

## The application of carved extruded polystyrene and papier-mâché clay for recreating missing bones of fossil dinosaurs for museum exhibit

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Skeletons of fossilized non-avian dinosaurs are some of the most popular museological exhibits, but most often only incomplete specimens or a few fragments are found. Mold casting and (more recently) 3D scanning and printing are the most common methods to manufacture replica bones to complete dinosaur skeletons, but these are limited to the equivalent skeletal elements in existence permissible to replication. In the case of the museological preparation of the stegosaurian *Miragaia longicollum* MG 4863, which preserves about half its skeleton, the missing bones that could not be replicated by casting or 3D printing were recreated as sculptures of extruded polystyrene (XPS) covered with papier-mâché clay, adapted as the optimal combination after testing with other diverse materials (including expanded polystyrene, polyurethane, papier-mâché paste, plaster and epoxy). Boards of XPS can be carved to an approximate bone shape with snap-off utility knives and, for larger or more complex shapes, glued with PVA glue. This should afterwards be coated with papier-mâché clay (an approximately equal parts mixture of papier-mâché paste and drywall joint compound) at least 2-3 millimeters thick, which can be textured and partially modelled. To finish, these should be painted with acrylic paints and sealed with varnish, preferably water-based. This method allowed missing bones with no equivalent directly replicable to be recreated by inferred reference of similar bones, either by reshaping and resizing neighboring bones or bones from related specimens (mainly dacentrurine stegosaurs from Portugal), mirroring symmetric bones, or retrodeforming deformed equivalent bones. For paleontological application, this was the main advantage found of XPS/papier-mâché clay recreations compared to the two other methods used in this project, as well as its much lower expense and higher remouldability. The resulting recreations are also very light and durable, but their accuracy is lower and limited to the crafting skill of the user. *Acknowledgments.* Jonni Good from *UltimatePaperMache.com* for developing the papier-mâché clay used here and providing tutorials for this technique; Ruben Dias, Susana Machado, Prof. Miguel Ramalho, Prof. Teresa Ponce de Leão, Dr. Mário Machado Leite, José António Anacleto and all other personnel from LNEG that made the project to mount the *Miragaia longicollum* MG 4863 in Museu Geológico de Lisboa possible; Museu da Lourinhã for allowing access and to use ML 433 for replication; Carla Alexandra Tomás from Museu da Lourinhã for instructing and assisting the mold and cast making; Dr. Simão Mateus for assisting with 3D scanning.

**Keywords:** replicas, reconstruction, Museology, methodology, remodeling.

## Estudio tafonómico de plantas fósiles de yacimientos asociados a eventos volcánicos en Tenerife (Islas Canarias)

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Los restos de plantas, pueden preservarse en varios tipos de ambientes sedimentarios –como los asociados a depósitos de origen volcánico –, y a través de distintos tipos de conservación: compresiones, impresiones, carbonizaciones, o permineralizaciones, entre otros. En islas volcánicas, el registro fósil de plantas todavía no se conoce bien, a pesar de ser tan abundante como el de otros grupos. En las Islas Canarias, según los datos publicados hasta el momento, se han encontrado restos fosilizados de vegetales en las islas de La Palma, La Gomera, Gran Canaria y Tenerife. En este trabajo, presentamos una descripción tafonómica de los fósiles hallados en el yacimiento cuaternario de Era de la Mesa, situado al sur de Tenerife. El material estudiado consta de

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# Abstract Book of the XIX EJIP

*Livro de resumos do XIX Encontro de Jovens Investigadores em Paleontologia*  
*Libro de resúmenes del XIX Encuentro de Jóvenes Investigadores en Paleontología*

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**Citation:** de Celis A, Guerrero A, Mocho P, Páramo A, Beccari V, Caprichoso C, Colmenar J, Garcia GG, Jacinto A, João P, Malafaia E, Pais V, Pereira S, Silvério G. 2021. Abstract book of the XIX EJIP, Coimbra, 72 pp.

**How to cite an abstract:** Santos A. 2021. Abstract title. In: de Celis A, Guerrero A, Mocho P, Páramo A, Beccari V, Caprichoso C, Colmenar J, Garcia GG, Jacinto A, João P, Malafaia E, Pais V, Pereira S, Silvério G (Eds). Abstract book of the XIX EJIP, Coimbra, Portugal, p. 24.

**ISBN:** 9781006988660

cover photographs by Gustavo Gonçalves Garcia

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