

The Acheulian Site of Gesher Benot Ya'aqov, Israel - I: The Wood Assemblage. By Naama Goren-Inbar, Ella Werker and Graig S. Feibel. Oxbow Books, Oxford. 120 pp. ISBN 1-84217-072-4

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In this volume, Goren-Inbar et al. offer an exhaustive analysis of the waterlogged wood assemblage retrieved from the excavations at the early Palaeolithic site of Gesher Benot Ya'aqov (GBY) in northern Israel. The book represents a unique contribution to our knowledge of Early Pleistocene vegetation environments in the Eastern Mediterranean. Contrary to the conditions prevailing in temperate climates, (where depositional environments often favour the preservation of various organic materials in waterlogged form) large assemblages of organic remains, particularly plant tissues, are very rarely preserved in semi-arid environments. GBY represents the most notable exception (to date) to this rule and it can only be hoped that future research here and elsewhere in the region will unearth more assemblages of this kind.

The volume spans a wide array of related subjects: these include the history of previous research on the site (Chapter 1); a short but concise and very informative section on the methodologies adopted for excavating and sampling the material in the field and its conservation (Chapter 2); a discussion of general stratigraphy, its dating and the correlation of the wood assemblage with the excavated deposits (Chapter 3); wood identification, palaeoenvironmental interpretation and taphonomy (Chapters 4-5); wooden artefacts and finds of charcoal (Chapter 6); and finally, a consideration of GBY in its broader regional context (archaeological and palaeoecological) alongside a comparison of its results with similar finds from other world regions (Chapter 7).

Given the impossibility of achieving reliable radiometric dates for such early material (according to the authors the radiocarbon-dated wood fragments gave infinite ages, another strong indication of their great antiquity) the chapter on the geology and stratigraphy of the site (Chapter 2) is crucial for addressing questions about the dating of the wood. The general sequence of geological events described in the text seems generally plausible. One should however note the absence of detailed plans and sections of the excavated areas. The publication of detailed sections, instead of the (certainly informative) composite ones (Figs. 8-9) presenting the stratigraphic succession and precise correlation of wood fragments to the geological and archaeological strata, would have allowed readers to evaluate for themselves the

proposed interpretations of the site's stratigraphy. Furthermore, the hypothesis suggesting an approximately 100,000 yrs duration of sediment deposition based on a pattern of postulated cyclical changes in depositional environments as described by the authors (pp. 24-25) would have been substantially strengthened by reference to independent palaeoenvironmental evidence (e.g. from molluscs or diatoms) tied to a more solid dating framework, to avoid a certain circularity of argument.

Reporting on the wood identifications and the interpretation of the wood assemblage (Chapter 4) stands out for the amount of information provided, including the detailed discussion of macroscopic characters (size, plant part), fragmentation and differences in preservation between individual wood fragments. Very important is also the inclusion of detailed anatomical descriptions for all identified (and non-identified) plant taxa. Full anatomical descriptions are certainly imperative given the antiquity of the site whilst at the same time allowing an objective assessment of the validity of botanical identifications.

Concerning identifications below the genus level, the authors appear in some cases to rely heavily on the anatomy of modern wood species known from this area (pp. 30, 34, 46, 50). For example, the size of the earlywood part in *Pistacia* fragments could be (as the authors seem to imply) the result of species differentiation (such as that between *P. atlantica* and *P. palaestina*) or, alternatively, the result of very different growing conditions and prevailing climate patterns during the Early Pleistocene compared to the present. Equally, the identification of *Fraxinus syriaca* (oriental ash) seems to reflect more the modern ecology and distribution of ash trees in the area rather than an unambiguous anatomical characterization; it is nearly impossible to distinguish anatomically between the different species of *Fraxinus*, and the same could also be said for oak (*Quercus*), both deciduous and evergreen, and poplar (*Populus*). Having said this, the limitations of wood anatomy for species identification are explicitly recognized by the authors elsewhere in the chapter (p. 60-62) and students and non-specialists should certainly refer to these pages for a detailed discussion on the practical limitations of wood identification. On a more technical note, the quantitative and visual presentation of the material is generally of a high standard. Perhaps a more careful orientation of some of the photographed specimens (e.g. Plates 2, 4, 14) alongside a brief description of the anatomical features displayed in each plate would have been helpful for those non-specialist

readers (particularly students) who want to familiarise themselves with the anatomy of the trees and shrubs identified in the assemblage.

The chapter concludes with a brief discussion of the palaeoecological significance of the wood data, a subject to which the authors return for a more detailed discussion in the penultimate chapter of the volume. Recording the presence of species instead of their abundance in the sampled geological and archaeological strata has been used appropriately as the basis for reconstructing woodland habitats, with the inclusion of a very useful cautionary note on the uncritical transference to the Early Pleistocene of the present-day ecological preferences of tree species.

The next three chapters of the book (5: “Wood Taphonomy”, 6: “Wooden Artefacts” and 7: “Burned Wood”) all deal with particular analytical aspects of the assemblage itself and their relevance to its interpretation. Impressive are the presentation of the wooden artefacts recovered from the excavations (accompanied by the appropriate drawings and photographs) and the consideration of the charcoal remains, which are likely to indicate a much more direct and long-term hominin involvement with prehistoric woodland vegetation (Chapters 6-7). Equally impressive is the detailed analysis and description of the various taphonomic aspects of the wood assemblage in Chapter 5 (depositional context and contextual associations, consideration of sample composition, fragment size attributes, fragment orientation, etc.).

The authors present in this chapter a very convincing case for the contemporaneity of elements of the wood assemblage with the excavated archaeological layers and also for the causes of wood deposition and accumulation (the “driftwood hypothesis”). Parts of the argument presented here, however, relate to a model of proposed environmental reconstruction that accepts modern conditions as a sufficient prototype for interpreting past environments (see for example p. 84: the analogy drawn between the Holocene Lake Hula and its Early/Middle Pleistocene counterpart, or p. 85: the proposed seasonal changes in wind direction and strength for Lake Hula are presumed to be identical to those of the present-day). The statement that “Botanical and palaeoecological data resulting from the taxonomic identification of the GBY wood segments demonstrate that wood species originated in different habitats and at different elevations” (p. 85) is a plausible suggestion, albeit heavily based on modern ecological analogues. This interpretation could be further reinforced

through the incorporation in future publications of independent evidence on climate change relevant to this region and time period.

The last chapter (8: “Discussion”) neatly summarises the arguments presented in previous chapters and places the site (through appropriate comparisons with sites from the Eastern Mediterranean and other world regions) in its broader archaeological and palaeoecological context. In a self-critical manner, the authors emphasise the partial nature of the evidence available to date and caution against reaching premature conclusions on the significance of the wood evidence *per se* for reconstructing both the “palaeoenvironment and behaviour of Acheulian hominids” (p. 101). In the light of this statement, it seems a bit demanding on the evidence to suggest (as the authors do) that the sole change that has been effected on the vegetation of this area between now and the Early Pleistocene is due to recent human interventions (p. 101). A more nuanced appreciation of other biotic and abiotic factors that might be responsible for vegetation evolution and change (such as climate and landform changes, variations in local fauna and adaptive responses of plant species, plant and animal migrations, etc.) is necessary. An appreciation of the possible effect of climate conditions on the distribution of plant species by the authors is however evident in the interpretation of the presence of species that require colder and moister conditions (i.e., *Cedrus*, *Cerasus*, *Juniperus*, *Lonicera* – the latter resembling anatomically temperate European species) (p. 102).

Part of the last chapter is also devoted to the discussion of possible exploitable resources (food, craft and vegetation) available to the Early Pleistocene inhabitants of the area. The authors rightly stress the limitations of the presently available evidence (further exacerbated by the small size of the excavated area) for reaching more reliable conclusions on the precise nature, means and patterns of resource exploitation by Pleistocene groups. Some useful hypotheses are nonetheless put forward based on the presence of tree taxa with edible fruits, and the exceptional (for such an early date) evidence on the use of perishable (plant) materials as craft resources, an indication of which is the presence (albeit extremely sporadic) of preformed (the wooden “plank”) and opportunistically used (the wood log) wooden artefacts.

In conclusion, this first volume in the GBY series represents a study of high quality, which is important for investigating the early prehistory and palaeoecology of the Eastern Mediterranean. The authors should be applauded for the prompt and professional publication of their results. Minor weaknesses in layout and

(occasionally) argument presentation should not distract the readers from the highly original and extremely informative content of this volume. The significance of such early palaeobotanical assemblages for understanding the origins and evolution of Mediterranean ecosystems cannot be overstated. Currently accepted palaeoecological models suggest that throughout the Pleistocene the Mediterranean area was host to much more complex and diverse ecosystems than at present, which offered southern refugia to retreating plant and animal species during glacial periods, and biodiversity “hotspots” from which plant and animal species migrated northwards during interglacials (Blondel and Aronson 1999). Future publications of the full analyses of other classes of evidence (seeds and fruits, animal bone, geomorphology and dating, stratigraphy, archaeology) and their integration with the evidence provided by the wood assemblage and independent palaeoclimatic studies, will undoubtedly establish the site of Gesher Benot Ya’aqov as one of the most important stepping stones towards a data-informed understanding of the origins and evolution of the Mediterranean world.

References cited

Blondel, J. and J. Aronson 1999. *Biology and wildlife of the Mediterranean region*. Oxford University Press, Oxford.