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# EXPRESSION

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# COLONIZATION

## Boats reaching a new shore

Rock paintings of Mt. Borradaile, Arnhem Land, Australia

(Photo Anati, 2001 XL-23 Australia, NT)

# PLEISTOCENE MARITIME COLONIZATIONS

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Of the two possible forms of colonization, on foot or by watercraft-assisted locomotion, the latter provides archaeologically far more comprehensive information than the former. While colonization of cold regions by walking may imply the use of apparel, dwelling construction or fire, it tells us little about the technological competence of the people concerned. This is quite different with maritime colonization, which provides more sharply defined information about technological limits than any other form of archaeological metadata. Early seafaring exploits, as we know from the ethnographic literature, involved very high mortality rates (Bednarik 2003). Just as the content of modern garbage does not inform one about modern man's ability to travel to the moon, Ice Age garbage (which is what Pleistocene archaeology usually studies) is not a reliable measure of the maximal technological capacity of any people. In the Pleistocene, seafaring was a dangerous pursuit that would have only been undertaken at the technological cutting edge of the times. Therefore information about the cutting-edge technology of early prehistory is most reliably provided by the logistical obstacles overcome by archaeologically demonstrated earliest events of maritime colonization.

To provide a sound measure of these obstacles is theoretically simple, but in practical terms it requires a great deal of experimentation. Having established at what time, approximately, the first hominin colonization of a hitherto unoccupied landmass occurred, and what difficulties it would have involved, one only has to design a project capable of determining what was needed to accomplish the crossing. For this one needs to know the resources available to the hominins in question, as tools and raw materials; and then establish the minimal conditions to succeed. Replicas need to be made of the Pleistocene stone tools used at the time, with which one then builds a series of simple watercrafts and sails them across the sea barrier, each time increasing their economy and minimalism to establish at what level the crossing would fail. Then one has obtained a reliable measure of the maximal technological capability of some humans at the time in question.

In order to test various hypotheses concerning the first maritime colonizations in the world I began in 1996 what became the largest replicative archaeology experiment ever undertaken. So far my project, called The First Mariners, has involved the collaboration of over 1,000 people, such as scientists from many fields, archaeologists, traditional boat builders, film makers and their crews, artisans of various fields, construction crews and of course rafting crews. Numerous documentary films have been made about this project, including four by BBC and National Geographic, and books have been published (Bednarik and Kuckenburg 1999; Bednarik 2014, 2015), as well as more than 30 scholarly papers. At the time I commenced the project, almost nothing was known about seagoing rafts in the academic literature. Today, having gathered a great amount of knowledge about this, we are able to build the simplest platform imaginable entirely with stone tools (Figure 1) and then sail it across sea barriers with confidence. So far, eight rafts have been built in this way and sea-trialled in Morocco and Indonesia, the largest weighing about 20 tonnes. Some have failed, some have succeeded, but all

Figure 1: The use of stone tools in the construction of a Lower Palaeolithic raft in Lombok, Indonesia.

have contributed to our understanding of how the first sea journeys may have been undertaken. The longest of these journeys took two weeks. Countless experiments have been made with associated technologies, concerning the need to carry fresh water and food on board the rafts, the need to secure food while at sea, the acquisition of raft materials and the required bindings. Some 2,000 stone tools needed for these tasks had to be fashioned, and many of those used in the experiments have been studied by micro-wear analysis. Thus the entire project was based on scientific procedures of testing ideas and applying the principles of falsification to all propositions. We were in a sense not trying to establish how to reach one shore from another, but at what point such an endeavour would fail. In this sense the project has pioneered a new approach to an important archaeological issue. There exists general agreement that seafaring expeditions could only be organized if the hominins in question possessed an adequately effective and probably recursive language, the refore Pleistocene seafaring has far-reachingimplications for determining the cognitive status of the hominins concerned. Another important consideration is that an ability to cross the sea was not sufficient to secure an archaeologically visible colonization event. What was needed was that a genetically viable party had to succeed in doing so. There is no consensus on the minimum number of people required for this, but it can safely be assumed to be at least in the dozens. Most importantly it had to include a minimum number of females of child-bearing age, or else the colonizers would have been doomed to the genetic decline various known endemic island populations have experienced (Figure 2). Another key factor to consider is that all sea straits feature strong transverse currents that change direction unpredictably. Therefore it is impossible to cross them without propelling power.

Simple drifting would deliver the hapless passengers to the open sea, where they could drift for months or years and would almost certainly perish.

In fact our experiments at several straits demonstrated that resisting the currents of straits is the most delicate and most demanding aspect of such attempts. Some armchair archaeologists have suggested that perhaps people did not intend to cross, but were swept out to sea by events such as tsunamis, and were carried across on drifts of vegetation matter. This shows that such commentators were ignorant of the conditions, and it again demonstrates the need to conduct such experiments. It also suggests a lack of logic: if humans can cross on vegetation mats, then other large mammals can too, and yet we know that in the case of Wallacea, humans were the only animals larger than rats that ever crossed. The only exceptions are elephants which are powerful swimmers and which can swim distances of more than 48 km at sea because they possess trunks to act as snorkels (Johnson 1980). They in fact almost reached Australia. The earliest archaeologically demonstrated sea crossings by hominins occurred in what today is Indonesia, where *Homo erectus* colonized the Wallacean island of Flores around 1 Ma years ago (Verhoeven 1958; Sondaar et al. 1994; Bednarik 1997, 1999a; Bednarik and Kuckenburg1999; Morwood et al. 1999; Brumm et al. 2010). Subsequently he also reached Timor (Bednarik and Kuckenburg 1999) and Roti (Bednarik 1999a), and we can safely assume that he arrived at Lombok and Sumbawa en route to Flores. Seafaring in the Pleistocene has been demonstrated by several types of finds from about 20 islands that have never been connected to a mainland (most of them not even to another island), or at least not during the existence of humans; and from the continent of

Figure 2: Reconstruction of a Lower Palaeolithic raft, bearing four women and four men and approaching the shores of Flores.

Figure 3: The Nale Tasih 2, a 4-tonne Middle Palaeolithic raft riding 5-m high waves on its epic journey from Kupang to Darwin. The waves submerged most of the raft occasionally.

Australia (Bednarik 2003) (Figure 3). They consist of skeletal remains of approximately 200 humans, mostly from Australia but including those of nine individuals from four islands (Santa Rosa, Okinawa, Crete and Sardinia); and of human occupation evidence in the form of stone tools, food remains, ornaments, rock art and occupation sites. The two main regions of Pleistocene maritime navigation evidence-are the Mediterranean, where at least five deep-water islands were occupied during the Ice Age, and the general region of eastern Asia (Japan to Australia). The only other island with known Pleistocene occupation is Santa Rosa, one of the Californian Channel Islands.

The possibility that hominins crossed the Straits of Gibraltar has also been considered, although not proven (Bednarik 1999b, 2001).

One of the most instructive findings of my First Mariners project has been the establishment of how hominin confidence and competence increased steadily over time (Figure 4). From about 1 Ma years ago, when we can assume that people on the southeasternmost shores of mainland Asia had mastered offshore fishing, to about 60,000 years ago, when they finally ventured to reach a continent that remained invisible to them until they had travelled more than nine-tenths of the distance, the ability to master the sea grew exponentially

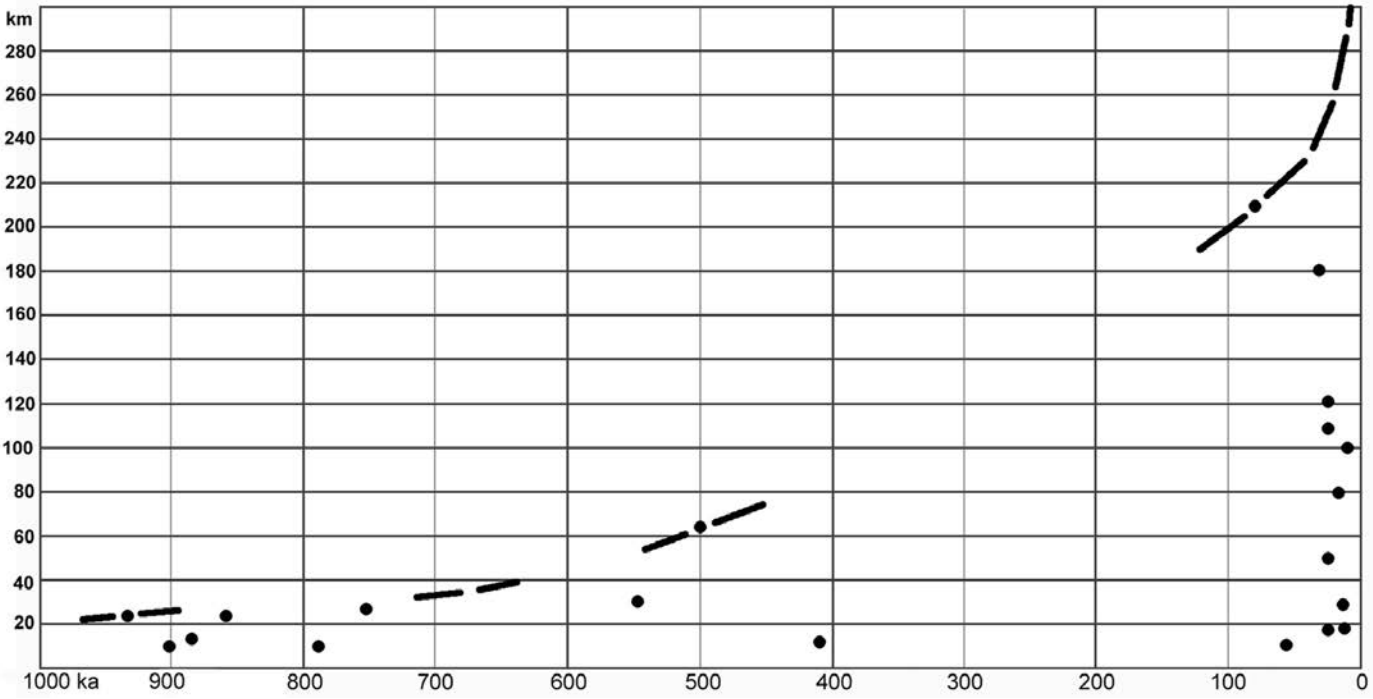


Figure 4: Estimated time of first maritime colonizations (in ka, millennia) plotted against presumed shore distances in km (not travel distances) at time of travel, showing how maximal distances travelled increased gradually through time. The broken line thus indicates approximate maximal navigation capability of hominins through time.

(all colonizations before first landfall in Australia were of islands whose shores were visible from the shore of departure). By 30,000 years ago, tiny targets such as Buka Island, 180 km from New Ireland, were reached by Middle Palaeolithic seafarers. This implies that sailing the open sea had become almost a routine by then, and we can safely assume that this ancient tradition underpinned the incredible exploits of Pacific sailors during the Holocene, crisscrossing the largest ocean at will. To understand the foundations of maritime colonization it is essential to be familiar with the seafaring capabilities of Homo erectus and subsequent sub-species of hominins. It is also essential to appreciating other competencies of the ancients, such as their abilities of symbolic expression since the Early Pleistocene, their expression of self-awareness through the wearing of beads at least since the Acheulian technocomplex and similar evidence. For the past couple of centuries, archaeology has sought to reject or suppress evidence of sophistication or cognitive modernity of the ancients, culminating in the African Eve hoax begun by Professor Protsch (Bednarik 2008) and still being defended by what Thompson (2014) has defined as "the high priesthood of archaeology". The maritime exploits of Homo erectus in Wallacea have been known and reported since the 1960s, yet over half a century later I still have to explain them to archaeologists who have never heard such outlandish notions. This is a fair assessment of the discipline's level of misinformation, unmatched in all of science. In navigating the seas we stand on the shoulders of giants, and most specifically on those of the First Mariners.

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