Chapter 43
MAINZ: The Zoological Collections of the Mainz Natural History Museum/State Collection of Natural History of Rhineland Palatinate

Carsten Renker, Bettina Henrich, and Uwe Hildebrand

Abstract The oldest parts of the collections at the 'Mainz Natural History Museum/State Collection of Natural History of Rhineland-Palatinate' date back to the year 1834 and had been assembled by the 'Rheinische Naturforschende Gesellschaft' (RNG). Unfortunately, major parts of these old collections were destroyed during a British air raid in 1945.

The museum itself dates back to the year 1910. A major step forward for the gathering of scientifically valuable collections was the foundation of the State Collection of Natural History of Rhineland-Palatinate in 1988. To date the zoological collections contain more than 700,000 specimens with a focus on the fauna of Rhineland-Palatinate.

Keywords Mainz Natural History Museum/State Collection of Natural History of Rhineland-Palatinate • Rheinische Naturforschende Gesellschaft • Javan rhinoceros (*Rhinoceros sondaicus*) • Pyrenean ibex (*Capra pyrenaica* pyrenaica) • Thylacine (*Thylacinus cynocephalus*) • Quagga (*Equus quagga* quagga)

43.1 Historical Background

The oldest parts of the collection date back to the year 1834, founding year of the 'Rheinische Naturforschende Gesellschaft' (RNG). After closure of the University of Mainz in 1798, when all parts on the western side of the river Rhine belonged to France, the citizens of Mainz tried to continue the Age of Enlightenment and struggled against the scientific vacuum by the foundation of this society, one of the oldest still existing natural history societies in Germany and Central Europe. The aim, defined in a preamble, is to collect and properly store and arrange natural

C. Renker (✉) • B. Henrich • U. Hildebrand
Naturhistorisches Museum Mainz/Landessammlung für Naturkunde Rheinland-Pfalz, Reichklarastr. 1 + 10, 55116 Mainz, Germany
e-mail: dr.carsten.renker@stadt.mainz.de; http://www.mainz.de/nhm/index.html

L.A. Beck (ed.), *Zoological Collections of Germany*, Natural History Collections,
DOI 10.1007/978-3-319-44321-8_43

history items, mainly these from the Rhineland, and to organize scientific presentations and talks (Würz 2009). Notary Dr. Carl Friedrich Bruch, founder member of the society, still had a large and international collection of birds at that time, which he sold to the society in 1837. His private collection contained at least 832 specimens of 412 bird species (Kunz 2009). Based on this collection, the society succeeded in collecting birds and mammals, mainly organized by Bruch. He always attempted to receive complete 'families' comprising one male, one female and one juvenile specimen of each species. In 1843 he published a list of mammals, listing 383 species with 520 mounted specimens, 105 skulls and 38 skeletons from all over the world, comprising, for example, 27 species of marsupials (Bruch 1843). The collections were exhibited right from the beginning at two different locations in Mainz before they were moved to the Electoral Palace (Kurfürstliches Schloss) in 1842, where they were shown for the next 60 years as the 'Naturalienkabinett of the RNG'.

Due to the rapidly increasing collections, responsibilities were gradually shifted from the society to the town administration, and first personnel were at least partially paid by the city of Mainz. At the beginning of the twentieth century, a Natural History Museum was arranged in the former monastery 'Reichklara', and based on a contract signed February 10, 1910, all collections of the society became property of the city of Mainz, including the responsibility to care for an orderly administration and accommodation of the collections forever and all time. The city of Mainz confirmed this contract in recent years.

More than 90 % of these first zoological collections were destroyed during a British air raid on February 27, 1945. Only small parts of the mammal collection (i.e., quagga, Javan rhinoceros, thylacine, Pyrenean ibex) survived the bombing. Many objects got lost or were later destroyed due to lacking curatorship between the end of World War II and the reopening of the museum in June 1962.

In the first years, from 1960 until 1979, the new museum vertebrate collections were mainly curated by the taxidermist Ernst Wadewitz, who restored, cleaned and saved many of the old specimens which had survived the air raid. A first inventory of the vertebrate collection after the destructions was conducted in 1980 with approx. 1100 objects.

The reorganization of the entomological collections started with the help of volunteers. Between 1963 and 1966, the pupil and student Hannes F. Paulus took the responsibility for this part of the collection and gave some short information concerning the remaining parts of material after World War II (Paulus 1966). Afterwards, another 14 years passed by before Ulrich Schmidt gained a first official position as scientist and curator of zoology at the museum from 1979 until 2006. Again, the main work in the entomological collections was done by a volunteer, Adalbert Frey, who worked in the collections between 1980 and 1992. Again substantial parts of the 'new' entomological collections, built up by Hannes Paulus, had to be thrown away, due to inadequate storing facilities and lacking curatorship. A major step forward was the foundation of the 'State Collection of Natural History of Rhineland-Palatinate' in 1988 (Fig. 43.1). This had been initiated already in 1979 by Franz Otto Neuffer, director of the museum from 1978 to 2003. Thanks to this

Fig. 43.1 The 'Tower of Time'—main entrance of the Mainz Natural History Museum until 2015

cooperation between the city of Mainz and the state government of Rhineland-Palatinate, subsidies from the state considerably support both the collecting work and scientific activities of the museum.

At the transition from the twentieth to the twenty-first century, the staff responsible for the zoological collections reached its maximum with two taxidermists, two permanent scientists (Ulrich Schmidt, Jürgen Jungbluth) and several trainees, supporting the work. During the last years, personnel have drastically been reduced ending up with two taxidermists, Uwe Hildebrand (since 1977) and Bettina Henrich (since 1989) and one scientist, Carsten Renker (since 2006), now on a 66 % position, being also responsible for the botanical collections.

43.2 Recent Collection

43.2.1 Structure

Due to steadily growing specimen and species numbers in the different parts of the collection, it is difficult or even impossible to give fully reliable numbers. Traditionally, the zoological collections are split up into three parts: (i) the vertebrate collection (inventoried with a W in front of the inventory number), (ii) the entomological collection (E) and (iii) the invertebrate collection (WL), which mainly contains molluscs.

Parts of the collections can be accessed via the 'Global Biodiversity Information Facility' (GBIF) under http://www.gbif.org/dataset/search?q=Naturhistorisches+Museum+Mainz where 9038 georeferenced zoological datasets are available. A more visually based web portal is 'Museum Digital Rheinland-Pfalz' (http://www.museum-digital.de/rlp/index.php?t=institution&instnr=13) showing 209 objects from the zoological collections.

43.2.1.1 The Vertebrate Collection

The most valuable and oldest parts of the collection still contain a set of extinct or almost extinct species (Plate 43.1):

- Three Pyrenean ibexes (*Capra pyrenaica pyrenaica*) (male, female, juvenile) purchased in 1835/1836 by Bruch, who recognized them as distinct species but left the first description to Heinrich Rudolf Schinz (Zurich), who described and figured the species (Schinz 1837, see also Brehm 1844).
- Three quaggas (*Equus quagga quagga*) (male, female, juvenile/foetus) purchased in 1842/1843 by Bruch. The juvenile was almost destroyed in World War II, but restored between 1980 and 1982 together with the two adults which were remounted on new manikins (Rau 1981, 1984, 2004). Samples of the skin tissue were used for the first sequencing of an extinct species (Higuchi et al. 1984) and inspired Michael Crichton to write his book 'Jurassic Park', published in 1990 (Frenz 2012: 164). Finally, discussions arose whether the quagga was just a subspecies of the still existing plains zebra (e.g., Groves and Bell 2004) or a distinct species (Leonard et al. 2005).
- One thylacine (*Thylacinus cynocephalus*) about which almost nothing is known and which was not mentioned by Bruch (1843). Accordingly, the specimen should have been integrated in the collection after 1843.
- One European bison (*Bison bonasus*) from Białowieża, a present of Nicholas I, Emperor of Russia, for Louis II von Hessen und bei Rhein, Grand Duke of Hessen-Darmstadt, who donated the specimen to the Rheinische Naturforschende Gesellschaft in 1841.
- One Javan rhinoceros (*Rhinoceros sondaicus*) from 1842. During restoration of this specimen at the beginning of the 1980's, it was found that the head belonged to a male, the back part to a female specimen. Both were tied together by horseshoe nails.

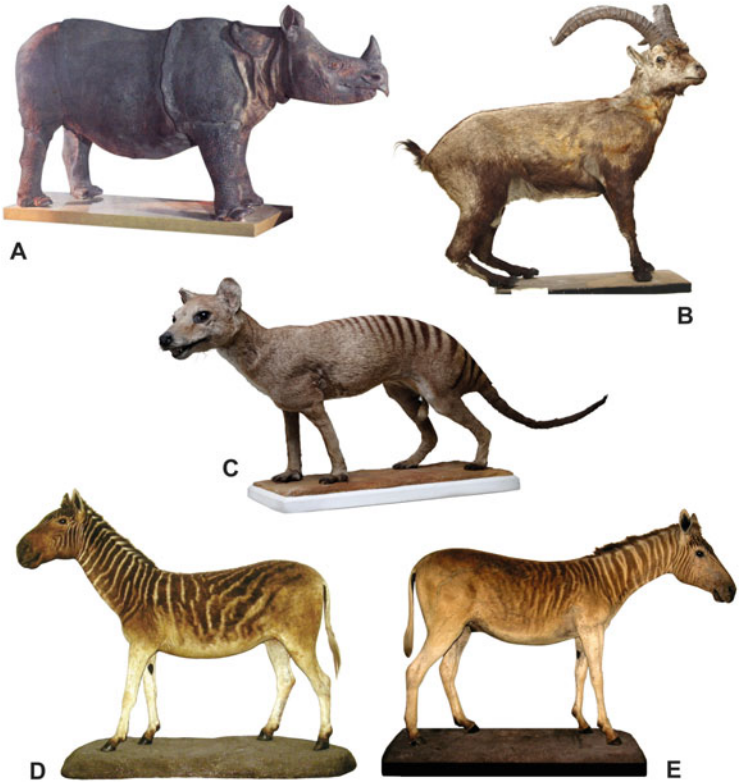

Plate 43.1 The 'Top Rarities' of the zoological collections at the Mainz Natural History Museum. (**a**) Javan rhinoceros (*Rhinoceros sondaicus*). (**b**) Male Pyrenean ibexes (*Capra pyrenaica pyrenaica*). (**c**) Thylacine (*Thylacinus cynocephalus*). (**d**) Female and (**e**) male quagga (*Equus quagga quagga*) (with permission from: Mainz Natural History Museum)

The vertebrate collection is the only part of the zoological collection which is almost fully inventoried and which contains at the moment (December 2014) *10,502 numbers*. The focus is on birds and mammals.

The birds are the largest part. Based on a 2006 species list, at least *530 bird species* are preserved within the collection, particularly species from Central Europe, but also species from other parts of the world; these are mainly based on specimens from zoos in the region. Most specimens are represented as mounted specimens; Central European species, available in larger numbers, are also stored as specimen skins. A large *oological collection* incorporated in 2011 contains eggs of *463 bird species*. Other items of the bird collection comprise bird's nests and skeletons.

The mammal collection contains *249 species* (status 2006), mainly mounted specimens, specimen skins and skulls or full skeletons. Reptiles, amphibians and fishes are represented by 55, 21 and 31 species, respectively.

Scientifically relevant collections within the bird section are the collection of *Carlo Freiherr von Erlanger* representing mounted bird species mainly from the area around Ingelheim but also from North Africa (mainly Tunisia), collected during the transition from the nineteenth to the twentieth century, some of which are nowadays extinct in the whole of Germany. This collection is a permanent loan by the 'Ingelheimer Museum bei der Kaiserpfalz', since 1993 curated in the Mainz Natural History Museum [Akronym: MNHM (Thiers 2015, preferred abbreviation), also NHMM (Evenhuis 2015)]. Altogether, approx. 700 specimens are represented in this collection (Hildebrand 2004).

The oological collection could be obtained in 2011 from *Jürgen Partenscky* (Karlsruhe), containing 931 clutches of 463 species, of which 708 clutches have been collected by *Wolfgang Makatsch* (Dresden). 890 of these clutches, representing 437 species, have been collected in all parts of Europe. Unfortunately, locality data are most often imprecise.

Scientifically relevant collections within the mammalian section are a collection of specimen skins and skulls of European small mammals (mainly shrews and rodents) collected by *Franz Malec* (Kassel) and donated in 2007. This collection contains 1541 specimens in 23 species.

In 1990 and 1993, a large collection of mainly skulls and skeletons, but also skins, was bought from *Siegfried Eckardt* (Frankfurt a. M.), which altogether contains 2396 objects.

In 2011 the museum received a collection of 38 freshwater fish skeletons from *Jutta Krey*, collected along the river Rhine. These were used to compare recent fishes with subfossil material from the archaeological excavation at Bedburg-Königshoven (North Rhine-Westphalia) in 1987/1988.

Due to the partnership between Rhineland-Palatinate and Rwanda (Africa), the museum, particularly *Ulrich Schmidt*, deputy director of the museum at this time, collected approx. 70 skulls, skeletons and mounted specimens of mammals and birds, but also bird's nests, insects and reptiles (in ethanol) between 1988 and 1992. Some of these specimens were used to equip the Natural History Museum Kigali, also known as 'Kandt House', e.g., male impala antelope, Grant's zebra foal and other zoological objects.

43.2.1.2 The Entomological Collection

A summary on the entomological collections was published in 2009 (Renker and Henrich 2009). A rough estimate ended up with 700,000 insect specimens at this time. Since this publication the following collections or parts of the following collections were integrated (collectors in alphabetical order): *Ernst Blum* (Lepidoptera, 2014), *Klaus Cölln* (Hymenoptera, continuously), *Adalbert Frey* (private collection, Lepidoptera, 2014), *Andrea Jakubzik* (Hymenoptera, continuously), *Friedhelm Nippel* (Lepidoptera, 2014), *Jochen Rodenkirchen* (Lepidoptera, 2014), *Alexander Walland* (Coleoptera, 2011), and *Ernst Zebe* (Coleoptera, Lepidoptera, Orthoptera, 2014), adding at least another 25,000 specimens to the

collections. The only collection containing a significant number of type specimens within the whole zoology is the Heteroptera collection of *Hannes Günther* (Koschwitz 2007).

43.2.1.3 The Invertebrate Collection

The invertebrate collection mainly consists of molluscs. The focus is on Central Europe. Almost all species of land gastropods figured in Kerney et al. (1983) are available. Until 1989 the former curator Jürgen H. Jungbluth (co-author of this book) inventoried 5499 specimen series of molluscs. Up to this time, the collection mainly contained the following material: freshwater gastropods collected by *Ragnar Kinzelbach* and co-workers within the frame of different projects (e.g., Meinert and Kinzelbach 1985), unionids collected by *Jürgen H. Jungbluth* and collection *Ulrich Hecker*. Besides this valuable material, a representative set of marine gastropod and bivalve species representing at least all major marine families was bought from the natural history dealer *Jens Hemmen*, with the aim of allowing comparative studies between recent species and the fossil mollusc samples from the Cenozoic Mainz Basin.

During the last years, the extent of the mollusc collection was doubled concerning collection numbers by the integration of the collection by *Friedrich Ehrenfeld* from the first half of the twentieth century, which contains (self-collected) material from all parts of Germany (mainly land gastropods), exchange material from many colleagues (e.g., Kurt Büttner) but also many species from abroad (e.g., Sri Lanka, Madagascar, the Philippines and New Guinea) bought from the natural history dealer Hermann Rolle. Another large set of land gastropods was donated by *Dieter Weber*, collected in caves, caverns and chambers of Luxembourg, Saarland and Rhineland-Palatinate (Renker et al. 2013). Two donations in 2013 and 2014 by *Winfried Engl* enriched the collection with marine (micro-) molluscs from all European seas (mainly Rissoidae, Rissoinidae, Eulimidae, Aclididae, Epitoniidae, Cerithiopsidae, Mangeliidae, Drilliidae, Raphitomidae), which were completely missing in the collection up to this point.

Two other necessary topics within the invertebrate collection exist: (i) the alcohol collection of scorpions collected by *Ragnar Kinzelbach* (Kinzelbach 1982, 1984) which contains 276 series and (ii) the alcohol collection of invertebrates from the river Rhine (Kinzelbach 1985).

43.2.1.4 Infrastructure of the Zoological Collections

The available infrastructure of the whole museum is limited, consisting of a basically equipped workroom for taxidermy and a basically equipped room for microscopy. The magazine has been enlarged considerably in 2014. The library of the museum has an extended literature exchange, receiving almost 500 periodicals (covering all fields of natural sciences) in this frame. Another 500 periodicals are

available based on donations. Availability of monographs is limited since the library has only a small budget. Due to the communal responsibility for the museum, it seems to be unlikely that the financial situation will improve within the next years because maintaining cultural institutions isn't a communal duty.

43.2.2 Research

Due to the limited personnel power, the research program is limited. Faunistic survey programs are supported wherever possible. Based on the activities of Jürgen Jungbluth and the 'Projektgruppe Molluskenkartierung', the land and freshwater molluscs of Rhineland-Palatinate were collected by Peter Subai and Paul Schnell based on a 10 × 10 km UTM grid between 1989 and 1996. Parts of this effort have been published by Vogt et al. (1994).

During the last years, the museum was involved in the publication of a dragonfly atlas for parts of Belgium, France, Luxembourg, Saarland and Rhineland-Palatinate (Trockur et al. 2010). Another project was the atlas of grasshoppers, crickets and mantids (Pfeifer et al. 2011).

The museum issues the 'Mainzer Naturwissenschaftliches Archiv' and its supplements on an annual basis. The volumes of the main series contain between 200 and 500 pages of articles covering all fields of natural sciences with a regional focus on Rhineland-Palatinate.

43.2.3 Educational Work

The main activity concerning the educational work of the museum for a larger audience can be seen in the (special) exhibitions, covering all fields of natural sciences. During the last years, the museum showed zoological exhibitions on rats ('Ratten', 2013/2014), poisonous animals ('Gifttiere', 2012/2013) and bats ('Flatterwochen! Fledermäuse—kleine Kobolde der Nacht', 2010/2011) as well as grasshoppers, crickets and mantids ('Heuschrecken—übersehene Schönheiten', 2010). A short survey of the exhibitions in previous years has been summarized by Frankenhäuser (2009).

The museum's educational service has two full-time employees, who offer a wide range of activities for all kinds of individuals and groups with a focus on kindergartens and primary schools. The museum is a well-known place for extracurricular learning in the region.

Between 1987 and 2006, three Rwandese taxidermists could be trained at the museum: 1987, Jean-Baptiste Kayishema; 1990, Theogene Bosenibamwe; and 2006, Jean-Claude Igiraneza (Schmidt 2009).

References

Brehm CL (1844) Einige naturgeschichtliche Bemerkungen auf einer Reise an den Rhein im September und October 1842. Dritte Abtheilung. Isis 1844(7):484–500 [*Capra pyrenaica*: pp 484–485]

Bruch CF (1843) Verzeichniss der in dem ehemaligen kurfürstlichen Schlosse zu Mainz aufgestellten Säugethiere der rheinischen naturf. Gesellschaft. Erste Abtheilung. Säugethiere und deren Skelette. Mainz, 17 pp

Evenhuis NL (2015) Abbreviations for insect and spider collections of the world. http://hbs.bishopmuseum.org/codens/codens-inst.html. Last accessed 22 Jun 2015 [continuously updated]

Frankenhäuser H (2009) Sonderausstellungen im Naturhistorischen Museum. Mainzer Naturwiss Arch 47:455–461

Frenz L (2012) Lonesome George oder Das Verschwinden der Arten. Rowohlt, Berlin, 350 pp

Groves CP, Bell CH (2004) New investigations on the taxonomy of the zebras genus *Equus*, subgenus *Hippotigris*. Mamm Biol 69(3):182–196

Higuchi R, Bowman B, Freiberger M, Ryder OA, Wilson AC (1984) DNA sequences from the quagga, an extinct member of the horse family. Nature 312:282–284

Hildebrand U (2004) Carlo von Erlanger (Ingelheim) und die Präparatesammlung aus Ingelheim im Naturhistorischen Museum Mainz—Sammlungsbericht. Mainzer Naturwiss Arch 42:267–278

Kerney MP, Cameron RAD, Jungbluth JH (1983) Die Landschnecken Nord- und Mitteleuropas: Ein Bestimmungsbuch für Biologen und Naturfreunde. Verlag Paul Parey, Hamburg und Berlin, 384 pp

Kinzelbach R (1982) Die Skorpionssammlung des Naturhistorischen Museums der Stadt Mainz.—Teil I: Europa und Anatolien. Mainzer Naturwiss Arch 20:49–66

Kinzelbach R (1984) Die Skorpionssammlung des Naturhistorischen Museums der Stadt Mainz.—Teil II: Vorderasien. Mainzer Naturwiss Arch 22:97–106

Kinzelbach R (Hrsg.) (1985) Die Tierwelt des Rheins einst und jetzt. Symposium zum Jubiläum der Reinischen Naturforschenden Gesellschaft und des Naturhistorischen Museums Mainz am 9. November 1984. Mainzer Naturwiss Arch Beiheft 5:183 pp + 3 pls

Koschwitz U (2007) Dr. Johannes (Hannes) Günther. In: Renker C (Hrsg.) Festschrift zum 70. Geburtstag von Hannes Günther. Mainzer Naturwiss Arch Beiheft 31:7–19

Kunz A (2009) Das ornithologische Schaffen des Mainzer Notars Carl Friedrich Bruch (1789–1857) im Überblick. Mainzer Naturwiss Arch 47:89–106

Leonard JA, Rohland N, Glaberman S, Fleischer RC, Caccone A, Hofreiter M (2005) A rapid loss of stripes: the evolutionary history of the extinct quagga. Biol Lett 1(3):291–295

Meinert W, Kinzelbach R (1985) Die Limnischen Schnecken und Muscheln von Rheinland-Pfalz (Mollusca: Gastropoda et Bivalvia). Mainzer Naturwiss Arch Beiheft 4:58 pp + 65 maps

Paulus H (1966) Unser Insektenkabinett. Z Rheinischen Naturforsch Ges Mainz 4:85–87

Pfeiffer MA, Niehuis M, Renker C (Hrsg.) (2011) Die Fang- und Heuschrecken in Rheinland-Pfalz. Fauna Flora Rheinl Pfalz Beiheft 41:678 pp

Rau RE (1981) Zur Geschichte der Präparation des "Mainzer Quaggas". Mainzer Naturwiss Arch 19:221–236

Rau RE (1984) Über die Restaurierung des Mainzer Quagga Fohlens. Mainzer Naturwiss Arch 22:231–238

Rau RE (2004) Der Mainzer Quagga-Fötus. Mainzer Naturwiss Arch 42:245–257

Renker C, Henrich B (2009) Die Entomologischen Sammlungen des Naturhistorischen Museums Mainz/Landessammlung für Naturkunde Rheinland-Pfalz. Mainzer Naturwiss Arch 47:395–447

Renker C, Weber D, Pohl A (2013) Schnecken aus Höhlen des Großherzogtums Luxemburg. Ferrantia 69:96–107

Schinz HR (1837) Bemerkungen ueber die Arten der Wilden Ziegen, besonders mit Beziehung auf den Sibirischen Steinbock, den Steinbock der Alpen und den Steinbock der Pyrenaeen. Neuchatel, 25 pp, 3 pls

Schmidt U (2009) Das Ruanda-Engagement des Naturhistorischen Museums (1982—heute). Mainzer Naturwiss Arch 47:463–477

Thiers B (2015) Index Herbariorum: a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. http://sweetgum.nybg.org/ih/. Last accessed 27 Jul 2015 [continuously updated]

Trockur B, Boudot J-P, Fichefet V, Goffart P, Ott J, Proess R (2010) Atlas der Libellen/Atlas des libellules (Insecta Odonata). Fauna und Flora in der Großregion/Faune et Flore dans la Grande Région 1:201 pp

Vogt D, Hey-Reidt P, Groh K, Jungbluth JH (1994) Die Mollusken in Rheinland-Pfalz—Statusbericht 1994. Fauna und Flora in Rheinl Pfalz Beiheft 13:222 pp

Würz M (2009) 175 Jahre Rheinische Naturforschende Gesellschaft und 100 Jahre Naturhistorisches Museum Mainz. Mainzer Naturwiss Arch 47:35–88