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A ghost population of the Ice Age hidden in a Mexican cave

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Our excavation at Chiquihuite Cave in Zacatecas, Mexico, produced evidence that humans arrived to the Americas as early as 32,000 year ago, doubling the currently accepted age for the human presence on the continent. Stone artefacts made of limestone reveal an enigmatic population and a new culture that had not been acknowledged before.

Image credits: Ciprian F. Ardelean

More often than we admit, we ignore things that are right in front of us, simply because they do not match "our reality", or our current understanding of it. A priori beliefs can weigh heavily on our capacity to see diversity and detect the unknown contrary to popular perceptions, ground-breaking findings often appear when we are not explicitly looking for them. In the 1960's, Thomas S. Kuhn said that the daily scientific agenda was not focused on achieving new discoveries, but on achieving a deeper understanding of what we already know. In "Old World" archaeology, it is common to read, nonchalantly, about revolutionary finds, shifts in theories, evidence of Homo sapiens pushed back by 100,000 years, etc. Oppositely, the American stage is paradigmatic, skeptical and viscerally reluctant to changes. The leads to a healthy sense of prudence, but can also result in selective blindness towards discoveries that escape the accepted norm.

When and how humans first arrived to the Americas remains an enigma. For most of the 20th century, evidence pointed at Clovis as the oldest culture: nomadic mammoth hunters spreading out fast on the continent 14,000–12,800 years ago. The current paradigm accepts pre-Clovis populations, as long as they are not older than 16,000-18,000 years. This period marks the end of the Last Glacial Maximum and is the most recent extreme cold peak during the 2.6 million years of the Ice Age. Our understanding of these well-known prehistoric cultures and their remarkable technical and aesthetic achievements influenced our perception of how Ice Age artefacts should look like.

However, we hypothesized that humans arrived to the Americas before the Last Glacial Maximum (over 26,000-28,000 ago) and started a systematic search ten years ago, in northern Zacatecas, Mexico. We found Chiquihuite Cave, high in the mountains, excavated it, and the data acquired there points to a new paradigm.

The cave's original entrance is buried by ancient debris, making us excavate inside the main chamber, in areas chosen by topographic, logistic and safety criteria. These were far from ancient fire-making and food-processing areas, limiting the type of accessible materials. This ancient debris (gravels alternating with finer-grained layers) demanded a stepped approach: the deeper we dug, the narrower the working area became. Hence, the oldest layers were explored in smaller volume, with proportionally less finds.

We sought stone artefacts - from small flakes of rock to proper tools and weapons such as spear and arrow heads. In addition, we collected animal bones, plant remains, vegetal charcoals, as well as many sediment samples. These were later analyzed in laboratories around the world, to obtain radiocarbon and luminescence (OSL) dating, as well as paleo-environmental reconstructions based on charcoals, fauna, and plant remains - which give us information about the environment and climate - and organic chemical signatures of metabolic processes - which help us to reconstruct human presence and past activities such as spaces for living, cooking, urinating or defecating, butchering, etc. We also tested for ancient human, plant, and animal genetic material (environmental DNA or eDNA), which can be preserved as fragmented molecules in the sediment itself. Despite its revolutionary implications, the reliability of eDNA depends on its age, the type of sediment it is found in, and the quantity of eDNA fragments found.

Our 2016-2017 excavation revealed that humans visited the cave, sporadically but constantly, over a long period of 15 millennia, between about 28,000 and 12,000 years ago. We collected cultural evidence consists in over a thousand stone artefacts made of a particularly fine-grained green limestone that behaves like chert. This is a novel discovery that challenges previous consensus that stone tools are always made of obsidian or cherts. The artefacts found were mainly flakes and blades, but also scrapers, cutting tools, and projectile points. They reflect a simple lithic industry never seen before in the American Ice Age, yet similar to limestone technologies found in Brazil in sites from the same period. Our cave artefacts remained almost unchanged for thousands of years. They were scarce in the layers representing the time during and before the Last Glacial Maximum, becoming increasingly abundant 16,000 ago. Paleo-environmental data, including eDNA, show the settings were colder, wetter, and forested, similar to today's landscape in Western Canada.

The presence of artefacts in cave deposits in Mexico dating to 27,000 years ago immediately translates into an arrival of humans to Americas before the Last Glacial Maximum, probably as early as 32,000 years ago. The simple morphology of the stone tools manufactured in limestone varieties (a custom maintained by human groups in the region until recent epochs) contrasted with the traditional perception of Ice Age technologies on the continent. Chiquihuite brought to light a whole new world completely ignored until now, inhabited by humans hidden behind our own pre-established ideas about how the earliest human cultures looked like. At the moment, we are still analyzing the results of the latest excavations from 2019, hoping to reveal more information about this previously unknown community.