Aurochs (*Bos taurus* LINNAEUS, 1758)

European cattle has been domesticated from the aurochs (*Bos marinus*), which appeared in Europe during the Mid-Pleistocene and became extinct in the 17th or 18th century. The large body of the remaining aurochs raised gradually towards the withers, and the backline was straight with short tails. It was covered by long, bushy-than-cattle hair of dark brown (males) or light reddish brown (females and juveniles) color with a whitish stripe on the back. Based on a depiction of an aurochs from Augsburg, the chin and the puffed mamillaneum as well as the belly and the inner surface of legs also had a whitish hue. Contours of the aurochs skull were straight, eye pits anastomosed forward and to the side, forehead plain, crest linear, and the upper part of the mandible accentuated. The horns of bulls pointed sideways, those of cows forward and up. According to past observations, horns were white with a black tip.

The vast range of the aurochs included the whole of Europe, and the Near and Middle East. Although it cannot be traced as far north in Siberia as the tundra, to the south it occurred in Mesopotamia, Palestine and even in North Africa.

Horse (*Equus caballus* LINNAEUS, 1758)

True Equus evolved ca. 1 million years ago with two major lineages: the Caballid and *Palaeohippus* forms. Close eye pits, extended upper limb, and then middle neck. The wild horse inhabited open grasslands exclusively. Their diet consisted of mostly tough grasses. The hardy Equus caballus had colonized the whole of Europe and Asia. In response to adaptation to climate, these morphological types segregated in Europe. In Central and Eastern Europe, caballid horses underwent a decline in body size during the last glacial period. This phenomenon was attributed to decreasing temperatures. In line with this explanation, fossil horses from higher latitudes are mostly small bodied (*Equus caballus scoticus*), while the forest-steps of Central Europe yield remains of the robust *Equus caballus boitesii*. The thick-skinned *Equus caballus scoticus* typical in North and Northeastern Siberia had successfully established in open areas of the tundra and occasionally in tundra heaths more to the South.

Giant deer (*Megaloceros giganteus* BLUMENBACH, 1799)

The *Megaloceros* or *Irish Elk* evolved 400 thousand years ago and vanished 7700 years before now. Giant deer passed the largest antlers ever encountered, measuring 3.85 m from tip to tip, well nailing average body height at willows of about 2 m. For building these ponderous antlers and for growth, as well as for the construction of strong horns, large amounts of calcium (Ca) and phosphorus (P) were needed. For continuous supply of these elements the animal must have been grazing winter.

Early forms like the Asian *Neomegaloceros* and the *Praecoxmegeloceros* were not yet restricted to open steppes or sparse woodlands. *Megaloceros giganteus* usually occupied forest steppes or even steppe-like habitats. Its diet included mainly grasses, but occasionally it browsed on young tree and shrub foliage or bark. Giant deer was superseded well adapted to temperature extremes. The animal did not migrate during the alternating freezing and thawing periods in the Pleistocene. Furthermore, its fossils can be found in the northern up to 60 degrees latitude. Rapid climate change and associated altercations to the vegetation at the end of the Ice Ages might have caused the extinction of giant deer. Most probably, the animal was unable to adapt new environmental conditions from the new foal.
Cave hyena (Cynictis crocuta spelaea) (GOLDFUS, 1810)

The cave hyena (Cynictis crocuta spelaea) probably appeared about 20,000 years ago, and, like other large-buried for Age mammals, became extinct 14,000 years ago. The cave hyena differed from its extinct relative in few morphological characters like the length of front and hind legs, there was no change in the size of middle limb bones (radius-cubitus and ulna-olux). These morphological features suggest that the walking of cave hyena was probably different from that of present-day hyenas. Its body was also remarkably larger reaching a height of 1 m and weight up to 80 kg on average. These figures match maximum values measured on spotted hyenas. Hyenas characteristically possess large, massive jaw bones, which is the biggest relative to body size among mammals. There are only speculations on the behavior of the cave hyena with an evidence of living in hierarchically structured groups (clans).

The cave hyena was able toTuple in the cold climate thanks to adaptations such as the modified teeth (pair of carnassials, massive premolars), which made the beast capable of chewing through even the strongest bones with ease. Despite its heavy makeup, the cave hyena must have avoided areas of very low winter temperatures. A complete absence of cave hyena fossils from beyond the 60° degree latitude suggests this.

Like other spotted hyenas, cave hyenas must have searched shelter in caves and crevices. They always preferred sparsely wooded areas, plains and mountains, but never established in such high altitudes as the cave bear did.

Wolly mammoth (Mammuthus primigenius) (BLUMENBACH, 1799)

Elephants (Elephantidae) include: the African elephants (Loxodonta) and Asian elephants (Elephas), as well as the closest relative of the latter, the mammoth, which lived in the forests of the Pleistocene for about 2 million years during the Pleistocene ice ages. The ancestor of the well-known woolly mammoth migrated from Africa to Eurasia ca. 2 million years ago, where it gave rise to a large number of different species which can be distinguished from each other based on tooth morphology. The earliest Mammuthus moriones existed between 2 million and 600 thousand years before present; it was followed by M. primigenius from 600 to 200 thousand years ago. The most derived woolly mammoth (Mammuthus primigenius) lived from 200 to 10,000 thousand years before present until the last interglacial period. During this almost 200,000 years period, woolly mammoths had successfully established in most of Europe, Asia and North America.

Wolly mammoths are old and heavy animals, heavier than that of recent elephants, and measured up to 3.2 to 3.7 meters in height and 6 to 7 tons weight. Mammoths differed markedly from elephants not only in dimensions, but also in general appearance. For example, while mammoths were covered by thick fur, elephants have bare skin. The large ears of elephants are counterbalanced by thin ones of mammoths. Altogether, the body morphology of mammoths was adapted to frozen polar environments, while that of elephants suits hot tropical climate. Characteristic feature of woolly mammoth include relatively high, dome-shaped skull and fauced shoulders. Its back carried a large hump behind which it was straight. Front legs were longer than hind legs, and the whole body was covered by two layers of thick fleece.

Tasks are generally multilayered upper incisors made of dentin. Mammoths possessed tusks from their birth and it continued growing until the death of the animal. The size of mammoth tusks far exceeds that of recent elephants. Both sexes carry these wodd incisors, although female tusks were much smaller than those of males. Male tusks curved down and sideways such that the left tusk pointed towards the right one and the right tusk towards the left.

Mammoths were herbivores feeding on plants of the “mammoth steppe”: fresh sedge, grasses, grasses, reed and associated herbs. An adult might have consumed up to 3-4 kg in green tissue a day. Herds of 12-15 individuals with 1-2 juveniles kept wandering year-round in search for food. During warm months mammoths moved north approaching permanent ice, while in autumn returned to the woe tundra.

As a consequence of climate warming following the last glaciation, cold steps gradually disappeared, thus surviving mammoth populations became restricted to areas close to the polar circle. Some 15-30 thousand years ago mammoths crossed the Bering Strait and colonized first Alaska then the whole of North America.

Wolly rhinoceros (Coelodonta antiquitatis) (BLUMENBACH, 1807)

The wolly rhinoceros (Coelodonta antiquitatis), a descendant of Dicerorhinus etruscus, evolved in Asia about 350 thousand years ago, and migrated to Europe 200 thousand years before now.

This megaherbivore was up to 3.5 m long, almost 2 m high and weighed 3 tons. It had two horns in a line on its head. The longer anterior one grew above the nose and reached 1.3 m in length and 10 kg in weight. The posterior horn protruded from its forehead and was 40-60 cm long. Horn diameter at base was 25-30 cm. Beneath horns the nasal and frontal bones were strengthened.

The woolly rhinoceros had special, so-called subepithelial teeth with wrinkled enamel craters and enamel-dotted grooves adapted to withstand the intensive wearing of the distinctive forage foliage.

Its body was covered by light brown flax made of two sort of hair: a thin, dense inner layer and an outer coat of long stiff hairs appearing on the sides. A little mane was on its neck and withers.

Similarly to the woolly mammoth, the woolly rhinoceros lived on cold tundras and steppes. It often occupied broad river floodplains and lakeshores where dense wetland vegetation provided ample food for this plant-sterile. Its diet included mostly grasses and young shoots of herbs, deciduous trees (willow, birch and alder).

Wolly rhinoceroses were solitary animals, never formed herds. Courtship and reproduction occurred every 2-3 years. Familiarly usually stayed together briefly, as the female took care of her calf not longer than a couple of months. Then the young "adult" departed and searched for new feeding grounds.

The woolly rhinoceros was a characteristic member of the Ice Age megafauna and was supremely well adapted to the harsh cold climate.

Like other members of the Ice Age megafauna, the wolly rhinoceros became extinct during the last interglacial period when the warming, climate profoundly altered ecosystems, and led to the disappearance of tender-rich steppe pastures.

Cave bear (Ursus spelaeus) ROSEN MULLER, 1794

Cave bear evolved some 200-250 thousand years ago. Its name derives from the fact that fossils of this species have been uncovered from cave sediments almost exclusively. It remains trapped up from England to the Caucasus Sea, mostly abundantly in mountainous regions of Central and Eastern Europe.

Standing on two feet the height of the animal may have reached 3 m, and it weighed up to 800 kg. Skull length may have exceeded 0.5 m, being 35% larger than that of recent brown bear. In the skull of the cave bear the eye pit and the forehead protrude in a step-like manner, whereas the skull of modern bears is more even and slightly slanted. Furthermore, the back of cave bears stood more steeper than that of modern bears because its front legs were longer than the hind legs. Systematically bears being in carnivorous. The wear of teeth clearly reveals that cave bears lived mostly on plant diet, and were carnivorous exclusively.

Unlike recent bears which use caved only for hibernation in winter, cave bears dwelled in caves all round the year.

Vegetation had transformed markedly in response to climate warming after the last glaciation at the end of the Pleistocene spuch some 15,000 thousand years ago. Like other members of the Ice Age megafauna (woolly mammoth, wolly rhinoceros, giant deer, etc.), cave bears must have gone extinct because of this environmental change.

Ancient bison (Bison priscus) BOHANUS, 1827

Adult males may have reached the size of 2 m in height and 3 m in length, weighing more than 2.25 tons. The width of horns averaged 1 m. The body was mongrel and muscular covered by brownish flax, the long legs terminated in wide hooves. Despite their great body size bison were light agile animals. Experts assume top running speed of 60-80 km/h.

As a characteristic inhabitant of Ice Age cold steppes bison mostly grazed on steppe grasses, but during the harsh frosty winters it also browse buckwheat and twigs of forest-edge trees.

Ancient bison greatly had no natural enemies, thus their abundance increased rapidly. Large herds counting up to 1000 individuals had roamed the cold steppes. About 10,000 years ago at the beginning of a warming period the number of bison gradually declined and finally they disappeared. In some areas of Europe, however, with altered stature they survived until the Middle Ages. The Viking and Russian princes regularly hunted on bison.