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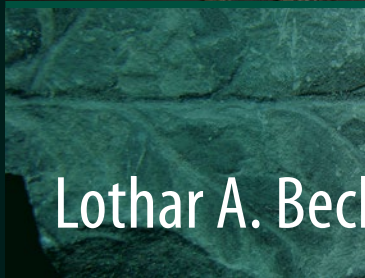
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Chapter 34

MAUER: The Locality of Mauer and its Virtual Collection of Middle Pleistocene Mammal Fossils



H. Dieter Schreiber, Kristina Eck, and Volker Liebig

34.1 Introduction

The main issue concerning the fossil assemblage from the locality of Mauer is, that the objects are stored in collections at several institutions and museums of natural history. The fossils of the ‘Mauer collection’ have been sampled from sand pits around the villages of Mauer and Bammental (16 km southeast of Heidelberg, southwestern Germany) over the last 200 years by different persons with different intentions. While extracting the sand for economical purposes the majority of fossils were found by chance and donated or sold to institutions, private dealers or private collectors.

A project initiated in 2004 by the association “*Homo heidelbergensis* von Mauer e.V.” (VHHM) started an inventory and documentation of the fossils from the locality of Mauer that were available at institutions at the time (Schreiber 2006, 2007), resulting in a ‘virtual’ catalogue and database of the collections: the ‘Fossilien Daten Sammlung Mauer’ (FDSM). The project was supported by the State Museum of Natural History Karlsruhe (SMNK) and the Institute of Earth Sciences of the Heidelberg University (GEOW), and financially supported by the ‘Klaus-Tschira-Stiftung, gemeinnützige GmbH’ in Heidelberg (KTS). It ended in 2006, but the catalogue FDSM has been continually revised and expanded to the present day by H. D. Schreiber with regard to osteological, taxonomical, taphonomical and stratigraphical aspects of the specimen. The catalogue reached a status of 5,769 datasets representing 13,004 fossil specimens stored at 12 different institutions in Germany (as of March 1, 2015).

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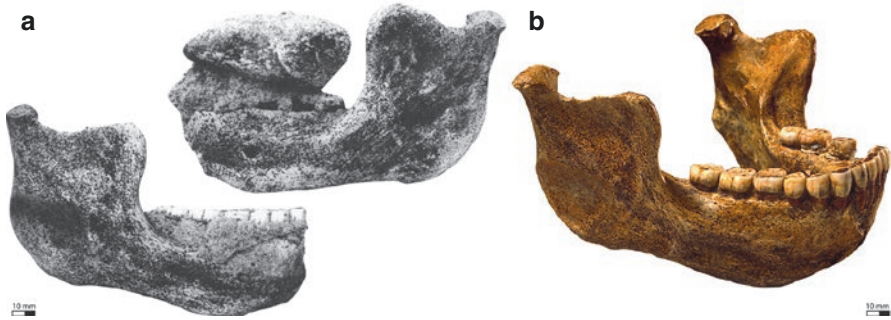


Fig. 34.1 The mandible of *Homo heidelbergensis* Schoetensack, 1908 (“Mauer 1”, M.1 [MS 0001]): (a) condition before any preparation (Schoetensack 1908), (b) present condition (photo: K. Schacherl, GEOW)

With the find of a hominid mandible in 1907 (Fig. 34.1, see also below) the Middle Pleistocene locality of Mauer, esp. the ‘Grafenrain’ sand pit, became famous world-wide for containing the historical first evidence for the early presence of humans in Europe before the Neanderthals. Almost one year later Otto Schoetensack (1850–1912) argued that the new hominid species, *Homo heidelbergensis*, was ancestral to the Neanderthals and modern humans (Schoetensack 1908). Beside the human fossil the locality of Mauer was already well known in the palaeontological community for its rich and varied mammalian faunal assemblage dating to a warm period before the three holarctic glaciations. Especially the molluscs were the focus of early investigations (see Andreae 1884; Sauer 1898), giving a climatic signal of warm temperatures, similar to the locality of Mosbach (near Wiesbaden). It was also Andreae (1884) who gave a first mammalian faunal list for Mauer, containing the straight-tusked elephant and a ‘forest’ rhinoceros, supporting the warm climatic signal. Several scientists drew comparisons with Mauer in their revisions of similar localities or fossils (esp. Schroeder 1898, 1903; Wüst 1901; Toula 1906; Reichenau 1910). With his major revision of the faunal list Soergel (1914) confirmed the warm age character of the assemblage from the Grafenrain sand pit. Beside numerous special investigations of the taxa, later revisions corroborated Soergel’s list while also updating it on the basis of new discoveries, nomenclature, and taxonomy (Rüger 1927; Koenigswald 1997; Koenigswald and Heinrich 1999; Schreiber 2007; Wagner et al. 2011; Maul et al. 2015; Löscher and Schreiber 2015).

34.2 The Hominid Mandible from Mauer

During his work on 21st October 1907 in the Grafenrain sand pit north of the village of Mauer, the sand worker Daniel Hartmann (1854–1952) unearthed the mandible of a prehistoric man (Fig. 34.1). He reported his discovery to Josef Rösch (1838–1925), the tenant of the pit, who wrote a letter to the head of the

Zoological Institute at Heidelberg University Otto Büschli (1848–1929) and Otto Schoetensack: “You struggled for 20 years to prove that prehistoric men and mammoths lived at the same time in our region, based on remains from my sand pit. Yesterday we produced proof of this assumption. We found a mandible of a prehistoric man 20 m under the arable land on the slope of my sand pit. The fossil is in very good condition and with complete dentition. The left side of the lower jaw is covered by a conglomerate, but the right side is completely visible” (Schoetensack 1908: p. 22). Because of a fracture at the symphysis the mandible was broken into two parts.

34.3 History of its Research

Just one year later in 1908 Otto Schoetensack published his monograph on the new hominid species *Homo heidelbergensis* (Schoetensack 1908), based on the mandible “Mauer 1” (M.1, [MS 0001]) from Mauer. His anatomical study relied mainly on the work of the anatomist Hermann Klaatsch (1863–1916). Gottlieb Port (1867–1918) did X-ray photographs of both parts of the mandible at the Dental Institute of Heidelberg University. It was the first time that a human fossil was investigated with radiography (Kontny et al. 2007). In the following decades it became rather quiet about the mandible. The next investigations only commenced in 1994, when the former Institute of Anthropology and Human Genetics, University of Frankfurt, analysed the mastication of Heidelberg Man (Haidle 1996). Ten years later, in 2004, the Division of Neuroradiology of Heidelberg University Hospital took computed tomography images of the mandible. The images showed flawless teeth without caries sitting on a strong alveolar ridge without any indication of bone atrophy. Additionally a healed fracture in the left ramus of the mandible was recognized (Kontny et al. 2007). The Max Planck Institute for Evolutionary Anthropology in Leipzig (MPI Leipzig) performed digital measurements of the mandible in 2006 under the direction of J.-J. Hublin and K. Harvati-Papatheodorou. This investigation delivered detailed scans of all teeth with a resolution of 25 μm and a new casting form (Kontny et al. 2007). Mounier et al. (2009) investigated the validity of the species *Homo heidelbergensis* based on a careful anatomical description. Since that study the definition of *Homo heidelbergensis* has been more precise and mainly supports the theory of an Afro-European taxon that is the last common ancestor of *Homo neanderthalensis* and *Homo sapiens*. G. A. Wagner from the Geographical Institute of Heidelberg University presented a new radiometric dating of the type site Grafenrain (Wagner et al. (2010). The mandible’s age was for the first time determined as to be 609 ka (± 40). Meanwhile the MPI Leipzig developed methods for the retrieval of DNA sequences from archaeological and paleontological remains. Unfortunately it is not possible to extract the DNA of any fossil from the Mauer sands (pers. com. M. Meyer, MPI Leipzig, 2014).

34.4 History of Preparation

Otto Büschli undertook the first preparation in 1907. During removal of the concretion from the left side of the mandible four teeth broke off (p3, p4, m1, m2). After a complete cleaning and assembly of both parts of the mandible, the whole fossil was coated with shellac. Because of missing parts of the enamel of the four broken teeth, they were not fixed again (Wegner 2007). The second preparation was carried out in 1937 for the 30th anniversary. The head of the 'Geologisch-Paläontologisches Institut der Universität Heidelberg' (GPIH, today GEOW), Ludwig Wilser (1888–1949), arranged a completion of the dentition to be done by Peter Welz (1884–1962). After this preparation the dentition of the mandible was complete for the first time since its discovery (Kontny et al. 2007). During the Second World War the Mauer mandible was stored in a box in the salt mine Kochendorf (Baden-Württemberg, Germany). After the war the box was found opened and the mandible lost, but the specimen was re-discovered on a garbage heap in the salt mine. It was broken into two pieces again at the symphysis and two of the four broken teeth were lost for good. These circumstances required a third preparation in 1947. Again Peter Welz fixed the mandible and after his repairs the distance between the two condyles was found to have decreased by 10 mm (Kontny et al. 2007). Many years later in 1994 the former Institute of Anthropology and Human Genetics, University of Frankfurt, submitted a proposal to prepare the fossil again. The head of the GPIH, T. Bechstädt, and the curator at the time, H. Bahlburg, supported this idea. The mandible was disjoined again at the symphysis to remove the residual glue of the previous preparations and to construct a new junction of both parts. After one year in Frankfurt, the mandible returned to the institute in Heidelberg (Kontny et al. 2007), where it is now stored in a safe again.

34.5 History of the 'Mauer Collections'

The first collections were established in the 1830s at the museums of natural history in Karlsruhe and Stuttgart by the donation of the private collectors and priests Johann Jakob Rutz (1800–1851) from Mauer (Figs. 34.2 and 34.3), Johann Balthasar Ullmann (1764–1846) from Epfenbach, and Johann David Karl Wilhelmi (1786–1857) from Sinsheim (Fig. 34.4). But the main collecting activities were established by Heidelberg University over the decades in the 19th and twentieth century, starting at the Zoological Institute with Heinrich Georg Bronn (1800–1862) professor of zoology, who first introduced the locality of Mauer into the scientific literature in 1830 (Bronn 1830), followed by Otto Schoetensack and Wilhelm Salomon-Calvi (1868–1941) at the Geological Institute.

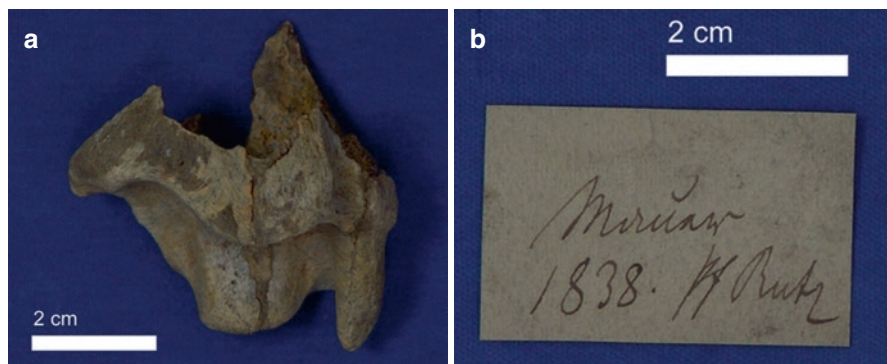


Fig. 34.2 Fragmented bone from the collection of the priest Johann Jakob Rutz. (a) tibia, sinistral, distal fragment, plantar view. Mauer, ‘Karlsruhe collection’, SMNK [MS 3790]. *Cervus elaphus* (red deer). (b) label, mentioning the locality of Mauer, the year 1838, assigned to the priest Rutz

34.6 ‘Karlsruhe Collection’ (SMNK)

As mentioned above the collection of fossils from the locality of Mauer started in Karlsruhe in the 1830s by donations of the priest Johann Jakob Rutz. He had been in contact with Alexander Braun (1805–1877), director of the museum in Karlsruhe (the “Naturalienkabinett zu Karlsruhe”, today SMNK). Again in 1849 Rutz donated material to the museum in Karlsruhe and even offered support for systematic excavations, but the authorities of the museum rejected the offer (Mayer 1971). By the 1920s only little material from private collectors had become part of the collection. Unfortunately a complete account of the collection up to 1945 is impossible as a result of heavy damage to the museum buildings caused by air strikes during the Second World War in 1942 and 1944. The newest specimens in the ‘Karlsruhe collection’, like two isolated teeth of macaque (Fig. 34.5, Schreiber and Löscher 2011, Schreiber 2012), a pelvis of a rhinoceros and a micromammal assemblage, are owed to the dedicated work of the private collector M. Löscher (teacher and member of the VHHM, see below). Thus far the ‘Karlsruhe collection’ amounts to 728 specimens, of which 14 are thought to come from Rutz.

Beside its own collection from Mauer, the SMNK took over three collections, containing material from Mauer, which have become part of its own Quaternary collection. First, the ‘Freiburg collection’ (with 38 specimens from Mauer), which was removed from the Geological Institute at the University of Freiburg in the 1980s. Second, the ‘Mannheim collection’ (with 19 specimens), which belonged to the former ‘Zeughaus Museum’ in Mannheim, was transferred to Karlsruhe in 1977. Finally, there is the collection of the palaeontologist Wilhelm Freudenberg (1881–1960), who assembled a huge private collection of Pleistocene fossils during his career, parts of

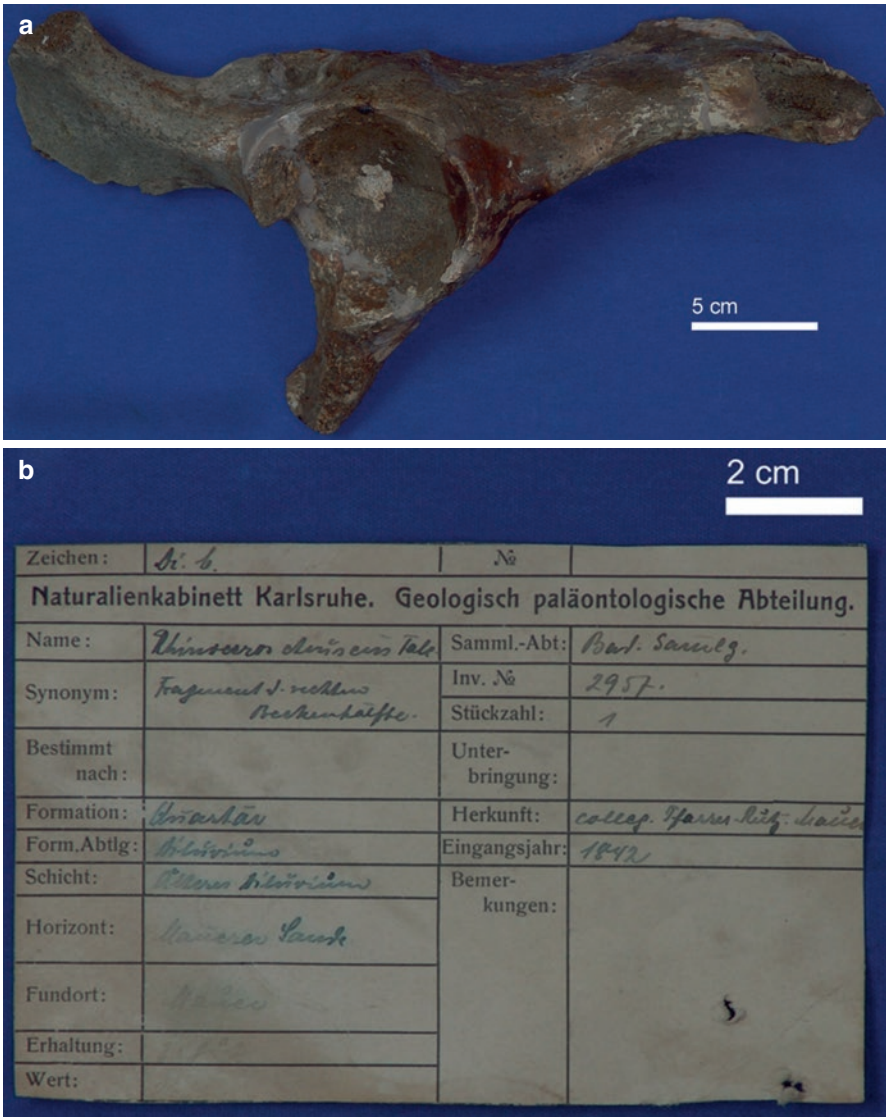


Fig. 34.3 Inventoried at the museum in Karlsruhe: (a) pelvis, coxa (acetabulum with fragment of ilium, ischium and pubis), dextral, lateral view. Mauer, Mauer sands, 'Karlsruhe collection', SMNK Inv. 2957 [MS 4994]. *Stephanorhinus* cf. *hundsheimensis* (Hundsheim rhinoceros). (b) label of the 'Naturalienkabinett', mentioning the specimen as part of a donation to the collection in Karlsruhe in 1842 by the priest Rutz

which were sold to the museum in 1926 (Mayer 1971). In the following decades, further parts of Freudenberg's collection came to Karlsruhe from different sources. Unfortunately there is a lack of documentation. The 'Freudenberg collection' counts 133 specimens relatable to Mauer.

Fig. 34.4 Fragmented bone from the collection of the priest Johann David Karl Wilhelmi at the Museum in Stuttgart. Mandible, rostral symphysis, dextral and sinistral, ventral view. Mauer, ‘Stuttgart collection’, SMNS 33926 [MS 4035]. *Equus mosbachensis* (Mosbach horse). The label fixed on the specimen mentions a taxon, the locality of Mauer, and the year 1835; signed by the priest Wilhelmi

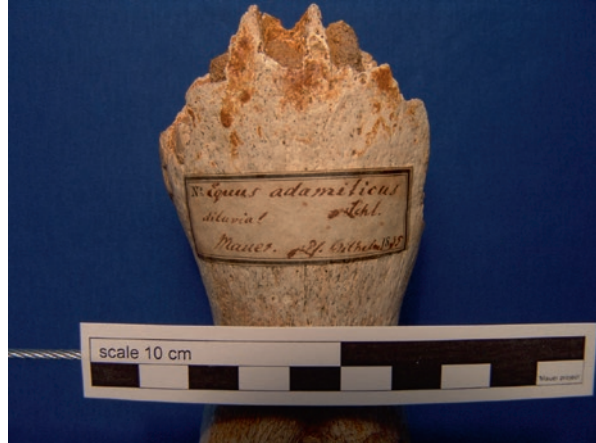


Fig. 34.5 The evidence of macaques in the locality of Mauer: two isolated teeth of *Macaca sylvanus* were found in 2008, resp. 2010 (Schreiber and Löscher 2011, Schreiber 2012). Lower molars, m2 and m3, dextral, occlusal view. Mauer, Grafenrain sand pit, lower Mauer sands, ‘Löscher collection’ (SMNK), m2: SMNK-PAL 6602 [MS 5136], m3: SMNK-PAL 6630 [MS 5149]



34.7 ‘Stuttgart Collection’ (SMNS)

The greater part of the 271 specimens from Mauer at the State Museum of Natural History Stuttgart (SMNS) goes back to acquisitions from private collectors, esp. Wilhelm Freudenberg in the 1940s. Some 62 specimens from the locality of Mauer remain in the hands of the family Freudenberg. Other private collectors, like the priest Wilhelmi (in 1835, Fig. 34.4), Otto Schoetensack (in 1893), G. Stettner (member of an excursion in 1936) or R. Wild (SMNS, in the 1960s) donated smaller numbers of Mauer specimens to the museum.

34.8 ‘Heidelberg Collection’ (GEOW, SMNK)

Two remains of a rhinoceros are historically the first recognisable fossil objects from Mauer in the collection of Heidelberg, donated by Professor Kilian (?1812–1846, probably from Mannheim) in 1856. Including an almost complete skull of the straight-tusked elephant (*Elephas antiquus*) found in 1887 (Fig. 34.6), the number of fossils grew to 4,625 by 1962, when the Grafenrain sand pit was closed. The elephant skull from 1887 inspired Otto Schoetensack to start as a professor at Heidelberg University in 1888. Based on the fossil record of Taubach near Weimar (Portis 1878) he defended the hypothesis, that where *Elephas* can be found, human fossils might be present too (Schoetensack 1908, Adam 1997). In the following two decades Schoetensack continuously visited the fossil site of Mauer and maintained contact with the tenant of the pit Josef Rösch, instructed the sand workers about fossils (Schoetensack and Schoetensack 1997), and became the first contact person concerning the hominid find on 21st October 1907. After this important find, and boosted by Wilhelm Salomon-Calvi, the engagement of Heidelberg University reached a new level with the exclusive right of purchase of fossil objects from the Grafenrain sand pit. Until the 1930s and again in the 1950s, fossil acquisitions were greatest at the GPIH (today GEOW). In the 1980s the material was newly conserved and catalogued. Since 1992 most of the ‘Heidelberg collection’ is stored at the SMNK (Fig. 34.7), but some original material and well-preserved material remained at the



Fig. 34.6 Cranium, nearly complete, found in 1887 in the Grafenrain sand pit. Mauer, ‘Heidelberg collection’ (GEOW), M.303, M.304, M.305, M.306 [MS 0189]. *Elephas antiquus* (straight-tusked elephant). On exhibit since 1992 at the Reiss-Engelhorn-Museen in Mannheim (REM)



Fig. 34.7 Inspecting fossil material of Mauer in the collection of the SMNK for the new catalogue FDSM. The purpose was to observe osteological, taxonomical and taphonomical features on the material



Fig. 34.8 The exhibition at the GEOW (former GPIH) with well-preserved specimens of the 'Heidelberg collection'

institute in Heidelberg (Fig. 34.8), and a smaller amount was provided for the exhibition in the ‘Urgeschichtliches Museum’ (UMRM) in the town hall of Mauer.

34.9 ‘Darmstadt Collection’ (HLMD)

The fossil material at the Hesse State Museum Darmstadt (HLMD) dates back to an acquisition from private sellers (D. Blatz, Heidelberg, and Krantz, Bonn) between 1896 and 1940 probably in order to establish a reference collection from the locality of Mauer. The collection at HLMD contains 565 specimens.

34.10 ‘Löscher Collection’

The motivation of M. Löscher for screening samples from the Grafenrain sand pit in order to gain micromammal fossils was to establish a biostratigraphic basis for dating Mauer, and to teach school kids about methods in the earth sciences. Since 1995 Löscher takes frequently samples from the Mauer sands in the Grafenrain sand pit (Löscher and Löscher 2012; Maul et al. 2015; Löscher and Schreiber 2015), publishing first results with the evidence of the *Pliomys episcopalis* und *P. coronensis* in the fossil record of Mauer (Löscher and Unkel 1997). By 2015 the collection contained 6,512 specimens. Besides the remains of small mammals and numerous mollusc shell fragments, Löscher occasionally found larger fossils, such as specimens of *Cervus elaphus* (mandibula, calcaneus), *Bison* sp. (axis), a pelvis of *Stephanorhinus* sp. (Fig. 34.9), two isolated teeth of *Macaca* (see above), and well-rounded isolated teeth of *Capreolus* and *Cervus* (Löscher and Schreiber 2015).

34.11 Smaller Collections

In the case of some smaller collections the fossil remains were collected under very different circumstances, like scientific field campaigns (6 specimens at the Steinmann-Institut für Geologie, Mineralogie und Paläontologie, Bonn), and fieldtrips to the Grafenrain sand pit (10 specimens at the Bayerischen Staatssammlungen für Paläontologie und Geologie, München), or private collectings by chance (14 specimens at the Forschungsinstitut Senckenberg Frankfurt). In other cases the material dates back to historic collections of scientists (3 at the Museum für Naturkunde Berlin, 7 at the Naturhistorisches Museum Basel).

At the Reiss-Engelhorn-Museen Mannheim (REM) are stored 11 specimens donated by Karl F. Hormuth (1904–1992), an enthusiastic private collector of artefacts, who frequently visited the sand pits in Mauer and Bammental in the late 1920s.

Fig. 34.9 Pelvis, nearly complete, illium sinistral missed, cranial view. Mauer, Grafenrain sand pit, lower Mauer sands, ‘Löscher collection’ (SMNK), SMNK-PAL 2630 [MS 3784]. *Stephanorhinus* sp., found in 2005, while sampling for micromammals



The amount of specimens in the collection of the company ‘Dr. F. Krantz Rheinisches Mineralien-Kontor’ (Company Krantz, Bonn) is unknown, but some material collected by Friedrich Krantz (1888–1926) in the early twentieth century remains with the company (pers. comm. U. Müller-Krantz, 2006). In the first half of the twentieth century Krantz was a reputable seller of fossils in Europe, and he had the license to sell casts of the hominid mandible.

34.12 The Virtual Catalogue FDSM (Fossilien Daten Sammlung Mauer)

Usually institutions develop their own system of inventory, which are not necessarily comparable. The experience of dealing with the collections of numerous museums from the same locality suggested the establishment of a new catalogue with unique numbering and consistent metadata for the fossil remains from the locality of Mauer. An additional aim was to achieve the best possible overview and create an instrument for future investigations on the faunal assemblages from the fossil sites. It covers the requirements of inventories, and the scientific approach to the palaeontological objects, stored in different museums and institutes. The specimens are characterized as far as possible with regard to their osteological, taphonomical, and taxonomical features, the circumstances of their discovery, and collections history. The FDSM introduces a new numbering in the format “MS [four digit number]”, like MS 0001 for the mandible of *Homo heidelbergensis*. At the same time, the inventory numbers of the several collections retain their validity. The FDSM catalogue is available for scientific purposes from H. D. Schreiber.

34.13 Geological Background and Faunal Assemblages

The majority of fossils from the locality of Mauer are isolated and fragmentary finds from the fluvial sequences of the Quaternary deposits along a former meander of the Neckar river. The sands and gravels have been extracted from 13 sand pits in the valley between Mauer and Bammental, but just a few outcrops preserved fossil remains. The Grafenrain sand pit yielded the largest amount (around 77 % of the specimens), followed by the Hollmut sand pit northern to Bammental (5 %). Other 11 % come from different horizons and outcrops, and for 7 % a specific site is unknown.

The Quaternary deposits at Mauer represent several cyclic phases of erosion and deposition in the valley of the Neckar river. It started with gravels, preserved at higher altitudes (187 to 165 m above sea level) near Wiesenbach (2 km north of Mauer), followed by the Mauer sands with a thickness of around 50 m in the lowest reached altitude (119 m above sea level), after a longer phase of erosion in the Neckar valley.

The Mauer sands sequence stopped with a cut-off of the Neckar river meander near Bammental (2 km northwest of Mauer), but continued soon with sediments known from the Hollmut sand pit. After a next meander cut-off near Neckargemünd (6 km north of Mauer) the sequence of the Mauer sands terminated.

Subsequently the Elsenz river ran through the former western Neckar valley, and started to cut into the Mauer sands. This process has been interrupted few times, but it continues even today. The origin of the so called ‘Rostrote Sande’ dates back to the early phase of erosion. The Rostrote Sande is a localised deposit of red-brown, well-sorted sands, probably laid down on the riverbank of the Elsenz river in the area of the later Grafenrain sand pit. During the cold ages of the Middle and Upper Pleistocene the landscape was covered by loess, reaching 10 m thickness in places.

Based on the geological structures of the deposits, and their corresponding faunal (and floral) content, it is necessary to distinguish five faunal and one floral assemblages at the locality of Mauer (in addition to Schreiber et al. 2007):

- The ‘Fauna Mauerer Sande’ [FM]. Fossil record from the fluvial sediments of the Mauer sands (main fossil record), from base to top, early Middle Pleistocene, MIS 15 (to 13?), 627 to 420 ka (Wagner et al. 2010), warm climate, forest to open land (Koenigswald and Heinrich 1999; Schreiber et al. 2007).
- The ‘Fauna Hollmut’ [FH]. Fossil record from the fluvial sediments of the Mauer sands south of the Hollmut hillside, exposed in the Hollmut sand pit, early Middle Pleistocene (MIS 13?), warm climate, forest to open land, with tendency to a temperate climate.
- The ‘Fauna Rostrote Sande’ [FR]. Fossil record from red-brown sands, extracted from the area of the Grafenrain sand pit, top of the Mauer sands, underlying the loess (Wurm 1913; Förster 1913a, b), late Middle Pleistocene (MIS 12-6?) or Upper Pleistocene (Weichselian), cold climate, open land (cold steppe).

- The ‘Fauna Löss’ [FL]. Fossil record from the loess in the area of the Grafenrain sand pit and the outcrop ‘Ziegelei’, representing the glacials of the Middle and Upper Pleistocene (probable just the Weichselian), cold climate, open land, cold steppe (Koenigswald 1992, 1997).
- The ‘Flora Mauerer Sande’ [Fa]. Fossil plant record (pollen, wood imprints) from the fluvial sediments of the Mauer sands, early Middle Pleistocene (see Urban 1992, 1997; Koenigswald 1997).
- the ‘Fauna Wiesenbach’ [FW]. Fossil record from ‘Wiesenbacher gravels’ north of Wiesenbach, Lower to Middle Pleistocene (?).

34.14 Exhibitions and Public Activities

“Urgeschichtliches Museum” (UMRM): The museum was established in the town hall of Mauer in 1982. Here, open to the public, the museum presents the largest exhibition of fossils from the Mauer sands (Fig. 34.10). The exhibition focus on *Homo heidelbergensis* and its ‘large hominid family’. Numerous original fossils illustrate the accompanying fauna. In 2007, after 25 years, on the occasion of the 100th anniversary of the discovery of the Mauer mandible, the museum was renovated and the exhibition revised (www.gemeinde-mauer.de).



Fig. 34.10 The exhibition at the “Urgeschichtliches Museum” (UMRM) in the town hall of Mauer, revised in 2007



Fig. 34.11 Mauer sands exposed at the Grafenrain sand pit

Grafenrain sand pit: After the end of the sand mining in the 1960s the numerous sand pits in the former meander of the Neckar river near Mauer were abandoned or refilled. Only at the Grafenrain sand pit, which is situated directly on the outskirts north of Mauer, small remnants of the originally gigantic pit walls remained (Fig. 34.11). This is where Heidelberg Man and most fossils of the Mauer collections were discovered. Today the sand pit is under nature protection and equipped with displays. It can be visited at all times.

“Heid’sches Haus”: A half-timbered house in Mauer hosts an information centre, which is also the seat of the association VHHM. Here, in the so-called “Heid’sches Haus”, the history of the discovery and the research on *Homo heidelbergensis* of Mauer is presented in a small exhibition.

Time path: The three parts of the exhibition about *Homo heidelbergensis*, UMRM, “Heid’sches Haus” and the Grafenrain sand pit, are connected by a time path, which runs through the village for a length of about 1.1 km. Displays along the path illustrate events of the last 600,000 years of human history.

Association “*Homo heidelbergensis* von Mauer e.V.” (VHHM): The VHHM was founded in 2001. It coordinates all activities concerning *Homo heidelbergensis* in the village of Mauer. For example, all-year-round guided tours with the topic “Human ancestors” can be booked by anyone. From April to October there are free public guided tours every Sunday. A vaulted cellar in the “Heid’sches Haus” hosts a “stone age studio”. Here, courses in experimental archaeology are offered, especially for children. In addition, the association offers free evening lectures once a month from September to March (www.homoheidelbergensis.de).

34.15 Exhibitions outside of Mauer

Museum of Geosciences at the GEOW in Heidelberg: At the beginning of the 1960s the current GEOW (former GPIH) was moved to the Campus “Im Neuenheimer Feld”. There is a permanent geological and palaeontological exhibition, which also presents fossils from the Mauer sands (Fig. 34.8). They belong to the ‘Heidelberg collection’. Among these are remarkable objects like several partially articulated bones probably belonging to one young red deer. The mandible of *Homo heidelbergensis* is usually displayed as a cast in the permanent exhibition. The original is securely locked away in a safe of the institute. It can be visited on request (www.geow.uni-heidelberg.de).

Reiss-Engelhorn-Museen Mannheim (REM): In the permanent exhibition “MenschenZeit”, Heidelberg Man plays a special role. Also the accompanying animal world from the Mauer sands is presented to the visitor in a vivid manner. For example, the visitor may encounter the largest contemporary of *Homo heidelbergensis*, a straight-tusked elephant. In the form of a life-size reconstruction, the elephant is placed nearby the nearly complete skull found in the Grafenrain sand pit (Fig. 34.6). In the entrance hall of the museum, a drill core from a research drilling project gives an insight into the geology of the site (www.rem-mannheim.de).

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