterlogged deposits, such as peats and lake sediments. Thus we aim to provide an environmental background to the many archaeological excavations, paying particular attention for changes that can be related to human activity, for example woodland clearances and indications of agricultural activity.

Our interest in the Boufferdanger Muer stems from its relative proximity to the Titelberg Oppidum and its surrounding cultural landscape. Excavations at the Titelberg (Metzler 1995) are a major component of the overall Romanisation project, showing that this Treverian Oppidum was of major importance during the

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late Celtic to early Roman transition. It is of great interest to investigate the vegetation history of its surroundings during this particular period in comparison to older and younger times. Previous exploratory corings of a number of other sites near the Titelberg, undertaken by our working group in Kiel, proved unsatisfactory. The sites investigated either yielded sediments that had formed to recently to cover the time period under investigation, or sediments that were not suitable for study i.e. they did not provide the necessary conditions for the preservation of pollen grains.

Two previous pollen diagrams have been produced from Boufferdanger Muer. The earliest was the study of Sauvage (1952), whose results suggest that the earliest sediments present in the Muer date from the end of the Atlantic period. By today's standards her published pollen diagram lacks detail, but it does appear that the Celtic - Roman transition period is recorded in this diagram. Slotboom (1963) took a core from near the edge of the Muer (pers. comm.), his pollen diagram, although more detailed, only appears to date back to the early Medieval period. However, it should be noted that neither of these diagram is supported by radiocarbon dating.

From these earlier studies it appears that the Boufferdanger Muer is a suitable study site for our project, and offer a good chance of recovering sediments from the time period we are working on.

Fig. 1. A sketch map of Boufferdanger Muer showing the approximate positions of the two transects investigated.

Methods

Our investigation of the Muer consisted of two stages, firstly we made two short transects of preliminary corings with a small diameter “Pürckhauer”, the position of the transects is shown on Fig. 1. Then once we had selected a suitable point we recovered our main 8 cm sediment core, in one meter sections, using a modified piston Corer (Usinger type). We also recovered a second parallel core, the sections of which were offset by a depth of 50 cm from those of the first core to give continuous coverage of any breaks in the first core.

Access to the centre of the Muer was made possible with the help of temporary wooden piers.

On our return to Kiel the core sections were extruded, placed in plastic liners, sectioned, photographed and a written description made. Colours are related to the Munsell Soil Colour Charts, while the characterisation of the sediment composition follows the modified Troels-Smith notation of Aaby & Berglund (1986).

Results

The Transects

The results of the transect corings are given in Fig. 2. It should be noted that many of the sediments present proved too fluid to be recovered by the small diameter corer. However evidence recovered with the piston corer has also been taken into account when constructing these diagrams.

Fig. 2. Stratigraphic profiles of the two transects.

It can be seen that most of the Muer is covered by a floating raft of *Sphagnum* peat. It was not possible to measure its thickness accurately, but by observing the amount of resistance encountered by the small corer it was estimated that this floating raft of peat was of around 1m in thickness. It was noted that the weight of those working on the peat raft was only supported because of a strengthening network of roots belonging to the trees and shrubs growing on the surface of the peat, that ramify the uppermost 10-15 cm.

Below the raft of *Sphagnum* peat it is assumed that a layer of water or extremely fluid sediments are present. Our equipment was unable to recover anything from this part of the sequence.

The bulk of the sediments present in the Muer are made up of organic mud, although not entirely uniform, they are not differentiated on the preliminary diagram due to problems of contamination when using the small diameter corer. Their composition is described in detail later. One feature that we could detect was the presence of a thin band of yellow material, siltier in character than the main part of this deposit, which seems to be present throughout the central part of the Muer.

Underlying the organic mud is a layer of clays. Evidence from the piston corer shows that an intermediate band of clay containing weathered oil shales is present, and that this directly adjoin the underlying bedrock of oil shales.

Fig. 3. Diagram showing the relationship of the core sections and the overall stratigraphy of the 8 cm core.

Table 1. Description of the sediment stratigraphy of Boufferdanger Muer.
*: Approximate boundary - unable to ascertain exact figure.
**: Within this block of sediments, two small inclusions of clay (composition: As; colour: grey 5Y8/1) were noted at depths 362.5 cm and 379.5 cm.

Depth (cm)	Description	Colour	Composition
0 - 100*	Poorly humidified *Sphagnum* peat.	Pale green (5Y7/4)	$Tb^{1}4$
100 - 214	No sediments recovered - material too fluid.		
214 - 228	Organic lake mud, well humidified, with some small plant fragments.	Dark olive grey (5Y3/1)	$Ld^{3}4Dh+$
228 - 242	Organic lake mud, very humidified.	Very dark grey (5Y2.5/1)	$Ld^{4}4$
242 - 407**	Organic lake mud, well humidified, with some small plant fragments.	Dark olive grey (5Y3/1) with mottled dark patches (5Y2.5/1).	$Ld^{3}4Dh+$
407 - 411	Silty lake mud with a high, well humidified, organic content.	Olive grey (5Y4/1)	$Ld^{3}2Ag2$
411 - 418	Silty lake mud with a high, well humidified, organic content.	Predominantly yellow (2.5Y7/6) streaks over a olive grey (5Y3/1) background	$Ld^{3}2Ag2$
418 - 428	Silty lake mud with a high, well humidified, organic content.	Olive grey (5Y3/1) with some yellow (2.5Y7/6) streaking.	$Ld^{3}2Ag2$
428 - 459	Peat, moderately humidified.	Dark olive grey (5Y3/1)	$Th^{3}4$
459 - 485	Clay with a few plant remains.	Grey (5Y5/2)	As4Dh+
485 - 493	Clay containing fragments of weathered shale.	Grey (5Y6/1)	
493 - 500	Shale.	Grey (5Y6/1)	

The Main Core

The main 8 cm cores were taken from the end position of transect 1 as here the sediments recovered appeared to be representative of the central part of the Muer, and that this position offered a suitable amount of working space on a firm part of the peat raft.

Because of the relatively soft nature of the sediments recovered by the 8 cm piston corer, when the cores are extruded they tend to suffer a certain amount of compression, distorting the thickness of the cores recovered (but not its stratification). Also, in some cases we were not able to retrieve a full one metre core section because of problems with the coring equipment. But by comparison of changes in sediment type and of other markers in the two parallel cores taken, we were able to compensate for compression and losses and produce a more reliable stratigraphy. Fig. 3 shows how the two cores were correlated, and gives a diagrammatic representation of the sediments. Table 1 gives a description of the sediment stratigraphy.

Discussion

The results from our preliminary transect seem broadly in agreement with the depth measurements made by Schiltz (1924), suggesting that the depth of the Muer increases rapidly near its edge then shows a rather flattened profile. Generally the maximum depth of our study is about 50 cm deeper than those of the previous

investigation, but this is likely to be due to changes in the management of the Muer and subsequent growth of the floating peat raft. However, our results do suggest a little more variation in the depth of the Muer than the very uniform results of the earlier study, although the differences are in the order of only a few centimetres.

The stratigraphy of the main core appears similar to that of the core analysed by Sauvage (1952), so we can be optimistic that the Celtic - Roman period will be contained in the core recovered. As might be expected the core analysed by Slotboom (1963) is more similar to the first preliminary boring made in transect 2, suggesting that the centre of the basin will in fact provide the longest sedimentary record.

Now that we have recovered a sediment core, our future research strategy will be to initially sub-sample the core for pollen analysis at a spatial resolution of 8 cm. This should enable us to construct a skeleton pollen diagram, and thus locate the Celtic - Roman transition. This part of the sediment core will then be further sub-sampled with a closer sampling interval of every 2 cm, possibly every centimetre or even finer, in order that a detailed picture of the vegetation/land use history can be seen. A better temporal framework than that provided by pollen analysis alone will then be set up using radiocarbon analysis taken from various parts of the core. Samples from the bottom of the sediment sequence will provide a date for the overall age of the Boufferdanger Muer. In addition to the pollen and radiocarbon analyses, other analyses such as loss on ignition will provide information about the history of erosion and changes in the Muer's environment.

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References

Aaby, B., and B. E. Berglund, 1986. - Characterization of peat and lake deposits. - In: Handbook of Holocene Palaeoecology and Palaeohydrology (B. E. Berglund, ed.), Wiley, Chichester.

Haffner, A., and S. von Schnurbein, 1996. - Kelten, Germanen, Römer im Mittelgebirgsraum zwischen Luxemburg und Thüringen. Ein Schwerpunktprogramm der Deutschen Forschungsgemeinschaft. - Arch. Nachrichtenbl. 1: 70 - 77.

Metzler, J., 1995. - Das treverische Oppidum auf dem Titelberg (G.-H. Luxemburg). Zur Kontinuität zwischen der spätkeltischen und frührömischen Zeit in Nord-Gallien. - Dossiers d'Archéologie du Musée National d'Histoire et d'Art, Luxembourg, 789 pp.

Munsell Soil Color Charts, 1975. - Munsell Color Macbeth a Division of Kollmorgen Corporation, 2441 North Calvert Street, Baltimore, Maryland 21218.

Sauvage, J., 1952 - Étude pollenanalytique des tourbières du Gutland luxembourgeois. - Bull. Soc. Nat. luxemb. 56 (1951): 52-59.

Schiltz, P., 1924. - Das Bofferdanger Moor. - Bull. Soc. Nat. luxemb. (1923): 63-71.

Slotboom, R. T., 1963. - Comparative geomorphological and palynological investigation of the Pingos (Viviers) in the Hautes Fagnes (Belgium) and the Mardellen in the Gutland (Luxemburg). - Zeitschrift für Geomorphologie. N.F. 7 (3): 193-231.