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The Fossil Collections from the Sperrgebiet at the National Earth Science Museum, Geological Survey of Namibia

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Abstract: The establishment of the National Earth Science Museum at the Geological Survey of Namibia four years after Namibia's Independence has resulted in the cataloging of a large palaeontological collection. To date the fossil collection consists of more than 12,298 specimens that were collected in the Sperrgebiet since before the First World War until recently. The fossils comprise Cretaceous, Eocene, Miocene and Plio-Pleistocene plants, invertebrates and vertebrates which have been studied and published by many scientists such as Böhm, Stromer, Lang, Hopwood and Lavocat. The collections are frequently visited by researchers from all over the world.

Key words: National Earth Science Museum; Geological Survey of Namibia; Sperrgebiet; Fossil Collections; Palaeontology.

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Introduction

The National Earth Science Museum, which forms part of the Geological Survey of Namibia, was established in 1995, after Namibian Independence in 1991. Before independence collected fossil specimens were usually housed at the researcher or collector's institution, which was often located outside of the country, e.g. South Africa, Germany, America and England. Some collections which remained in Namibia were kept at various institutions, for example the National and Swakopmund Museums.

The first fossils from the Sperrgebiet were earnestly collected in the forbidden territory before and during the First World War by Erich Kaiser and Werner Beetz (Kaiser 1926) and sent to the Munich Museum in Germany where they were further examined and studied by Stromer (1922, 1923, 1926) and Böhme. These fossils were then donated to the Munich Museum of Natural History and until recently these collections were thought to have been destroyed during the war, but quite a lot of them have resurfaced in the past few years, including the sharks studied by Böhm (1926). Beetz also assisted Herbert Lang to collect fossil specimens for the American Museum of Natural History in New York and these were subsequently studied

by Hopwood (1929) and by other authors like Lavocat (1973). Most of the fossils collected in the Sperrgebiet were described in 1926 (Kaiser 1926) and by 1930 over 25 scientific papers had been published on the Sperrgebiet and Namaqualand fossils (Pickford & Senut 1999).

Gudrun Corvinus, who worked for Namdeb in the 1970's collected many fossils at Arrisdrift along the Orange River. These collections were initially stored at the Iziko Museum in Cape Town, South Africa, but were eventually returned to the Geological Survey in Windhoek, Namibia. However some fossils, which she had collected at Grillental in the Sperrgebiet, have remained at the Iziko Museum including a few fossils from Glastal, whose collector remains unknown, and a ruminant mandible from Langental. Roger Hamilton from the Natural History Museum, London, collected fossils from the Sperrgebiet as well, of which casts were made and stored at the museum in London. The original collection was returned to the Iziko Museum.

Other fossils collected from the Sperrgebiet prior to 1925 are curated in the SNSB-BSPG (Bayerische Staatsammlung für Paläontologie und Historische Geologie),

München, Germany, including sharks, molluscs, and the vertebrates studied by Stromer (1926).

Materials and Methods

The Sperrgebiet fossil collections housed in Windhoek, include specimens from the following sites; Arrisdrift, Auchas, Auchas Main Pit SE, Chalcedon Tafelberg, Daberas, Elisabethfeld, Eocliff, Eoridge, Fiskus, Glastal, Glastal Frog Site, Grillental, Gypsum Plate Pan North, Karingarab, Langental, Rooilepel and Trigieville among others (Table 1).

Some fossiliferous blocks from recently discovered localities such as Black Crow and Silica North still need to be prepared. In addition blocks containing terrestrial molluscs from the localities Eisenkieselklippenbake, Silica North and Silica South, and marine molluscs and shark teeth that were collected from the Eocene Neue Anlage Shark Site, Langental *Turitella* Site (Fig. 1) and Buntfeldschuh still need to be accessioned. Currently they are labelled with the site data.

Fossils that have been collected include wood, algae, molluscs, fishes, reptiles, tortoises, birds, bats, rodents, macroscelidids, insectivores, pedetids, hyracoids, tubulidentates, creodonts, carnivores, ruminants (tragulids and bovids), anthracotheres, proboscideans and rhinocerotids (Pickford & Senut 1999, 2003, 2008). Microscopic fossils have been identified at several localities, but have not been accessioned into the collections, but sometimes form part of collected blocks.

To date approximately 12,298 fossil specimens from the Sperrgebiet have been accessioned into the museum collections. The top three localities for which fossils were collected and accessioned are Arrisdrift, Langental and Grillental. There are substantial samples in the collections from various sites (Table 1) which require formal registration.

Sperrgebiet specimens have been labelled in the format; locality abbreviation, number of specimen and year collected, e.g. EF 12'00, means that the specimen was collected at Elisabethfeld, it is the 12th fossil accessioned and in the year 2000, it's year of collection (Fig. 2).

Abbreviations used for Sperrgebiet localities are as follows:

AD - Arrisdrift
AM - Auchas and Auchas Main Pit SE
BC - Black Crow
CT - Chalcedon Tafelberg
Dab - Daberas
EF - Elisabethfeld
EC - Eocliff
ER - Eoridge
FS - Fiskus
GL or Glastal - Glastal and Glastal Frog Site
GT - Grillental
RS - Grillental Road Side
GPN - Gypsum Plate Pan North
KG - Karingarab
LT - Langental
RL - Rooilepel
Reuning's - Reuning's Pipe
SN - Silica North
SS - Silica South
TV - Trigieville

Researchers usually provide specimens discovered during a field season with field numbers. After field work, specimens are brought to the museum to be accessioned into the museum collections using the GSN prefix. GSN stands for Geological Survey of Namibia. To date the museum has not acquired a dedicated cataloging database and all collections data is entered into Excel spreadsheets.

Fossils are labelled with specimen numbers using a permanent marker and are then neatly placed in a specimen box with a specimen label. After this all specimens are arranged in drawers and cabinets according to the locality where they were found, and within each cabinet the fossils are arranged by taxonomic group. If the Family or Genus is not known, the fossils are packed into drawers in special steel cabinets that are labelled with numbers and locality names. These cabinets are housed in the fossil store room behind the exhibition area of the museum.

Researchers may take specimens they wish to study further on a temporary loan. This loan needs to be accompanied by a permit, which is issued by the National Heritage Council.

Curating and storing fossils in store rooms that are not accessible to the general public for viewing cannot on its own promote an interest and knowledge in Namibia's palaeontology. Therefore, since the establishment of the museum's exhibition, seven cabinets have been dedicated to displaying fossils from the Sperrgebiet. Some of the more spectacular and well-preserved fossils that have been found were selected for display. This was done to show visitors to the museum some of the extraordinary fossils that have been found in the Sperrgebiet. Labels explain how the landscape, fauna and flora have changed over millions of years.

Some fossils from the Sperrgebiet have also been displayed in the Swakopmund and Oranjemund Museums and are on loan from the Geological Survey of Namibia.

The geo-palaeontology display at the Geological Survey of Namibia (Fig. 3-5) is visited by many school groups every year, as well as by the general public and tourists. According to the visitor's book the museum had the following visitor numbers from the months of January to December; 830 in 2015, 701 in 2016 and 1733 in 2017.



Figure 1. *Aturia lotzi* shell from Priabonian Langental *Turritella* Beds, Sperrgebiet, Namibia.

Table 1. Table showing number of accessioned fossil specimens for each locality in the Sperrgebiet (+ means that fossils are present in the collections but await formal registration). The geographic location of these fossil sites are to be found in Pickford & Senut (1999, 2003, 2008).

Locality Name	Accessioned Fossils	Fossils preserved	Age
Arrisdrift	5,098	Plants, vertebrates	Basal Middle Miocene
Auchas	131	Plants, vertebrates	Basal Middle Miocene
Auchas Main Pit SE	3	Vertebrates	Basal Middle Miocene
Black Crow	+	Invertebrates, vertebrates	Ypresian/Lutetian
Blaubok	+	Plants	Oligo-Miocene
Bohrlock IV	+	Vertebrates	Early Miocene
Buntfeldschuh	+	Invertebrates, vertebrates	Priabonian
Chalcedon Tafelberg	39	Plants, invertebrates	Eocene
Chameis	+	Invertebrates	Middle Miocene
Daberas Dunes	4	Invertebrates, vertebrates	Plio-Pleistocene
Eisenkieselklippenbake	+	Plants, invertebrates	Eocene
Elfert's Tafelberg Sandstone	+	Vertebrates	Pliocene
Elisabethfeld	1,069	Invertebrates, vertebrates	Early Miocene
Elisabeth Bay	+	Vertebrates	Early Miocene
Eocliff	6	Vertebrates	Middle Eocene
Eoridge	8	Invertebrates, vertebrates	Middle Eocene
Fiskus	298	Vertebrates	Early Miocene
Gamachab	+	Invertebrates	Plio-Pleistocene
Glastal	9	Invertebrates, vertebrates	Early Miocene
Glastal Frog Site	1	Vertebrates	Early Miocene
Grillental	1,626	Invertebrates, vertebrates	Early Miocene
Grillental Road Site	3	Vertebrates	Early Miocene
Gypsum Plate Pan North	32	Invertebrates, vertebrates	Middle Miocene
Hexen Kessel	+	Plants, invertebrates	Pliocene
Kalkrücken	+	Invertebrates, vertebrates	Late Miocene
Karingarab	33	Invertebrates, vertebrates	Middle Miocene to Pleistocene
Kaukausib	+	Vertebrates	Pliocene
Langental mammal site	3,516	Invertebrates, vertebrates	Early Miocene
Langental <i>Turritella</i> site	+	Invertebrates, vertebrates	Priabonian
Marienberg	+	Invertebrates	Pliocene
Neue Anlage	+	Vertebrates	Priabonian
Obib Dunes	+	Invertebrates	Pliocene
Phytoherm Ridge	+	Plants	Eocene
Reuning's Pipe	+	Invertebrates	Eocene
Rooilepel	391	Invertebrates, vertebrates	Middle Miocene to Pleistocene
Schmidtfeld	+	Vertebrates	Middle Miocene
Silica North	+	Invertebrates, vertebrates	Bartonian
Silica South	+	Invertebrates, vertebrates	Bartonian
Steffenkop	+	Invertebrates	Eocene
Strauchputz	+	Invertebrates	Early Miocene
Tafelberg Nord	+	Ichnofossils	Eocene
Target Pan	+	Invertebrates, vertebrates	Miocene
Trigieville	2	Invertebrates	Pleistocene
<i>Trigonephrus</i> site	+	Invertebrates	Pliocene
Vlei 315	+	Invertebrates	Plio-Pleistocene
Wanderfeld IV	+	Invertebrates	Cretaceous



Figure 2. Holotype specimen of *Hypsorhynchocyon burrelli*, from Early Miocene sediments at Grillental-6, Sperrgebiet, Namibia. Note the register number written on 'white-out' consisting of the Locality abbreviation (GT), the specimen number (50) and the year of collection (2000).



Figure 3. Display of fossil struthious eggs from Rooilepel and other sites in the Sperrgebiet ranging in age from 16 million years to Recent. Note the artwork of Christine Marais on the back panel of the display case.



Figure 4. Part of the display on fossil vertebrates from Arrisdrift, Orange River Valley, Namibia, including crocodiles (*Crocodylus garipeus*), land tortoises (*Namibchersus namaquensis*), a small-scale model of the giant carnivoran *Megistotherium osteothlastes*, and the large fossil dassie from the site (*Prohyrax hendeyi*) compared to much smaller extant dassies from Namibia (*Procavia capensis*).

Discussion and conclusion

Collections of fossils that are well curated and documented add to the scientific value of the specimens, assuring that they can be used as raw material for understanding past environments, climate change and evolution of species. Proper curation enables museums to better preserve their collections for future generations and for ensuring easy access to researchers for continued scientific research. Diamond mining has contributed significantly to the discovery, excavation and study of fossils in the Sperrgebiet.

Over the last four decades managers and mine geologists of Namdeb Diamond Corporation (Pty), a 50:50 mine venture between the

Government of Namibia and the de Beers group in South Africa, have enabled access to fossiliferous sites and have contributed resources to their discovery and excavation. This relationship between Namdeb Diamond Corporation (Pty) and the Geological Survey Museum continues to this day, with a regular, annual field season to the Sperrgebiet by the Namibia Palaeontology Expedition, or NPE.

The processes involved in curation can be tedious and may take many dedicated hours, weeks, months and even years, depending on the size of the collection. This task is often performed by a focused museum curator or scientist, and its importance to the integrity and value of museum

collections cannot be over-emphasized. Collections that have not been properly curated lose a great deal of their scientific value, sometimes even being rendered worthless. Well-curated and stored collections can add significantly to a museum's reputation and legacy, and can ultimately significantly add to the number of specimens that are studied and published. Therefore all collections which enter the museum must be curated in a manner that is

acceptable to good museum collections management practices and stewardship.

Although the National Earth Science Museum has a long way to go in the process of curation and developing its own best practices, the first step is to retain dedicated museum personnel, which keep abreast of the latest technology and techniques in curation and collections management, because collections without a dedicated curator can soon be rendered valueless to science.



Figure 5. Holotype specimen of *Sperrgebietomeryx wardi* from Elisabethfeld, Sperrgebiet, on display in the National Earth Science Museum, Windhoek, Namibia.

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Pickford, Senut and Bamford. The curation of the extensive fossil collections kept at the National Earth Science Museum would not have been possible without the hard and dedicated work of previous curators in the museum, such as Dr. Martin Pickford, Dr. Angela Riganti and Ms. Mariette Kotze. In addition, Dr. Wulf Hegenberger managed the museum for many years and dedicated much of his support and efforts into the repatriation of various fossils that had been exported from Namibia. Previous directors of the Geological Survey of Namibia over the last decades, Dr. Roy Miller, Dr. Brian Hoal and Dr. Gabi Schneider all supported the museum in obtaining the much needed resources and facilities to curate, store and exhibit thousands of Namibian fossil specimens.

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