

Fossils Show Ravens Lived Alongside Early Humans in Beijing

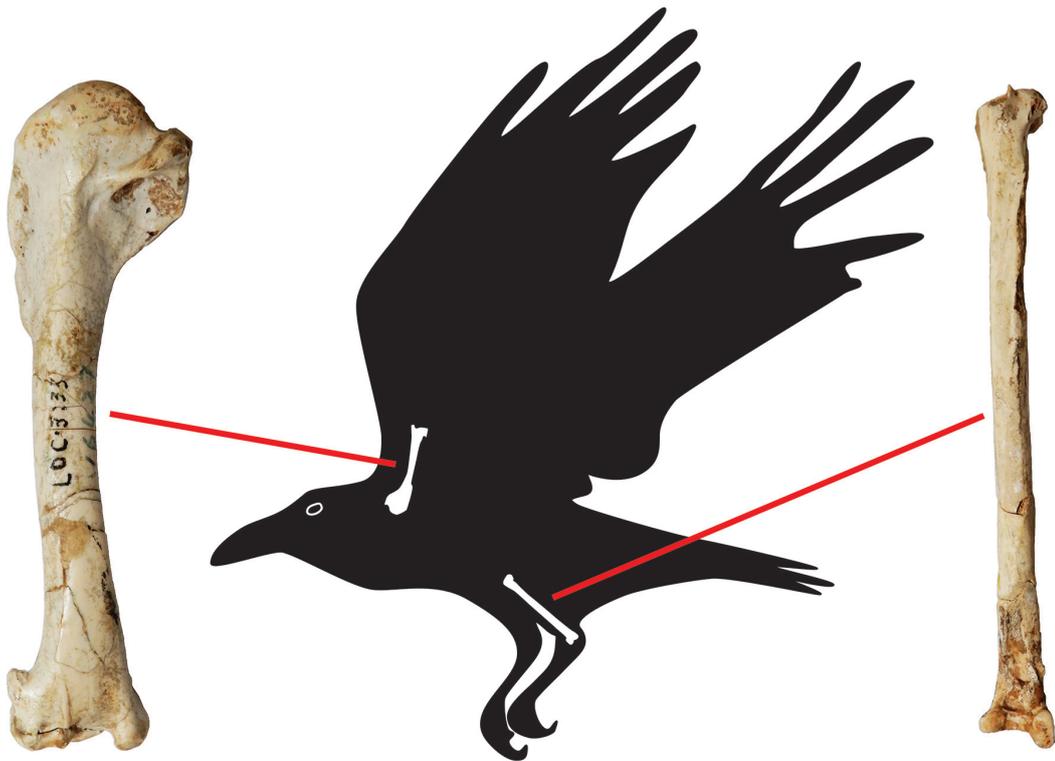
While ravens do not occur in what is now the Chinese capital of Beijing today, a new scientific study analyzing fossil bird bones from the UNESCO World Heritage Zhoukoudian “Peking Man” site demonstrates that ravens lived in western Beijing at the same time as some of its famous ancient human inhabitants.

The study of raven fossils by Dr. Thomas A. Stidham and Dr. LI Zhiheng from the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP) of the Chinese Academy of Sciences and Dr. Jingmai O’Connor from the Field Museum of Natural History in the U.S.A. was published in the *Journal of Ornithology* on August 28.

The fossil raven bones were excavated many years ago from the cave site known as Locality 3 on Dragon

Bone Hill in western Beijing. Those excavated ancient caves from the Pleistocene Epoch distributed across the hill contained thousands of fossils of birds and mammals, including the first fossils of early humans in China, particularly those of “Peking Man” (*Homo erectus*) and of our species, *Homo sapiens*.

Ravens have been closely associated with humans for much of our history. These remarkable black birds have been incorporated into our art, literature, and lives. The identification of Pleistocene age raven fossils at one of the classic cave sites on Dragon Bone Hill in Beijing where the original “Peking Man” cave site is located, helps to show that the relationship between ravens and people may have extended far back into prehistory in eastern Asia.



Newly identified fossil raven wing and leg bones from the UNESCO World Heritage Zhoukoudian “Peking Man” site. (Image by IVPP)

The Northern Raven, also called the Common Raven, is the largest species of songbird (Order Passeriformes) in the world, with a weight of nearly 1.5 kilograms and a wingspan over one meter. It is mostly a scavenger of carrion but also consumes fruits, seeds, and a wide variety of small animals. It is a nonmigratory bird residing across the northern parts of Europe, North America, and Asia.

Nearly 30 years ago, these bird fossils from Beijing, including an upper arm bone (humerus) and a shinbone (tibiotarsus), were placed in their own extinct species under the scientific name *Corvus fangshannus*. However, they were not compared at that time to the living raven. In the current analysis, the research team compared the fossils to skeletons of many living species of raven and crow relatives, as well as to extinct fossil species from across Eurasia. Using data from all of those skeletons and bones, the paleontologists identified features of the fossils that are common to some groups of crow and raven relatives as well as other specific anatomical traits that showed these fossils are from Northern Ravens.

Dr. Stidham and Dr. LI reported a large raven skull from a similar cave site in Liaoning Province in northeastern China two years ago. The fossils excavated from cave Locality 3 on Dragon Bone Hill of Zhoukoudian are more than 100,000 years old, whereas the skull from Liaoning Province is nearly 500,000 years old. Since the fossilized animals from the Beijing cave typically lived in warmer areas of China, the mammal fossils from Locality 3 show that Beijing had a warm climate at the time they lived. On the other hand, the Pleistocene cave in Liaoning Province with the raven skull contains fossils showing it had a cold, dry climate.

“Since the Northern Raven is not a migratory species, its presence as fossils outside of its current

and historic geographic range across a large part of northeastern China in Beijing and Liaoning Province, during both colder and warmer parts of the Pleistocene Epoch, shows that the raven likely was resilient against climate change,” said Dr. O’Connor.

While the Northern Raven appears to have been at least somewhat resistant to climate change in the deep past, its absence during warmer times today leads to a question: Why is it not found in Beijing today?

Lead author Dr. Stidham noted that climate and environmental change are not the only factors impacting where a bird lives. “The fossils from the cave sites on Dragon Bone Hill show us that ancient Beijing was full of large animals like elephants, rhinos, and extinct horses that would have provided carrion to be eaten by local scavengers like hyenas, bears, people, and ravens. With the loss of those large animals at the end of the Pleistocene, we also see the loss of the scavengers in Beijing who ate their meat, including the raven.”

The implications of this study extend far beyond Beijing and China. Global researchers continue to analyze and document the diverse responses of birds to recent decades of climate change in order to better conserve them and their ecological relationships. However, those studies largely do not give us data over the longer time intervals needed to clearly prepare for what may happen to birds over the next century of warming climates. “If we want to better protect birds and other organisms on our changing planet, then we need studies like ours that examine the deep past during different global climates using museum fossil collections in order help us to identify key factors affecting birds and their responses over the long term,” adds Dr. LI.

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(IVPP)