The 8000-year-old dugout canoe from Dufuna (NE Nigeria)

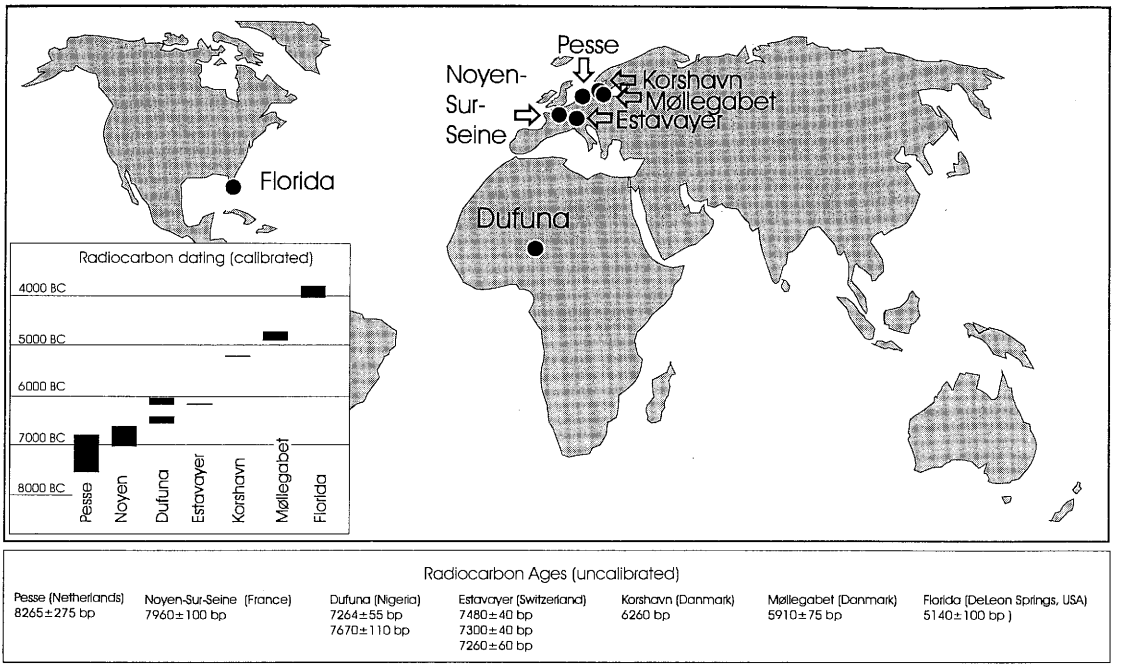
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Introduction

Boats are humanity's oldest means of transport. Long before the invention of the wheel and cart, or of transport by animal, boats enabled not only rapid communication over long distances and the efficient exploitation of aquatic resources, but also the colonisation of islands and even continents. The earliest water craft known from the archaeological record are skin boats similar to Eskimo kayaks. They are depicted in north European rock art. Pieces of worked reindeer antler, considered to be fragments of ribs from such boats, have been dated to the European Upper Palaeolithic (Ellmers 1984; Tromnau 1987). Wood suitable for the construction of dugout canoes was absent from the sub-arctic environment of Upper Palaeolithic Europe. Only after the afforestation of Europe did dugouts — technically easier to manufacture than skin boats — appear. As opposed to the still rather hypothetical skin boats of the Upper Palaeolithic, they represent the earliest vessels for which there is direct evidence. Since the discovery of a dugout at Perth in Scotland (Geikie 1879) in the last century, a number of boats and related objects (e.g. paddles) have been found which date the first manufacture and use of dugouts in Europe firmly to the Mesolithic. According to calibrated C-14 dates for the dugout from Pesse (Netherlands) (Van Zeist 1957), Noyen-sur-Seine (France) (Mordant and Mordant 1992) und Estavayer-le-Lac (Switzerland) (Ramseyer, Reinhard and Pillonel 1989) this began in the seventh millennium BC (Fig. 1). In the New World, the dugout tradition seems not to go quite so far back, starting around the turn from the fifth to the fourth millennium BC (Newsom and Purdy 1990).

For a long time, Africa was not considered in this context, as no prehistoric finds were known from Egypt or sub-Saharan Africa with dates nearly as old as those of the European boats. The history of water transport (summarised for West Africa by Smith 1970) hardly reached back before the historic period and seemed to show that this phenomenon, although important for communication, was relatively recent in comparison with Europe. In the twentieth century, archaeological research in Africa has repeatedly illustrated the falsity of conclusions drawn from negative evidence. The prehistory of African water transport provides yet another example of this. In connection with a Joint Research Project of the universities of Maiduguri (Nigeria) and Frankfurt (Germany), research has been carried out on a boat whose age forces a reconsideration of Africa's role in the history of water transport.

Figure 1 The earliest dugout boats and their dates.



The boat

The find was made at the site of Dufuna, between Potiskum and Gashua on the Komadugu Gana, a large river system in northern Nigeria (Fig. 2). In the dry season the watercourse vanishes almost completely but for a few small pools, while during the rainy season countless streams flow through the valley, which is several kilometres wide and lined by gallery forest. Parts of this landscape become extensively flooded - as is the case at this site, situated beside a branch of the Komadugu Gana (at 12° 16' 53" N, 11° 10' 52" E).

Here, in 1987, the herdsman Malam Yau' dug a well. At a depth of several metres he came upon a hollowed-out tree trunk, which he recognised as a dugout canoe. News of a boat buried deep in the earth reached the University of Maiduguri, where further investigations were planned as a project of the Centre for Trans Saharan Studies (Garba *et al.* 1988). Two years ago Abubakar Garba (University of Maiduguri) made a trial excavation. This showed that the nature of the deposits overlying the boat was such that it could only be uncovered by extensive area excavation. This was carried out in early 1994.

The boat is stratified below clays and sands whose alternating sequence is evidence of deposition in standing and flowing water, presumably as a result of shifts in the river channel (Fig. 3). Some of the clay layers contain pollen, and thus may be placed in at least a partial vegetation sequence. There are no associated archaeological finds. A few sherds and charcoal fragments were found in the layers above the boat. In a layer of grey clay directly above the coarse sand in which the boat lies, a small, complete, undecorated pot was found. A tree trunk is embedded in the same layer, transverse to the axis of the boat. This trunk has a C-14 date of 2612±48 BP (KN-4689). The two C-14 dates for the boat itself, determined in different laboratories, are: 7264±55 BP (KN-4683) and 7670 ±110 BP (KI-3587). The samples were of wood taken from two positions several metres apart

Figure 2 Map of NE-Nigeria indicating the Dufuna site. Major relief units according to P. Tuley (ed.), The Land Resources of North East Nigeria, Vol. 1.

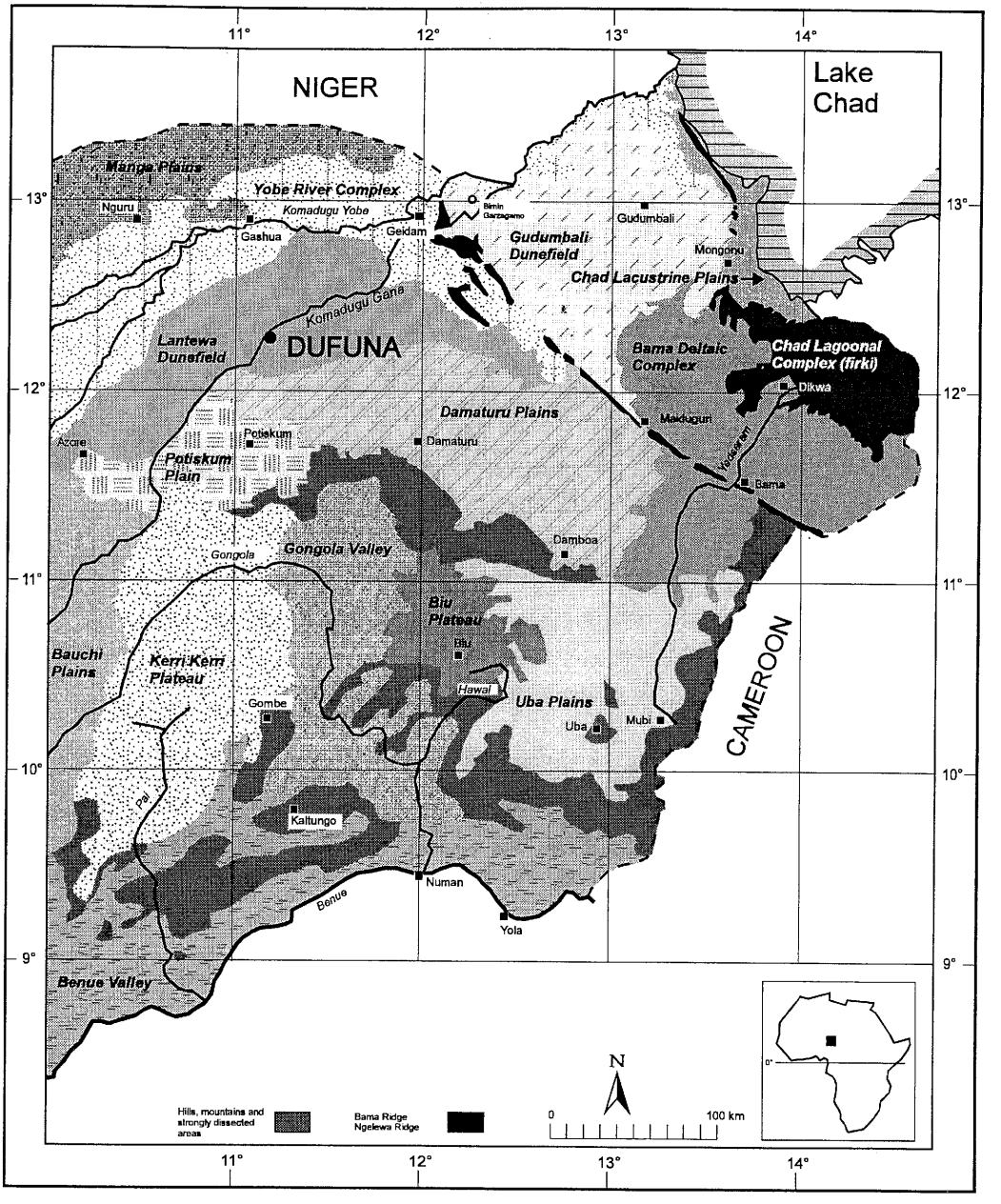


Figure 3 Section through the boat site at Dufuna.

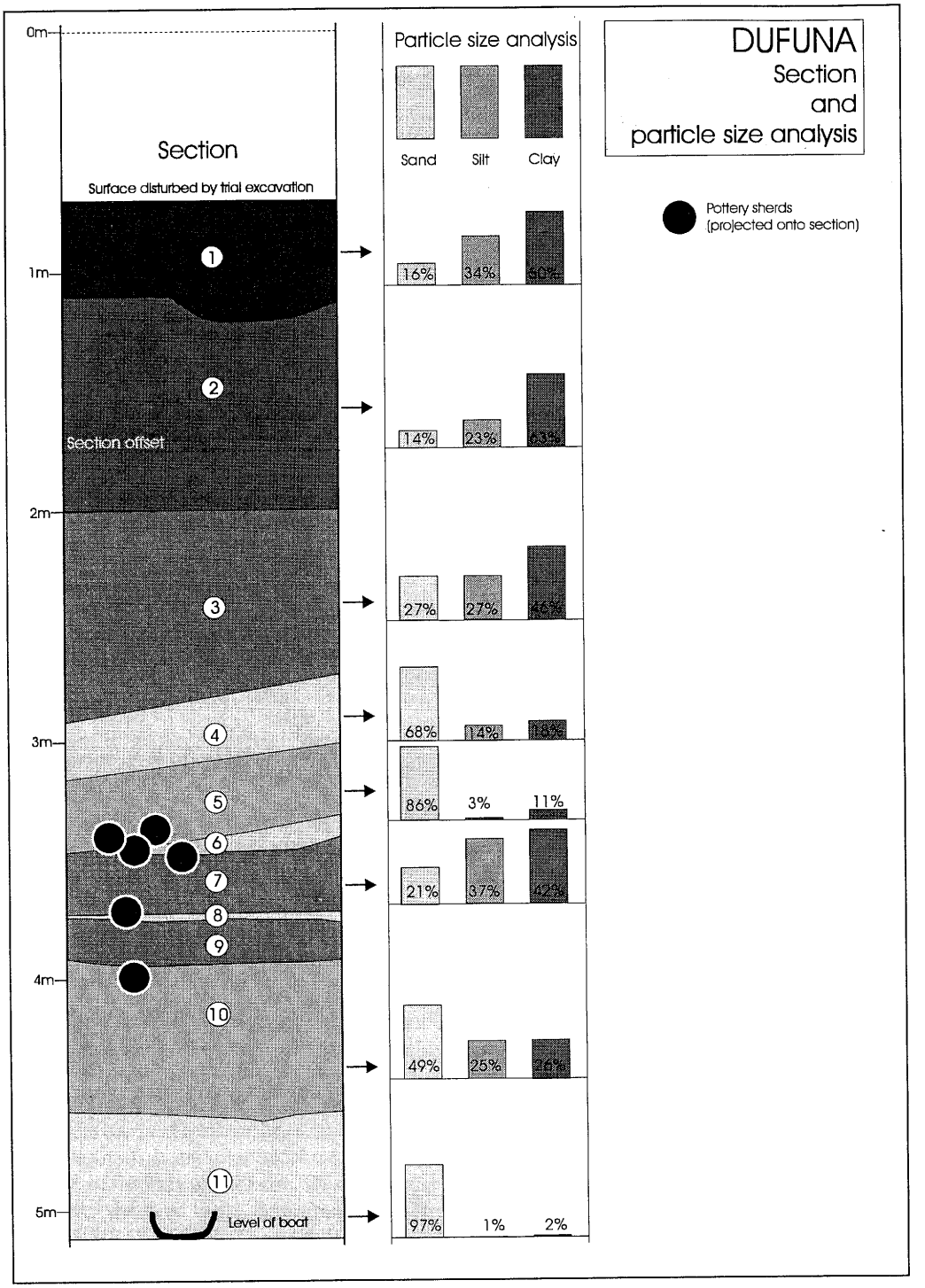


Figure 4 View of the excavation showing the boat almost completely exposed and the tree-trunk lying over it.



on the boat. There is no reason to doubt the broad date of the boat. However, the difference in age between the boat and the tree trunk above it indicates a break in sedimentation of around 5000 years, for which there is currently no explanation. Scientific studies are planned to address this specific question.

The boat is fully preserved apart from a few missing fragments from the tops of the sides (Fig. 4). It has a length of 8.40 m and maximum breadth and height of around 0.5 m. The sides are barely more than 5 cm thick. The bow and stern are both carefully worked to points, giving the boat a notably more elegant form than finds of similar age from Mesolithic Europe, such as the aforementioned dugout made of conifer wood from Pesse in the Netherlands (Van Zeist 1957), whose blunt ends and thick sides seem crude in comparison with Dufuna. It is highly probable that the Dufuna boat does not represent the beginning of a tradition, but had already undergone a long development, and that the origins of water transport in Africa lie even further back in time.

The almost black wood has been initially identified by Katharina Neumann (University of Frankfurt) as belonging to the genus *Khaya*, African mahogany. The four species of mahogany occurring today in Nigeria cannot be separated by their wood structure. The wood of *K. senegalensis* is the heaviest of the African mahoganies and less easily to work than the other *Khaya* species, but nevertheless it is much used in the savanna regions today, and its suitability for boat building is well known (Irvine 1961). From the modern distribution, *K. senegalensis* would be the only species which could grow as far north as the Dufuna region. However, as the climate was most probably more humid 8000 years ago, it cannot be excluded that more southern species reached the area by taking their way along the rivers.

The analysis of the boat's sides and the tool marks in the wood will only be possible after lifting the boat, which has been left in the ground awaiting conservation by the German Maritime Museum (Bremerhaven, Germany). We expect to gain information on techniques of construction. Microlithic

stone tools which are typical for the early and middle Holocene Later Stone Age of western Africa definitely could not have been used to make the boat. Ground stone axes and adzes are also out of consideration for the Dufuna boat, as ground stone does not appear in the archaeological record of western Africa until a later date. The earliest date for polished stone axes in sub-Saharan West Africa is 5370±1000 before present (N-1805) (Bosumpra Cave, Ghana) (Smith 1975). Even if the trunk had been hollowed by controlled burning — a method for the construction of dugouts known in ethnographic contexts from various parts of the world — similar tools would have been needed to remove the charred wood. Post-Pleistocene unground core-axe-like and pick-like bifacial tools of macrolithic appearance were probably used, such as have been known in West Africa for decades and reconsidered by MacDonald and Allsworth-Jones (1994) recently.

Conclusion

Little is known of the period to which the Dufuna find belongs — either in the south-western Chad Basin or in the whole West African savanna. In archaeological terms it is described as an early phase of the Later Stone Age, which began rather more than 12,000 years ago and ended with the appearance of pottery, probably more than 7000 years ago. Stratified sites of this period in Nigeria include Mejiro cave, Old Oyo (Willett 1962), the lower layers of Rop (Eyo 1972), Iwo Eleru (Shaw 1969, 1973; Shaw and Daniels 1984) and Dutsen Kongba (York 1974, 1978).

The hunter-gatherers of Dufuna probably used the boat in exploiting the fish stocks of the Komadugu Gana. Whereas the present-day river almost vanishes in the dry season, and fishing plays a relatively minor part in local subsistence, hydrological conditions around 7000 BP would have made quite different resources available. The boat may even have existed at the same time as Mega-Chad, whose surface is agreed by most geographers to have been 40 m higher than its present level. Dufuna would then have lain barely 50 km from the lake. The floodplain at Dufuna may even have been part of a permanently flooded lagoon of Lake Chad, formed by inundation of the Komadugu Gana. Under these conditions fish — whose importance in prehistoric subsistence may be generally underestimated due to poor preservation — would have been in abundant supply all year round. If these assumptions are correct, the makers of the dugout belonged to a population which spread along the southern edge of the Sahara, from north Kenya through the central Sudanese Nile Valley to the western Sahara, and adapted to the resources of the lakes of the early and mid-Holocene wet phase. Sutton (1974) described these pottery-making, epipalaeolithic fisher-hunter-gatherers as the "aqualithic civilisation". Although the archaeological type-fossils of the "aqualithic", namely bone harpoons and pottery with "wavy line" decoration, are absent from Dufuna, the dugout indicates — as has long been suspected — that water transport was part of the culture of this period.

The vicinity of the early Holocene inland sea stimulated the manufacture of boats in Middle Africa at a time for which comparable finds are known only from Europe. As evidence for a means of rapid transport, allowing contacts over long distances, the Dufuna boat may also help to explain the wide distribution of, and great similarity between, early Holocene cultural phenomena at the southern edge of the Sahara. Moreover, an eight-thousand-year-old tradition of boat-building in Africa touches on other, more distant regions. For instance, it must be asked whether, in a period with such boats, the equatorial rain forest really presented — as is often assumed — a barrier betwen northern and southern sub-Saharan Africa. And finally, Dufuna supports the view, long accepted by specialists, that the cultural history of Africa was not determined by Near Eastern and European influences, but took its own, in many cases parallel, course.

Acknowledgements

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