“Jamila’s” Grave: Consolidation and Reconstruction

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During the Ba`ja Neolithic Project field season 2021 (27th, September to 12th, October 2021), the 9000 year-old grave of “Jamila” was reconstructed at the new Petra Museum. The tomb of this child had been considered extraordinary due to its elaborate construction and the sophisticated ornaments that adorned the child (Gebel *et al*. 2019, 2020; Benz *et al*. 2020, this volume, Part 2).Therefore, the restoration project CARE[1] was initiated to reconstruct the tomb and the necklace, in order to display them in a museum (Alarashi b this volume; Costes and Fischer this volume). In 2018, prior to backfilling, all the stones (structural parts) of the grave construction, particularly the covering slabs, were repositioned inside the stone cist. The two vertical sandstone slabs and the surrounding small wall were left undisturbed in their original positions.

For the restoration of the grave construction, the co-directors had invited Hussein al-Sababha, archaeologist and director of the Archaeo-anthropological Museum of the Yarmouk University, Irbid, Martin Bader, then leading conservator of the National Museum Zurich, and Julia Graf, a media specialist from Zurich, to document and take off the constructional elements of the grave from the Neolithic site. During the 2019a season in April, all items were carefully extracted and secured using the following procedures: documenting each individual constructional element, labeling every stone, and whenever possible, recording its exact original placement (the comprehensive catalogue of all items can be found in Appendix 1; see also Benz *et al*. this volume, Part 2: Table 22); onsite packing of each piece in stretch foil; larger elements were additionally put in wooden boxes by filling the space between the element and the box’s walls with polyurethane foam; even the most fragile elements were safely transported down the *siq* to the base camp. All elements were registered in the project’s database. Under the auspices of the Department of Antiquities’ local representative, Abdallah Rawashdeh, they were transported to and stored in the storeroom of the Department of Antiquities at the site of Petra. By compiling the infield documentation, levels, drawings, and recorded stone items, Martin Bader and Julia Graf developed a 3D digital reconstruction. They accomplished this by identifying and relocating nearly every item to its original position, as recorded in the drawings by Christoph Purschwitz and the excavation’s photo documentation (Fig. 2; see also Gebel *et al.* 2020: Fig. 50). This model and the resulting catalogue have been realised using *Adobe Creative Suite* (*Illustrator*, *InDesign* and *Photoshop*; *CS6*), *Blender* (*V.2.81*) and *Wolfram Mathematica* (*V.12*) (Appendix 1). It constitutes the plan after which the authors reconstructed the grave during the autumn season in 2021.

Fig. 1 Every constructional element was photographed, labelled, and carefully packed for transportation down the *siq* to the old Petra Museum. (Photo: J. Graf, Ba`ja N.P.)

[1] https://www.bajahouseholdanddeath.de/care-02.html

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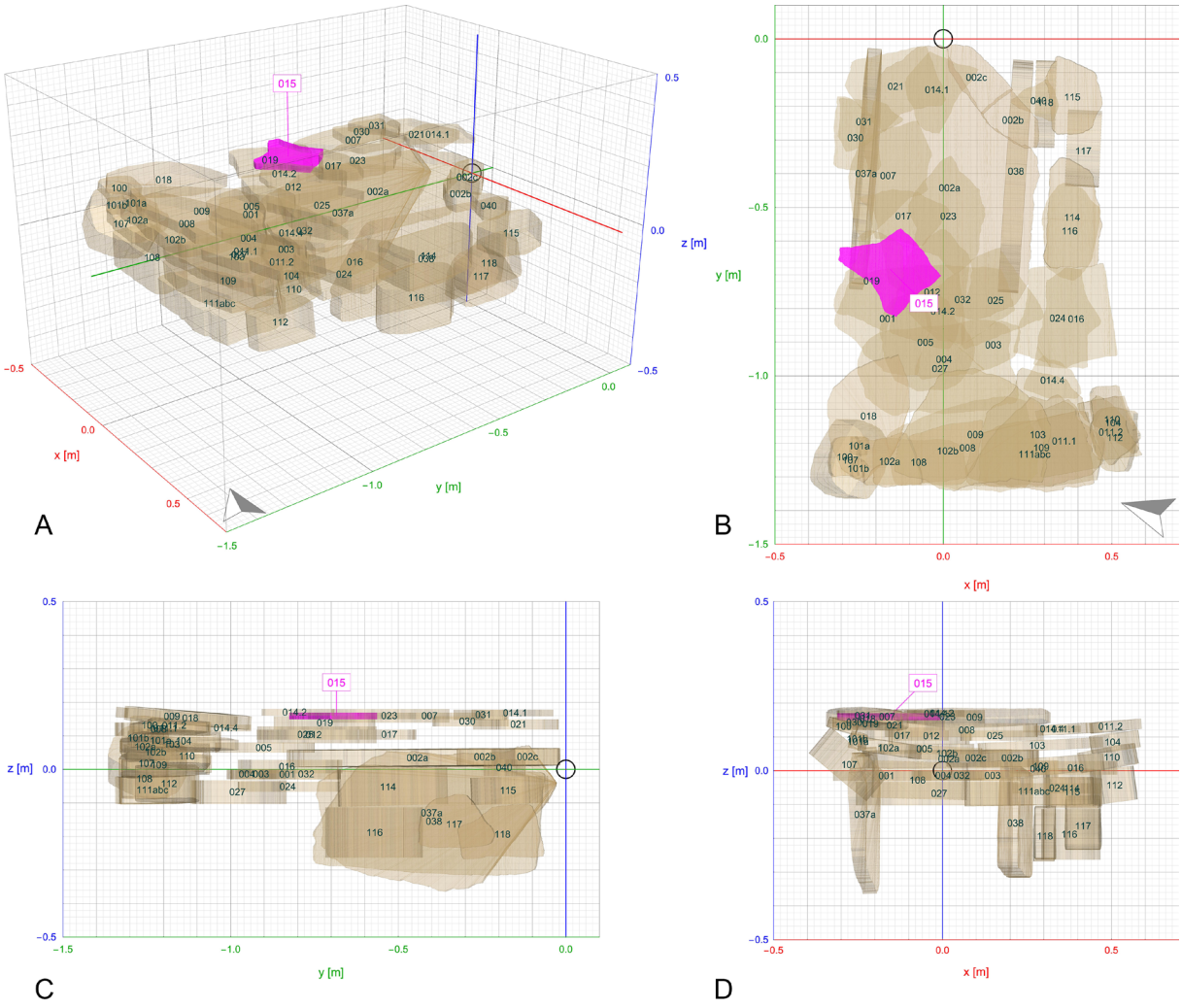

Fig. 2 With the help of the photographic documentation, levels, and drawings, as well as with the measurements and morphology of the stone items, Martin Bader and Julia Graf were able to identify almost every constructional element and relocate them in a 3D Model (Software: *Wolfram Mathematica*): *A* southwest view showcasing the small wall in front of the grave cist, *B* top-down perspective, *C* virtual east-west section highlighting the southern wall and southern cist slab, and *D* virtual north-south section as seen from the west. (Model: M. Bader, based on 2D drawings by C. Purschwitz, Ba`ja N.P.)

The Reconstruction of the Grave

In 2021, with a one-and-a-half year delay due to Corona Pandemic, the authors were able to rebuild the grave in the Neolithic section of the new Petra Museum. The work started by transporting all the stones from the storeroom in the old Petra Museum to the working place at the new museum. Challenges started right away after arrival. The first challenge was to choose the right type of showcase that would be suitable for displaying the grave. After consulting the director of the new Petra Museum, Naher al-Rawadieh, we found a second-hand platform in their storeroom, which had been used earlier to hold the statue of the Goddess of Petra (Thu-Sharah). The dimensions of the platform were suitable, but the design hardly met the requirements for the reconstruction of the tomb. Therefore, we modified it to make it suitable. Carpenters are located about 10km outside of the town of Wadi Musa, on the way to Shobak which made things more complicated. Although we had the main materials and tools to complete the mission, the limited resources at hand demanded creativity to find adequate solutions that met the requirements of restoration standards (Fig. 3).

After the supporting platform had been prepared, we could work on the stones of the grave. At first, we cleaned all the stones of the burial's construction mechanically with brushes of different hardness according to the

Fig. 3 *A-B* Archaeologist Hussein al-Sababha and archaeo-technician Mousa Serbil testing and discussing solutions to meet the restoration standards as well as static and archaeological requirements of the reconstruction, *C* preparing the sub-construction for its final location in the museum's Neolithic section. (Photos: H. al-Sababha, M. Serbil, Ba`ja N.P.)

condition of the stones. In the second step, we consolidated the three main slabs of the grave. The northern side slab (037a) required fixing of its large chippings, which was accomplished by injecting a consolidator (*Remmers KSE 300* solvent-free stone strengthener on a silicic acid ester base; Fig. 4A-C). The preservation of the other side slab was much better, but to enhance its durability, it was also sealed by applying a consolidator with a brush. As the covering slab (Loc. C1:39.1) had been broken into three parts during the excavation due to its own weight, metal rods were used to support all parts, which had been fixed with an epoxy resin (*Araldite*®; Fig. 4D).

When all necessary treatments of the burial's stone elements were completed, we tested a preliminary installation of the main slabs prior to the final installation at the definite location in the Neolithic section of the new Petra Museum. This step was necessary to prevent any mistakes which might otherwise have occurred during the final reconstruction (Fig. 5).

All the wooden stakes and iron angels were coated with a layer of *Araldite*® to prevent any further reactions with the stones in the future. At its final place, we consolidated the grave with the surrounding soil. In contrast to the original findings, where both vertical stone slabs of the stone cist were stabilised using sand, stones, and a small wall in the southern section, our intention was to maintain partial visibility of the side sections in the museum to showcase the constructional elements. This is a further reason why we needed the support of iron angles and the wooden sub-structure.

After completing nine days of intensive preparations – out of the twelve days we had for accomplishing our mission – we were ready to begin rebuilding "Jamila's" grave in its permanent location in the Neolithic section of

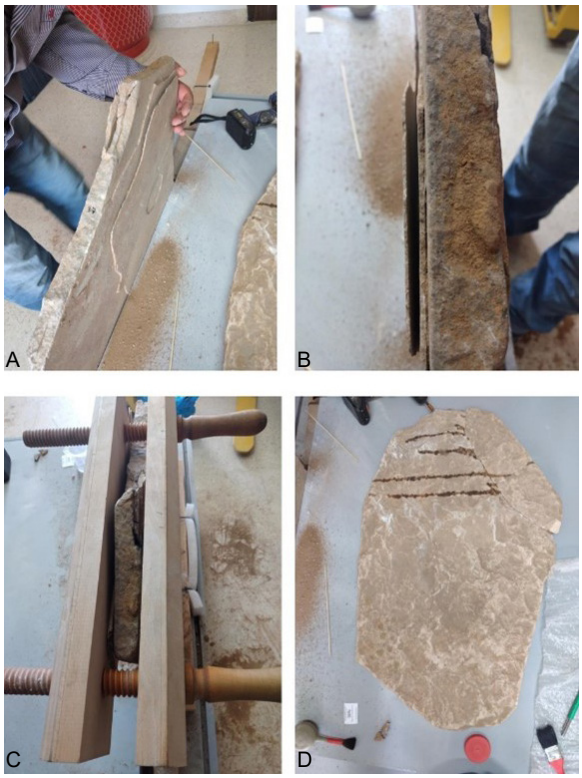

Fig. 4 *A-C* Fixing the thin parts of the shistic limestone slab of the stone cist's wall, *D* glueing the three fragments of the main grave cover (Loc. C1:39.1) with epoxy resin. The slab was broken while being lifted during the excavation, due to its own weight and the thinness of the slab. (Photos: H. al-Sababha, Ba`ja N.P.)

Fig. 5 For static reasons, a wooden and iron sub-construction was necessary to fix the stone cist. It also served as a support for the heavy covering slabs that had to be placed on top of the main covering slab. (Photo: H. al-Sababha, Ba`ja N.P.)

the Petra Museum. We reconstituted all of the stones of the grave by using the original silty-sandy paleosol sediment from Ba`ja.

The reconstruction followed exactly the 3D model (Fig. 2). However, unlike the original Neolithic grave construction, we did not seal the grave with white plaster made of small flint and limestone grit covered with a thin layer of white limestone plaster. This decision was intentional, as we wanted to show the covering slabs. However, in the future, it may be possible to add such a finish in one part of the tomb to display the material of the original top cover.

Outlook

The display of the skeleton inside the grave raises moral and ethical questions, and it is crucial to engage in discussions with a broader group of local museum experts to ensure that local values and ethics are respected, despite the scientific objectives. Unfortunately, due to time limitations, we were unable to have this discussion as part of the CARE Project. In addition, the original bones are too poorly preserved to be showcased in the tomb, but it may be feasible to project a photo of the child's skeleton inside the grave cist, subject to a future consent of the group of experts.

Figures 6A-D present the final reconstruction of the grave in the museum with the protecting glass cover that was kindly provided by the Petra Museum after our departure (Fig. 6D). The necklace of "Jamila" is on display in a separate showcase next to the grave (Costes and Fischer this volume). The necklace and the reconstruction of the grave not only highlight the care and efforts that the Neolithic people put into burying this approximately 8 year-old child, but they also indicate the remarkable technical skills, corporate frameworks and exchange networks involved in intra-mural burying during that period.

Fig. 6 The reconstruction of “Jamila’s” grave in the Neolithic section of the new Petra Museum: *A* view from the northeast (according to the original position). To the left of the tomb, the showcase of the necklace is visible. Some information on the tomb is given in a short accompanying text, *B* view from the southeast (according to the original position), *C* view from the east where the tomb was built against the eastern wall of Room CR36.1 at Ba`ja, *D* view from the top, with a small patch of white plaster indicating the original top cover, which was originally made of fine grit and white limestone plaster. (Photos: H. al-Sababha, Ba`ja N.P.)

A future task is a comprehensive survey among local and international visitors to assess their interest and emotional reactions to the reconstruction of the tomb. The results of such a questionnaire could help identify and respect visitors’ perspectives and wishes in promoting the Neolithic cultural heritage of the Petra Region. Additionally, there are plans to display a scenery depicting the burial ritual and Neolithic life at Ba`ja on a touchscreen. This interactive tool would provide in-depth information on the early Neolithic context of the tomb, including the provenance of exotic artefacts, domesticated and wild animals, and Neolithic architecture, as well as the social and natural environments of the site. The tool would offer various levels of information, starting with general data and ending with scientific references and cross-references to

enable visitors of all ages and interests to choose the depths of information at their own pace and preferences. The drawing of the life scene, which was completed within the CARE Project, not only provides access to this information but also sparks children's curiosity because of the children represented in the drawing.

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Appendix 1

Link: https://www.exoriente.org/baja/archive/