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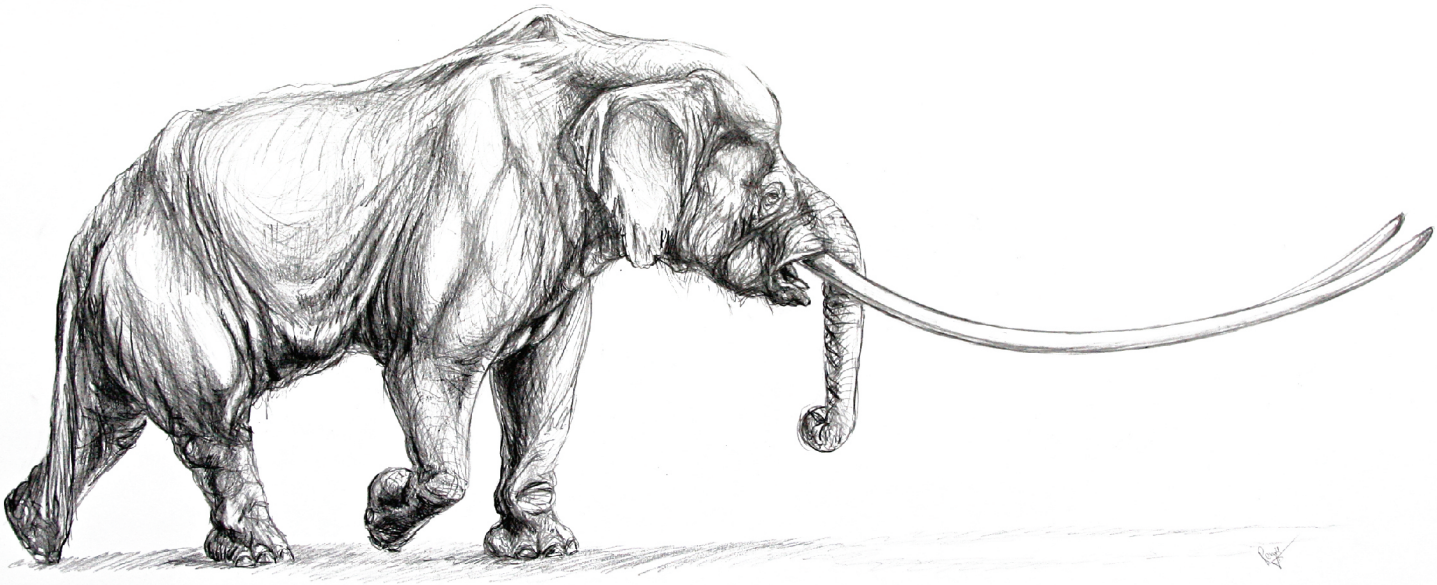

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ABSTRACT BOOK

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Cave lion skeleton from the Maly Anyuy River (Chukotka, Russia)

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Cave lion (*Panthera spelaea*) remains, like skeletons, skulls and individual bones, have been discovered all over the mammoth fauna range from Iberian Peninsula to North America. In Russia these finds are scattered and seldom.

In summer 2008 a compact cluster of cave lion remains belonging to a single specimen, a tuft of visually unidentified ginger-coloured hair and a horse vertebra were found in the water under the bank outcrop of Maly Anuy River (68.18 N, 161.44 E), Chukotka, Russia. The find included 36 vertebrae, 20 ribs, limbs bones: scapula, humerus, pelvic, femur, tibia, fibula, patellae, talus, metatarsal, and third phalanx with cover. In 2009 on the same spot the cave lion mandibular bones were found. Their age, sex and features support the probability of belonging to the same specimen as the skeleton prior. Bone sizes (mandible length: 255.7-262.0 mm; P3-M1 mean alveolar length: 80.2 mm; mean LxB of M1: 29.5x14.9 mm; M1 mean height (buccal): 53.5 mm; length of humerus: 386.1 mm, of femur: 431.5 mm, of tibia: 362.0 mm) fell within the range of other cave lion finds.

Some bones display deformities and age-related changes, e.g. an asymmetry of thoracic and sacral vertebrae, a notch on the scapula, sclerotized ligaments on the femur and tibia, osteophytes on the ribs. Vertebrae asymmetry is probably a result of young age trauma. Sclerotized ligaments are likely a sign of myositis – common for musculoskeletal overloads. The mandibles bear traces of age-related changes and pathological cortex transformation due to periostitis, usually from traumatic injuries. The noted features are not a sign of systemic illness though. The bone cortex, apart from the mandible outer surface, is dense and healthy; joint surfaces show no traces of degradation; muscle origins and insertions are clearly pronounced on the bones that testifies a high motor activity of the animal. The skeleton evidently belonged to a mature but not old male. The age, from counting the annual layers in canine cementum, was about 12 years. The claw sheath on the third phalanx and fur sample are of particular interest, since the cave lion skin derivatives have not been discovered previously.

Stable isotope analyses of samples taken from a few bones, fur and claw sheath of the finds were done to check the possible diet of the animal and specimens identity. The results compared with five more specimens of cave lion and some representatives of mammoth fauna from Chukchi and Yakut territories, namely mammoth, woolly rhinoceros, bison, horse, two species of deer, bighorn sheep and wolf (all samples from the Ice Age Museum, Moscow). The isotopic signature of the Anuy lion remains testifies that all of them nearly certainly came from the same individual, yet the mandible slightly differs from the rest. Stable isotope studies for this cave lion also define that the main prey included *Bison*, *Equus* and *Ovibos*. Notably, reindeer (*Rangifer tarandus*) was not among its most probable prey. The obtained stable isotope results for the found lion remains and its potential diet deviate from these for Western Europe, where reindeer remained the main food source (Bocherens et al., 2011). This deviation can be explained by relatively smaller reindeer population in the Asian North-East compared to the other available ungulate prey.

The tuft of fur found near the cave lion's remains has good differentiation: guard hair (I–IV categories) (GH) and woolly hair (I–II categories) (WH). GH colour varies from light-yellow to dark-brown, without a black tip. WH is light-yellow or whitish. GH type I are typical primary hairs, which, judging by their fragments of length up to 50 mm, are long, thick (up to 200 μm), strong and smooth. The shape of shaft at the base is cylindrical, but in the middle one side flattens a little. The medulla is well-developed, occupies up to 80% of the shaft diameter and runs through its middle. GH of other categories are thinner (45–90 μm) and have medulla less developed. WH are long, with 3–6 bends looking like elastic springs. In the bends the medulla is shifted in the direction of lesser radii. Unlike the modern lion's the found fur has very thick and dense woolly undercoat of numerous closely shut and compressed wavy woolly hairs with the medulla. The coloration of the hair is not fully similar to that of the modern lion. The microstructure and degree of development of the medulla and the cortex, and the ornament of the cuticle look similar between modern species and the found sample, but the cuticular scales of the find are larger. Because of the small size of the tuft and absence of other cave lion hair samples for comparison it is not possible to determine its origin topographically or relate to a season. Its attribution to a lion is still debatable.

Radiocarbon AMS dating was performed at ANSTO (Fink et al., 2004) for samples taken from a rib, claw sheath and fur tuft (lab codes OZQ290, OZQ291, OZQ292). Bone sample exhibited good collagen preservation, consistent with its origin from permafrost. Keratin was analysed for claw and fur. Both rib and claw gave 14C dates greater than 61 thousand years. Fur in contrast came out much younger (28690+130 14C years), which makes it impossible to come from the same specimen as the bones. However, its stable isotope signature fits that for the carnivore.

The remains from the Maly Anuy River represent the first associated skeleton of cave lion found in Russia and the most ancient for the region.

References

Bocherens H., Drucker D. G., Bonjean D., Bridault A., Conard N. J., Cupillard C., Germonpre M., Honeisen M., Munzel S.C., Napierala H., Patou-Mathis M., Stephan E., Uerpmann H.-P., Ziegler R., 2011. Isotopic evidence for dietary ecology of cave lion (*Panthera spelaea*) in North-Western Europe: Prey choice, competition and implications for extinction. Quaternary International 245, 249-261.

D. Fink, Hotchkis M., Hua G., Jacobsen G., Smith A. M., Zoppi U., Child D., Mifsud C., van der Gaast H., Williams A., Williams M., 2004. The ANTARES AMS facility at ANSTO, NIM B 223-224, 109-115.

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