Primate archaeology, proposal of a new research field

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The use of tools by hominins - the primate group which includes humans (*Homo*) and chimpanzees and bonobos (*Pan*) - has been extensively researched by archaeologists and primatologists, both of who manifest the relevance of tool-use in understanding technology and the origins of human behaviour.

However, recent research has highlighted the need to include other species such as gorillas and orangutans, as well as other extinct primate groups prior to hominins, in order to situate, for the first time in history, the full evolution of human behaviour within a greater biological context. With this aim, an international group of researchers from different universities, among them Universitat Autňnoma de Barcelona (UAB), proposes to create a new interdisciplinary field called primate archaeology. The new field is described in detail in *Nature*.

The proposal of this new discipline, published in Nature, is the result of a meeting which took place in Cambridge in October 2008 with the objective of tackling a central theme in Palaeoanthropology: the origin and meaning of the first stone tools found at the archaeological sites studied until now. Researchers defending the need for this new field come from the University of Cambridge, University College London, Rutgers University, New Jersey, Kenyon College and Miami University, Ohio, Kyoto University, University of Calgary, the Centre International de la Réchérche Scientifique, Istituto di Scienze e Tecnologie della Cognizione de Roma, and Universitat Autňnoma de Barcelona (UAB), with the collaboration of Rafael Mora, professor of the Department of

Prehistory.

Researchers argue that since long there has been a separation between archaeology - with a focus on the study of "*Homo*" - and primatology, which has impeded applying a holistic perspective required to obtain more knowledge on the cognitive evolution of the order Primates and a better understanding of the biological, environmental and social contexts of their behaviour. With primate archaeology, researchers propose to combine methodologies used in both areas of knowledge, compare data obtained in the studies on tool-use carried out until now, both by humans and non-humans, and establish a new field which is needed for a variety of researches already taking place.

Thus, answers to the following questions could be found: how many extinct primate groups "invented" tool-use; what circumstances allowed or prevented such discoveries; how has continuous and repetitive use of tools influenced the anatomy of non-human primates; or why is it that only hominins have continued to use tools up until the present date? Researchers will also be able to delve deeper and learn about the precise moment in human evolution that tools began to be used, as well as which species made them and what uses these tools were given.

A necessary field

The need to establish a new field has grown in recent years due to the results obtained in researches carried out in the second half of the 20th century, which shed new light upon the possibility that a common ancestor of chimpanzees and humans - before the lineage split between humans and chimpanzees some 5-7 million years ago - already manufactured stone tools; or the use orangutans, capuchins and macaques presently give to rudimentary tools.

On the one hand, stone artefacts found in prehistoric Oldowan sites

which date back 2.6 to 1.6 million years demonstrate much planning depth, optimal spatial coordination and manual dexterity carried out by a genus older than the earliest member of our genus (*Homo habilis*). This leads researchers to believe that it is likely that earlier, currently unrecognised, tool manufacturing occurred in more ancestral hominins (*Australopithecus africanus*, *A. afarensis* and *A. garhi*). On occasions more than 70 flakes struck from a single cobble were found at these sites, which were obtained during the manufacturing of tools used mainly to cut meat, as well as hammers and anvils similar to the pounding tools used today by chimpanzees.

On the other hand, the relevant brain size and manipulative abilities of these hominins and modern great apes has led to speculation that the capacities of modern great apes may either directly or through analogy provide an insight into those of extinct hominins. Non-human primates take stones and plant material and modify them in order to obtain food or interact socially, and this challenges the conventional idea of hominins as the only creators found at archaeological sites. Although free-living primate populations have not been seen deliberately manufacturing tools, recent studies with animals in captivity (orangutans, bonobos and capuchins) have demonstrated that they can be taught to reduce stones or obtain sharp stone edges through different techniques.

Researchers conclude that primate archaeology will not only improve the integral development of both archaeology and primatology, but it will also favour the incorporation of other disciplines such as comparative anatomy or evolutionary ecology. All in all, this will help researchers obtain new and valuable data on the cognitive evolution of both human and non-human primates.

More information: "Primate archaeology". Michael Haslam, Adriana Hernandez-Aguilar, Victoria Ling, Susana Carvalho, Ignacio de la Torre, April DeStefano, Andrew Du, Bruce Hardy, Jack Harris, Linda

Marchant, Tetsuro Matsuzawa, William McGrew, Julio Mercader, Rafael Mora, Michael Petraglia, Hélčne Roche, Elisabetta Visalberghi, Rebecca Warren. *Nature*, Vol. 460 (pp. 339-344), 16 July 2009.

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