

CONSIDERATIONS ON DISPERSALS BETWEEN AFRICA AND EUROPE ACROSS THE STRAIT OF GIBRALTAR

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ABSTRACT

En relación con las hipótesis de dispersión humana y faunística de África a Europa (vía Oriente Medio o a través del Estrecho de Gibraltar), se discute la dispersión de los mamíferos dentro de Europa y la dispersión continente-isla.

Palabras clave: dispersión, tecnología de barcos, Pleistoceno, Estrecho de Gibraltar.

There is much discussion on the alleged dispersal of early man to Europe across the Strait of Gibraltar. This hypothetical dispersal is often said to be related to other faunal dispersals, which are equally hypothetical. Alternatively, the dispersals occurred over land through the Middle East, or across the Channel of Sicily.

The arguments in favour of a dispersal across the Strait of Gibraltar include: 1) There may have been a land connection, or at least, the distance between Africa and Europe may have been shorter than today. 2) There may have been a “stepping stone”, a small island in the middle of the strait. 3) Europe can be seen from Africa. 4) Presence of *Homo* and other fauna of African origin in Spain, but absence in central and / or southeastern Europe.

A variant of the latter argument was suggested by Martínez Navarro & Palmqvist (1996), who showed a map with the dispersal of *Megantereon whitei*, with arrows leading from Africa to Georgia, Greece and Spain, and who indicated the limit of its geographical distribution around 40° latitude. A similar distribution for *Homo* was assumed. Such a latitudinal limit to the distribution would imply that the Adriatic and Ligurian Seas are barriers to west ward dispersal from the Middle East and Balkans into Italy and Spain. In the mean time, *Megantereon* was shown to have occurred in Germany (Hemmer, 2001). However, there are reasons, why this argument is not valid in its general form.

There are many cases of mammals that lived in SE Europe and Anatolia and in the Iberian Peninsula, but that are not known from the areas in between. Among other examples, these include for the Middle Miocene: the rhinoceros *Hispanotherium*, for the early Late Miocene the palaeochoerid *Schizoschelus*, for the late Late Miocene the bovids *Protoryx* and *Palaeoryx*, and for the Pliocene the giraffid *Mitilanotherium*. (e.g. Van der Made et al., in press). The Iberian Peninsula is a relatively dry area disconnected from similar habitats at the same latitude in SE Europe, the Middle East and Central Asia. Occasional dispersals to the Iberian Peninsula may have occurred during short periods when dryer or more open habitats occurred in the areas between SE and SW Europe. Such environments may have resulted during very short periods from the out of phase changing of different parameters, as is also the case in Vrba's “traffic light model” and would be difficult to detect in the fossil record. The Pleistocene distributions of *Theropithecus*, *Homo* and the earliest *Praeovibos* can be explained in a similar way. It should be noted that all these forms are adapted to arid or open environments or at least are tolerant to it.

Dispersals across a sea strait are difficult to prove, even if the distance is short, the other side can be seen, and if there is a “stepping stone”. Geology and geography may show that dispersals may have been possible, but do not prove that they really occurred. There are however situations when dispersals across a sea barrier can be proven. This is the case in dispersals towards islands. *Hippopotamus* reached Madagascar, crossing at least 320 km of sea. Murids reached (probably on natural rafts, such as a floating trees) the Canary islands, some 70-90 km, and Australia, a distance that is difficult to estimate but which may have been as much as 300 km. Proboscideans reached Cyprus, over 60 km, and the distance to different Asian islands where their fossils have been found, may have been equal or less, according to present hypsobaths. Deer, lutrines and soricids are also good colonizers and their records are possibly in Crete, though the distances are difficult to tell due to active tectonics, but may have been in the order of some 30-60 km. Other animals have lesser capabilities to reach islands and are not known from islands near to the main land that might have supported a population of those species. The canid *Cynotherium* reached Sardinia, crossing possibly some 10 to 20 km of sea. Large cats reached Sicily during the late Pleistocene, crossing the Strait of Messina, which today has a width of some 2.5 km, but are otherwise not known from typical insular environments. Their presence in the large islands of Indonesia dates from a glacial period, when there was a land connection. From this it is apparent, that if the Strait of Gibraltar would be easy to cross, hippos, proboscideans and deer would be the most likely large mammals to find at the other side. During the Late Pleistocene various Palaearctic mammals appeared in northern Africa, but during most of the Pleistocene the Strait of Gibraltar marks a sharp separation between African and European fauna. Possibly, the surface current into the Mediterranean made a crossing difficult. The Channel of Sicily was much wider.

A similar way of reasoning can be applied to *Homo*. For most of the Mediterranean islands the earliest evidence of the presence of *Homo* is Late Pleistocene or Holocene in age and in most (or all?) cases concerns *Homo sapiens*. Even the evidence from Flores points in that direction: whatever the way *Homo* reached Flores in this tectonically highly active area, the result is that an endemic species evolved in isolation. If boat technology was available, it surprises that this was not further developed. If the dispersal was by swimming, it should be taken into account that swimming in tropical waters is not the same as crossing the Strait of Gibraltar during a glacial period, when distance is short.

Based on these considerations, it does not seem likely that during most of the Pleistocene faunal and human dispersals across the Strait of Gibraltar were common. However, there is a way of studying the dispersal routes, which, as far as I know, has not yet been explored. If a particular character is found in a species in the north-west of Africa and in the south-west of Europe, but not in the north east of Africa and the Middle East, it seems likely that the species dispersed across the Strait of Gibraltar. In a similar way, morphology may provide an argument in favour for a dispersal through the Middle East.

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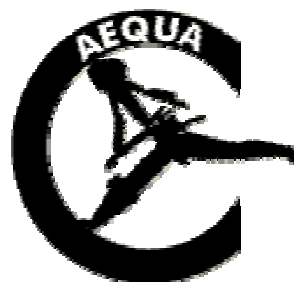
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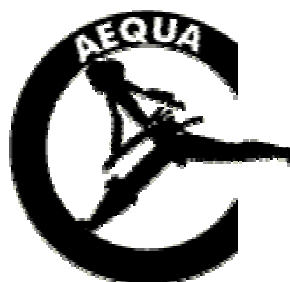
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Motivo de la Portada:

***Vista oblicua del Peñón de Gibraltar, desde el Norte.
Filtro azul y trama granulada.***

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