

***Homo floresiensis* :**

A little Woman on Flores Island gives Evolution its Right "Sense" !

by François de SARRE

The usual « linear » model of an evolution, whose result is *Homo sapiens*, has definitively fallen from grace...

Let us recall that this image, linked to a descent from apes, was forged in the 19th century, and that it lasted until the years 1990.

At the latest since 2004, at the news of the discovery of *Homo floresiensis*, a small fossil from the Indonesian island of Flores, it has become clear that "modern" man is not the more advanced of the primates, but the today representative of a lineage among many others... and moreover a most archaic one!

During the Pleistocene, a process of diversifying and splitting into new varieties and species occurred many times, just as there was also the case for other large mammals (elephants, bears, cervids) of the same period, that was marked by climatic and geological upheavals.

Thus, various *specialised* human forms made their appearance in several points of the Earth. One of these "evolutionary products" is *Homo floresiensis*, a very small species, called "hobbit" by its Australian and Indonesian discoverers, in reference to J.R.R. Tolkien's work.

In addition, some ethnological data make us think that this hominin survived in Flores – or on other islands of the Indo-Pacific area.

At the 19th and 20th centuries, the researchers had drawn hasty conclusions about the evolution of the human *phylum*, by placing all their hopes in the survival of only the *sapiens*... as if this one would represent the ultimate stage of the evolutionary process... However, the small *floresiensis* comes now at the right moment to show us that the *dehumanisation* is a normal evolutionary tendency among primates, and that the intellectual primacy of *Homo sapiens* is but the tree which is hiding the forest !

Are there *infra*-pygmies in Indonesia ?

Until this famous publication in *Nature* (**1**) in October 2004, with the description of tiny people on the Indonesian island of Flores, researchers thought that the zoological genus *Homo* had been represented during the Late Pleistocene in Southeast Asia by only 2 species : *erectus* and *sapiens*, characterised both by a big size and by a relatively voluminous brain, especially if we compare it with that of *Australopithecus*, in Africa.

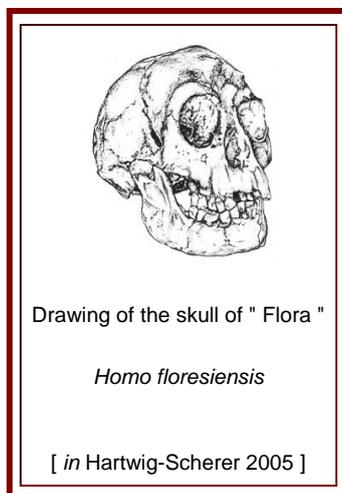
The discovery of the hardly fossilised skeleton (18,000 years old) of a new hominin for science, was quite surprising. In addition, this woman, to which the palaeontologists gave the name of "Flora", barely exceeded the meter!

That does not make it truly sensational, except... if we do realise that this is the size (and the stature) of a 5 years old child...

It's difficult to speak here of a "pygmy", as the Indonesian professor Teuku Jacob and some other anthropologists would like to do, claiming that a community of small size always lives in Rampapasa (**2**), not far from the cave of Liang Bua, where *Homo floresiensis* was exhumed. But these modern natives have an average size around 1,45 – 1,35 for the females: we are far from the meter of "Flora", who had the real appearance of an *infra*-pygmy !

If there is a criterion that we should adopt here, it is well the *cerebral volume*. At a true pygmy of the species *sapiens*, the brain is comparable with ours (around 1200 cc). It is not the case of *Homo floresiensis*, whose small cranium contained a brain of ... hardly 400 cc capacity.

It is about what we observe in *Australopithecus* of similar stature, like the famous "Lucy", discovered in 1974 in Ethiopia by Yves Coppens and Donald Johanson.



In a comparative study, it is easy to make some calculations, according to size, that if " Flora " had belonged to our species, she would have had a cerebral volume of 890 cc. And, if she would be a kind of miniature *Homo erectus*, as recommended by certain researchers, her cranial volume would reach 650 cc (3).

In any event, the low size of *Flora's* brain does not make possible to get evolutionary conclusions from a reputedly archaic character... since *floresiensis* is geologically young !

We know now that – contrary to what we have believed for a long time – *Homo sapiens* was not the *only* representative of *Homo* who lived on Earth at the Late Pleistocene (at the time of Cro-Magnon). As a matter of fact, in the past tens of thousands of years, people of modern type shared the world with at least 3 other species of the genus *Homo*, i.e. : *H. erectus*, *H. neanderthalensis* and *H. floresiensis*...

The model of *Initial Bipedalism* – on which we shall return – easily conceives such a distribution of forms, evolving in a parallel and *in a divergent* way, and we can even think that there were much more other *Homo* representatives at the end of the Pleistocene period !

Was "Flora" able to swim ?

How to explain that the dwarf of Flores could formerly arrive on this island of the Indian Ocean, if we take account of the current evolutionary views in anthropology ?

About which time occurred this ? A million years in the past, or much less ? [During this talk, we will keep by convenience the dates currently used by palaeontologists for Plio-Pleistocene]

A major problem is that of the geographical localisation of Flores in the Indonesian archipelago.

The zoologists know the *Wallace's Line*, a natural border which keeps the animals from dispersing between continental Southeast Asia, on the one side, and *Wallacea*, on the other, i.e., the zoogeographical province which includes Australia, New Guinea, Flores, and some other islands.

When there were fluctuations of the sea level during the Pleistocene, the lands located at the East of the Wallace's line were not attached to the Asian continent. They were thus not accessible during the Ice Age, otherwise... by swimming! Could *Homo floresiensis* swim ?

It's what the French palaeontologist Pascal Picq (4) considers on a whole: "... *people thus arrived with boats, or swimming ...*". By the way, *Pithecanthropus* and even *Homo sapiens* existed, too, – at this same time – in the Indonesian area.

During the late Pleistocene, all these people were moving... It is not forbidden to think that *erectus* and *floresiensis* were perfectly able to swim, on rather long distances... The latter, perhaps, colonised most islands of the Indo-Pacific. We will further evoke the rumours on the existence of a "*Little People*".

For now, let us go on with considerations on the *body size*. It is only *one* variable among some others, and it did really occur in a various and *non-systematic* way !

Even if this is in disagreement with the currently admitted model, much of major events in Human Story seem to have occurred *out of Africa*... The diversification of the original type (*sapiens*), and its splitting into various species, is, indeed, a process that was many times repeated, in several locations and occasions, as that was also the case **for other large mammals** during Pleistocene (as we'll see it in a next chapter).

In any way, we are now able to claim that the phylogenetic tree of the hominids, during the Plio-Pleistocene period, appears more and more *bushy*...

Homo sapiens was thus to share the planet with the "hobbits", but also with *Pithecanthropus* in Southeast Asia, and, not to forget, with the Neanderthals in Europe and in the Middle East ! We must here added : in our state of knowledge... Then the next years perhaps will bring us some new fossil finds moreover... or even the discovery of *living representatives* of another species than *Homo sapiens*...!

It seems very improbable that only the latter had survived.

But even if it were the case, it is obvious that it will be no more possible, henceforth, to draw evolutionary conclusions *from Homo sapiens' alone survival*... Far from being a final result, the "modern" human morphology is rather *at the origin of other forms of hominids* : *Pithecanthropus*, Neanderthals, "hobbits"...!

And what palaeontology doesn't yet bring as an evidence, because of the lack of *sapiens* fossil specimens whose antiquity (former to Late Pleistocene) is undeniable, the biological study of man will supply it (5).

If referring to embryogenesis, man kept a round "primitive" skull and head, with frontal brain lobes located *above* the ocular orbits and the forehead. We have a vertical face, whereas the other *Homo* species don't have practically any more visible brow: the frontal cortex and all the brain are *rejected* behind, to differing degree according to different species. The brain is laterally compressed by the lengthening of the cranium shape. Ontogenesis shows us that these latter features are acquired *secondarily*... As a matter of fact, in all foetuses of primates, *the head is originally round*.

The other types of Pleistocene men (*erectus*, *neanderthalensis*...), far from being in "our" direct ascent, were indeed *specialised late forms*, marvellously adapted to their respective habitats : lagoons, mangroves, or large forests !

As the study of the recently discovered small-bodied *Homo floresiensis* suggests, we are here manifestly in presence of a **post-sapiens** hominid...

The small woman of Flores shows us the true "sense" of the evolution, in the human *phylum* : it's *Homo sapiens* – in his "modern" configuration – who is at the starting point of the other *Homo* species of the Pleistocene !

The astonishing plasticity of the genus *Homo*

The discovery of "Flora" shows us how *flexible* the genus *Homo* is, in adaptive answers to his environment !

Researchers tried to explain the small size of the "hobbit" by a geographical isolation and by the limitation of food resources on an island. It is a specious argument, because the palaeontologists presuppose the evolution *in loco* of a sort of *Pithecanthropus*... After reflection, this appears quite unlikely.

The theory of "insular nanism" can certainly be applied to big animals, like elephants, because they are obliged to develop small forms to survive. But is this really the case in *human* populations, too ?

Let us notice that the island of Flores (17,000 km²) is twice as large as the French island Corsica (8,700 km²), for instance. We can easily consider that *Homo floresiensis* was already tiny *before* arriving in Flores. Moreover, this matches the hypothesis of Dean Falk, professor at the University of Florida (6).

In any case, the occupation of the island of Flores seems to be relatively **ancient**. Bones and teeth of **seven or eight representatives** of the species *Homo floresiensis* were discovered in the grotto of Liang Bua ! A complete skull ("Flora"), its mandible, its right leg, hand-bones, foot-bones, fragments of the spinal column, sacrum, clavicles and ribs... They are dated between -12,000 and -95,000 years, which supposes a continual occupation of the island during this period !

If the principal skeleton is 18,000 years old (as calculated from the sediments found in place), the other fossils of Liang Bua are spread on a rather long duration, which wipes out the assumption of a "pathological dwarf", as supported by emeritus professor Teuku Jacob of palaeoanthropology at the Gadjah Mada University of Yogyakarta, Indonesia.

One of the first rules in the description of new species, as well in zoology as in palaeontology, consists in a careful checking whether the described specimen doesn't present any pathology, and if it is not an abnormal representative of an already indexed species : in that case, it would be *Homo sapiens*.

Already, the "long palaeontological life" of the Flores dwarf makes possible to exclude any idea of recurring pathology. As the palaeoneurologist Dean Falk also affirmed: the aspect of the brain of "Flora", as reconstituted, does not evoke at all that of a dwarf microcephalic *sapiens* (7).

Homo floresiensis is, indeed, a valid species !

This does not make any doubt for the Australian and Indonesian discoverers : Peter Brown, Michael Morwood and R.P. Soejono. A combination of primitive and derived – unique – features, characterises this new hominin species, that was described – in the rules – by giving the scientific name of *Homo floresiensis*.

Why are some anthropologists so hostile to the concept of a *new species* ?

It is, of course, in connection with the phylogenetic and evolutionary history of modern man... Because the discovery of Flores badly goes with the "multiregional" model of human origins, defended particularly by professor Teuko Jacob ! In such a scenario, *Homo sapiens*, issued from *Homo erectus*, has appeared simultaneously in many places on Earth, i.e., in several "hearths" of humanisation. At the late Quaternary period, the mixing of the human populations should have prevented the emergence of locally new species. Thus, *Homo floresiensis* is no longer justified ! Viewed from this angle, the "hobbit" is necessary an abnormal individual of the species *Homo sapiens*... But in the current state of our knowledge, this assumption appears to be very improbable.

Nevertheless, it is easy to understand that the sudden intrusion of *Homo floresiensis* in the evolutionary scene was not in best favour among the "multi-regionalists" !

On the opposite, the discovery of "Flora" fills those biologists and anthropologists with delight, who insisted on a *natural diversity* of mankind, and on the *gradual emergence* of new hominin species, thanks to a process we call : **dehumanisation**.

From now on, in human sciences, we can speak of a **before-28 October**, and an **after-28 October** !

Where did the Flores Man come from ?

Probably, from the Indian sub-continent. It is not only the reflection on the body-size which encouraged the discoverers to describe a new hominin species, but also the attentive examination of the skull. Thus, *Homo floresiensis* differs from *Homo sapiens*, because he has **no chin**, but protruded jaws (like a small monkey !), strong eye-brows, and a thick brain-pan. These are characteristics that *floresiensis* shared with *erectus*. If there were not the difference in stature. Therefore it was already known that German palaeontologist Ralph von Koenigswald discovered in 1948 a small fossil in Sangiran (Java), called *Pithecanthropus dubius*. Otherwise, the complete cranium which approaches closer to "*Flora*" is without doubt the *Homo georgicus* skull (D2700), found in 2001 in Dmanisi (Georgia), whose cerebral capacity did not exceed 600 cc. But it could be a question of only *convergence*.

Let's go back to present time. As a matter of fact, the pygmies of *Homo sapiens* are small because their growth is delayed during puberty. *But the brain has already reached its final size*, or nearly : this is the reason why it is hardly smaller than the brain in other populations of *Homo sapiens*.

The low size of pygmies results from a reduced level of the hormone IGF-1 (*insulin-like growth factor*) during the growth, or a reduced receptivity to IGF-1. But even if the adults are small, the head and *brain* proportions remain in the average of the neighbour populations of normal size.

Why thus became *Homo floresiensis* so tiny ?

As we said it before, it is necessary to get rid of the stereotype of an "insular nanism". Some researchers spoke, indeed, of reduced food resources, which would have "forced" humans to become tiny, because the environmental conditions made that a body of less size was an "advantage", in the darwinian sense of this word. But what is true for *Stegodon*, a kind of dwarf elephant, is not necessarily the case for an omnivorous hominin !

Even if the tropical rainy forests of the island of Flores offer only a limited supply in calories, we shall not forget that human groups take their resources also from the sea (shells, fish), or in catching insects and small preys.

Which is thus the rational explanation of the "hobbit" 's tiny body ? One can think of advantages in term of *thermoregulation*, in hot wet forests, because a reduced size makes it possible to *reduce the internal heat* produced by the body...

Thus, just like in negritos and other small people, the dwarfism of the "hobbits" was the result of an anatomical response to a very warm climate, and life in woodland (in the case of *floresiensis*, at seaside). Pygmies remained as *Homo sapiens* people, whereas the new discovered Indonesian hominin became the representative of a new *distinct* zoological line : *Homo floresiensis*.

In this species, the cerebral growth is not more carried out, like in *Homo sapiens* !

It must exist in the Flores hominin a mechanism which *reduces* the skull, instead of developing it – *already in uterine stage*. In the baby of *floresiensis*, just like in *Pithecanthropus*, the brain-case doesn't increase in the same proportions as the rest of the body (we call this : *heterochrony of development*). Growth is short, and sexual maturity is quick (towards 10-12 years?), which constitutes a *selective advantage*.

Under these environmental conditions – not necessarily on an island ! – the evolution could have supported the emergence of dwarf individuals with *very small* brains !

We know already from the study of fossils that the hominin called *Pithecanthropus* or *Homo erectus*, generated, at the time of his expansion in Asia, several varieties of different size and morphology, in China, Java or elsewhere, as for instance the *Meganthropus*, a giant *Homo erectus*.

Would be Flores man, on the contrary, a local dwarfish form of *Pithecanthropus* ? No, not at all : because the examination of the *virtual encephalon* by Dean Falk and her team allowed us to note that some of the characteristics of the "hobbit" 's brain are *unique* !

Moreover, *Homo floresiensis* is not in the evolutionary continuity of the African *Australopithecus*. Common characters, such as small size, basin anatomy, are explained by *convergence*, rather than by migration out of Africa.

Facial and dental characteristics, obviously, link the dwarf of Flores to the large *Homo* of the Pleistocene period. But not necessarily to Java's *Homo erectus*, which himself was already very specialised !

It seems extremely probable that once hominins, *already as dwarfs*, arrived in Flores, from other islands of the Sunda archipelago (Java, Sumatra, Bali), or even directly from the Indian sub-continent.

Small « dehumanised » humans ?

The evolution of the climate, of the fauna and flora during the course of Pleistocene, can be correlated with the *dehumanising* evolution of representatives of the genus *Homo*. Only *sapiens* was not affected by the process, thanks to the decisive contribution of his **culture**.

In the numerous *Homo* species (see the list, next chapter), we'll find enough common characters to be sure of their close relationships, and enough specialised characters, to affirm that *they are not alleged ancestors* of "modern" man (who remained unspecialised), but in reality *his followers* !

In her book "*Préhistoire du piéton*" (**8**), Yvette Deloison, a researcher at the CNRS (*Centre National de Recherche Scientifique*) and at the *Collège de France*, make us keep in mind the « Law of *Irreversibility of Evolution* », as formulated by the Belgian palaeontologist Louis Dollo (1857-1931) : specialised animals cannot evolve back in non-specialised ones. Therefore, *Homo sapiens* is a perfect example for anatomical **non-specialisation** !

Regarding *dehumanisation*, it is a driving force in the evolution of primates, which led to various morphotypes *beyond the type of sapiens*. As Bernard Heuvelmans (**9**) already wrote, it consists in a progressive distance from the features which characterise *sapiens* : upright posture, large brain and short face, almost round head, foot with rigid plantar arch, *cultural practices*...

It is not necessary to speak of "degeneration", because *dehumanisation* is a kind of specialisation : this defines in zoology a *loss of original features*, and at the same time, *an exaggerated development of one or more characters*.

As precisely Heuvelmans indicated, the biological phenomenon of *dehumanisation* concerns *all the lineages* in Pleistocene : *Homo sapiens* is but the only one who has remained *close to the original type* (with round head and a big brain). Other *Homo*-species got an elongated head, and a brain that was removed backwards inside the skull.

The factor triggering a *dehumanisation* can be found in the aggravation of life conditions, after durable climatic disturbances. Locally, the rejection of a group for discriminatory reasons (such as recurring pathologies) can also be evoked.

Berliner professor and anatomist Max Westenhöfer, in the years 1920, already put the emphasis on the *changes that occurred in food practices*.

Proteins and vitamins (role of sunshine !) condition the body metabolism, in particular during the delicate period of growth (*ontogeny*).

The bones, *particularly those of the skull*, are able to gain in density – and in robustness – by an accumulation of *calcium*. In that way, we could pass from the *gracile* model of man, to the *erectoid* or *neanderthaloid* ones (**10**).

There are two hormones, *calcitocin* and *parathomone*, whose combined action is at the base of the calcium metabolism, in mammals. This element is brought by blood circulation. If a hormonal dysfunction occurs, *surplus calcium* is *not* eliminated. Then it gets "stored", and the bone becomes more compact and much thicker.

All that is controlled by enzymes and hormones, which are *gene expressions*, but also by the vitamins *which come with the food*. Hence the importance of an adapted food !

Moreover, during the intra-uterine growth of embryo or foetus, *the diffusion of hormones* through the plasma of the pregnant mother can play a determining part, because it's just at this time that the delicate cerebral and cranial structures are set up, and some hormones may be able to induce – or reinforce – a *dehumanisation* in the growing foetus.

An *allopatric* isolation (no more possible contact with other groups) generally completes the process of *speciation*, which leads to the formation of a *new biological species*, genetically distinct from the original one. In theory, there is no more possible hybridisation, or the descent is not fertile.

In a catastrophic context, i.e. after the impact of an asteroid or the explosion of a super-volcano, there are "pockets of survival" that make possible the isolation of the new species, whereas other human groups (*sapiens* included) continue to live in other "pockets of survival".

This is also an illustration of the model of "*punctuated equilibria*" in evolution, which suggests that new species result from *very quick* evolutionary steps, following by long periods of standstill (*stases*).

In fact, as American palaeontologist Stephen J. Gould (1941-2002) affirmed, evolutionary changes rather come from an *exaptation* (not "*adaptation*"), in the sense that modifications that are *already* in place (like the robustness of the ocular orbits and cranium) *make then possible the colonisation of new environments* (like lagoons or mangroves).

Regarding the emergence of *Homo floresiensis*, the often evoked hypothesis of an "insular nanism" from an *erectus* offspring is not convincing, if we take a closer look at things.

We are, indeed, *not* in the scenario of a *simple* reduction of size. As a matter of fact, the entire body of the "hobbit" has been *reprogrammed* !

Dean Falk, neuropalaeontologist at the University of Florida, and her team, carried out (**11**) a three-dimensional image of the interior of "Flora" 's skull (*endocranium*), in order to compare it with the (virtual or real) encephalon of *Australopithecus*, of *Homo erectus*, of modern people, of apes, of a woman adult pygmy, and also of a person affected by microcephalism.

As a matter of fact, *Homo floresiensis* is perfectly "wired" ! His intelligence could have enabled him *to cross the oceans* – and probably to develop some type of civilisation. *Thanks to his cerebral capacities*, the "hobbit" was definitively able to travel and to settle everywhere through the world !

And we think again of the « *Little People* »...

Just like Ralph Holloway, palaeontologist at the Columbia University of New York, Dean Falk affirmed that *Homo floresiensis* is a good species, and not a dwarfish *Homo erectus*...

The brain of "Flora", indeed, shows a well developed frontal lobe. It's the seat of reflection, while the temporal lobes are the seat of memory and emotions. On the virtual three-dimensioned images of the skull, we can distinguish a brain, with a round-shaped hind part, and we see the *lunate sulcus*, also typical in *Homo sapiens*. The visible convolutions on the virtual brain do not come simply from the *miniaturisation* of a *sapiens* (or *erectus*) brain: it is "something else"...

We shall also not forget that the ratio of brain and body size is, in the "hobbit", closer to the same ratio in *Australopithecus* (like "Lucy"). This makes the specificity of *Homo floresiensis* even more obvious !

All the intelligence of the little man is locked up in an osteological "envelope" which reflects features that are generally considered to be "primitive" by palaeontologists. Regarding teeth and basin, they would be not inappropriate in an African, 4 millions years old *Australopithecus*, who looked rather like a chimpanzee.

The general anatomy of the "hobbit" was certainly that of a small man, but his head with a receding profile, and with a little "muzzle" formed by the protruding jaws (*prognathism*), made him surely resemble a bipedal monkey !

As we will see, it is quite the portrait of the *orang-pendek* (or other forms), observed by witnesses on several islands of the Indonesian archipelago.

In my opinion, *Homo erectus* and *Homo floresiensis* had a common, tall-sized ancestor. From the point of view of a *dehumanisation* of wild forms, this common ancestor could have been the *Homo sapiens*, as I already emphasised (12).

Yet, we must wait until other skulls, similar to "Flora", are discovered on the island of Flores, or elsewhere. The study of but a cranial (*virtual* !) cast cannot conclude the debate.

We also know that the French palaeontologist Jean-Jacques Hublin received from Teuku Jacob a piece of rib (1g) from "Flora" skeleton, to bring it for DNA-analyse to his colleague Svante Pääbo, of the Max-Planck-Institut in Leipzig. But it is certain that, if serious studies of the "hobbit"-DNA are to be carried out, it will be necessary, for instance, to extract dental pulp inside a molar. Otherwise, the hardly mineralised fossil could have been contaminated by the several researchers who handled it.

Comparison

with the lineage of other large mammals

According to the criteria of the *Initial Bipedalism* Theory, the big brain of the so-called "modern" man, is in reality an **ancestral** (plesiomorphic) character. Our brain fills up the whole cerebral cavity, above the base of the skull (*cranial floor*), where the vertebral column gets into the head. Man is walking upright because he has a big brain, *and not inversely* !

If we refer to only Pleistocene, and to the genus *Homo* alone, we shall notice that there were nearly **twelve species** of *Homo* (or more, according to some authors).

They are, alphabetically :

H. antecessor
H. (Pithecanthropus) erectus
H. (Pithecanthropus) ergaster
H. floresiensis
H. georgicus
H. heidelbergensis
H. neanderthalensis
H. (Meganthropus) palaeojavanicus
H. pongoides
H. sapiens
H. soloensis

Similar lists can be drawn up for other large mammals, at the same geological period !

As, for instance, the elephant (*Elephas*) :

E. (Loxodonta) africanus
E. antiquus
E. atlanticus
E. (Loxodonta) cyclotis
E. falconeri
E. indicus
E. melitensis
E. meridionalis
E. (Mammuthus) primigenius
E. recki
E. trogontherii

Just like in the genus *Homo*, we find here dwarf forms (*melitensis*), some with rounded forehead (*indicus*, *recki*), and others with receding forehead (*antiquus*, *africanus*)... We can also note that the supposedly more "hairy" of all elephants : the mammoth or *E. primigenius*, far from constituting (as researchers originally believed) the oldest and the more "primitive" elephant, on the contrary, *was a recent and very specialised form* !

As a matter of fact, we could claim the same thing about *Pithecanthropus* (*Homo erectus*), compared with *Homo sapiens*...

In another group: bears or *Ursidae*, the only genus *Ursus* showed during Pleistocene and Holocene :

U. americanus
U. arctos
U. arvernensis
U. (arctos) crowtheri
U. deningeri
U. etruscus
U. (arctos) horribilis
U. maritimus
U. spelaeus
U. thibetanus

Among all these genetically close related species, the polar bear (*U. maritimus*), unlike the brown bear (*U. arctos*), is an especially marine animal, well adapted to an icy environment, and hunting seals. The body of the polar bear is hydrodynamic lengthened, with a long neck and head, surrounded by small round ears. The forelimbs are broad, and fingers are palmed on half their length.

In spite of their anatomical and behavioural differences, the two bear species, *Ursus arctos* and *Ursus maritimus*, are close related by genetics and evolution (a common ancestor lived at the Middle Pleistocene period).

We consequently see here a parallel with *Homo sapiens*, especially terrestrial, and *Homo erectus*, possibly aquatic, swimming and diving (13) !

Reflections on the phylogeny

of the genus *Homo*

The first observation, we are able to make, is that the genus *Homo* matched in Pleistocene the evolution of any other group of large mammals...

The intra-genus variability is very comparable (about ten species), and that's, too, what makes very probable the survival, until now, of some of hominins, besides *Homo sapiens*... This is also the subject of the *hominological* research, as defined by the Russian scholars Boris Porchnev and Dmitri Bayanov (14).

Consequently, apart from *Homo sapiens*, several *specialised* wild forms of man could still exist, quite naturally, in various places on Earth.

We can consider one or more "miniature" forms, like *Homo floresiensis*, undoubtedly aquatic at their origin (currently, rather in forests), and "giant" forms, near large rivers, able to swim on open sea : *Homo erectus* (or *Meganthropus palaeojavanicus*) ; and *Homo neanderthalensis* (or *pongoides*), a rather more mountain dweller, probably issuing from a distinct line.

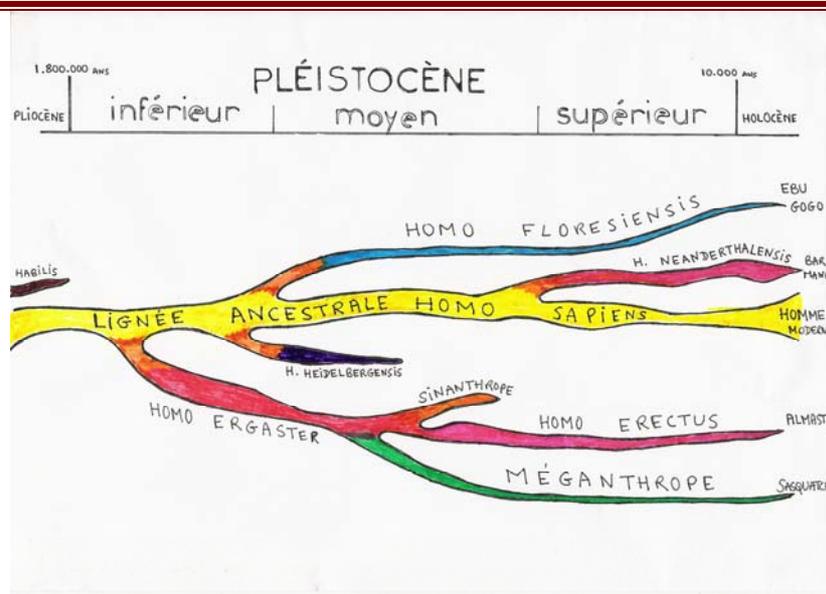
All these species remained genetically very close to *Homo sapiens*, in spite of important morphological and behavioural differences, in the same way as polar bear is in relation to brown bear, or today elephants in relation to mammoth.

Far from being "our ancestor", *Homo erectus* was undoubtedly a kind of wild man, specialised in a semi-aquatic habitat, even at sea-shore (estuaries, archipelagos).

If his limbs were proportioned like ours, his foot was already different. It was much more flexible, without rigid longitudinal arch, and better adapted to muddy grounds (it is easier to get a non-rigid foot out of mud !), to rocky grounds (because the toes could better grasp at substrate), and in water (for underwater propulsion !). It is interesting to read what the American anatomist Jeff Meldrum wrote on the print of an *erectus*-foot, found in the archaeological site of Terra Amata, in Nice (15).

At the opposite of the current paradigm in palaeontology, we think that specialised and robust *Homo* species, like *erectus* or *heidelbergensis*, have never generated a gracile type, like *sapiens*, who was called "modern" by... himself !

Quite on the contrary, it becomes necessary to consider that the *sapiens* type, the most polyvalent and the less specialised of all *Homo*, has to be replaced at the origin of all "robust" species !



Relationships in the genus *Homo* during Pleistocene

Only the principal lines are represented here :

- yellow** : ancestral lineage *Homo sapiens*
- blue** : *Homo floresiensis*
- red** : *Homo neanderthalensis*
- purple** : *Homo heidelbergensis*
- orange - pink** : *Homo ergaster* - *Sinanthropus* - *Homo erectus*
- green** : *Meganthropus*

Throughout Pleistocene, the ancestral stock of *Homo sapiens* is characterised by the maintenance of the embryonic disposition of a *round head*, by an upright posture of the body, and by a frontal cortex *above the ocular orbits* (flat face and high forehead).

Since always, the species *Homo sapiens* admitted a broad intra-specific variability. Thus, the various dehumanised lines branched out ; at the beginning, they are simple varieties of *Homo sapiens*. The distinct morphological features are explained by progressive modifications in ontogenetic process, during growth. Such modifications are *fast*, and correspond to a punctuation (as defined by Stephen J. Gould), probably after major cataclysmic events, that caused a separate evolution.

Homo erectus, *neanderthalensis*, *floresiensis* and others, are the results of an evolutionary process of hypermorphose, gradually spread in time. [This reinterpretation of the evolution of *Homo* shares together with punctualism and gradualism]

New varieties, like *Homo floresiensis*, developed in geographic *isolates*, and resulted indirectly from pressures of the environment (*exaptation*). They are finally developing in a new species (*speciation*), then remaining in standstill (*morphological stase*).

Such robust forms can have survived until present time. They are the "wild men", whose vernacular names are put on the right of the diagram: *ebu gogo*, *barmanu*, *almasty*, *sasquatch*...

The question of the great antiquity of *Homo sapiens* is, of course, controversial, because the oldest fossils that are "officially" recognised, are hardly 200,000 years old (Omo valley, Ethiopia). Older fossils of *Homo sapiens* may exist, indeed. If the populations of *Homo sapiens* during Early Pleistocene lived close to the coasts, perhaps their remains are now under the sea-line, whereas those of contemporary *Homo erectus* are, indeed, found in the zones corresponding to ancient swamps, or mangroves, where *Homo sapiens* did not live.

But it is also possible that discoveries of ancient *Homo sapiens* have remained "ignored" by the scientific community.

Some disconcerting geological discoveries are quoted in the controversial book "*Forbidden Archaeology*" by Cremo & Thompson (16), but if we seek a little, we can also find strange reports in the literature, known as "official". For instance, in the "*Traité de Paléontologie*", vol. VII, published in 1957 under the direction of professor Jean Piveteau, we can read in a chapter on "*Human fossils of dubious age*" (p. 587-588) :

« Dr Leakey announced the discovery in Kanam and in Kangerera, in vicinity of Lake Victoria, of human fossils dated back to Early Quaternary, and belonging to *Homo sapiens* [...].

According to Leakey, a mandible was found in Kanam, in association with remains of mastodons, of *Deinotherium*, and a pre-chellean industry. In Kangerera, there were skull fragments of three individuals, and a piece of femur, associated with *Elephas antiquus*, a mastodon, and perhaps *Hipparion*.

The mandible of Kanam seems "a little too thick" for one of *Homo sapiens*, but shows indeed a chin. Leakey considered it as the type for a new species : *Homo kanamensis*, who is allegedly the direct ancestor of *Homo sapiens*. In Kangira, the skull fragments show a high forehead without *torus supra-orbicularis* .

All this is very strange, indeed, because the associated fauna indicated the *Villafranchien* period, i.e. Lower Pleistocene ! The comment of professor Piveteau is « that these deposits underwent important rehandlings »... In other words, they were not truly datable : the *sapiens* fossils may have "slip" towards the layers containing *Hipparion* !

This episode was not too prejudicial for the professional career of Dr Leakey, who discovered a few years later the *Homo habilis*, a "politically correct" fossil, that one !

The « Little People » in legends

The revelation of *Homo floresiensis* could have important consequences, not only for anthropology, but also for cryptozoology, the "*science of the hidden animals*", initiated in the years 1950 by the French-Belgian zoologist Bernard Heuvelmans (1916-2001).

If he were still alive, Bernard had surely enjoyed the news of this discovery, because since his first book "*Sur la Piste des Bêtes Ignorées*" (1955), he had claimed that humanoid hairy creatures of *small size* existed, or have existed, on the Indo-Malay islands : *orang-pendek* in Sumatra, *nitaewo* in Ceylon, *batutut* in Borneo. And we can also add the *ebu gogo*... on Flores !

Is *Homo floresiensis* still alive ? Richard Roberts, a palaeontologist at Wollongong University (Australia) and co-author of the *Nature* article, is not hostile to this idea. He quotes a local story, according to which some villagers had offered food to the small people of the grotto : they ate it all !

In the regional language, *ebu* means "grand-mother" and *gogo* "eating everything". Small people are described : about one meter tall, with long hair, a round belly, ears sticking out, with an awkward walk, *but able to climb up trees with lightning speed*, repeating what they heard, like parrots...

In Sumatra, the *orang-pendek* is mentioned in a similar way.

All that seems quite improbable ?

But the existence of the Flores dwarf was at first quite so improbable... !

Henry Gee, a scientific editor in *Nature*, emphasizes in the 28-10-04 issue the hope that the discovery of *Homo floresiensis* aroused among the "hunters of yetis". Gee also referred to the researches of his compatriot Adam Davies, on the track of *orang-pendek* in Sumatra.

At the end of her very serious article "*The littlest Human*" (*Scientific American*, February 2005), the scientific journalist Kate Wong evokes the Indonesian folklore and the possibility of a survival of *Homo floresiensis*, in the form of *ebu gogo* or *orang-pendek*.

Following an excellent article "*Le Troisième Homme*" of the French scientific journalist Rachel Fléaux in *Sciences et Avenir*, December 2004, there is an original text of Pierre Lagrange : "*Flores : yéti y es-tu ?*".

Let us also quote the contribution of Desmond Morris in *BBC News*, October 2004: "Eton or the Zoo". The famous author of "*The Naked Ape*" wonders how to redirected the small people of Flores, if they were discovered alive, towards the school or the zoo ? We already knew this topic from the French novelist Vercors, in "*Les animaux dénaturés*".

As for Gregory Forth, a professor of anthropology at the University of Alberta (Canada), who published in *Anthropology Today* an article on the recent discovery of *Homo floresiensis* (17).

This author explains that he has carried out ethnological researches in the Nage area (centre of the island of Flores), since 1984, and that he collected traditions on the *ebu gogo*, a small-bodied hairy creature. Forth tells about features like the long and sagging breasts, that females could pass over her shoulders (it recalls similar accounts on the wild man in medieval Europe, and on the *almasty* in Caucasus). Gregory Forth speaks also of relatively long arms and of prominent bellies. He prepares now a book about "*Wild Men of Southeast Asia and elsewhere*".

Are there, precisely, reports of small people elsewhere in the world ?

Leaving the Indonesian archipelago, towards East, we meet the *menehune* on Hawaii and Fiji : it's a kind of goblin who allegedly live in the mountain forests, and would go down to shore only at night. On the website of the AFRC (*Association Française de Recherches Cryptozoologiques*), Jean-Luc Drévillon describes the *menehune* in this way (18) : «...two until three foot tall, with hairy body, a clumsy stature, a red-skinned face, large eyes and thick eyebrows, the head is covered with long hair going down in the back, the nose is broad and flat...».

In Central America (Belize, Honduras), we also find the *dwende*, which is between 1 m and 1,35 m, hairy with broad shoulders and rather long arms.

Is this still our *Homo floresiensis* ?

Other "little people" are known from Africa : *agogwé* or *kakundakari*. Are they surviving *Homo habilis* ?

In North America, small men, rather of *sapiens* type, are related (19). They are hardly more than 3 feet (1 metre), and have the characteristic to paint themselves in blue. The American author Paul Wilson bring them close to the Picts, former inhabitants of the British Isles, which would have also their face painted in blue.

In Antiquity and until the Middle Ages, people believed in the existence of North European "pygmies". At the 20th century, the debate had reappeared with the publication of a book of Margaret Murray on European sorcery (1921), initially the religion of the pre-historical "Small People". In fact, Margaret Murray asserted the existence of "Europeans pygmies", as if it was an established fact !

Like French folklorist Michel Meurger very well demonstrated (20), the construction of this modern myth, where nanism, superstition and sorcery are mixed, was accomplished in several stages : first, a *constitutive* period, then a period of *chronicles* and *reports*, and subsequently a period when pre-historians debate on possible pygmies in connection with the thesis of German scientist Josef Kollmann 's *primitive dwarf race*, and finally a last anthropological phase, when Egyptologist Margaret Murray, a professor at the London University, worked on the assumption that the Northern pygmies *really existed*.

Of course, this doesn't call into question the "Small People" in the Indonesian islands, whose existence is now supported by *fossils*. These bones are real, indeed. And the survival of *Homo floresiensis* is as much probable, as it's a species different from man (*sapiens*), not in direct competing with him !

Scenario for the Flores Man

The sometimes evoked assumption of "insular nanism", or miniature *Homo erectus*, doesn't fit, as we already said.

The island of Flores is relatively large. It provides various biotopes, and was attached to eastern regions (Australia included), during the last episodes of marine regression.

The small size of *Homo floresiensis* is thus not depending on insularity. Furthermore, an abundant (sea)food could be collected all along the coasts. That would also explain the "good mental conservation" of the Indonesian dwarf, because he always got a *calorific diet, adapted to his needs*.

Here is the scenario I propose as a whole.

Homo floresiensis is issued of ancestors who belonged to the *sapiens* hypodigm. Such a process reflects the *plasticity* and the natural diversity of human forms throughout the Quaternary period !

It is supposed that some *Homo sapiens* or *Homo erectus* already passed by Flores, 800,000 years ago. As a matter of fact, stone industry was discovered. In the Liang Bua cave, there were tools that most probably corresponded to normal-sized *Homo sapiens*. It is also the opinion of Michel Morwood, one of the co-discoverer.

The remains of *Homo floresiensis* are dated back between - 95,000 and - 13,000 years. The small people were perhaps used regularly as "meal" by *sapiens*, if the latter had no *Stegodon* (dwarf elephant) to eat... That's what professor Colin Groves, of the Australian National University, proposed (**21**). In any case, the tools of Liang Bua are in form and in size comparable to those found in Australia and Southeast Asia, showing that *Homo sapiens* well passed by...

In our assumption, "hobbits" issued from **man** by *dehumanisation*. As we saw, this is the evolutionary *change* in anatomical and morphological features that usually characterise *Homo sapiens*.

In this scenario, a human population is isolated from the others, for instance after a big catastrophic upheaval. Bad conditions of existence *if they last*, then radical changes in food habits, and the loss of social structure, may cause the appearance of features *to make the survivors being able to carry out an existence in wildness*. If these conditions continue, a new species, like *Homo floresiensis*, can develop.

Initially, the "hobbits" were normal-sized *Homo*, just like we...

But under the pressure of a hostile environment (predators, insufficient hygiene, recurring diseases, stress) which induced an increasing mortality, **the biological answer** consisted in an *acceleration* of the foetal growth (in order to reduce the gestation period) and in a *shortening* of the juvenile period (for a faster passage to the adult phase). They are heterochronies in development.

The concept of *heterochrony* is new in Biology. It is now possible to explain the evolution of an animal by the occurrence of some changes in the relative *timing* of developmental processes, until adult stage. Here, we are dealing with a *dehumanising* evolution.

The result is *Homo floresiensis* : a small size, a robust skull, a brain of 380 cc, and all that we don't see on the skeleton of "*Flora*" : a (probable) *pilosity*, an improvement of physical performances (swimming, climbing!) and a successful adaptation to wildlife.

The price the "hobbits" had to pay, due to *dehumanisation*, was a restraint of their cultural life, the less use of tools and, gradually, the loss of an articulate language.

At the end of Pleistocene, when the climate got better on Earth – or even before, during an interstadium – several human species got in contact in Southeast Asia – and also in competition. Under the pressure of *Homo sapiens*, and of *Homo erectus*, too, the populations of *Homo floresiensis* took refuge in places least accessible to the first two species : swamps, small islands, or dense forests inside large islands, on Sumatra, Borneo, Flores...

In fact, the discovery of little people on the island of Flores is certainly due to chance during excavations ! Undoubtedly, many other places in the Indo-Pacific area are likely to keep remains of the same minute form of human, now called *floresiensis*, or of similar forms, with a perhaps different evolutionary history.

Conclusion

In our current state of knowledge, the most probable scenario consists in a *speciation* of the dwarf hominin of Flores *from an ancient stock* of the genus *Homo*.

If we take account of the results and observations on the virtual endocranium of *Homo floresiensis*, as published by Dean Falk, those representatives of the genus *Homo* at the Middle Pleistocene, belonged to the species *sapiens*.

Subject to complementary studies of the DNA structure, the **exact** phylogenetical status of *Homo floresiensis* needs to be clarified ; it can therefore be thought that the nicknamed "hobbit" is a valid biological species (distinct at the same time from *Homo erectus* and *Homo sapiens*) which once had a broad diffusion, in an area that once included the whole Indo-Pacific region.

Many islands were possibly reached *by swimming*, what could confirm the study of the foot elements of the skeleton, if they are found. As a matter of fact, a *flexible* foot without rigid longitudinal arch would be an excellent adaptation for wading and swimming at shore. Regarding the particularly *robust* structure of skull and body, the "hobbit" is likely to have begun his evolution in a semi-aquatic environment.

An alternative hypothesis deals with a diffusion by *rafts*, what the cognitive faculties of the "hobbit" seemed to have made possible.

The stone industry found in the Liang Bua cave is probably not the work of *Homo floresiensis*, but of feral *Homo sapiens*, or of some *Homo erectus* whose dehumanisation was not accentuated too much. Microliths, as "hobbit" 's industry, will be perhaps found, but undoubtedly most artefacts will remain dissimulated under water, in formerly accessible areas, but now flooded by the inexorable rise in the ocean level, since the beginning of Holocene.

Homo floresiensis probably lived until our time – or very recently – as one of the cryptids quoted by Bernard Heuvelmans : *nitaewo* in Ceylon or *orang-pendek* in Sumatra. As his follower, French cryptozoologist Michel Raynal thinks that on the island of Sumatra the chances to find *Homo floresiensis* – or another cryptic primate – in his natural habitat are the best, because much of researchers are currently there, and they explore a relatively restricted area : the National Kerinci-Seblat Park, in the West of the island.

In any case, we can hope for next and promising discoveries, at well in zoology as in palaeontology. The chances to discover the "hobbit" are quite real !

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Addendum : In the issue **437** of October 12th, 2005, several articles are devoted to *Homo floresiensis*, with in particular the description of a mandible, and of elements of the post-cranial skeleton of new individuals (Morwood *et al.*, 1012-1017). See :

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