Contents of containers of fossils from 1909 expedition reconstructed nondestructively

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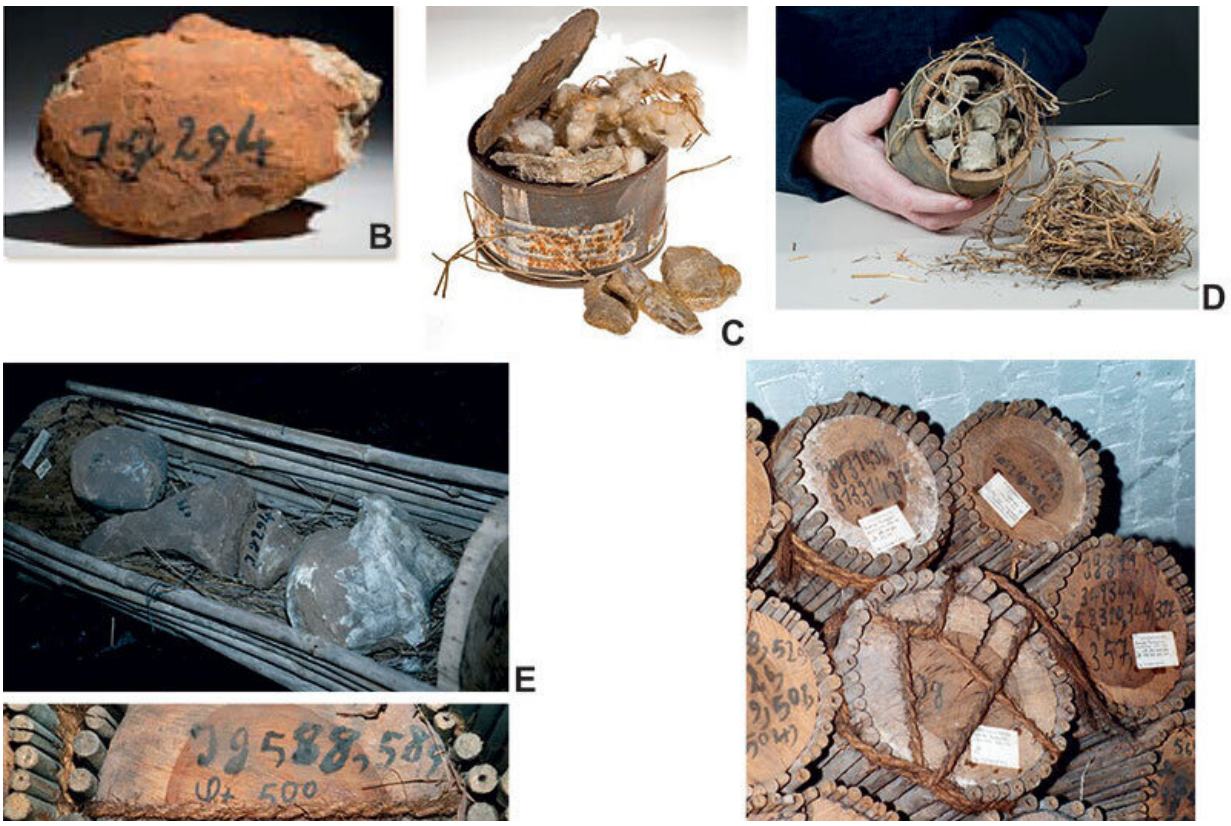
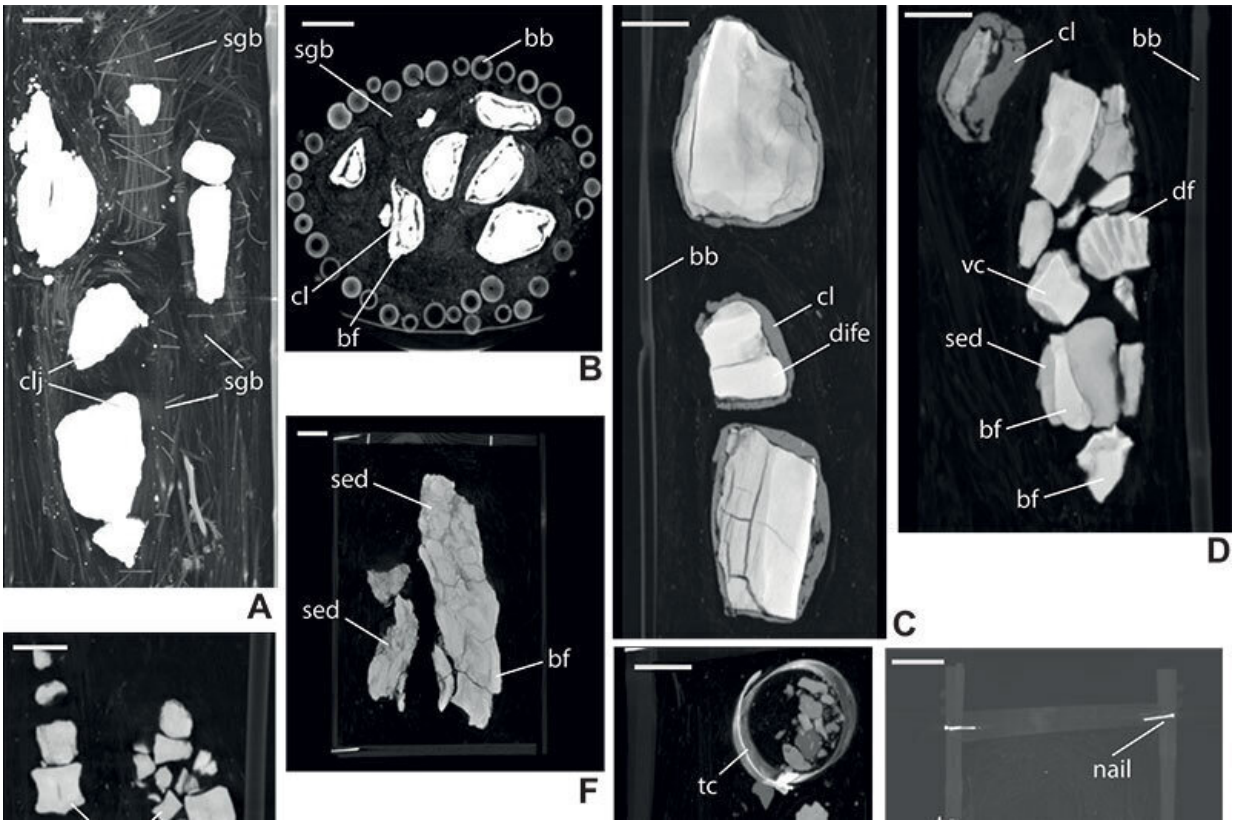


A) Entries in field catalog of Janensch (1909-1911) for Quarry Ig/WJ page 73 and page 143. Photographs of original packed items from Quarry Ig/WJ. B) clay jacket Ig294, C) tin can filled with small bones from Quarry Ig/WJ and padded with pieces of cotton, scale bar for B) and C) is 50 mm. D) baobab fruit capsule filled with small bones and vertebrae from Quarry Ig/WJ, padded with a bundle of savanna grass, not to scale, E) opened bamboo corset from Quarry Ig/WJ containing four clay jackets (one partially with plaster of paris) on a thick layer of savanna grass (this photograph is also used in Heinrich and Schultka, 2007:

Abb. 32), F) Close-up of one of the studied bamboo corsets in the collection of the MfN with original ink labeling and paper label visible, scale bar for E) and F) is 80 mm. G) Section of several bamboo corsets as stored at the collection of the MfN, not to scale. Photographs B) to E) by Carola Radke, and photographs F) and G) by Hwa Ja Götz, both MfN. Credit: *Palaeontologia Electronica* (2023). DOI: 10.26879/1231. https://palaeo-electronica.org/content/2023/3747-bamboo-corsets-from-tendaguru

Between 1909 and 1913, the Museum für Naturkunde Berlin organized and financed the German Tendaguru Expedition (GTE) to southern Tanzania, at that time still the German colony of Deutsch-Ostafrika. With the participation of more than 500 local African excavation workers, a large number of porters, and two Berlin scientists, a total of more than 230 tons of fossil dinosaur material was taken to Berlin.

The dinosaur material originating from Tendaguru proved to be so rich and spectacular that the site remains one of the most important dinosaur localities in the world today. Of the dinosaur material from Tendaguru, 40 original packed and unopened bamboo corsets and six wooden crates with unprepared bones are still in the vertebrate collection of the MfN—their exact contents are unknown thus far. This work is part of a large interdisciplinary scientific program in which the Museum für Naturkunde Berlin deals with its colonial past.



Packing types of fossil specimens as visible in the CT images A) “Ig 420, 439, 453, 512”, longitudinal section (MIP mode and CT-pulmonary filters set) showing wrapping of specimens in savanna grass, B) “Ig88” cross-section showing wrapping of fossils in savanna grass and tight stuffing of bamboo corsets, C) “Ig291, 291”, longitudinal section of the typical clay jackets, showing a femur of Dysalotosaurus in pieces with protection cover of clay, D) “Ig281”, partial longitudinal section showing clay jackets and single bone fragments with and without sediment, E) “Ig 122, 124, 266, 267, 269, 270, 272, 276”, longitudinal section showing clusters of vertebrae and bone fragments in the bamboo corset, F) “Ig_2011_4”, crate with two large sediment slabs with fossil bones, G) “Ig_2011_1”, crate with bamboo stalks filled with fossil bones and bones wrapped in savanna grass, H) “Ig_NN6”, bamboo corset in longitudinal section (MIP mode) showing tin cans and bone cluster in between (see also Figure 4C-D), I) “Ig 330, 339, 347, 349 350, 351, 352, 356, 360, 346, 366”, bamboo corset in longitudinal section (MIP mode) showing several tin cans and some additional loose bones. Scale bar is 50 mm. Abbreviations: bb, bamboo stalk; bf, bone fragment; cl, clay cover of bone; clj, clay jacket; df, dentary

fragment; dife, distal femur; sed, sediment; sgb, savanna grass bundle; vc, vertebral centrum. Credit: *Palaeontologia Electronica* (2023). DOI: 10.26879/1231. https://palaeo-electronica.org/content/2023/3747-bamboo-corsets-from-tendaguru

Using their high-quality medical CT scanners, colleagues from IZW and Charité now helped to analyze the contents of the shipping containers non-destructively. "It was very exciting for all of us to finally know exactly what was inside the bamboo corsets without having to open them right away," says Daniela Schwarz, head of the study. "Until now, there was a lot of uncertainty about how to handle this material, because physical preparation really takes a lot of time, and you also don't want to destroy historical documents of the era."

The virtual preparation revealed many individual bones from the small gazelle dinosaur Dysalotosaurus lettowvorbecki, but also some pieces of the spiked dinosaur Kentrosaurus and of sauropods. In addition, this method allowed for accurate documentation of already familiar excavation techniques: embedding bones in clay, collecting these many small vertebral bones, collecting small bones in tin cans in the field, and carrying whole pieces of rock in specially made bamboo corsets stuffed with savanna grass.

Photographs of packing and transport of bamboo corsets on the Tendaguru hill, A) MfN HBSB PM_B_IV_0072, and B) MfN HBSB PM_B_V_156, local workers producing and filling bamboo corsets, C) MfN HBSB PM_B_V_160, workers have gathered to start their march to Lindi with the bamboo corsets, D) MfN HBSB PM_B_V_168, long column of carriers following the small foot path to Lindi with bamboo corsets either between them or carried on the head. E) Aquilion CX CT scanner at the IZW, this machine was used to scan all 40 bamboo corsets, F) wooden crates from Quarry Ig/WJ on their way through the Toshiba Aquilion One CT scanner at the Charité, photograph by Oliver Wings. Credit: *Palaeontologia Electronica* (2023). DOI: 10.26879/1231. https://palaeo-electronica.org/content/2023/3747-bamboo-corsets-from-tendaguru

All of this work was done by local workers employed during the GTE, and the filled corsets were then carried to the coast during several days of foot marches by columns of porters. "Two aspects were particularly

important to me in the virtual exploitation of this material," explains Schwarz.

"On the one hand, we want to make the fossil material from Tendaguru virtually available to everyone in perspective, and on the other hand, it was important to be able to define priorities for the preparation and at the same time decide what should be preserved in its original state as a valuable contemporary testimony of this historic expedition under colonial conditions." The work shows that it is possible to combine the two.

The study is published in the journal *Palaeontologia Electronica*.

More information: Daniela Schwarz et al, Description of content of unopened bamboo corsets and crates from Quarry Ig/WJ of the Tendaguru locality (Late Jurassic, Tanzania, East Africa) as revealed by medical CT data and the potential of this data under paleontological and historical aspects, *Palaeontologia Electronica* (2023). DOI: 10.26879/1231. palaeo-electronica.org/content … rsets-from-tendaguru

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