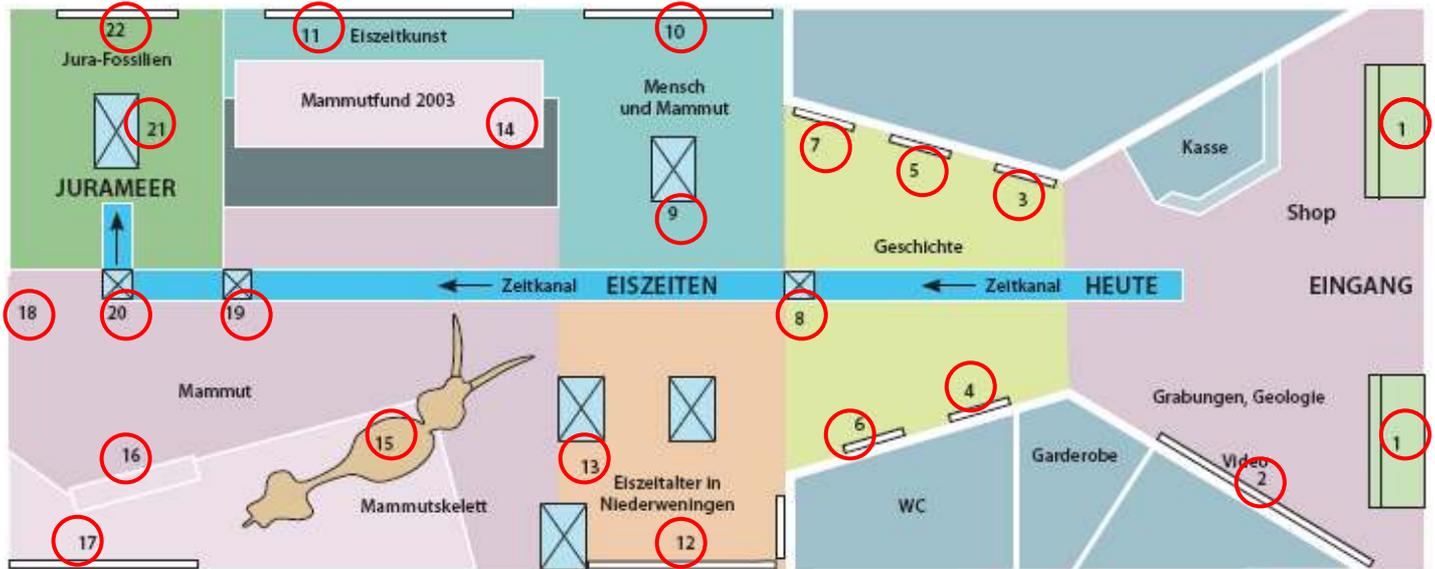


Tour through the Mammoth Museum Niederweningen



- 1 Entrance area, front showcase**
 Left side: 2.50 m long mammoth tusk, found in 2004 at Niederweningen.
 Right side: Mammoth fossils from gravel pits of Kanton Zürich.
Time canal with progressive timescale
 Begins «TODAY» in the entrance area of the museum, goes on to the «ICE AGE» and ends 150 million years ago in the subtropical «JURASSIC SEA».
- 2 History of mammoth discoveries in Switzerland and Niederweningen (with video)**
 The earliest mammoth bones in Switzerland were found in 1577 at Reiden/LU. They were interpreted as bones from a giant man.
 In 1890, spectacular bones and teeth of mammoth, woolly rhinoceros, wild horse, steppe wisent, wolf, vole, lemming and frog were discovered in a glacial peat below gravel, excavated for the construction of the Wehntal railway at Niederweningen.
 In July 2003, a large articulated mammoth skeleton was recovered during a rescue excavation in a construction pit at Niederweningen. In 2004 other disarticulated mammoth fossils were found nearby; e.g. a 2.50 m long tusk.
 Niederweningen is the most important mammoth site in Switzerland, with mammoth fossils from at least nine individuals, including a very young mammoth calf.
- 3-7 Cultural-historical epochs in the region of Wehntal / Lägern**



- Middle Ages (1500–450 AD)**
 People usually lived in isolated homesteads and smaller villages. In the High Middle Ages several castles (Alt-Regensberg, Alt-Lägern) developed in the region, and small cities such as Regensberg became more important. At this time, the Christian Church was a very important factor.
- Roman Times (450 AD–15 B.C.)**
 At 15 B.C., Roman troops under emperor Augustus occupied the area of Switzerland. The local Celtic population became «romanised». A Roman road system and new settlements were built. Roman manor houses at Buchs, Dällikon, Oberweningen and Schleinikon, some grave finds and road fragments are records of this epoch.

- **Iron Age (15–800 B.C.)**

Men lived in isolated homesteads and worked in agriculture and animal husbandry. They probably used local ore deposits at the Lägern mountain to produce iron tools and weapons. Major settlements were situated at strategically favourable places such as Rheinau, situated in a loop of the Rhine river. A burial mound of the older Iron Age with pottery was found at Niederweningen. One golden Celtic coin and foundations of a house are other records of this time.



- **Bronze Age (800–2200 B.C.)**

At the beginning of the Bronze Age men fabricated jewellery and tools of copper, but already in the Early Bronze Age they began to alloy the copper with tin to produce bronze. People often settled in lake dwellings, but homesteads and villages were also located on the flanks of the Lägern mountain. Ceramics and bronze objects such as bodkins, axes, sickles and jewellery needles have been found in the region.



- **Stone Age (2200–2500 000 B.C.)**

No fossils or artefacts from men are known from the earlier Stone Age. However, flint tools of the late Early Stone Age document that at the end of the Ice age modern men lived and hunted in the Furttal, near Otelfingen, 12 000 years ago. The flint beds at the Lägern had more than regional significance and were an important resource for the fabrication of tools and weapons.



8 **Flint – the steel of the Stone Age**

Flint was one of the most important resources for the fabrication of tools and weapons for men of the Stone Age. It was the most sought-after and traded resource of the Stone Age. Limestone beds with flint nodules are widespread in the Lägern mountain.



9 **Jewellery and tools from mammoth ivory, and huts from mammoth bones**

In the Stone Age, mammoth ivory was used to carve ornament objects, and animal and men figures. Decorated axes, hangers, barrettes and flutes made from mammoth ivory (exposed as replicas) from Southern Germany, Czech Republic and Russia have an age of ca. 20 000–35 000 years.

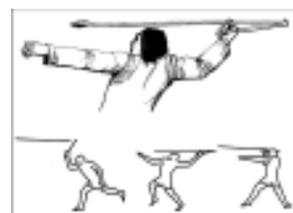
In the absence of wood, big mammoth bones and tusks were used for the construction of winter camps 15 000 years ago in the tundra of the Ukraine, Russia and Siberia.



10 **Men and mammoth**

Between 30 000 and 200 000 years before today, the Neanderthals lived in Europe. Around 45 000 years ago, anatomic modern men (*Homo sapiens sapiens*) migrated from the Middle East to Europe. Both Neanderthals and modern men lived contemporaneously with mammoths, whose bones and teeth provided several resources. There is still a scientific debate as to how far modern men, with his modest weapons, actively hunted the mammoth.

At present no human bones and no traces of human activity have been found in the glacial deposits at Niederweningen. Probably modern men reached the region of the Wehntal and the Lägern mountain after the end of Ice Age.



11 **The art of Ice Age**

The mammoth impressed men already 40 000 years ago and he documented the powerful animal often in the form of cave-paintings, ivory-, bone-, and pottery figurines. The exposed paintings and figurines of mammoths and other glacial animals have an age of 12 000–30 000 years and are examples from Baden-Württemberg, Rheinland-Pfalz, France, Czech Republic and Siberia.



12 Ice Age in Niederweningen

The late glacial mammoth peat at Niederweningen is an important archive of the environment. Beside the spectacular glacial mammals like the mammoth or the woolly rhinoceros, there are a lot of smaller fossils like insects or plants known from the peat bed, e.g. 150 different species of beetles and about 60 plant species known from pollen and seeds. A careful analysis allowed the reconstruction of six typical animal and plant communities.



13 Ice Age fossils, including micro-fossils in microscope view

By 1890, bones and teeth from wild horse, bison and wolf were found together with fossils from voles, lemmings, frogs and birds. More vertebrate fossils were gathered during 2004 in a construction pit, including teeth of other rodents, fish and cave hyena. Wood, spruce cone, leaf, and seed fossils are numerous in the late glacial peat. Microfossils from plants, beetles, rodents and fish can be examined under the microscope by the visitor.



14 The sensational mammoth discovery of 2003

In July 2003, about 50% of a large articulated mammoth skeleton was recovered in a construction pit at Niederweningen. The height at the shoulder measured about 3.50 m. The size of the well preserved molar teeth document that the animal perished at the age of approximately 40 years, in the bog of Niederweningen. Radiometric dating indicates a geologic age of 45 000 years before present. The skeleton is presented in its original situation on an inclined board.



15 The mammoth of Praz-Rodet and the mammoth calf of Niederweningen

The reconstruction of an adolescent mammoth with 2.50 m height at the shoulder is a polyester copy of the original skeleton, discovered in 1969 in a gravel pit of Praz-Rodet in the Vallée de Joux, southwest of Le Brassus, north western Switzerland. It has an age of ca. 14 000 years. The original is exposed in the Musée cantonal de géologie in Lausanne.



Already during the first excavation in Niederweningen 1890, the skeleton relics of a very young mammoth calf were found. The sensational discovery derives from a newborn baby or even unborn embryo. In 2007, the original fossils were copied and the skeleton was completed to a worldwide unique reconstruction of a very young mammoth.



16 Objects to touch

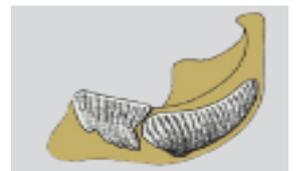
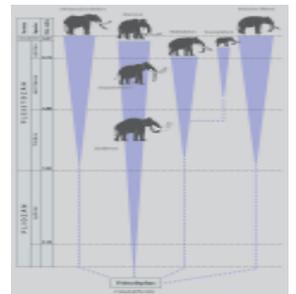
- Reconstruction of the left forefoot from the mammoth discovery Niederweningen 2003 (casts).
- Mammoth thighbone, original discovery from Niederweningen 1890.
- Molar teeth of mammoth, Asian and African elephants (casts).



17 What's a mammoth?

The woolly mammoth (*Mammuthus primigenius*) is a representative of the family elephants, adapted to the cold climate of the Ice Age. It is known from 200 000 years and became extinct about 11 500 years ago in Europe and North America. The extinction coincides with the dramatically changing climate – there was a rapid rise of temperature and increased precipitation at the end of Ice Age. These changes reduced the wide grass steppes, the specific habitat of the mammoth. Only on the small Wrangel Island in the northern Arctic Sea, a population of dwarf-mammoths survived until 4000 years ago.

An average male mammoth measured 3.00–3.50 m at the shoulder and had the dimension of the recent Asian elephant and weighed 4–5 tons. The biggest bulls stood up to 4 m tall and reached the dimensions of the present day African elephant. His food consisted of about 200 kg of plant material such as grass, leaves, branches, bark, roots and fruits, together with more than 100 litres of water per day. The mammoth was characterized by two big tusks and six generations of molar teeth. Usually only one molar tooth was in function per half of upper and lower jaw.



The mammoth had a 3 cm thick skin and 9 cm thick layer of fat as protection against low temperature. The 4–5 cm long woolly hairs of the under-fur were covered by a thicker fur made up of 1 m long hair. Very small ears and a short tail were other adaptations to the extremely cold winter.

In comparison with the recent African elephant, the mammoth probably lived for 50–70 years. He achieved sexual maturity by ca. 10 years. After a gestation time of about 22 months, young animals were probably born in spring time.



18 Illustration of the Wehntal 45 000 years ago

The large illustration on the back wall shows a mammoth with a recently born pup, endangered by a pack of wolves. A woolly rhinoceros is hiding in the open forest of spruces and pines. Behind birches and willows, some bison are browsing in the plain. In the marsh land of the shoaling Wehntal lake, wild horses and more mammoths are grazing.



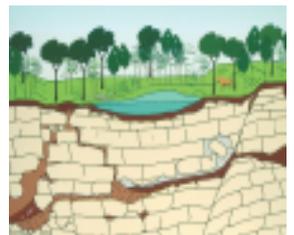
19 Miocene fossils

The coquina sandstone of the Upper Marine Molasse derives from a shallow sea, in which sand and mud was deposited 16–20 million years ago. Snails and cockles, teeth of sharks and rays, together with bones of sea cows are common. The hard sandstone was exploited next to Niederhasli and Würenlos and was a favoured building stone.



20 Eocene fossils

In the upper part of the Late Jurassic Lägern limestone, karst phenomena are widespread, filled by residual clay (bolus) and iron ore pellets in the Eocene. Disarticulated fossils, mainly teeth and bones of mammals and reptiles were found in local fissure fillings of the Lägern stone pits at Dielsdorf. The fauna with snakes, alligators and diverse mammals as early horses and small prosimian apes is about 40 million years old.



21 Marine fossils from the Late Jurassic Lägern limestones

Late Jurassic limestone (Baden and Wettingen Member) build the crest of the Lägern, the easternmost prolongation of the folded Jura mountains. Many well-preserved fossils came to light during the long exploitation of building stones by the Lägern Kalksteinbruch AG in Dielsdorf/Steinmaur. The high diverse fossil fauna suggests good life conditions in a 100–200 m deep subtropical sea 145–150 million years ago. Ammonites, belemnites, sea urchins, bivalves, brachiopods and sponges are very common, but fossil remains of fish and marine crocodiles are rare.



22 Illustration of the Jurassic sea

The illustration depicts a reconstruction of the Late Jurassic sea at the time of the deposition of the Baden Member with its typical fossils: Ammonites are the dominating cephalopods, swimming slowly in the former warm sea and fed on small animals. The belemnites were fast swimming cephalopods. Marine crocodiles preyed on the cephalopods, and bony fishes looked for food at the bottom of the sea. Diverse bivalves lived in soft muddy ground, but also attached to hard ground, in addition to many fixed brachiopods and numerous sponges. Stalked crinoids filtered their food from the water current, whereas sea urchins stilted on their spikes over the slightly compact sediment and grazed on algal and microbial crusts.

