OCEANS OF ARCHAEOLOGY

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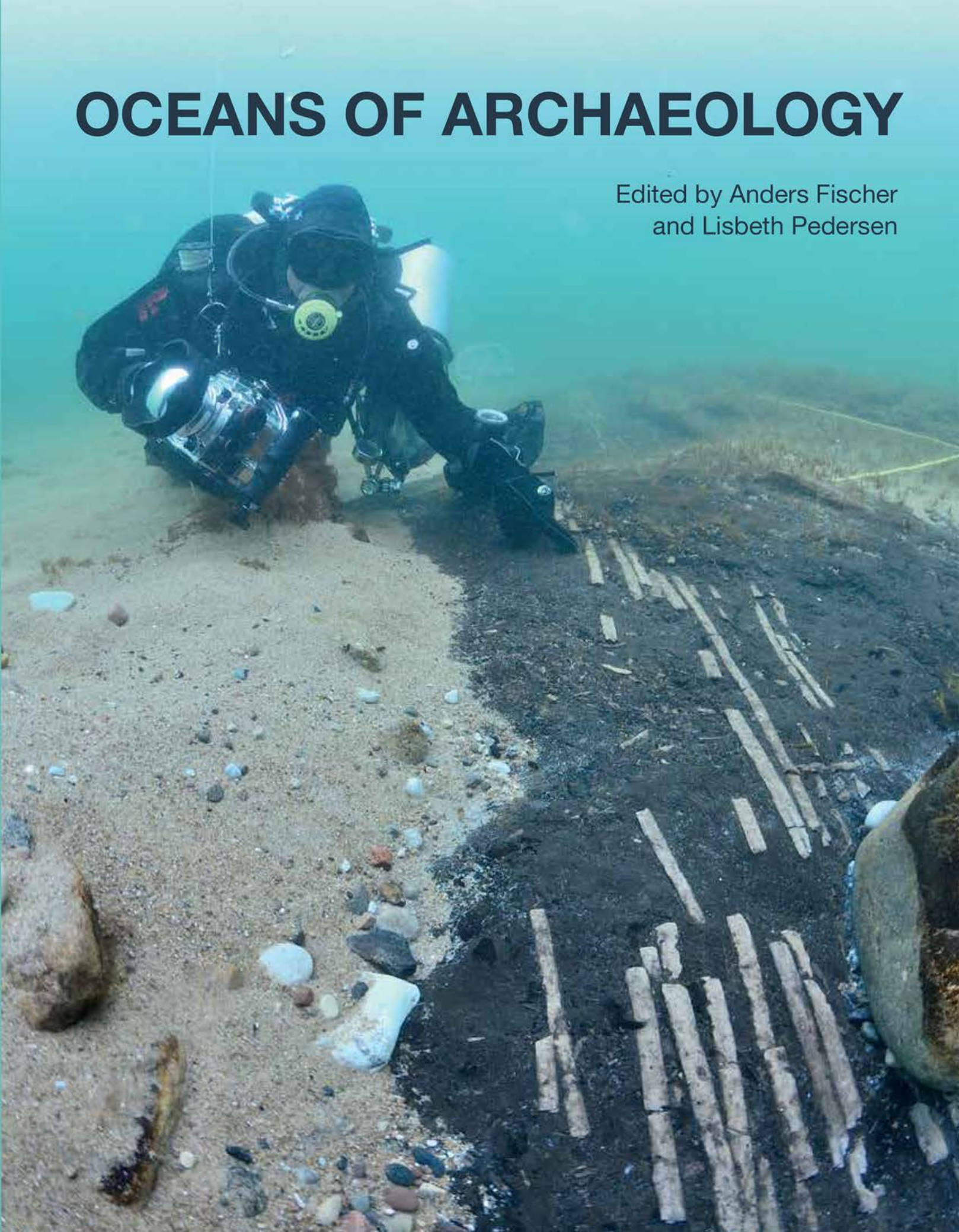
and Lisbeth Pedersen



4.1.2 Orehoved – high-tech hand excavation under water

Morten Johansen and Morten Ravn

Fig. 1. Underwater archaeologists make extensive use of technical equipment. The bubbles evident in the lower right-hand corner indicate where excavation work is taking place, 5 m below the surface of the sea. Photo: Andreas K. Bloch, Viking Ship Museum 2015.

An 8000 year old coastal settlement on the sea floor lay in the way of a large construction project at Orehoved, Denmark. Preliminary investigations involving mechanical excavation of test pits (cf. Ch. 4.1.1) revealed that settlement deposits rich in lithics and organic materials were preserved within parts of a c. 40 x 60 m area and were of significant research potential. For the developer, it was essential that an archaeological excavation was carried out quickly, irrespective of weather conditions. The heritage authority and the museum responsible for the fieldwork therefore decided

to complete the task with larger equipment and more advanced diving gear than normally used in the investigation of settlements in shallow water. The work was carried out from a 10 x 43 m multi-purpose barge, held in position using 'legs' (Fig. 1). The vessel provided space for all the archaeological field activities, including storage and a dressing room for the divers, purpose-built containers with dedicated facilities for the diving supervisors (Fig. 2) and the staff constantly engaged in the on-location evaluation, sorting, counting and packing of finds.

On the sea floor, the sediments were dug and fanned away by hand, and then pumped through a fine-meshed net, where all finds over c. 5 mm were retained (Fig. 3). With this method, the best-preserved parts of the occupation surface, and the associated dump area in the water deposits just beyond the contemporaneous strand zone, were explored in minute detail. The finds were collected by square metre, divided into geological layers. Important artefacts were photo-documented and plotted both horizontally and vertically in a local co-ordinate system. All in all, an area of 94 m^2 was investigated using this method.

On board the ship, the material was sorted into 25,000 pieces of worked flint, bone and wood, as well as 6000 unworked bones. From the square metre with the highest concentrations of finds, 750 artefacts of flint – including arrowheads and axes – were recovered.

The organic material from the settlement includes finished tools of bone, antler and wood. Quantities of food waste reveal that the occupants got their teeth into a varied diet, including red deer, roe deer, wild boar, fish and hazelnuts. Three human teeth, which are suitable for DNA analysis, also raise hopes of gaining an insight into the genetic characteristics of these early prehistoric people.

Fig. 2. The underwater archaeological work is followed by the excavation leader with the help of live images and a two-way 'diver telephone'. The panel on the right allows monitoring and adjustment of breathing gas, air pressure, depth and so on. Photo: Morten Johansen, Viking Ship Museum 2015.

Fig. 3. Manual excavation with optimised diving equipment. A torch, video camera and 'telephone' are mounted on the archaeologist's head-gear. Air and hot water, for warming up the archaeologist's diving suit, are pumped in via the coloured tubes, allowing the diver to work comfortably and stay mentally focused in the cold water for many hours at a time. Photo: Andreas K. Bloch, Viking Ship Museum 2015.

Vast coastal plains that vanished below the waves thousands of years ago were highways to new territories and a cornucopia of natural riches for early humankind. *Oceans of Archaeology* presents these virtually unexplored areas of the archaeological world map. It scrutinises the submerged early prehistory of Europe and the eastern Mediterranean, and reveals a richness and diversity unmatched around the globe.

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Jutland Archaeological Society
2018

Distributed by Aarhus University Press, Finlandsgade 29, DK-8200 Aarhus
www.unipress.dk