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The history of reptiles and amphibians at Frankfurt Zoo

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Abstract. Reptiles and amphibians were kept in Frankfurt Zoo from the very beginning in 1858. Information on the collection is somewhat fragmentary but still sufficient to draw a picture on its development from then until today. Starting with just a few reptile cages in the monkey house, reptiles soon became a major attraction for the visitors, and a special section in the aquarium building was opened for them in 1904. Knowledge about how to keep reptiles and amphibians was still very poor, but evolved steadily, and shortly before World War II Frankfurt Zoo was famous for its impressive collection of herps, especially crocodilians. Completely destroyed in 1944, the zoo re-opened only a few months after the end of war, but it was not until 1957 that the reptile hall on top of the newly erected aquarium building, which now was called “Exotarium”, could be opened. Having undergone a number of improvements and renovations in the last four decades, the Frankfurt Exotarium today has a number of remarkable breeding results and is putting – as the whole zoo – a focus on nature conservation.

Key words: Exotarium, terrarium, herpetological collection, breeding success, nature conservation

THE START WITH A FEW SPECIES

Frankfurt Zoo was opened on 8 August 1858, the second zoo in Germany after Berlin's. Reptiles and amphibians were exhibited here from the beginning. They were shown in a wing of the monkey house and consisted mainly of European species. The first Frankfurt Zoo guide published in 1860 mentions a few tailed amphibians and lizards, snakes and turtles (see Table 1). That chapter on herps also mentions that there were plans to replace the small “reptiles cage” and aquarium by a bigger facility. The newts and the salamanders were at that time kept in the aquarium together with the Great Loach (*Cobitis fossilis*). With regard to the salamanders, it was stated that the animals could be found “on the leaves” in the aquarium, but it is not clear what this means exactly. Were they presented on leaves floating on the water surface?

Unfortunately, aside from this first small “inventory” of the reptiles and amphibians kept in Frankfurt Zoo, a systematic list was started only in the 1950s. Daily reports contained information on new acquisitions, deaths and births, and an electronic register for herps has been started only recently. So there is no detailed, continuous documentation of the herpetological species kept here from the beginning until today. Substantial information on reptiles and amphibians in the Frankfurt collection is

scattered over a wide range of articles, zoo guides, and annual reports, allowing one to gain an overall picture with limited, but nevertheless interesting data.

Despite the growing importance and attractiveness of Frankfurt Zoo's herpetological section, not much attention was paid to it in the zoo publications, as will also be shown later. For example, the book published on the occasion of the 100th anniversary of Frankfurt Zoo (Zoologischer Garten der Stadt Frankfurt am Main 1958) has no picture of a reptile or amphibian and only one – rather unimportant – view of the interior of the reptile building from 1957–58.

THE FOUNDING OF THE “DEFINITIVE” ZOO

This first zoo was a huge success as it awoke much interest among the citizens of Frankfurt, but the terrain at the “Leers'scher Garten” was small and could be rented for only ten years. As a consequence, the founders of the zoo decided to find a new location for a bigger and “definitive” zoo. In 1865, the Frankfurt Zoological Society and the Senate of the City of Frankfurt signed a contract to establish a new Zoo at the “Pfingstweide”, (then) outside

Table 1. Herpetological species as mentioned in the first guide to Frankfurt Zoo (Weinland 1860).

Scientific name*	Common name (translated from German)	Remarks (translated from German)
<i>Lacerta viridis</i>	European green lizard	our specimens come from Vienna
<i>Pseudopus Pallasii</i> (scheltopusik, horned serpent)	Glass snake	
<i>Tropidonotus natrix</i> var. <i>bilineata</i>	Ringed snake	
<i>Coronella laevis</i>	Smooth snake	eats grass, outside during the summer on the flamingo meadow during the summer
<i>Testudo graeca</i>	Greek tortoise	
<i>Testudo polyphemus</i>	Gopher tortoise	
<i>Triton cristatus</i> , <i>igneus</i> , <i>taeniatus</i>	Our German water salamanders	on the leaves
<i>Salamandra maculata</i>	Common European salamander	

* Note: Scientific names in the whole article, when in quotes, and in this table are given as they are mentioned in the respective publication and have not been transferred into modern nomenclature.

the City of Frankfurt. Reptiles and fishes had turned out to be a real attraction for the visitors, and so, from the beginning, the plan for the new zoo included designs for a herpetological exhibition and aquaria. Due to a number of complications and especially as a consequence of the

wars between Prussia and Austria (1866) and France and Germany (1870–71), this contract never materialized and the zoo remained – with an extension of the old contract – at the “Leers’scher Garten” for a few more years. Finally, under a new contract, the new zoo was opened at the Pfingstweide on 29 March 1874, at the same place that had already been envisaged before the wars. Frankfurt Zoo has remained at this site until today. Thanks to an initiative of Bernhard Grzimek immediately after the Second World War it was enlarged and now covers eleven hectares. The city of Frankfurt has grown around it, so today Frankfurt Zoo is in a central location.



Fig. 1. The „romantic“ Aquarium tower of Frankfurt Zoo above the lake in 1880.

SLOW START FOR THE TERRARIUM SECTION

Despite all the plans and good intentions, the construction of a number of enclosures for mammals and birds and, in particular, a new aquarium and terrarium building had to be postponed due to financial and other constraints once the zoo had moved to its new destination in 1874. But at least there was substantial planning, and the knowledge about how to keep fish and herps as well as the development of technical means was rapidly increasing right throughout that period. This is also indicated by the fast growing number of associations of aquarium and terrarium hobbyists in Germany in the last two decades of the 19th century.

To provide the financial means for the aquarium building, the members of the administrative council and supervisory board provided a loan of 50,000 Reichsmarks. In 1877, the building, comprising two freshwater and 12 seawater aquaria and (as far as is known) a few terraria was

finally able to be opened. The building was placed inside an artificial hill, so the walls were insulated and the temperature could be kept relatively constant. The issue of major concern and of utmost importance for the aquarium section, namely water, was solved by erecting a tower with water tanks inside filled with ground water. This simple technique, based on gravity, is still functioning today, guaranteeing the constant and uniform flow of water into the filters and aquaria.

The tower was made to look like an old castle or ruin, and, together with the hill it stands on and the neighbouring lake, it catered nicely to the romantic taste of that time (Fig. 1).

An extra entrance fee was charged for the aquarium in order to pay the loan back. So the aquarium had its own entrance fee, and only in 1992 was this practice abandoned and no extra fee was charged any more for visiting the aquarium.

DIFFICULT TIMES, BUT A STEADY INCREASE IN EXPERIENCE

The herpetological section had been planned as the second storey of the aquarium building and could only be built later. It finally opened on 15 May 1904. In the ten years before that, the reptiles seem to have had a rather difficult life at Frankfurt Zoo. Especially in winter, many of these animals died because of the poor conditions they were kept in. It was Wilhelm Haacke, director of the zoo from 1888 to 1893, in particular, who expanded the reptile collection. During the summer months, when the monkeys were kept in outside enclosures, he used the monkey house to put boxes with reptiles and amphibians on exhibit. As can be read in the 1895 zoo guide, the “collection that was outstanding because of its richness ... [was] usually set up in May, temperatures allowing, and remained there until October, a few boxes (containing the giant snakes and bigger lizards) even remaining on show during the winter”. For that latter purpose, a heated platform (“Wärmetisch”) had been built in 1891.



Fig. 2. In the newly opened “Reptile Hall” sunlight was seen an important factor for the well being of reptiles (1904).



Fig. 3. Mixed life in a tropical jungle environment: *Tiliqua rugosa* (?), *Cordylus giganteus* and *Macroscincus coctei* (1912).

It is plain that mortality was high. The 1895 zoo guide (the first to be published after ten years!) lists, however, an impressive number of species – or to be more precise: two crocodiles, eleven turtles, 17 snakes, 22 lizards and ten



Fig. 4. A big specimen of *Python reticulatus* in its terrarium (1912).

anuran species and three species of urodela. A few of the comments and specimens are truly remarkable. So “thanks to the goodness of Mr Schmacker from Shanghai”, the collection contained “the first specimen of the Chinese alligator brought live to Europe” and “two giant Aldabra turtles (*Testudo elephantina*)”. With regard to the latter, the 1895 zoo guide states that “only a few decades will pass until this turtle of such incredible dimensions will have become extinct”. “One of the rarest species at the Zoological Garden, the snake-necked turtle, *Hydraspis hilairei*”, was kept together with *Chelydra serpentina*. “The Sinai lizard (*Uromastix ornatus*)” is described as a “very strange animal. It feeds on rose petals in summer and on acacia and lettuce in winter; as soon as the sun shines on its back, it opens certain depressions in the skin and the body assumes a very beautiful colour”. The lizard species ranged from *Anguis fragilis* to “*Silubosaurus stokesi*” and from “*Lacerta muralis*” to “*Tiliqua gigas*”. Aside from alpine salamander, Japanese giant salamander, bull frog and *Leptodactylus*, all amphibians kept at that time were species that occurred wild in the Frankfurt area.



Fig. 5. Tropical jungle landscape made of aquaria and plants (1912).

Haake (who by the way had been vividly recommended by Ernst Haeckel for the post of zoo director) had a well-developed collector's mentality but his attempt to establish systematic collections of birds and herps did not receive much of a positive response from visitors to the zoo, and he quit the job in 1893. His immediate successor, Adalbert Seitz, then started to develop a completely new concept for a reptile exhibit, recognizing that these animals needed sunlight. A glasshouse called the "reptile hall" was erected on top of the aquarium building and inaugurated on 15 May 1904 (Fig. 2). In the venomous snakes section, increased security measures were introduced in the year 1906 to offer the keepers better protection. The number of species had by then risen to twelve turtles, 28 snakes, 25 lizards and 13 amphibians. Evidently there was some "fluctuation" in the crocodile species, as the 1905 zoo guide states: "Mostly different species such as the alligator, Nile crocodile, dwarf crocodile etc. are on exhibit". The *Chlamydosaurus kingi* kept in the collection is said to be the first specimen "to have reached the European continent alive". In 1907, even before becoming zoo director in 1908, the then zoo assistant, Kurt Priemel, started changing the concept again. He wanted to show the visitors the diversity of life, abandoning the approach of systematic collections. He built a second glasshouse next to the first one, added to the reptile hall 40 aquaria for tropical fish (Fig. 5) and a tropical wetland area for crocodiles as well as big terraria for giant snakes (Fig. 4) and turned the reptile house, together with the aquarium, into the "biggest and most diverse of all such institutions on the continent" (Scherpner 1983). As visitors to the zoo had to pay an additional entrance fee for the aquarium and terrarium building, visitor numbers could be easily monitored. The new and enlarged building attracted more than 80,000 people every year.

The zoo did not suffer any major physical damage during the First World War, but the economically difficult post-war era obliged director Priemel to be creative. He made an interesting contract with the animal catcher and dealer John Hagenbeck. Frankfurt hosted reptiles imported by Hagenbeck and, in exchange, got the pre-emption rights and a reduced price on the specimens Priemel wanted to buy. It is reported that visitors were quite astonished by a sign saying "for sale" on a big container full of giant snakes which "none of the visitors managed to count" (Scherpner 1983).

Soon the reptile collection had reached an impressive dimension, and its increasing importance is also documented by a number of articles on it which were published in the Zoo's own "Mitteilungen aus dem Frankfurter Zoo" and elsewhere. One of the authors is Robert Mertens who did evidently have a close relationship with the zoo, since he authored seven papers between 1921 and 1925 specifically about the species and specimens kept at Frankfurt Zoo, and more precisely on the freshwater turtles (1921), giant snakes (1921, 1924 – the latter one not mentioned by Schirner 1977), venomous snakes (1925), news from the reptile house (1922), new animals (1922) and on *Ceratophrys ornata* (1922). An exhaustive paper on the whole collection of reptiles by Richard Wieschke (1925) gives, like the articles just mentioned, short notes and comments on the different species shown and mentions, as a special attraction, a giant salamander from Japan which was exhibited in an aquarium in the lower basement. From that description of the collection one can deduce that, in 1925, there were more than 40 snake species, 28 lizard species, more than 20 turtles and tortoises (including a loggerhead sea turtle), and seven crocodile species on exhibit. An interesting detail is the mentioning of a female reticulated python 8 m in length which, after having undergone "difficult surgery", had not taken any food for 16 months before she finally accepted a piglet. Six anuran and 2 urodelean species are specifically mentioned as part of the collection "plus the numerous European frogs, toads, salamanders and newts". Among the amphibians mentioned are "two giant bull frogs...", and, even more impressive, two South American horned frogs", as well as African clawed frogs "which because of their hopping movements under water soon got the name 'water monkeys'", besides *Pipas*, a Japanese giant salamander and a *Proteus*.

Whereas Robert Mertens is well known among herpetologists even today and does not need to be introduced to the reader, a few words have to be said about Wieschke. In one of the articles, his name is given as "Fritz", in the other article as "Rich[ard]". It was not possible to find out if Fritz and Rich[ard] Wieschke were the same person – and "Fritz" a printing error? – or whether and how they

were related. "Fritz" could not be identified at all, whereas it is known that Richard was a volunteer assistant, helping out quite actively with many activities in the zoo such as the administration of the library, keeping the register of animals and observing them. He published several small papers in the *Mitteilungen*, the last one appearing in November 1928, and, as far as is known, died at the age of 23 in 1929.

A remark in a review authored by zoo director Priemel on issues 1 and 2 of Wilhelm Klingelhöffer's *Terrarienkunde* in the *Mitteilungen* from May 1925 gives an interesting insight into the concept of reptile keeping. Priemel welcomes Klingelhöffer's approach to arranging the contents of the terraria in such a way that they resemble the habitat of the species in the wild. Furthermore, he writes that terraria for schools should always be arranged so that they imitate nature, but then he goes on to write: "Unfortunately, the containers in public exhibitions cannot follow this principle, as so many inhabitants must be kept in them in order that visitors can observe the major part of them at any time of the day".

In the following years, the collection continued to grow and attracted more and more visitors. Various publications talk about anacondas, chameleons, Gila monsters and sea turtles all becoming part of the collection and, of course, about "Komo", the tame Komodo monitor lizard which came to Frankfurt in 1927, only 15 years after this species had been discovered. It was brought from Komodo to Frankfurt by Robert Mertens. Frankfurt already had some experience in taming monitor lizards. Two *Varanus salvator* had come to Frankfurt Zoo in 1922–23, when they were just 25 cm long. They were quite aggressive and, while one died, the other one had grown to a length of 1.35 m by 1926 and thanks to "persistent, gentle, careful treatment and care" had become tame. Whenever the door to his enclosure was opened or his name ("Bubchen", little boy) was called, he climbed onto the keeper's shoulder and allowed himself to be carried around (Fig. 7).

In that time before World War II, discussions arose about the rights and wrongs and justifications of keeping animals "in captivity", and, as one of the arguments in favour of zoos, curator Gustav Lederer (1937) published information about the longevity of reptiles at Frankfurt Zoo.



Fig. 6. Different species, different sizes: A look into the "world renown" crocodile collection in 1925. Note the *Macroclemys* in the right foreground.



Fig. 7. *Varauns salvator* “Bubchen” and his keeper – in the truest sense of the word! – in 1929.

In that year, the zoo was home to an *Alligator mississippiensis*, a *Trionyx triunguis* and two *Heloderma suspectum* that had been living at the zoo since 1905, 1912 and 1927 respectively, as well as a Chinese alligator. The latter had moved to Frankfurt in 1910 when the Berlin Aquarium had to be closed because of financial problems and Frankfurt took over its entire reptile collection. This alligator had come to the Berlin Aquarium in 1886 and so had lived for 30 years in Frankfurt when he died in 1940.

The already highly diverse collection of crocodiles was enriched by a *Tomistoma schlegeli* in 1937, raising the number of species kept to eight. In addition, young and old, small and large individuals were all kept together (Fig. 6). This crocodile collection is repeatedly referred to as a major attraction and as “world renowned” (Lederer 1937), but, looking at it today, it certainly must be regarded as highly problematic from a zoological point of view as well as from the aspects of animal welfare. Wieschke (1927) mentions, for example, that the “newly created tropical swamp area for crocodiles” is host to “numerous species, among others a large number of American alligators (*Alligator mississippiensis*), one of the few surviving specimens of the Chinese alligator, Nile crocodiles, saltwater crocodiles and African dwarf crocodiles” – each in the plu-

ral! A completely new approach to keeping crocodiles was only introduced around 1975, when this collection was finally dissolved to create a larger crocodile enclosure.

With the retirement of Kurt Priemel in March 1938, the dynamic development of the herp collection came to an end, as his successor, Georg Steinbacher, was more of a “bird man” and evidently not much interested in reptiles. The first bombs hit Frankfurt Zoo in October 1943, causing some limited damage including to the aquarium building, but most, if not all, of the reptiles survived. The venomous snakes, however, now had to be put down for security reasons. A few months later, the disastrous bombing of Frankfurt on 18 March 1944 completely destroyed the zoo and the aquarium with all its animals (Fig. 9).

ON THE WAY TO A MODERN ZOO: THE PERIOD AFTER WORLD WAR II

The reconstruction of the zoo, under its new director Bernhard Grzimek, started immediately after the end of the war. The zoo re-opened on 1 July 1945, offering its visitors a few animals and a lot of entertainment in the form of all kinds of cultural events, circus shows, carousels and so on. The re-building of the aquarium started in 1951 and the shell of a “24 m long tropical swamp area destined for the keeping of crocodiles, turtles and so on” had been completed in 1952. Precisely 1 chameleon, four snakes, 26 turtles and seven crocodiles were housed in the preliminary terraria in 1953. From then on, more and more reptiles and amphibians were acquired by or donated to the zoo. The building with the new big reptile hall was opened officially on 27 August 1957 and by the end of that year, it had had 282,084 visitors. There were “giant crocodiles able to kill a human being” and “gigantic land tortoises 200 years of age” living in the (altogether eleven) “climatic landscapes”, with plant arrangements giving the visitor the illusion of being in a tropical jungle.

As the “aquarium” was now housing fish and other aquatic animals, as well as penguins in an Antarctic environment and a few other birds in the tropical section, along with many reptile and amphibian species, it was decided to give it a new name to better reflect the situation and intention of the building. Since 1954, this building has therefore been known as the “Exotarium”. The innovative ideas and plans for the Exotarium were basically developed by Gustav Lederer, who had already been the key person for the “pre-war” aquarium under director Priemel. After the war, he became the zoo’s chief curator. How far-sighted and innovative his thinking was and how carefully he observed his animals is reflected, for example, in his paper on the “importance of light in animal keeping” (Lederer 1927).



Fig. 8. An unidentified keeper working in the terrarium section (1936).



Fig. 9. View of the reptile hall after the bombing in 1944.

At the suggestion of Bernhard Grzimek and in recognition of his merits and the quality of his scientific publications, he received an honorary doctorate from Frankfurt University in 1953. He retired on 30 September 1958, after having served Frankfurt Zoo for 45 years, accompanying it through two world wars and all its ups and downs. Gustav Lederer died at the age of 69 on 13 February 1962.

THE EXOTARIUM TODAY

Despite all changes, improvements and renovation activities in the 1980s and 1990s, the concept of the herpetological section of the Frankfurt Exotarium until today essentially goes back to Gustav Lederer. He was followed by curator Dieter Backhaus who, in 1973, handed over to Hartmut Wilke. It was still a time of much “trial and error”, since knowledge regarding the keeping of reptiles was still limited. In 1960, a few adult and juvenile specimens of *Amblyrhynchus cristatus* were even exhibited, but did not survive the first two years.

Reptiles and amphibians were selected for their “didactic, zoogeographical and ecological aspects” and the zoo “dispensed with animals which were always hiding away during opening hours”. Backhaus, as well as his succes-



Fig. 10. The Exotarium Tower overlooking the “seal cliffs” (2008). Photograph: Sabine Binger.

sor, constantly tried to improve the living conditions of the animals, trying out all sorts of lamps, heating equipment and other means to improve the climate control of the terraria. They also did lots of work on nutrition and disease prevention and carried out the associated physical changes and improvements to the building, such as special rooms to prepare food, raise foraging animals and raise newly born reptiles and amphibians. Terraria were equipped with appropriate soil substrate for digging species as well as stones and trees for climbing species, in addition to hiding places and other structures, paving the way to modern reptile keeping. Another remarkable change was the renovation of the crocodile enclosure which had made it necessary to give up the crocodile collection in around 1975 and to send the gharial (which had been living at Frankfurt Zoo since 1958) to the Gharial Breeding Centre in Orissa, India in 1979. After the renovation of the building had been completed, Nile crocodiles returned to the zoo in 1977, but the enclosure turned out to be unsuitable for that aggressive species.

Finally, in 1990, Frankfurt Zoo started keeping Australian freshwater crocodiles, which started breeding regularly in 1994 and still do so today. This is one of the many breeding successes at the Frankfurt Exotarium since Rudolf Wicker became its curator in 1984. He took over at a time when again some necessary renovation work had started, and so the opportunity to build a big landscape terrarium

for freshwater tortoises (1987) was seized. The group of *Cyclura cornuta* then consisted of shy and aggressive animals. They had come to the zoo in 1974, but Wicker replaced them by ten new animals imported from the zoo in Santo Domingo. These animals laid eggs for the first time in 1987, but the keeping facility was not the most favourable in many aspects, and there was little breeding success. Just a few weeks after they had been moved to a newly built enclosure in 1991, they started breeding successfully and have done so ever since.

Other remarkable breeding successes of the last two decades have been the *Phelsuma klemmeri* from Madagascar, *Varanus salvator cumingi* and *Erymnochelys madagascariensis*, as well as the *Laemantus serratus* and *Petrosaurus thalassianus* that were all bred in Frankfurt for the first time ever under human care. Our specimens of *Crocodylus johnsoni* form the only breeding group outside Australia, and Frankfurt Zoo keeps and breeds *Ctenosaura bakeri*, the highly endangered iguana from Utila island.

Especially as Frankfurt Zoo has made nature conservation *in situ* and *ex situ* one of its top priorities, its close cooperation with the Customs Service at Frankfurt Airport must also be noted. Every year, this results in hundreds of reptiles being seized from travellers or commercial shipments at Frankfurt Airport and being brought to the Exotarium



Fig. 11. The entrance to the Frankfurt Exotarium still preserves the charm and character of the 1950s when it was rebuilt (2008). Photograph: Sabine Binger.

– even rare animals such as a few *Psammobates* from two different species. Some of the shipments seized contain quite a number of specimens, for example 300 *Geochelone elegans* or more than 70 *Cordylus mossambicus* and *C. rhodesianus* and, repeatedly, also large numbers of poison arrow frogs. Particularly with regard to the more common species and relatively high numbers of specimens, it is extremely difficult to find appropriate people and institutions willing and able to take them on. All these animals are lost to the natural world as they cannot usually be taken back and released into the wild.

One exception was the case of five hawksbill turtles (*Eretmochelys imbricata*) in 2009. Dogs trained to detect CITES species at Frankfurt Airport discovered the eggs in the luggage of a tourist. The eggs were brought to the Exotarium, and, as they looked good, were put into an incubator. During the following days, the turtles hatched and were kept in an aquarium until they had reached a length of around 20 cm. As it was known from which beach in the Seychelles they had been collected, they could be sent

back and were released into the sea by the local authorities. The media attention was huge, and so this successful, but quite untypical, story could be accompanied by the message that one should not take home souvenirs of endangered and protected species.

Generally, species conservation aspects today play an important role in Frankfurt Zoo, and this, of course, also applies to the Exotarium. This building, with its long and interesting history and its rich collection of reptiles and amphibians, is certainly one of the best places in Frankfurt Zoo to demonstrate to the visitors the multitude of forms, colours, adaptations and other expressions of the diversity of life. Today, there is neither a separate entrance fee nor any counting of the number of visitors to the Exotarium, but, in all probability, it may be assumed that almost all the visitors to Frankfurt Zoo (more than 900,000 per year!) also visit the Exotarium. Showing around 170 adult specimens of 29 amphibian species and more than 400 reptiles from 68 species, it is and remains one of the main attractions of Frankfurt Zoo.



Fig. 12. Despite all changes the Reptile Hall today still resembles in many aspects the one opened in 1904 (2008). Photograph: Sabine Binger.

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