

Palaeoecology Research Services

**Evaluation of biological remains from a watching brief
at the Guardian Glass site, Goole, East Riding of
Yorkshire (site code: GGG2002)**

by

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Summary

A single sediment sample from a layer of ?Mesolithic peat recovered during a watching brief of deposits encountered at the Guardian Glass site, Goole, East Riding of Yorkshire, was submitted to PRS for an evaluation of its palaeoecological potential.

The peat consisted of extremely strongly humified material, almost all of which had been reduced to amorphous organic debris, with quite a large sand content. The pollen present proved to be rather crumpled and not in a very good state of preservation (though there were some well-preserved spores of the fern Polypodium). The plant, fungal and invertebrate remains recovered from the processed subsample suggested that this deposit most likely formed on a damp woodland floor, an unusual kind of habitat within the fossil record, with some disturbance (or the intrusion of disturbance indicators at some point).

Radiometric dating of the less than 250 micron sediment fraction of a subsample from the deposit returned a 2-sigma calibrated radiocarbon date of Cal BC 3650 to 3360.

The early radiocarbon date means that further analysis is clearly justified. If it appears that the sediment is autochthonous and lacks a transported component, then detailed analysis is recommended to provide reconstruction of the local ecology and data concerning the development of woodland fauna at this critical period of prehistory.

All samples of deposits from this excavation, and the fossils extracted from them, should be retained for the present.

KEYWORDS: GUARDIAN GLASS; GOOLE; EAST RIDING OF YORKSHIRE; WATCHING BRIEF; EVALUATION; PREHISTORIC; MESOLITHIC; RADIOCARBON DATE CAL BC 3650 TO 3360; PEAT; PLANT REMAINS; CHARRED PLANT REMAINS; POLLEN; FUNGAL SCLEROTIA; INVERTEBRATE REMAINS

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Introduction

An archaeological watching brief was carried out by Humber Field Archaeology at the Guardian Glass site, Goole, East Riding of Yorkshire (NGR SE 7250 2300), during the period July to September 2002.

The works were undertaken in advance of the construction of a new glass factory, and were located to investigate the deposits at the foundations of the walls, cullet store and furnace. The sampled peat was noted as a thin band everywhere at the same level under approximately one metre of deep warp or flood deposit (presumed to be of 18th/19th century date but possibly earlier).

A single sediment sample ('GBA'/'BS' *sensu* Dobney *et al.* 1992) was submitted to PRS for an evaluation of its palaeoecological potential.

Methods

The submitted sediment sample was inspected in the laboratory and described prior to processing, following the procedures of Kenward *et al.* (1980; 1986), for the recovery of plant and invertebrate macrofossils.

The flot and residue resulting from processing were examined for plant and invertebrate macrofossils, and other biological and artefactual remains.

Insect preservation was recorded using the scale of Kenward and Large (1998).

The sample was examined for microfossils using the 'squash' technique of Dainton (1992). Although primarily for the detection of intestinal parasitic nematode eggs the 'squash' technique can provide a rapid assessment of the presence/absence and state

of preservation of other microscopic remains such as pollen and diatoms.

A 208 g subsample of the raw sediment was submitted to Beta Analytic Inc. for radiocarbon dating of the deposit.

Results

Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment is given (in round brackets) after the sample number.

Context 4 [peat layer of ?Mesolithic date]

Sample 1/T (2 kg sieved to 300 microns with paraffin flotation; approximately 35 litres of unprocessed sediment remain)

The peat consisted of extremely strongly humified material, almost all of which had been reduced to amorphous organic debris. There was quite a large sand content, however, which—if not wind-blown—suggests inwash in a stream. Pollen observed in a 'squash' (Dainton 1992) proved to be rather crumpled and not in a very good state of preservation (though there were some well-preserved spores of the fern *Polypodium*), but all the taxa observed (mainly *Corylus*-type, presumably hazel) were consistent with a woodland, perhaps wet woodland, environment. The occurrence of elm (*Ulmus*) at moderate percentages (insofar as a 'squash' provides more than a subjective assessment) certainly concords with a date prior to the Neolithic, though the traces of weed seeds are perhaps more consistent with a slightly later date.

This sample yielded a modest-sized residue of about 200 cm³ of granular organics and a little quartz sand. The former were found to consist mainly of rather decayed wood fragments up to 30 mm in maximum dimension (whose internal structure had collapsed making identification impossible) and bark (also to 10 mm), with fragments which may have been peat (to 5 mm) and charred peat. There were also abundant sub-spherical black fungal sclerotia, some as large as 2.5 mm, but very many in the 0.3-1 mm fraction. These are likely to be from the cosmopolitan soil-dwelling fungus *Cenococcum* and indicate the development of a soil *in*

situ or the inwash of an active soil to form part of this deposit. Jensen (1974) notes that *Cenococcum geophilum* (the usual designation of this organism at species level) is primarily known as mycorrhiza-forming fungus in forests, but also occurs under vegetation on heather-*(Calluna)*-dominated heaths and in peat bogs as well as in arable soils, whilst Shay and Kapinga (1997) observe that there is some evidence for the sclerotia being commoner in burnt areas, and also perhaps in areas of disturbance (which may explain why the remains are so common on archaeological sites). The presence of some probable pteridophyte (fern or horsetail?) rhizome epidermis fragments and tiny (to 1 mm) fragments of leaf epidermis of holly (*Ilex aquifolium* L.) represent the only other plant remains. Interpretation of this material from the plant remains is difficult but formation within woodland is not ruled out.

The very small flot contained quite a lot of insect fragments and a few seeds, the latter from annual weeds of waste places (chickweed, *Stellaria media* (L.) Vill. and fat hen, *Chenopodium album* L.), though with traces of sedge (*Carex*) nutlets, perhaps from peat. The insect remains were mostly so fragmented and decayed as to be practically unidentifiable, although some were in good condition (at least chemically): erosion and fragmentation indices, following Kenward and Large (1998) were E2.0-4.0, mode 3.5 weak; F2.0-5.0, mode 4.0 weak. Rather large numbers of insect remains were still present in the residue but could not be examined for this evaluation; presumably they had not floated because their surfaces had lost the hydrophobic layer needed for effective paraffin-flotation. Those remains that could be identified within the scope of this work included some indicating dead wood (*Rhizophagus* sp. and a rhyncholine weevil), and subjectively the assemblage was suggestive of a woodland floor. There was only a single aquatic and that was a *Helophorus*, a genus common in terrestrial deposits as a result of its migratory behaviour.

After pre-treatment of the subsample sent for dating, two dateable fractions were available. These were a greater than 250 micron fraction of fine plant matter and very fine charcoal (dateable by AMS and supporting the evidence of burning from the abundance of fungal sclerotia), and a larger fraction of less than 250 micron sediment. The sediment fraction was dated using the radiometric technique. The 2-sigma calibrated radiocarbon date obtained was Cal BC 3650 to 3360 (Beta-175574).

Discussion and statement of potential

Overall, this deposit appears most likely to have formed on a damp woodland floor, an

unusual kind of habitat within the fossil record, with some disturbance (or the intrusion of disturbance indicators at some point). If a large quantity was processed (and with sorting of the residue for insects which cannot be recovered by paraffin flotation), a useful assemblage of insects could be obtained (and probably a more clearly diagnostic plant assemblage), although a substantial amount of time would be required for identification. The application of pollen analysis to a subsample of the peat may reveal more information about the environment of deposition and nature of the local vegetation and is certainly worth considering.

Recommendations

The radiocarbon date on matrix material (Beta-175574, Cal BC 3650 to 3360, 2 sigma) means that further analysis is clearly justified. If it appears that the sediment is autochthonous and lacks a transported component, then detailed analysis is recommended to provide reconstruction of the local ecology and data concerning the development of woodland fauna at this critical period of prehistory.

Retention and disposal

All samples of deposits from this excavation, and the fossils extracted from them, should be retained for the present.

Archive

All material is currently stored by Palaeoecology Research Services (Unit 8, Dabble Duck Industrial Estate, Shildon, County Durham), along with paper and electronic records pertaining to the work described here.

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