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## **World's oldest known ground-edge stone axe fragments found in Western Australia**

By Dani Cooper  
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A fragment of the world's oldest known ground-edge axe has been found in the remote Kimberley region of northern Australia.

The discovery pushes back the technological advance to between 45,000 to 49,000 years ago, and coincides with the arrival of people in Australia.

The fragment is 10,000 years older than the previous oldest known fragments found in northern Australia in 2010.

Archaeologists said the original axe would have been hafted - meaning it was made with a handle attached.

Professor Sue O'Connor, who discovered the fragment, said the world's oldest known examples of hafted axes all came from Australia.

"In Japan such axes [also] appear about 35,000 years ago. But in most countries in the world they arrive with agriculture after 10,000 years ago," Professor O'Connor, from the Australian National University School of Culture, History and Language, said.

Professor O'Connor found the thumbnail-sized fragment in the early 1990s at Carpenters Gap - a large rock shelter in Winjana Gorge National Park - one of the first sites in Australia known to be occupied by modern humans.

In 2014, she was re-examining the objects dug out of the site when she identified a possible polished axe fragment and approached Professor Peter Hiscock of the University of Sydney to help verify the find.

The axe fragment was found in the same layer of sediment as a charcoal sample that was radiocarbon dated to 48,875-43,941 years old.

### **Fragments shaped from basalt**

Work by the team of researchers showed the fragment came from an axe that had been shaped out of basalt then polished by grinding it on a softer rock such as sandstone until it was very smooth.

Professor Hiscock said experimental work confirmed the smoothness of the basalt fragment could not have been achieved accidentally through natural processes.

He took basalt from the same area as where the artefact was found and rubbed it on sandstone.

"It took 800 double strokes to get the same smoothness [as the axe fragment]," he said.

"It's not the kind of thing that happens accidentally."

Professor O'Connor said the discovery showed early Aboriginal technology was not as simple as has been previously suggested.

"Australian stone artefacts have often been characterised as being simple. But clearly that's not the case when you have these hafted axes earlier in Australia than anywhere else in the world," she said.

Professor Hiscock said the find cast doubt on prevailing views around the dispersal of modern humans out of Africa.

He said it was believed that as modern humans dispersed "they maintained and employed a cultural system from Africa and used it everywhere".

"In evolutionary terms it is hard to imagine how one way of doing things works in every environment," he said.

Professor Hiscock said the Australian find supported the idea that modern humans employed "ingenuity and flexibility" as they dispersed.

"The moment people set foot on Australia we now have them adapting to survive," he said.

But, he said, the technology did not spread across Australia with humans as the earliest axes in the southern two-thirds of Australia date to about 3,000 years ago.

This suggested either two different colonising groups or that the technology was abandoned as people spread into desert and sub-tropical woodlands.

Professor Hiscock said these early innovations helped create cultural differences between groups.

"[The axe] is perhaps a material signal of cultural variations in the ancestors of Aboriginal people," he said.

The research appears in the journal *Australian Archaeology*.