THE DEBATE AROUND THE STATUS OF THE *HOMO FLORESIENSIS*

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1.- The announcement of a surprising news

On the 28th October, 2004 a news which shocked the world of *Science* hit the headlines all over the world. In fact, that very day the prestigious magazine *Nature* published two articles[1] which astonished many specialists in human evolution. In these articles Peter Brown and Michael J. Morwood (both professors at the New England University in Armidale, Australia, and codirectors of a mixed group of investigation formed by Australian and Indonesian scientists) announced they had discovered the partial skeleton of an adult female human who had died 18,000 years ago in a cave in the Indonesian island of Flores[2]. It was no more than a metre tall and had a brain of 380 cc., a brain volume slightly smaller than that of more than three million of years ago hominids, such as the Australopithecus afarensis, and similar to the one of the chimpanzees (380 cc.). According to the discoverers it corresponded to a healthy individual who, as a result, was assigned to a new human species: *Homo floresiensis*[3].

Obviously the news was so shocking that it seemed even a joke. Juan Luis Arsuaga said from it in ABC: "Until yesterday[4] I thought that to play a joke on a paleoanthropologist colleague I would tell them that an australopitecus had appeared in a place of La Mancha whose name from that moment onwards will always be remembered all over the world. What the magazine *Nature* tells us is much more surprising and however, we have to admit it is true. At least for the moment"[5].

The final tag is precisely the key point. We are going to develop this essay about it. The announcement of its discovery was so surprising that soon many skeptical voices arouse. Nevertheless, not only its discoverers but also a great number of scientists have refuted one by one all the criticisms to the thesis that the *Homo floresiensis* is a human species different to us or to any other, with the peculiarity of having a very small height, a scarce metre (we repeat that we are dealing with adult and healthy individuals) and a tiny brain around 400 cc.; and, however, intelligent enough to make complex stone tools as the ones of our direct ancestors the *Homo sapiens* 20,000 years ago; and more important things as we will shortly see.

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[1] Cf. P. Brown, M.J. Morwood, *et. al.*: *A new small-bodied hominin from the late Pleistocene of Flores, Indonesia*; *Nature*, 431, 28th October, 2004, pp. 1055-1061; y M.J. Morwood, R.G. Roberts, *et. al.*: *Archaeology and age of a new hominin from Flores in eastern Indonesia*; *Nature* 431, 28th October,2005, pp. 1087-1091.

[2] A very small island of the Indonesian archipelago situated between Java (to the West) and Timor (to the East), with Australia towards the South and the Celebes and the Molucas to the North.

[3] There is someone who has reminded us, not without humour, we should not forget that despite being called *Homo floresiensis* the holotype (or paradigmatic specimen of the clado) is a female; technically known as LB1.

[4] It refers to the 28th October, 2004.

[5] http://www.portalciencia.net/antroevoflor.html

What we are going to analyse is, precisely, the historical development of that controversy. That is to say, the analytical chronicle of the debate. We will logically start by paying attention to what Brown and Morwood stated in the before mentioned articles. Then we will focus on the criticisms they received and analyse the first replies and so on and so forth until we arrive to the last works published this year. But before we will see the results of the first works of Morwood in Flores.

2.- The first finds of Morwood

Mike Morwood, one of the codirectors of the team who discovered the *Homo floresiensis*, was several years working on the island of Flores. In fact, in 1998 announced the discovery of lithic industry close to 800.000 years old[6]. Though it was impressive the so old existence of stone tools in that area, which it was really amazing of that discovery was none of the two, because, in fact, samples of lithic industry were already found with a similar or superior age in the Indonesian archipelago. Where did the remarkable facts of this discovery lie? Not surprisingly, in the very exact place of its discovery: the island of Flores.

Why? For the simple reason that Flores was never united to the continent. That is, it has always preserved the status of insularity independently of weather variations of the planet which provoked that the water concentrated on the poles when the temperatures were low, with the consequent regression of the seas and the increase of the surfaced continental platform, something which favoured that many of the current islands which exist in the world and that are near to the coast were united to it by an arm of land. This was never the case of Flores; however there have been times when great parts of the Indonesian archipelago (all its central and western part: Java, Sumatra, Bali, etc…) were united to the current peninsula of Malaca (o Malaysia); and, generally speaking, to all the Asian South East (Malaysia, Thailand, Vietnam, Camboya or Kamphuchea and Laos), forming the geographic unity known as the Peninsula of Sunda or Sonda. Flores was always separated from this peninsula by a waterspout, the so called Strait of Komodo.

What does all this mean? Something quite obvious: that the makers of these stone tools had no other way to arrive in Flores but by sea. That supposes something quite unusual and unexpected.

[6] M.J. Morwood *et al.*: *Fission-track ages of stone tools and fossils of the east Indonesian islands of Flores*; *Nature* 392, pp. 173-176, 1998. And M. J. Morwood *et al.*: *Archaeological and paleontological research in central Flores, East Indonesia: results of fieldwork, 1997-98*; Antiquity 73, 273-286 (1999).

Up to 1988 it was believed that the oldest proofs of navigation were 60,000 years old (60 kyr.)[7] and corresponded to the first crossing of the northern Australia by members of our species, *Homo sapiens*, who arrived in the area by sea.

Nowadays the space which separates Flores from Java is marked by a number of islands, among whom Bali, Lombok, Sumbawa and other smaller ones such as Comodo, which is just in the western strip of land of Flores, stand out. From all these islands the ones situated more to the west were part of the before mentioned Peninsula of Sonda. That was not the case of the ones towards the east. However they could have an important role as they allowed for "frog jumps", which favoured the navigation to Flores. In any case, the human presence in that island more 80,000 years ago makes us think a lot.

However, at first, not everybody agreed on admitting that the origin of those tools were anthropic. The skepticism came mainly from the fact that Flores had never been united to the continent; which means that those humans had to have arrived to Flores sailing through the dangerous Strait of Comodo. If that was so, then the *erectus* should be considered the first sailors in the history of humankind. Privilege given up to that moment to the *sapiens* who, almost seven thousand years alter, were able to arrive in Australia from some island of Indonesia. Truly it was something rather shocking to be accepted as such.

Nevertheless the controversy was settled in the summer of 2006, with the publishing by Morwood and collaborators of a work in which he announced to have discovered 507 new tools dating between 840 kyr. and 700 kyr ago. But we will be referring to them later because they have a very important role in relation to the *Homo floresiensis*.

3.- The discovery of the Man of the island of Flores[8]

Let's go back to the year 1999. In that moment Morwood decided to undertake new excavations in other locations, so that he could confirm that the humans had arrived in Flores in very early times. In order to do so they were heading towards the

[7] Kyr. means kylia years; that is: thousands of years.

[8] For a thorough analysis of the most important aspects related to the discovery of the *Homo floresiensis* see Carlos A. Marmelada: *Homo floresiensis. El pequeño gran misterio de la evolución humana*; en http://www.unav.es/cryf/homofloresiensis.html, which is the extract of a conference given on the 19th April, 2005 in the University Cardenal Herrera of Valencia; also in the web page of the Consejería de Educación y Cultura del Gobierno de la Región Autónoma de Murcia (http://www.educarm.es/templates/portal/images/ficheros/etapasEducativas/secundaria/10/secciones/425/contenidos/7187/homo_floresiensis.pdf). See also Carlos A. Marmelada: *El pequeño gran hombre de Flores*; Aceprensa service 144/04, 10-11-2004.

cave of Liang Bua. In the campaign of the summer of 2003 the researchers came up against a great surprise. In fact, when they were working in the sector VII, they unearthed several human remains including a human tiny brain: all the remains corresponded to the same individual and were at a level 18,000 years old. By the pelvis shape they concluded it corresponded to a female and by the wear of the teeth deduced she had died when she was about 30 years old. Her small height, around a metre, made them think for a moment she would be a young girl. But when they noticed the wear of the teeth and the presence of the wisdom tooth they had no other choice but to accept a really surprising fact: it was an adult individual! With all the implications that deriver from it. Her small height was therefore not a question related to her age of death, but a specific feature.

The fact she had a similar height to the ones of the *Australopithecus* and the first humans (*Homo habilis* and *Homo rudolfensis*) and a similar brain to the one of the chimpanzees, but with an excellent talent to make very complex tools, as well as the possession of other archaic anthropological features, led their discoverers to include these specimen in a new human kind: *Homo floresiensis*.

It could be possible to think they could have come up against an individual of our kind but exceptionally short due to some anomaly of its growth. However this hypothesis was ruled out by them, as the research team had found previously, in other site of the island, a fragment of an arm, from another individual of the same kind, but 38 kyr. old, which suggested that the individual to whom it belonged was also around a metre tall. Its discoverers rejected it belonged to our kind but rather it was a pygmy, as the physical development of these *sapiens* stops at the end of the adolescence, but then their brain has reached a size as big as the one of any other *sapiens*, whereas "Hobbit"[9] died being an adult woman.

In this sense and in an anecdotal way we may remember that Henry Gee, director of the *Nature* magazine, warns that this discovery should lead us to redefine the degree of veracity given to the legends explained by the natives of the island to the Dutch sailors who landed there; stories which referred to the existence of mysterious humans (the *ebu gogo*) who were around a metre tall and lived inside the wood.

[9] In a popular way they are also called that way in honour of J.R.R. Tolkien and his race of tiny humans in the *Saga of The Lord of the Rings*.

4.- Why was the *Homo floresiensis so small*?

A form the herbivorous species have to defend from their predators is to resort to the megadontia, that is: to develop an enormous growth of their organism to avoid or make difficult to the carnivorous ones to eat them. However in the absence of predators when a quite big population of herbivorous is geographically isolated in a small area where there are scarce food resources the only way to survive is to reduce their size (so, for example, in the island of Sicily the elephants reduced their size as much as only 250 kg.), so that after a time this population evolves giving rise to a new species that, although heir or descendant, it is already different to the mother species.

At first Brown thought this evolutionary mechanism was the one which allowed the emergence of the *Homo floresiensis*. A primitive population of *Homo erectus* may have arrived sailing (something by itself impressive) up to the island of Flores; there it would remain isolated and it would evolve to give rise to these tiny humans. If that was the case, it would mean, according to Brown, that the hominids and, therefore the humans were subject to the same evolutionary forces than to the rest of the mammals. That interpretation is not only reasonable, but it is even also obvious: as it is something logical from a biological point of view, as it is from a physical perspective men is ruled by the laws of gravity, as any other body. The scientific and philosophical problem lies in determining to what extent the brain can reduce its size preserving all the intellectual abilities common to the humans. At the end of the article we will deal with the topic of the current hypotheses about the origin of the *H. floresiensis*.

We have to bear in mind that in spite of their small size, they were able to hunt animals such us tiny elephants already extinct (Stegodon), mainly the breeding; giant lizards, the famous dragon of Comodo, still existing, and other animals such as: snakes, turtles, frogs, rodents (also giants) and bats. As the bones of some of these animals have appeared reduced to ashes, it is believed that the *floresiensis* had to have dominated the fire.

In Liang Bua thousands of lithic tools have also been found used to skin, quarter, tan or make holes. Many of these tools appear in sediments 78 kyr. old. We know *H. sapiens* did not arrive in Flores until 12 kyr. ago, so he cannot have been the maker of these tools. So then … who is the maker of those tools of Flores, so similar to the ones made by the neanderthals in that time in Europe and the *sapiens* in Africa and other places around the world? At first there was no complete certainty, because it could not be dismissed that the anatomically modern humans may have arrived in the island much before the fossil testimonies that have come to us. But in the summer of

2007 the issue seemed to progress well with the publication of the works about the tools of Mata Menge before mentioned, and that we will be dealing with more thoroughly later.

5.- The first criticisms

5.1.- Microcephalia and dwarfism

It is logical that before a surprising and revolutionary discovery such as this some critical voices arise which tried to give a more conventional explanation. In that sense Maciej Henneberg (from the Department of Anatomical *Science*s, Medical School, University of Adelaida, Adelaida 5005, Australia; the same university in which Morwood y Brown work) and Alan Thorne (from the Research School of Pacific and Asian Studies, Australia National University, Canberra, ACT 0200 Australia) insisted from the beginning that what it was really found was, according to them, individuals who belonged to the same species but who presented pathologies. So the *Homo floresiensis* was, in fact, a *Homo sapiens* with anomalies on their growth, as they announced in a small communication entitled: *Flores human may be pathological* Homo sapiens[10]. According to these scientists the most acceptable explanation for the small brain size was the microcephalia. So we would be facing members of our kind who had suffered from some type of pathology of the growth. In fact the two scientists mention one of the finds of the research team of Liang Bua as a fact favouring them. It is about a radius, a bone of the forearm, found in the cave and which has a length of 210 mm, which according to Henneberg and Thorne will be equivalent to an individual between 1,51 y 1, 62 meters tall; parameters within the range of variability of the *Homo sapiens*. As other fact reinforces in other cave of the island of Flores, Liang Toge, was found another skeleton of a *Homo sapiens* who lived 3,500 years ago and who was 1,48 metres tall, however having only a brain capacity of 1204 cc[11].

The text in which these two scientists express their criticism end by appealing to prudence and warning that not until new reasonably complete brains are found the hypothesis that states that a quite common pathology, as it is the case of the microcephalia, cannot be discarded and could be the cause of the morphology discovered in Liang Bua.

[10] Article included in Larry Barham: *Some initial informal reactions to publication of the discovery of Homo floresiensis and replies from Brown & Morwood*; in Before Farming 2004/4 article 1, pp. 2 and 3. The reply of Brown and Morwood is in p. 6.
[11] This skeleton was described by Teuko Jacob in: *Some problems pertaining to the racial History of the Indonesian Region*; Utrecht: Drukkerij, Neerlandia, 1967.

The reply of Brown and Morwood was conclusive, maybe too much, because it even reached the argumentation *ad hominem*. What it was really devastating was the content of the countercriticism. In fact, the codirectors of the works of Liang Bua declare to own human remains belonging to seven different individuals, all of them coming from the same cave and all with the same body, dental and facial proportions as the specimen LB1. The authors of the reply wonder, quite sensibly, if there is any possibility that all these individuals are a group of unhealthy types. The answer is that it is quite unlikely, above all if we take into consideration they are a minimum number of individuals which correspond to a chronological rank spanning several dozens of thousands of years. To reinforce their position, Brown and Morwood refer to one of the found jaw and remind us it has no chin[12], a distinctive feature of the *Homo sapiens*, as it is an exclusive morphological feature of our kind. In fact, no other human kind has chin. So, the individual to whom that jaw corresponded should accumulate two abnormalities: lack chin and suffer from dwarfism; likewise the female of Liang Bua had also two pathologies: the microcephalia and the dwarfism. In short, too many coincidences together. Quite unlikely that each time an individual was found in Liang Bua it was an unhealthy type who had arrived there, taking also into account they were separated by thousands of years.

Marta Mirazón Lahr and Robert Foley, from the Leverhulme Center for Evolutionary Studies, Department of Biological Anthropology, Cambridge, also think it is impossible that the *Homo floresiensis* is a pygmy *Homo sapiens*. According to these researchers, if we compare the skull of the LB1 with the one of a current human person in scale (that is, to a third of its normal size) both differ in shape, robustness and a whole range of main features of the base of the skull. To sum up, they do not have a specific similarity[13].

As far as the radius mentioned by Henneberg and Thorne is concerned, Morwood and colleagues affirm it belonged to an individual no more than a metre tall and that is why they assigned it provisionally to a *Homo floresiensis*; though they admit as the postcranial remains assigned to LB1 lack arms they cannot make a direct comparison between both[14], something it could be corrected later, as we will be able to prove.

[12] We will come back about it later. See the further note 31.
[13] M. Mirazón Lahr and R. Foley: *Human evolution writ small*; *Nature*, vol. 431, 28th October, 2004, p. 1043.
[14] M.J. Morwood *et al.*: *Archaeology and age of a new hominin from Flores in eastern Indonesia*; op. cit., p. 1089.

5.2.- Too much advanced technology

Other of the criticisms received is the one related to the statement of the directors of Liang Bua regarding the lithic industry found there and associated not only to a premolar of *Homo floresiensis* but also to remains of *Stegodon*, was made by this species; which it would show that in spite of the small brain size (let's remember that when its discovery was announced its endocranial capacity was estimated in 380 cc.) they were very intelligent and quite skillful in the making of complex tools, as much as the own *Homo sapiens*. However, among the archaeological remains there is nothing comparable to pieces that could be interpreted as art objects.

Tim Reynolds was one of the first ones in expressing his doubts regarding the attribution of that technology to the *Homo floresiensis* lacking more evident testimonies. Fair enough, for this researcher the morphology of the lithic industry of Liang Bua is similar to the one found in other places of the same geographical location and associated to the *Homo sapiens*; so that, if the *H. floresiensis* were the maker of the tools of Liang Bua we should postulate an evolution in parallel with the technological development in that area, something quite unlikely, so it is more convincing and conservative to think that the artefacts of Liang Bua were made by members of our species[15].

The reply of Morwood and Brown is quite simple. The authors start by admitting that, really, there is no unmistakable association of a rich accumulation of lithic industry together with a big number of fossil remains of *Homo floresiensis*, but rather the association in this sense is quite weak, as it was stated before. That it is true, but there is an interesting fact: Many of these tools appear in sediments that are 78 kyr. old. We know the oldest remains of *H. sapiens* found up to now in Flores are 12 kyr. old. So it could not have been the maker of those tools. Who was then the maker of them, tools so similar to the ones made by the neanderthals in Europe and the *sapiens* in Africa in that time? In that moment, there was no way to assure it.

Nevertheless the argument of Reynolds ends with very interesting words that we wanted to emphasize apart from what it was said in the previous paragraph. In fact, Reynolds reminds us that the oldest tools found in Flores are the ones already mentioned before and that come from Mata Menge, ranging from 880,000 to 800.000 years old; according to Reynolds those tools do not bear any resemblance with the

[15] Opinion given by Tim Reynolds in Larry Barham: *Some initial informal reactions to publication of the discovery of Homo floresiensis and replies from Brown & Morwood* ; in Before Farming 2004/4 article 1, pp. 4 y 5. The reply is in p. 6.

morphological standards identified in Liang Bua and there is an enormous period of time between both.

This is precisely what the team of Morwood has been able to clarify from e Mata Menge. In fact, there Mark Moore, from the New England University, and Adam Brumm, from the National University of Australia, have found some tools 840,000 years old and bear a great resemblance (together with certain differences) with the ones found in Liang Bua. The complexity of these so old tools shows that the *Homo floresiensis*, much more modern than the makers of those pieces, could very easily have been the makers of the ones found in Liang Bua. If 800,000 years ago some humans who lived in Flores (we do not know who, though we assumed they were some population of *Homo erectus*) could make tools so similar to the ones found in Liang Bua with a minimum of between 78 kys. or 18 kys. old. Why could not the *Homo floresiensis* have been the maker of these last ones? To assume that the reason is because the appearance is too modern is not a reason enough to dismiss the *H. floresiensis* as a plausible author. Such an argument could not be any other thing but a form of ethnocentrism.

6.- The bones of the discord

Leaving criticisms apart around the fossils found in Liang Bua there was a real legal battle for its possession. At first Teuko Jacob was in charge of them for an initial evaluation of the Bioanthropology and Paleoanthropology Laboratory of the Gadjah Mada University of Indonesia. He kept them on the first days of November thanks to the collaboration of his friend Radien P. Soejono (from the Archaeological Centre of Indonesia in Jakarta and who had also formed part of the team who worked in Liang Bua) though with the condition that he should turn them back by the 1st January, 2005. However he was late for handing them in to the team lead by the Australian researchers, so they started to feel very nervous and Jacob was found suspicious of not letting their discoverers examine them claiming they were property of the Indonesian government and that their conservation and preservation demanded not moving them too much. There was then a tough struggle for the right to study the original fossils discovered in[16]; which, besides, was even tougher from the moment in which Teuko Jacob started to say in public that the remains from Liang Bua were

[16] For more information regarding the subject see Elizabeth Culotta: *Battle erupts over the 'Hobbit' bones*; *Science*, Vol. 307, 25th February, 2005, p. 1179.

pygmies of our own kind, opinion shared by Soejono, Henneberg, Thorne and Eckhardt[17].

At the end of March Jacob returned part of the fossils to the team of Morwood and Brown. But then an unpleasant surprise was to come. Some of the returned pieces were in very bad state, as some of the photographs published by the newspaper USA Today[18] on the 22nd March, 2005 show. In them the state of the pelvis and the jaw before being sent to the Jacob's Laboratory and in their return to Morwood and Brown's custody can be appreciated. The deterioration is quite evident in both cases, though in the case of the pelvis the degradation is enormous, as it was returned broken. The jaw did not have a better luck: in the jawbone an incisor was missing; the inferior jawbone was broken into several parts (the reconstruction has changed, necessarily, the features of this jawbone zone); in the back upper part of the upper jawbone there is a fragment of bone missing; besides an empty space has been created, not existing before, between the canine tooth and the premolar one. To sum up, something quite incomprehensible specially when we are dealing with fossils of such a great value[19].

7.- The analysis of the computerized tomography (TC) of the skull of LB 1

In the middle of all this controversy that very month (March, 2005) an article by Dean Falk (from the Department of Anthropology of the Florida State University) appeared and other ones[20] in which the conclusions of his study about the skull of LB1 were exposed. The team directed by Falk had analyzed the skull of the "Hobbit" female using the computerized tomography. The conclusions to which they arrived were that the three-dimensional analysis of the brain of the LB1 has revealed it does not have the endocranial structure of a microcephalic individual, but it shows a normal endocranial structure, though with very tiny dimensions.

Regarding the endocranial volume there were also novelties. In fact, as we mentioned before, when "Hobbit" was presented in society in October, 2004 it was

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[17] See Rex Dalton: *Fossil finders in tug of war over analysis of hobbit bones*; *Nature*, Vol. 434, 3rd of March, 2005.

[18] We have to thank M. J. Morwood for his great kindness in providing us with a copy of the pages of the mentioned diary.

[19] For an analysis of the state in which the fossils of *H. floresiensis* were returned to M. Morwood and colleagues you can see Elizabeth Culotta: *Discoverers charge damage to 'Hobbit' specimens*, *Science*, 25th of March.

[20] Dean Falk, Charles Hildebolt, Kira Smith, Mike Morwood, Peter Brown, et al.: *The brain of LB1, Homo floresiensis*; *Science* Express, and *Science*, Vol. 308, pp. 242 y ss. Cf. also, Michael Balter: *Small but smart? Flores hominid shows signs of advanced brain*; *Science* 307, 4th March, 2005, pp. 1386-1389. And also Carlos A. Marmelada: *El Hombre de Flores asombra a los científicos*, Aceprensa, Servicio 27/05, 09-03-2005. You can also consult Rex Dalton: *Looking for the ancestors*; *Nature*, Vol 434, 24th March, 2005, pp. 432-434.

considered to have a brain volume 380 cc.; an identical volume to the average one of the chimpanzees, and very far away from the average 1350 cc. of the humans nowadays. The new volume attributed to Falk team in that work was 417 cc.[21]. This brain capacity is included within the characteristic parameters of the graceful *Australopithecus* of 3 million years ago, as it is case the of Lucy.

However what called more the attention to the Falk's team was the structure of the brain. According to them they were dealing with a specimen with a brain size common to the Austrolopithecus but with a brain structure clearly human.

The way to determine the brain structure of the LB1cranium was from the marks that the brain leaves in the internal face of the cranium. Though the brain does not logically fossilizes what it really does is to leave the marks of its external structure in the walls of the endocranium.

The study of the endocranium of the hominid of Liang Bua has revealed several very important things. On the one hand it has allowed to know that it had the temporal lobes very much developed, that is, the areas that in our gender are associated to the language comprehension and in which the area of Wernicke and the area of Broca are located, both closely linked to the language abilities. the brain area which controls the hearing is also situated in the temporal lobes.

On the other hand, the researchers could also verify that the frontal lobe was very much developed, where the area 10 of Brodmann is located which is the area associated to the control of the rational abilities and to the planning of the future; this last feature seems to be essentially and exclusively associated to the human kind.

These facts allowed Falk and colleagues to speculate with the possibility that the *Homo floresiensis* was able to plan complex future actions as well as dominate some form of spoken language.

8.- Criticisms and countercriticisms to the article of Falk and colleagues

The before mentioned study provoked a crossfire between various research teams which lasted the autumn of that year and beginning of 2006. In fact, the first criticisms came from Jochen Weber (from the Department of Neurosurgery of the Hospital Leopoldina from Schweinfurt, Alemania), Alfred Czarnetzki (from the Department of Paleoanthropology and Osteology of the University of Tubinga,

[21] Fact calculated from a virtual reconstruction of the brain using technics of computerized tomography (TC).

Alemania) and Castren M. Pusch (from the Institute of Anthropology and Human Genetics also from the University of Tubinga) when they published an article[22] in October, 2005, just a year from the announcement of the discovery of these strange human, in which they denied that the *H. floresiensis* were members of a species different to our own one.

According to these researchers, after having analyzed 19 microcephalic members of our own species, they proved that the average of their cranial size was 404 cc., so the 417 cc. assigned to a LB1 by the Falk team was within the level of variability characteristic of the microcephalic ones of our species. Among the 19 specimen analyzed by Weber et al. there was one who specially called their attention and towards which they focused great amount of their time as it had a endocranial volume 415 cc.; very similar to the one of the LB1. After studying six distinctive features from it, they observe they were similar to the ones present in the cranium of the LB1. They arrive to the conclusion that both the cranium and the brain morphology of the 19 microcephalic individuals studied is very similar to the shape of the cranium and to the brain structure of the *Homo floresiensis*, so they refused to think it was a different human kind to us and they chose the hypothesis which states they were pathological individuals of our kind.

Regarding the commentary of the expectations that the drawing of the 10 area in the endocranium of the LB1 provoked, Weber *et al.* denied it could be important as far as the speculations around the supposing advanced cognitive abilities of the *H. floresiensis* were concerned. According to Weber and his colleagues, a male microcephalic individual studied by them had an endocranial volume of 485 cc. and well developed area 10; however, though it was able to walk, it could not talk. From it, they come to the conclusion that to extrapolate to a LB1 advanced cognitive abilities from the acceptable size of its area 10 was too risky.

9.- The reply of Falk *et. al.*[23]

To start with the Falk team pointed out that Weber and colleagues made a mistake in the relative calculations to the six features they studied in a microcephalic brain of similar size to the one of the LB1, so they calculations are invalid to establish extrapolations or comparisons with the mentioned brain of the female of Liang Bua.

[22] J. Weber, A. Czarnetzki y C. M. Pusch: *Comment on "The brian of LB 1,* Homo floresiensis; *Science*, Vol 310, 14th October, 2005, p. 236b.
[23] D. Falk *et al.*: *Response to Comment on "The Brian of LB 1,* Homo floresiensis*"*; *Nature*, Vol. 310, 14 October, 2005, p. 236c.

They also observed that the pictures offered by Weber and colleagues in their article are not enlightening enough and even they may belong to different individuals. They do not agree either with the reflections made around the area 10 of Bordmann. In short, they find missing important facts in the Weber and colleagues' report, so their thesis are not conclusive regarding the nullity of the hypothesis which states that the *Homo floresiensis* is a different species to ours.

10.- The new criticisms

7 months after the appearance of these two articles in *Nature*, the prestigious magazine *Science* published a new criticism to the study made by the Falk team to the cranium LB1. However, it needs to be said that the article had been received by the magazine on the 11th October, 2005, that is, just a few days before the publishing of Weber *et al.* Article in the same magazine as well as the reply of Dean Falk *et al.* in *Nature*. This clarification is important because at the same time as a number of crossing statements were being, M. Morwood and his collaborators published an article in which new discoveries were made public, so the publication of *Science* regarding the commentary of Martin was a little obsolete considering the new findings. But let's not get ahead of events. We will first be looking to the argument of Martin and his collaborators, as well as the due reply of the Falk team and then we will study the new discoveries.

The criticism of Robert Martin and his collaborators[24] insisted on the idea that the reduced dimensions of the brain of the female of Liang Bua were not due to a tendency towards dwarfism suffered for a population of *Homo erectus* in conditions of insularity giving rise to a new human kind, but rather to an encephalopathy of some members of our species.

In short, the habitual thesis which status that the specimen of Liang Bua were ill *Homo sapiens*, more specifically suffering from microcephalia. Disease to which we have to add the dwarfism and the craniumfacial anomaly of the lacking of chin. In short: too many pathologies in the same individual and the same sample of fossils.

Martin and collaborators warn that "european microcephalic"[25] specimen used in the study of the Falk team is in fact a plaster cast of a cranium and not really an

[24] Robert D. Martin *et al.*: *Comment on "The Brian of LB 1,* Homo floresiensis*"*; *Science*, Vol. 312, 19th May, 2006, p. 999b.
[25] Known technically as AMNH 2792ª and which corresponds to a child called Jacob Moegele, who died at the age of 10 years old in Plattenhardt, Germany. His cranium capacity was really tiny: 272 cc. The acronym AMNH means American Museum of Natural History.

original fossil; adding that the calota did not fit well with the rest of the plaster cast as it was varnished. In fact, according to Martin and collaborators, the spectrometric study confirmed that the calota belonged to a batch of plaster different to the one of craniumfacial structure.

Martin and his colleagues also informed that Falk And his collaborators had only in mind a kind of microcephalia and not the multiple variations that this disease present, more than 400, which makes that the available craniums of microcephalic individuals show a great variability, always associated to genetic malformations. According to Martin and collaborators, as there are more than a dozen diseases associated to developmental delays syndromes and microcephalia, LB1 could be perfectly be an individual born of humans of regular size.

Martin's article finishes by stating that the found tools in Liang Bua show a morphology more connected to the productions of the *Homo sapiens* than to the *Homo erectus* ones.

11.- The reply of Falk and his collaborators[26]

To start with the Falk team refuses that the two craniums of microcephalic individuals that Martin team possess, and that they state are very much alike a LB1, are so in fact. According to Falk there are a number of important features in which they do not coincide. Also they warn there are many lacking facts (such as comparative measures, actual pictures - in Martin's articles there are only drawings -, and identifying sketches of the most important features) to be able to extract the most significant conclusions from the study of Martin and collaborators.

Falk also denies that they do not bear in mind the great variety of genetic syndromes associated with the primary microcephalia, contrasting the opinion of the Martin's team according to which the typical pathology is the recessive autosomal inheritance, something that Falk says is in conflict with what they have found in the specialized literature.

Falk insists on the fact that the Martin's statements related to two endocraniums that would be similar to the one of Liang Bua lack important facts to be able to determine the authentic grade of similarity and so they cannot be taken into account to accept or refute one of the hypothesis relative to the status of the *Homo floresiensis*.

[26] Dean Falk *et al.*: *Response to Comment on "The Brian of LB 1,* Homo floresiensis*"*; *Science*, Vol. 312, 19th May, 2006, p. 999b.

Regarding the statement of Martin's team about the tools of Liang Bua, the works of Moore y Brumm about the found tools in Mata Menge leave, as we will see later, that argumentation invalid.

12.- The new discoveries

At the same time as all these crossed declarations were being made in October, 2005, though some were published in May, 2006, Mike Morwood's team announced they had found more remains of *Homo floresiensis*, publishing a work about the study of some fossils which were still unknown[27].

The new described material ranges from fossils of a three year old boy 50 cm. tall, to an adult who was even shorter than the species of 1 in Liang Bua. Among these fossils there is a new jaw belonging to an adult individual, and postcranium remains corresponding to several specimen, as well as the arms of LB1, which were not originally found in 2003, and which, consequently, allowed to make comparisons with other arm bones of other individuals. In fact Morwood declares that the new material can reconstruct the body proportions of the *H. floresiensis* with a high degree of certainty, so we can affirm the morphology of these specimen was a specific feature and not an abnormal shape produced by some kind of pathology of individual character.

Their discoverers considered the found fossils had a chronological level ranging from the twelve thousand years (date calculated according to their extinction before the first humans of our species arrived in the island, or at least this is what it is supposed for the moment) to the ninety thousand years old for the oldest specimen.

The conclusions of Morwood and Brown from the new findings were clear. The proofs were accumulating in favour of the thesis which states we are in front of a new human kind who was able to survive 12,000 years ago. The Flores' men were humans who did not belong to our species. The fact that all the found bones had dimensions proportionally small would show that the partial skeleton of a female found in Liang Bua was not a dwarf woman, but rather we would be in front of a human kind really different to ours; and which has, as the most outstanding feature, a tiny height.

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[27] M. J. Morwood *et al*.: *Further evidence for small-bodied hominins from the Late Pleistocene of Flores, Indonesia*; *Nature*, Vol. 437, 13th October, 2005, pp. 1012-1017. Other articles related with this issue that may be consulted are Daniel Lieberman: *Further fossils finds from Flores*; *Nature*, Vol 437, 13th October, 2005, pp. 957-958 and Rex Dalton: *More evidence for hobbit unearthed as diggers are refused access to cave*; *Nature*, Vol. 437, 13th October, 2005, pp. 934-935; as well as Elizabeth Culotta: *New 'Hobbits' bolster species, but origins still a mystery*; *Science*, Vol. 310, 14th October, pp. 208-209.

Logically speaking, the duplication of fossil bones reinforces the idea that the *H. floresiensis* corresponds to a population of tiny humans specifically different from any other human type; ruling out the possibility of the skeleton of LB1 would represent an individual affected by a pathology (or several at the same time, as the opposite thesis requires) or that it was some anatomically abnormal form of *sapiens*.

Among the new announced discoveries there is a tibia whose size suggests that the individual to whom it belonged was no more than 106 cm. tall, who, for the moment, would be the tallest specimen of *Homo floresiensis* found.

The article ends by placing on record that the origin of the *Homo floresiensis* is still uncertain, but it states it cannot be said it was a simple alometric version of *Homo erectus*; that is, that the *H. floresiensis* do not descend from a population of *H. erectus* who arrived in the island and were reducing their size.

13.- The lithic industry of Mata Menge[28]

We have referred in several occasions to the publication of a work about the find of some stone tools in the site of Mata Menge, 50 km. away from Liang Bua, with a maximum age between 800,000 and 880,000 years. The collection covers about 500 small pieces and comparing them with the ones found in Liang Bua, and whose age ranges from a chronological level between 95,000 and 12,000 years, it can be seen a remarkable morphological and functional similarity in most of them.

One of the arguments which supported the idea that the *Homo floresiensis* was not the author of the lithic industry found in the cave of Liang Bua was that their appearance was too much modern, so that it seemed to be more the product of the *Homo sapiens* rather than the result of the making of the tiny humans who had a brain as big as a grapefruit.

The supporters of the *Homo floresiensis* as the maker of those tools had against the fact there were very few fossils of that species near the lithic industry. But the ones who stated that the responsibility was of the *Homo sapiens* did not offer any more convincing reasonings, as the oldest human remains anatomically modern found in Flores were less than 12 kyr. old whereas there are tools morphologically modern in Liang Bua found 95 kyr. ago.

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[28] Adam Brumm, Mark Moore, Fachroel Aziz, Michael Morwood, *et al.: Early stone technology on Flores and its implicatios for* Homo floresiensis; *Nature*, Vol. 441, 1st June, 2006, pp. 624-628. See also Elizabeth Culotta: *Tools links indonesian 'Hobbits' to earlier* Homo *ancestor*; *Science*, Vol. 312, 2nd June, 2006, p. 1239.You could also consult Michael Hopking: *Old tools shed Light on hobbit origins*; *Nature*, Vol. 441, 1st June, 2006, p. 559.

The fact a collection of tools made 800 kyr. ago had been discovered in Mata Menge with a so modern appearance as most of the ones found in Liang Bua, means the *Homo floresiensis* may have been the maker of them. However, this does not mean automatically it was, but only that it cannot be denied they made them as their appearance is too modern and only *Homo sapiens* could carve tools with so complex morphology. It was not only that the *Homo sapiens* 8had not arrived in Flores 800,000 years ago but also he did not exist as a species. However, as there were no human remains associated to the collection of Mata Menge we cannot state either who was its maker, but the best candidate is the *Homo erectus* as it was the only known taxon in the area at the time. Nevertheless, as we will see later, other possible authors still not discovered cannot be dismissed.

Brumm and Moore end up their article by reminding us the *Homo floresiensis* disappeared 12 kyr. ago whereas the oldest burials of *Homo sapiens* found in Flores were 10,500 years old and showed a radical behavioural change regarding all previously mentioned including the archaeological register related to the lithic industry. Finally, and in the absence of evidences which state the opposite Brumm and Moore affirm the most logical interpretation comes from supposing the group of tools found in Mata Menge and Liang Bua represented a technological continuity made by the same hominid lineage. To state the *Homo floresiensis* lacked the brain size to make the mentioned tools was based more in prejudices than in real evidences

14.- The last criticisms

When the summer of 2006 was ending, new criticisms appeared regarding the status of the *Homo floresiensis* as a human kind with own entity. Teuko Jacob, Radien P. Soejono, Maciej Henneberg, Allan Thorne, R. B. Eckhardt *et al.* Were the ones who signed an article[29] in which they defended again that the human remains found in Liang Bua were from some *Homo sapiens* who had suffered from several pathologies.

According to these authors the found specimen found in Liang Bua came from a population of pygmy *Homo sapiens* predecessors of the Rampasasa who live now in the area. The found individuals in the before mentioned cave of Flores would show, according to these researchers, own individual signs of an abnormal development , including the microcephalia.

[29] Teuko Jacob, Rodien P. Soejono, Maciej Henneberg, Allan Thorne, R. B. Eckhardt *et al.*: *Pygmoid australomelanesian* Homo sapiens *skeletal remains from Liang Bua, Flores: Population affinities and pathological abnormalities*; PNAS, Vol. 113, nº 36, 5th September, 2006, 13421-13426.

It could be claimed it would be something quite unlikely as it would imply these individuals should have been dwarf and microcephalic pygmies, which it would mean they had suffered from too many pathologies at the same time. However, the authors reply that the microcephalia goes together, commonly, with a number of abnormalities[30].

We mentioned before the jaw of the LB1 lacked chin[31], something contrasted with the own morphology of a *Homo sapiens*. However Teuko and his colleagues supported that the 93,4% of the present pygmy Rampasasa have a neutral and negative chin, that is, it is either too soft or they directly lack it and the jaw turns to be evasive (that is, with a light inclined plane backwards) in that area.

15.- New facts about the cranium of the LB 1

This month of September a new article of the *Homo floresiensis* was published in the Journal of Human Evolution[32]. In it its authors sustained that the cranium of LB1 was not the one from a microcephalic individual, but rather the one from a healthy individual of tiny height. This was in support of the ones who consider the *Homo floresiensis* as a human species different to ours. The authors come to this conclusion after having studied the cranium of LB1 and having compared it with the one of the first humans, two craniums of microcephalic individuals, a cranium of a pygmy taken from another cave in Flores, several craniums of *Homo sapiens* (which included the ones from some African pygmies and the one from individuals from the Andaman islands – in the Indic Ocean, in front of the coast of Thailand) *Australopithecus* and *Paranthropus*, concluding it is very unlikely that the LB1 is neither a microcephalic human, nor any other known species, so it is reasonable to assign it to a new human species: *Homo floresiensis*. The article ends up by dealing with the topic of the origin of these amazing humans, something we will be discussing later.

16.- The shape of the brain in microcephalic humans and in the *Homo floresiensis*

In the year 2007 new works about the *Homo floresiensis* appear. In February the Falk team published an article in Proceedings of the National Academy of *Science*s

[30] Jacob *et al.*: *Pygmoid australomelanesian* Homo sapiens *skeletal remains from Liang Bua, Flores: Population affinities and pathological abnormalities*; op. cit., p. 13.422.
[31] See former note 12.
[32] Debbie Argue, Dense Donlon, Colin Groves, Richard Wright: Homo floresiensis*: Microcephalic, pygmoid,* Australopithecus*, or* Homo*?*; Journal of Human Evolution, 51, 2006, pp. 360-374.

(PNAS)[33] in which they reiterate from new studies of the specimen no. 1 of Liang Bua, this could not be a mirocephalic *Homo sapiens.* For that they have reconstructed in three dimensions the endocraniums of 9 microcephalic individuals and 10 normal humans, using the computerized tomography. These virtual reconstructions collect the marks left by the brain in the internal walls of the endocranium, so that the external morphology of the brain is reflected; they also allow to calculate the cranial capacity.

As the cranial capacity of the *Homo floresiensis* is only of 417 cc., some researchers have suggested we are rather dealing with a microcephalic *Homo sapiens* than with an individual of a new human species. This hypothesis is difficult to be valued without a clear understanding of how the shape of the brain of the microcephalic individuals is in comparison to the normal humans. The team led by Dean Falk and Mike Morwood, using the computerized tomography, has made the reconstruction in three dimensions of three endocraniums.

From the observations made in these casts, the researchers have been able to identify two variables which allow to classify the brain in either a normal or microcephalic one with a 100% guarantee of correct answer. From these facts, the Falk team and his colleagues have been able to conclude that the resemblance of the LB1 looks more like the one of a normal than a microcephalic brain. According to these authors, the investigations that have been carried out do not only allow to classify the brain of a LB1 as normal, instead of microcephalic one, but also provide facts about the genetic substratum of the evolution of the human brain and can be very useful in order to make clinic diagnoses.

However, in spite of the fact that the brain of the LB1 shows features that makes it very much more alike a normal human one than a microcephalic one, there are as well a number of characteristics such as its small brain size which are consistent with the fact of assigning it to a own human species, that is, different to ours.

The microcephalia, that is: the possession of a sickly small brain, is a condition according to which the adult ones reach a 400-500 g of brain mass; which causes mental delays ranging from moderate to severe. Certain works of investigation of cases of microcephalic individuals all over the world have been spread. Quite commonly we are talking about a disease result of blood unions.

Due to the controversy emerged around the status of the LB1, the authors of the investigation have decided to study the endocranium of a microcephalic woman

[33] D. Falk, *et al.*: *Brian shape in human microcephalics and* Homo floresiensis; PNAS, Vol. 107, nº 7, 13th February, 2007, pp. 2513-2518.

with a brain volume similar to the tiny female of the island of Flores. They have also studied the cranium of an adult microcephalic woman who also had approximately the same height as the female of Flores.

The virtual endocraniums were measured electronically to obtain the cranial capacities used traditionally to express the brain mass. The difference in size between the brain of the immature microcephalic individuals and the normal humans was even inferior to the assigned values given to the mature microcephalic individuals. This is so because in these pathological individuals their maximum brain development is reached sooner than in normal humans. From this point, the brain of the mocrocephalic reduces its size.

The conclusion of the study is that the cranium of LB1 shows a bigger number of similar features as the ones of a normal person (with the exception of its size) than those of a microcephalic individual.

17.- The study of the lithic industry from the Asian Southeast

In another work by Mark Moore and Adam Bruma, they examine again the present compression of the collections of lithical artefacts of the Pleistocene in the Asian Southeast[34]. Obviously, in spite of such an aseptic title, this work needs to be framed within the controversial debate which arose around the hominid status of the *Homo floresiensis*. The mentioned discovery in Mata Menge of 800 kyr. old stone tools, with a similar morphology to the one of the lithic industry associated to the *H. floresiensis*, destroys the preconceived idea that only humans of our species could be the authors of lithical instruments of so advanced typology. In this new article, Moore and Brumm deepen in the topics dealt in the published article in *Nature* in June, 2006.

According to the authors there is a difference made for a long time between the collections of lithic industry of great size (groups of tools) and small size industry (chips). The former is normally associated with *H. erectus*, whereas the latter is connected with *H. sapiens*. The authors affirm this traditional way to interpret the Asian Southeast archaeological register in relation with the lithic industry assumes the recovered artefacts in a site reflect a complete technological sequence. After the analysis of the collections of the artefacts from the Pleistocene found in Flores, the authors maintain the thesis that the big groups of pebbles and the small chips are aspects of a unique reduced sequence.

[34] M. Moore and A. Brumm: *Stone artefacts and hominins in island Southeast Asia: New insights from Flores, eastern Indonesia*; Journal of Human Evolution, Vol. 52, 2007, pp. 85-102.

Moore and Brumm suggest to apply the model observed in Flores to the artefacts from the Pleistocene of other islands of that geographical area. The article ends by debating the implications of that form of analysis of the archaeological register of the Asian Southeast establishing associations between collections of lithical artefacts and human species in the islands of that area.

18.- The structure of the shoulder of the *Homo floresiensis*

So far, the last of the main articles published around the *Homo floresiensis*, is one from Susan G. Larson's team related to the structure of its shoulder[35] and which appeared in August.

The authors of the study suggest that the articulation of the shoulder of the *Homo floresiensis* had no similar structure to the anatomically modern humans; that is, us. In their opinion, the collarbone is relatively short in comparison with ours (taking into account its minor absolute size) and the scapula was longer, which made movements more frontal than lateral ones. As a whole, the shoulder's morphology is quite similar to the one of the Child of Nariokotome, or Turkana Boy, a specimen of *Homo ergaster* or African *Homo erectus*, technically known as KNM-WT 15000, found by the Richard Leakey and Allan Walker's team in Kenya in 1984. After comparing the equivalent bones of LB1 with the right collarbone of the Child of Nariokotome (KNM-WT 15000 D), the scapula (KNM-WT 15000 E) and the humerus (KNM-WT 15000 F) the authors of the study conclude the configuration of the shoulder of the *Homo floresiensis* could suppose the transition between the shown by the morpho represented by the Turkana Boy and the *Homo sapiens*, so, whereas our shoulder is more prone to lateral movements than that of the *H. floresiensis,* it would be more adapted to frontal than lateral movements

Despite the clear differences between the features of the *Homo erectus* represented by the Child of Nariokotome and the ones of the *H. floresiensis*, shown by the partial skeleton of Liang Bua, we have to recognize the group of bones which make up the shoulder are closely related (collarbone relatively short, short degree of torsion Huaraz, etc…). Because of that Susan G. Larson and colleagues consider these similarities are not due to casual morphological coincidences, but rather they are part of the expression of a functional complex which had characterized the early *Homo erectus* and that it was preserved by the *Homo floresiensis*. It would be, then, an

[35] S. G. Larson: Homo floresiensis *and the evolution of hominin shoulder*; Journal of Human Evolution, 2007, pp. 1-14.

evolutionary development that had remained unknown until now. Finally the authors focus on Dmanisi (Republic of Georgia) and warn that the new discoveries of postcranial remains made in this Caucasian site (which, strangely enough, they do not assign to a *Homo georgicus*, but to an early *Homo erectus* from the Caucasus) could throw some light on the topic.

19.- The structure of the wrist of the *Homo floresiensis*

A month after the publication of the article about the shoulder of the *Homo floresiensis*, the magazine *Science* published a new study about other element of the postcranial skeleton of this human species. In this particular case, it was a research study about the wrist of the LB1 skeleton made by the team led by Matthew W. Tocheri (from the Department of Anthropology of the National Museum of Natural History of the Smithsonian Institute of Washington)[36].

The study comes to very similar conclusions to the ones established after analyzing the shoulder of this same skeleton and comparing in it with the one from the Nariokotome child. The archaic morphology of the three bones of the wrist analyzed confirm they are, by no means, similar to ours, but rather they seem to represent a morphology dating back 800,000 years which means that the anatomy of the wrist of the *Homo floresiensis* was not present neither in the *Homo sapiens*, nor in the *Homo neanderthalensis* nor, even, in the last ancestor common to both of them.

The morphology of the wrist of the *H. sapiens* and the neandertals present some derived features that are not present in the one from the LB1. From these studies the authors came to the conclusion that the *Homo floresiensis* is not a pathological *Homo sapiens*, but rather a specific human species, different to anything which could be present in the fossil register of the human species. According to Tochieri and his colleagues, *Homo floresiensis* was ramified making its own evolutionary path before the lineage which derived in the *sapiens* and the neandertals from their last common ancestor.

The authors recognized, however, more fossils are hended, above all from the *Homo erectus* in broad sense, that is to say, African examples between 1,8 and Ma.

[36] Matthew W. Tocheri, *et al.*: *The Primitive Wrist of Homo floresiensis and Its Implications for Hominin Evolution*; Science, Vol. 317, 21st September, 2007, pp. 1743-1745.

They mainly miss carpian bones[37] of that size. If they could be found, they would help notoriously either to validate or refute the hypotheses that the authors have suggested.

20.- The uncertainty regarding the origin of the *Homo floresiensis*

Which is the origin of the *Homo floresiensis*? The topic is too open, as it implies many uncertainties. At first its discoverers were strongly in favour of the *H. floresiensis* as descendants of the *Homo erectus*, which had arrived in what it is nowadays Java and Sumatra 1,8 million of years ago (as the finds in Modjokerto, Trinil or Solo show, and according to the datings of the geochronologist Carl Shiwcher). We have already mentioned Flores was never united to the continent because it was always isolated by an inlet which acted (relatively) as a biological barrier. That separation is known as "Line of Wallace". The human presence in Flores goes back to at least more than 800,000 years ago, as Morwood points out, alleging that is what supports the fact of having found lithic tools in the island that old. However there are people who question this arguing their morphology is not from anthropic origin, but due to the action of natural agents. Though the truth is most of the scientific community tends to believe the testimony of Morwood and Brown. The question would be then: How was it possible some humans could navigate through so dangerous waters 800,000 years ago? Were they able to arrive in Flores by chance? Anyhow, this fact is part of many mysteries still to be solved in relation with the human presence in Flores.

Nowadays there are three big hypotheses are considered to explain the origin of the *Homo floresiensis*. On the one hand, there is the possibility they are the descendants of some supposed *erectus* who had arrived in Flores at least 800,000 years ago (being then the possible authors of the tools found in the Depression of Soa), and who had reduced their body dimensions as a way of adaptation to the scarce resources of the island. This is the hypothesis the authors of the discovery opted for the most. Another possibility is that the *H. floresiensis* already arrived in the island with a size significantly tiny, maybe due to a process of dwarfism undertaken in other islands. Nowadays the directors of the team working in Liang Bua consider this as the most valid hypothesis. Although, in this case, it is still a mystery the specimen from which the *H. floresiensis* had evolved. However, it cannot be rejected these humans already arrived in the Asian Southeast with body dimensions extremely tiny before occupying some island. In that case, the possibility they descended directly from the *Homo habilis*, or the *Homo georgicus*, seems to be quite plausible. Not in vain from the

[37] Scaphoid, trapezium, trapezoid, etc…

finds of Dmanisi, in the Caucasus, it has been proved the first humans to abandon Africa were not the *Homo ergaster* (that is: the so called African *Homo erectus*; or, to be more precise, the African ancestors of the Asian *Homo erectus*) but a more archaic human species and possibly derived from the *Homo habilis*: los *Homo georgicus*[38]. More surprising was Milford Wolpof's proposal, who suggests the *H. floresiensis* could descend from the *Australopithecus* and that even they could have leave Africa, being the promoters of an early exodus towards the Asian Southeast. A risky proposal such as this should be based on empirical proofs with a minimum of soundness (some fossils which suggest something like this) to be able to have certain degree of credibility. However, nothing of this has been found, though Wolpof maintains that it has happens so, but we do not know how to see it, so fossils assigned up to now first to *Meganthropus* and then to a *H. erectus* should be re-examined considering the new finds to see if it was possible to assign them to an *Australopithecus*. A far too much heterodox proposal and that before acquiring certain credibility has to see how the possible more plausible and less revolutionary hypotheses become exhausted.

Nowadays the team who directs the excavation works in Liang Bua consider the *Homo florsiensis* as descendant from some kind of hominid similar to the *Homo habilis* who had arrived in the Asian Southeast. Although the fossil remains of African *Homo habilis* and *Homo floresiensis* are separated for more than 9,000 km and by more than two million of years, the truth is that the cranium of LB1 and of some *H. habilis* are very much alike[39].

Anyhow, the truth is the mystery of the origin of *H. floresiensis* continues and we cannot even imagine the surprises this question may bring.

Carlos A. Marmelada.

[38] For more information about the *Homo georgicus* cif.: *Unos fósiles hallados en el Cáucaso se asignan a una nueva especie humana*; by Carlos A. Marmelada, in Aceprensa service 154/02, 20-11-2002.
[39] Ver al respecto Mike Morwood y Penny Van Oosterzee: *The discovery of the Hobbit. The scientific breakthrough that changed the face of human history*; Random House, Australia 2007.