

## Yes, it's a Hobbit. The debate that has divided science is solved at last (sort of)

- Scientists shed new light on disputed skeleton find
- Bone analysis supports distinct species theory

James Randerson, science correspondent The Guardian  
Friday September 21 2007

It was the most astonishing anthropological find of a generation - a diminutive new species of human that apparently shared the planet with us until 13,000 years ago.

But the discovery of the fossilized "Hobbit", as she quickly became known, has provoked a long-running and sometimes acrimonious debate among scientists: was she really one of a race of mini-humans or was she merely one of us, but with a brain-shrinking disease?



The painting is of a male *Homo floresiensis*, the "hobbit", discovered on Flores, Indonesia. returning from a hunt.

Now scientists have analyzed fossilized wrist bones that were part of the original discovery in 2003 but had not been looked at in detail. They say they prove the Hobbit really was a distinct and previously unknown type of human, and not just an abnormally small member of our own species.

That analysis has revealed significant differences between the bones and human or Neanderthal equivalents. At the same time there are crucial similarities with older species of human and living apes such as chimps and gorillas. The researchers say

this puts paid to the idea that Homo floresiensis could be a "normal" human being with a brain-shrinking disease called microcephaly or some form of dwarfism.

The Hobbit was remarkable because of where it was found and when it was supposed to have lived. Its existence alongside modern humans 13,000 years ago is more than 15,000 years after the Neanderthals died out and more than 140,000 years after modern humans evolved in Africa.

"What we are beginning to realise is that our recent evolutionary history is much more diverse than we realised," said Matthew Tocheri of the Smithsonian Institution, lead author on the paper in Science that describes the wrist bone analysis. "It's a little shot to our over-inflated modern human egos."

For some though that interpretation is just too incredible. Robert Martin at the Field Museum of Chicago argued in a paper last year that the Hobbit's grapefruit-sized brain was simply too small compared with its body to be a scaled-down human species. He also said that tools found with the fossils were too advanced to have come from a creature with such a small brain. Meanwhile, Robert Eckhardt at Pennsylvania State University argued last year that Flores, the Indonesian island on which the Hobbit was found, was too small to support a population of hunter gatherers without immigration from other islands. That would mean it was not genetically isolated and so could not have evolved into a separate species. He criticised other researchers' willingness to get caught up in the hype and sniped that, "critical faculties were suspended on the part of many people".

Even the bones themselves have not escaped the intellectual tug of war. Almost as soon as H floresiensis hit the public consciousness in 2004, they were taken - some say borrowed, some say "hijacked" - by a researcher who was not involved in the original find.

But proponents of the separate species hypothesis say that evidence is stacking up in their favour. "I think slowly but surely the facts are coming out," said Dr Tocheri. His own analysis shows that the wrist bones of H floresiensis are not like ours or Neanderthals'. "Even if you are not trained as an anatomist, I think it is clear that the bones look very similar to what we see in living chimps and gorillas today, as well as earlier hominin fossils like Australopithecus - or Lucy," he said, "The wrist evidence is definitely a smoking gun ... I would say that it is proof that it is not a modern human - microcephalic, normal or otherwise."

Crucially, the shape of the wrist forms very early in a baby's development in the

womb, in the first three months. Genetic problems leading to small brains or dwarfism tend to hit later or after birth. "It would be extraordinary if a pathology could revert three wrist bones to this morphology," said Chris Stringer, an expert on human evolution at the Natural History Museum. "To have three bones which show this complex of features really does add to the case that this is a distinct and very peculiar human-like creature."

He is open to the possibility that it might yet turn out to be a small-brained human, but he thinks the tide is turning in favour of it representing a much more primitive and distinct species.

"There is a lot at stake. One group of people are going to be 100% wrong in what they have said, which is a situation that is rare in science," he said. "It will be a fascinating test case for science. Will the people who turn out to be wrong hold their position to the bitter end regardless of the evidence that accumulates?"

"As good scientists, we should all be pleased to have new data, even when it proves us wrong, but also being human beings it doesn't always work that way. We have human flaws like everyone else," added Prof Stringer.

Critics of the separate species explanation, however, show no sign of conceding. "If the evidence provided by the wrist bones is so important, why was it not part of the original description and diagnosis of the new species?" said Dr Eckhardt. "The answer is that the wrist bone evidence is not important in and of itself, but rather as a last ditch effort to save the supposed new species by finding some new "unique" feature."

"This is an exercise in the presentation of misleading ideas in an obfuscatory manner. In that sense, then, their paper is far from a model of how science should be done."

## **Body of evidence**

**September 2003** 'Hobbit' discovered by Indonesian and Australian team on the island of Flores, in Indonesia. It is also called Ebu, after a local legend about a small waddling creature with a big appetite.

**October 2004** The findings of a skull and partial skeleton are published in Nature. The team classify the metre high creature as a new species, Homo floresiensis

**February 2005** A computer generated model of the skull suggests it did not have an abnormal brain.

**October 2005** Australian scientists announce the discovery of more bones including another jaw bone. These confirm the creature's diminutive size, but the haul does not include a skull.

**May 2006** Researchers claim the Hobbit's brain is far too small to be microcephalic.

**August 2006** Another study claims that Flores is too small to have supported a population without immigration from other islands - so they could not have evolved in isolation.

# New species of 'hobbit' human was hype, says primatologist

Alok Jha, science correspondent, [The Guardian](#)  
Friday May 19 2006

Reports of the discovery in Indonesia of a new species of human, a metre tall "hobbit", were unfounded and hyped, experts said yesterday. They argue that the classification of 18,000-year-old remains on the remote island of Flores in 2003 as a different species of human, *Homo floresiensis*, is wrong.

In a study published today in *Science*, Robert Martin, a primatologist at the Field Museum of Chicago, presents evidence claiming that the bones must have belonged to a modern human who had microencephaly, a pathological condition that causes small brain size and is often associated with short stature.

The archaeologists who made the initial find have hit back at Dr Martin's claims, however, saying his analysis did not take all the bones into account and that he had not given enough detail.

Dr Martin said the size of the brain, inferred from the skull, was too small in relation to the body, and that the tools found with the bones were too advanced for early humans. "If you plot a graph of all the data we have on brain sizes of hominids against time, flores is the only one that falls right off the curve. It's an anomaly."

The authors who first identified the hobbit claimed it was a dwarf form of *Homo erectus*, a human ancestor that lived as far back as 1.8m years. Islands are known to affect the evolution of animals, causing them to shrink due to limited food supply and fewer predators.

But Dr Martin said the brains of dwarf humans would not be as small as that supposedly borne by the hobbit. "We know body size can change but brain size doesn't change very much. I calculated that if you started with a 60kg *Homo erectus* [person], you would have to reduce it to 2kg, the size of a domestic cat, to end up with a brain size that [matches flores]."

Chris Stringer, head of human origins at the Natural History Museum, said that identification of the hobbit relied on much more than one skull; there were jawbones and most of a skeleton. "The evidence is still very strong that this is really a distinct species, a strange isolated population."

Dr Martin also pointed to the tools found with the hobbit fossils. "They include really advanced elements that you only find with *Homo sapiens*," he said.

Dr Stringer said: "We don't know how much of the archaeology is because of the hobbit and how much because of modern humans. There's a big question mark."

The Indonesian government has placed a moratorium on further archaeological digs on Flores, so doubts about the hobbit are likely to continue.

# Bones of contention

The discovery of a new species of human astounded the world. But is it what it seems? John Vidal went to remotest Flores to find out

John Vidal, [The Guardian](#)

Thursday January 13 2005

If you want to understand human evolution, it may be worth starting with Johannes Daak from the remote village of Akel in the heavily forested centre of the Indonesian island of Flores. Johannes, from the Manggarai ethnic group, reckons he is 100 years old and says he owes his longevity and enduring strength to having only ever known one woman. He says he owes his stature to his ancestors.

Johannes is no more than 4ft 1in (1m 25cm) tall, give or take an inch. His grandfather and father were also tiny, and so is his son. All of them had "normal" sized mothers, but for some reason, only the males in his family seem to be small.

Next month, two researchers from Indonesia's leading Gadjah Mada University in Yogyakarta, will head to Akel and nearby Rampasasa villages to measure Johannes's family and other "little" people who live there. The size and proportions of their limbs and skulls will then be compared with those of the most celebrated skeleton in the world - Homo floresiensis, aka the Hobbit, the little lady of Flores, ebu, or, in the shorthand of the scientists who found the skeleton in a Flores cave called Lian Bua, LB1.

This 13,000-year-old, 1m tall, 25-year-old hominin with a brain one-third the size of modern man's, was found just a few miles from Johannes's village and was a scientific sensation last October when the team of Australian and Indonesians that unearthed it claimed in the journal Nature that it was an entirely new human species. Dubbing it Homo floresiensis and nicknaming it hobbit, they said it was a descendant of a long-extinct ancestor of modern man (Homo erectus), thought to have flourished between 1.8m and possibly 300,000 years ago. Dubbed one of the breakthroughs of 2004 by US journal Science, it made worldwide news. Fossils show only about 10 human species and 50 sub-species, so finding a brand new one is a huge story for anthropologists, and Homo floresiensis was greeted as the most breathtaking and important discovery in 150 years, changing our understanding of late human evolutionary geography, biology and culture. It was not only the smallest adult hominid found, but the Australian team even suggested that because it came so late in the human evolutionary scale, a group of Homo floresiensis could be alive today in the forests of Flores.

But every major find has a backlash, and in this case a fierce, high-level challenge has come from academics in several countries. Leading them is Professor Teuka Jacob, who heads the Laboratory of Bioanthropology and Paleoanthropology at Gadjah Mada. The only man outside the excavating team to have inspected the skeleton, Jacob says it is conceivable that Johannes' family are descendants of the Little Lady of Flores.

But even if his researchers find no direct link, he says he is certain from his own preliminary inspection that the bones now locked in a safe in his vault at the university do not belong to a new species within the genus homo, or even a sub-species, but a pygmy version of Homo sapiens - not unlike Johannes.

And he claims that behind the intense media attention last October were ill-equipped, hurried young academics whose work was not properly scrutinised. The world of anthropology is used

to disputes, but the fierce nature of this one has split the field.

Lian Bua, the limestone cave where *Homo floresiensis* was found 5.9m below the floor in October 2003, translates as "cold cave". It is at least 10C cooler than the deep, hidden valley of paddy fields that it overlooks.

It is also easy to see why early man used this cave for so long. It is ideal for hunter-gatherers. Light and dry, with 20m ceilings, easily defensible ledges and secret chambers, a tribe could live under its stalactites

"This is where they found the skeleton," says Riccus Bandar, a farmer from the nearby village of Beotaras who helped the dig and is now the cave's unofficial custodian, guide and gateman. He points out the slightly disturbed ground, a few feet from the cave's left wall. "They also found pygmy elephants, komodo dragons, and tools. It is the most beautiful cave in the world." Lian Bua has a colourful recent history. At one point a schoolroom for villagers, it was first investigated in the 1950s by Theodoor Verhoevenis, a Dutch missionary and amateur archaeologist. Indonesian archaeologists excavated it again in the 1980s but the work was suspended during the Asian financial crash. Since then it has become a favourite picnic spot for locals.

But it is legendary in Beoteras. "My grandmother told me when I was about six of how, long ago, six children from the village went hunting and one of their dogs went into the cave but did not come out," says Bandar, who is in his 60s. "They went in and saw a little man there. He was very small, standing on a rock. They were frightened and ran back. The people were very afraid."

The story is more or less echoed in other villages, many of whose people say they originate from the island of Kalimantan (formerly Borneo) - where pygmy-sized people live. According to one account, the little people of Flores were also called the Reba Ruck and were very hairy. The Australian scientists say they were told of the Ebu Gogo who reportedly lived on Flores until just a few hundred years ago. But no one in the villages near Lian Bua has heard that name.

Some 1,500km to the west of Flores, on the far more developed island of Java, is Jacob's laboratory. The only one of its kind in south Asia, its ground floor is a chaos of cabinets and shelving, holding 40 years of excavated material. It includes Jacob's large collection of hominids - including his discoveries of *Homo erectus*, *Homo erectus palaeojavanicus* and *Homo erectus soloensis*.

But he is keeping the latest Flores find in a safe in his steel-doored vault. Like all other major finds made by the department of archaeology, the bones were sent to his laboratory. He did not - as the press have said - kidnap them. "They even gave me the money for the transport." He insists he is not jealously guarding his patch, or upset that Australians found the skeleton. "At my age you look at things quite calmly. I have been working in this field for more than 40 years ... Here [in this laboratory] we have one third of the world's homo erectus finds."

But Professor Richard "Bert" Roberts of the University of Wollongong, Australia, a co-author of the original Nature paper, accuses Jacob of "stifling study" by not releasing the bones. "Jacob has a habit of hanging on to fossils for a long time. He cannot be allowed to keep these, to stifle the study that he so advocates. I urge him to send the fossils back."

Jacob is one of the world's most experienced paleoanthropologists, as well as being a pathologist. After training in Holland and getting his PhD in the US, he worked for 40 years on many of Indonesia's major sites, as well as in Kenya, Australia, Italy, China and South Africa. He has written more than 20 books and is one of Asia's most decorated and well-known

academics.

All his experience, he says, tells him that this is not a new species. "When I saw the Australians' research, I refused to comment for the first two weeks. Then the head of the archaeological centre [which co-sponsored the dig] asked me to take the bones and then we got a really good look.

"The skull looked to me like a primate's. It was only when I picked it up that I knew it was *Homo sapiens*. We did the measurements. A few things might confuse people, like the shape of the skull from the back is pentagonal. Later I saw the pelvis and the thigh bone. It's just human. It's not *erectus*."

He believes that the small brain volume may be a sign of mental abnormalities, specifically microcephaly, (small brain) which has been observed elsewhere in early man. "I started to get confirmation about the size of the brain. Then I knew they had found [something] similar to a microcephelate. It [the disease] could be genetic or acquired during birth."

He did not find the tiny skull remarkable. "It was what we call microcranic - very small. There was a very small brain and jaw. In this case there were no other abnormalities, only in the skull. The legs, arms and everything else were genetically normal. But this [microcephaly] can happen anywhere. It could be as common as one in 500."

In rapid succession he picks up bits of the bones laid out on his desk. "Look at the teeth, they are clearly modern ... so is the skull. The arm bones, the leg bones ... all are small, but that is all. If you analyse the front of the face, you might think it is an ape. But look at the whole head and it looks much more human, especially from behind."

He inspects the jaw. "The front teeth are very small. It has only one premolar. In [*Homo*] *erectus*, they get smaller and then larger. This has the same occlusal pattern as recent Javanese finds."

He believes that the Australians got not only the species wrong but even the gender. "The margin of the eye hole is rounder than for a female," he says. He picks up the thighbone. "Observe the muscular attachments. They are more pronounced than with females. Again, the pelvis is rounded [which suggests a man]."

The row is now splitting anthropologists. Although the Australian and Indonesian scientists stand their ground and are backed by many experts, a group which includes paleo-pathologist Maciej Henneberg of the University of Adelaide and anthropologist Alan Thorne of the Australian National University in Canberra is sceptical of their case. Henneberg argues that the skull of the Flores hominid is very similar to a 4,000-year-old microcephalic Minoan skull found on Crete in 1975.

Jacob says he is now getting support from around the world and hopes to publish a paper setting out his arguments in *Science* soon.

The Australians' mistake, he says, was not to fully compare their findings with others made in Flores or elsewhere in the region. A find like this, he says, "must be seen from all aspects, in relation to the environment and neighbouring areas. They did their study without comparative material. We are now studying every detail and comparing it with all the other remains from Flores caves and neighbouring islands, like the small individuals found in east Java in the 1950s.

"I have studied the remains from several caves in Flores in the 1960s. There are five similar caves in the area. Catholic priests found some small skeletons in the 1950s. Dutch anthropologists found some in the 1960s."

The Australians say it is too much of a coincidence to have seven possible hominids all with

small bones (only one skull has been found) but Jacob says small people are not uncommon in the region.

"There is plenty of other evidence of pygmy peoples in the region. There are pygmies still living in west Papua, the Andaman and Nicobar islands, and in the Philippines. But they are all *Homo sapiens*. They're just a smaller size. These pygmies were once quite common, but only pockets remain. There was far more diversity of people before."

He says the row has become personal. "I have been called everything. They say it's jealousy, a turf war, but it's not."

He claims the Australian team were "scientific terrorists" forcing ideas on people, that it was unethical for them to have made the announcement without the Indonesians being invited, and that they were not experienced enough. "I don't think the Australians have the expertise. They were very narrow. They have a tunnel vision and were not equipped in this area."

He absolves the Indonesians on the team. "Professor RP Soejono, [the head of the Indonesian archaeology centre which jointly sponsored the dig] was in the list of authors, but he never even saw the drafts [of the *Nature* article]. The others were young Indonesians. In the present climate it's hard to get a job. You usually follow the hand that feeds you.

"I would say [to the Australians] 'do some more work. Think twice. Look at everything from different angles. Don't start with the conclusion.'"

And he has concerns about the referees of the *Nature* article. "The reviewers seemed unevenly selected, very one-sided."

It is an argument Roberts categorically rejects. The referees were leading anthropologists.

"They [*Nature*] had six referees on each paper, the most I have ever known. They made damn sure they had a cushion behind their arse. The papers had to be submitted three times. It took six months, so was hardly rushed out. It was fair and rigorous.

"Our team had everyone involved - geomorphologists, geochronologists, archaeologists, paleoanthropologists ... We left no bone unturned. Good grief, it was a soccer team of authors!"

And he raises the stakes by suggesting that Jacob and other critics have an "intellectual interest" in denying that the skeleton was a new species. "All ... are supporters of the multiregionalism evolutionary model ... This discovery would destroy their theory. It suits their purposes very nicely [to oppose *Homo floresiensis*]."

The background to the row is a long and bitter debate between those anthropologists who say the modern human evolved in Africa and that all modern *Homo sapiens* developed there, and those such as Jacob who say that *Homo erectus* migrated from Africa through the north and spread [and developed] throughout the rest of the world. The argument is far from being resolved on either side.

One of the original advocates of multiregionalism, Professor Alan Thorne of the Australian National University at Canberra, was co-author of a reaction to the Flores paper in the journal, *Before Farming*, and has weighed in on Jacob's side. He says: "If it was another species, as they are saying, then it's very unlikely that all the details of racial characteristics [are] exactly the same as *Homo sapiens* living there today. They might have one or two features but not all of them. There is something seriously misleading here."

Like Jacob, he thinks *Homo floresiensis* is a case of "secondary microcephaly". "That means that we don't know the genetic reason for [the disorder] but that secondary reasons may be responsible, like something being wrong in the gut. There are many examples in the literature. The disorder may be as common as mongolism, say one in 2,000. Dwarfism, anyway, goes with microcephaly, especially in hunter/gatherer populations."

And he supported Jacob's broader points. "Paleoanthropology has lost its way and people are desperate for new species. People are more aggressive. If, as Jacob thinks, it's a case of microcephaly, there are a lot of people in my field who cannot recognise a village idiot when they see one."

Perhaps unsurprisingly, Jacob loves a good row. "This is like ecstasy without the drug. It relieves you. The blood speeds up. It excites you. You think more. But it has stirred up a nest of hornets. It's like opening a can of worms and you cannot put them back in again. The creationists are using it for the wrong reason [to deny evolution]. I am not a creationist at all. "I don't want to seem like a killjoy but we are looking for truth, not for fame. You have to look for the truth but fame will come to you whether you look for it or not," he says. "I think it's quite possible that there are other species. But in the past 15,000 years there is only one. It's not an entirely unimportant find because it is a pygmy skeleton found in a controlled excavation. But it's certainly not the most important in the last 150 years."