

DOCUMENTING A HISTORIC MOUNTED FIN WHALE SKELETON IN PREPARATION FOR A MOVE—A CASE STUDY AT THE MUSEU DE CIÈNCIES NATURALS DE BARCELONA

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Abstract.—In 2009, the Museu de Ciències Naturals de Barcelona launched a new permanent exhibit that included removal and restoration of a landmark piece, a fin whale skeleton, and complete redesign of its assembly structure. In this paper we present the process and results of documenting the piece before the dismantling procedure. A graphic record was created as part of the restoration process, which secondarily served as an important source of information for designing the new mounting system. A detailed visual examination of the skeleton revealed problems in the preservation of the bone. The results of the preparatory examinations proved useful for planning a new preventive conservation program for the piece in its new location.

Key words.—dismantling, documentation, mount, whale, preventive conservation, skeleton.

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INTRODUCTION AND OBJECTIVES

The mounted fin whale skeleton, *Balaenoptera physalus*, is a landmark piece at the Museu de Ciències Naturals de Barcelona (MCNB) (Fig. 1). From the time it entered the collection in 1917 until the year 2010, it had been transferred, disassembled, and reassembled several times. However, none of these changes involved the modernization of the piece's mounting structure and museographic record.

In 2009, the MCNB launched a new project that involved the transfer of permanent and temporary exhibitions to a new building located in the Fòrum Park (Barcelona). The plan included removal and remedial conservation of the fin whale skeleton and redesign of its assembly structure. The aims of this challenging intervention were to improve the condition of the skeleton and, at the same time, to update the design of the mounting to enhance the skeleton's educational value as a museum exhibit.

The new assembly was designed to display the skeleton so that it could better represent the natural anatomical position of a fin whale, which meant having to entirely replace the historical mounting. The Laboratory of Conservation and Preventive Restoration (LCPR) of the MCNB was tasked with the documentation of the piece before the removal. The objectives that LCPR set out to complete this assignment were the following:

To leave a testimony of how large cetaceans were historically represented and to document the techniques and materials used for their assembly.—It should be noted that compiling historical documentation is a required and essential step before any conservation project. Moreover, analysis of historic descriptions of the skeleton's condition through time could contribute to an understanding of its deterioration (Stollman et al. 2005).

To document the condition of the skeleton at the beginning of the intervention.—A detailed profile of the skeleton's current condition would prove a useful tool for the team in charge of remedial conservation, since they would receive the skeleton after disassembly. Documentation of the skeleton's initial status could be used to diagnose whether any observed damage occurred previously, subsequent to or as a consequence of the disassembly



Figure 1. Photograph of the whale skeleton as mounted in the Castell dels Tres Dragons before the dismantling process. ©J. Vidal—MCNB.

work. Diagnosis is required for conservation intervention to determine the most suitable treatment (Appelbaum 2009).

To provide a reference image of the dimensions of the mounted skeleton.—A reference image would be used by the team in charge of the new assembly structure and by the architects responsible for hanging it in its new location.

METHODS

The documentation of the mounted skeleton was carried out in June 2010, just before the beginning of the dismantling project. To this end, the LCPR used some of the documentation tools available to the conservator: archival research, visual examination, photography, and illustration. The process was conducted in three phases.

Archival Research

The LCPR collected all the available historical documents that could contain information about the piece to extract data related to the preparation method of the skeleton and the systems and materials used for its original assembly. Documents were also examined for details about events such as transfers, accidents, or repairs that could have affected preservation of the skeleton during its 100 years on display.

Our sources were the Figueres Regional Archive, Llançà City Council, Archive of the University of Barcelona, Barcelona Administrative City Council Archive, MCNB Historical Archive, Library of the MCNB, and interviews with museum staff.

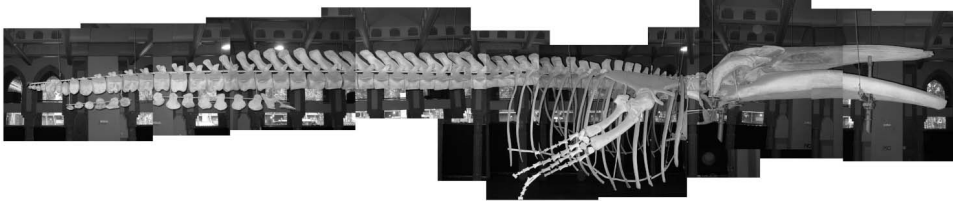


Figure 2. Continuous assembly photomontage of the skeleton. ©B. Font—MCNB.

Visual Examination and Photographic Documentation

Limited resources were available for visual study. There was no scaffolding available, but the height of the assembly (approximately 4 m) permitted the use of a high ladder that was moved along the piece during the examination. The general lighting of the room was indirect and quite poor, so we resorted to using headlamps.

Several photographs were taken of the mounting system, including construction details and conservation issues, using a Canon PowerShot G10® camera.

Drawing of a Detailed Map

To draw a detailed map of the assembly, we adapted and applied a technique previously used successfully for the documentation of conservation works of large and complex objects (Cabello 2009, 2012).

First, two series of photographs, one for each side, were taken around the perimeter of the mounting. To avoid optical distortion in the images, a normal camera lens was used, and each photograph was taken from a frontal point of view with the Canon PowerShot G10. Each series of photographs was overlapped and processed to obtain a continuous assembly photomontage using Adobe Photoshop CS3® software (Fig. 2). A freehand tracing of the photomontage was then drawn to get the elevation map of the piece. This was revised by observation and detailed measurements on site. Finally, the freehand drawing was digitized (Wacom Intuos 3® graphic tablet), and a vector drawing program (Adobe Illustrator CS3®) was used to map the details and the sections (Fig. 3). Notes and detailed photographs taken on site were used to perform a final revision of the map.

RESULTS

Study of Historical Documentation on the Piece

According to the documents analyzed, the original assembly of the skeleton was completed in 1881. Unfortunately, we could not find any data on the methods used by the skeleton preparers or the assembly team.

The first transfer dates from 1917 when the piece was placed on exhibit in MCNB, supported on iron columns (MCNB 1917) (Fig. 4). The main iron elements observed in the mounting can be found in photographs taken after this first transfer. The brackets that held the weight of the skull and mandible could have been added in 1925 during the second move of the mounting (Fig. 5).

Most of the systems and materials that fixed the skeleton to the structure would have been built during the third relocation in 1947 (Fig. 6). These are poor-quality materials added by unskilled workers (Arxiu Administratiu de l'Ajuntament de Barcelona 1947).

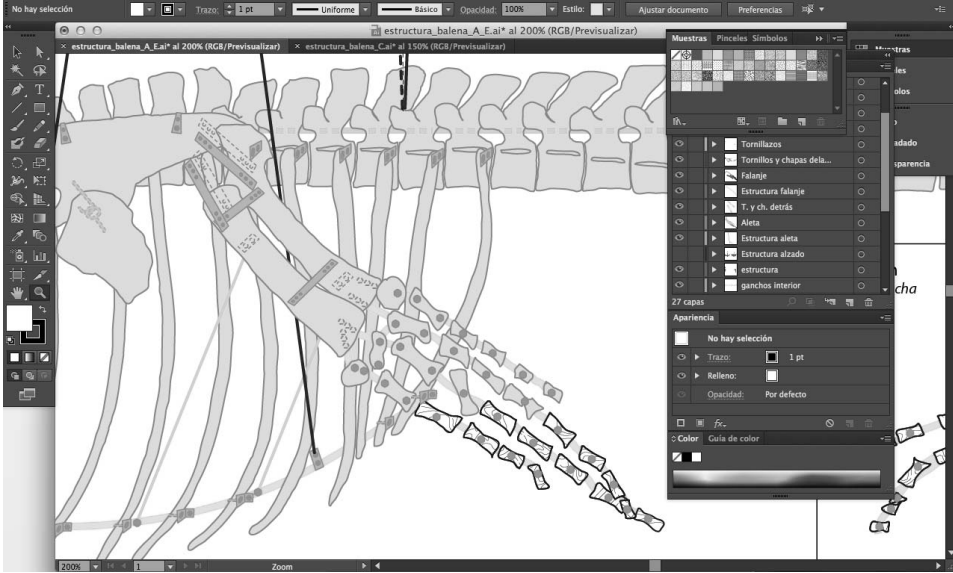


Figure 3. Drawing the digital map. ©M. Pérez—MCNB.



Figure 4. A photograph taken in 1922 showing the skeleton mounted in the center of the first MCNB permanent exhibition. There was some confusion among visitors at the time because the specimen became known as “the dinosaur” (Dacosta and Pagés 1993). ©Anonymous—MCNB.

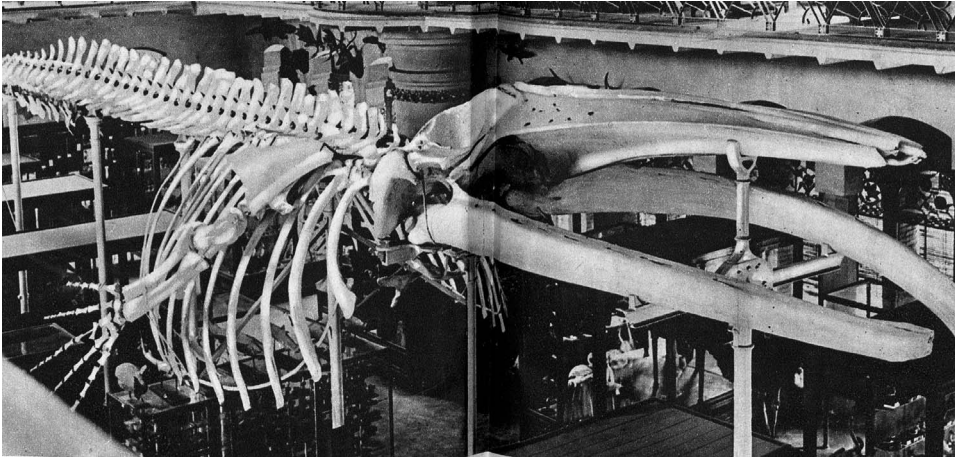


Figure 5. Photograph of the mounted whale skeleton after its 1925 relocation. © P. Farran.

The last modification of the mounting took place in 1986. It was adapted to hang from the ceiling of the room where it was exhibited, conserving the upper part of the iron columns as a supporting element. With this renovation, the ground floor became a clear space, and the hall began to be used for the museum's temporary exhibitions.

Although the installations for temporary exhibitions reduced the skeleton's visibility, the piece never lost its prominence (Fig. 7). Due to the display of the mounting, the room where it was hung was renamed the "Hall of the Whale." Almost 10 years after the whale skeleton was removed in 2010, the room is still known by this name.

No documents were found about bone fractures or other accidents occurring during any of these operations. After dismantling, and based on these findings, some of the components that could have been part of the original support structure were selected to be kept in the MCNB storerooms.

More details on the history of the specimen have been reported in other studies (García-Franquesa 2018).

General and Detailed Examination and Photographic Documentation of the Assembly

Visual examination of the piece showed multiple conservation concerns. The extent of damage and possible causes are listed below.

Marked accumulation of dirt (Fig. 8).—Possible causes: low maintenance and periods of poor environmental control in the exhibition area. Periodic cleaning of the piece was not carried out, partly because of the display's inaccessibility once hung from the ceiling. In addition, some bones were covered by white paint that hid layers of dirt and what appeared to be residues of oxidized animal fat (Fig. 9).

Broken arches of some cervical vertebrae.—Possible cause: improper installation system. The vertebrae are suspended on a bar that passes through the foramen, so arches must hold the weight of the entire vertebra (Fig. 10).

Fracture in the skull repaired by metal plates screwed to the bone.—Some pieces were missing. Possible cause: accident during one of the transfers (Fig. 11).

Oxide stains on the bones.—Possible causes: improper assembly materials and nonenvironmental-conditioned exhibition area. Nonstainless metal elements in the struc-

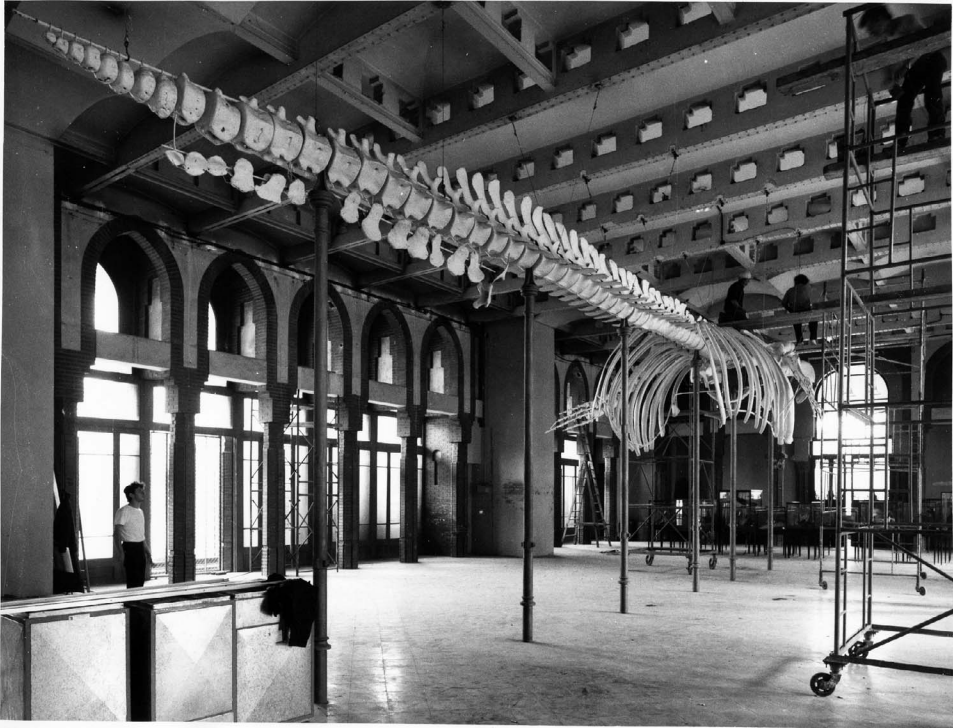


Figure 6. The piece in its third location at the Castell dels Tres Dragons, just before the skeleton was hung from the ceiling. ©Anonymous—MCNB.



Figure 7. The mounted whale looms over a temporary exhibition of the MCNB. ©J. Vidal—MCNB.



Figure 8. Accumulation of dust on the bone surface.

ture are in direct contact with the bones. Corrosion of metallic elements has been accelerated by the absence of environmental control in the exhibition area (Fig. 12).

Some small bones missing (mainly phalanges) and replaced by replicas in wood.—Possible cause: vandalism, i.e., insufficient protection against vandalism and visitors having easy access to the piece; the phalanges at the ends were within reach of the public for years.

Drawing of a Detailed Map of the Assembly

The main difficulties documenting this kind of piece lie in its large dimensions and large number of parts (Larkin 2016). The historic MCNB mounting turned out to be composed of more than 100 parts, including bones and assembly elements, extending over a length of almost 15 meters. After disassembly, a detailed osteological descriptive study of the specimen was conducted by specialists (Carrillo et al. 2014).

Figure 13 shows a low-definition, black-and-white version of the detailed digital map of the mounting drafted for this study.

CONCLUSIONS

On 11 June 1862, a fin whale stranded on a beach near Barcelona. This event marked the end of the animal's life but the beginning of its existence as a collection specimen. Examination and documentation of the old structure that held its skeleton before its replacement was essential so as not to lose information about the history of such an emblematic piece of the MCNB.



Figure 9. Dirt and oxidized fat visible through a layer of white paint at the end of a rib. ©B. Font—MCNB.

The documents, testimonies, and historical images collected provided clues about the origin and evolution of the structure of the piece.

A detailed visual examination of the mounting before the dismantling process revealed problems in preservation of bone, arising from inappropriate assembly materials and systems, and deficiencies in preventive conservation (accessibility, maintenance, environmental conditions, and air pollution).



Figure 10. Fractured cervical vertebrae (after removal). ©B. Font—MCNB.

Mapping via computer-aided design provided a precise document of the structure of the piece and its assembly systems. As in previous work, mapping allowed a higher level of analysis than the photographs, although both methods of documentation proved effective and complementary.

All graphic records of the old mounting were used, first, by the restoration team during the remedial conservation process (Val et al. 2012) and, second, by the architects as a source of information for designing a modern support system that would permit this landmark MCNB specimen to be suspended from the ceiling in its new location (Costales Calvo 2016).

The new project to dismount, transfer, and install the whale skeleton in the Fòrum Park building involved the deletion of all structural elements from the mounting and complete transformation of the piece. The study of historical documentation revealed that some of those elements as well as the shape and position in which the skeleton was mounted could be considered original, dating back from the end of the 19th century. However, significant modifications were necessary to update the design of the mounting and permit enhancement of the skeleton's educational value as a museum exhibit. The dismantling not only allowed full restoration of the skeleton, but furthermore permitted the reassembly project to include the replacement of mounting materials and configurations that examination revealed were harmful to the bone. Moreover, installation in a new exhibition area provided the opportunity to improve the general prevention measures in place to ensure conservation of the piece.

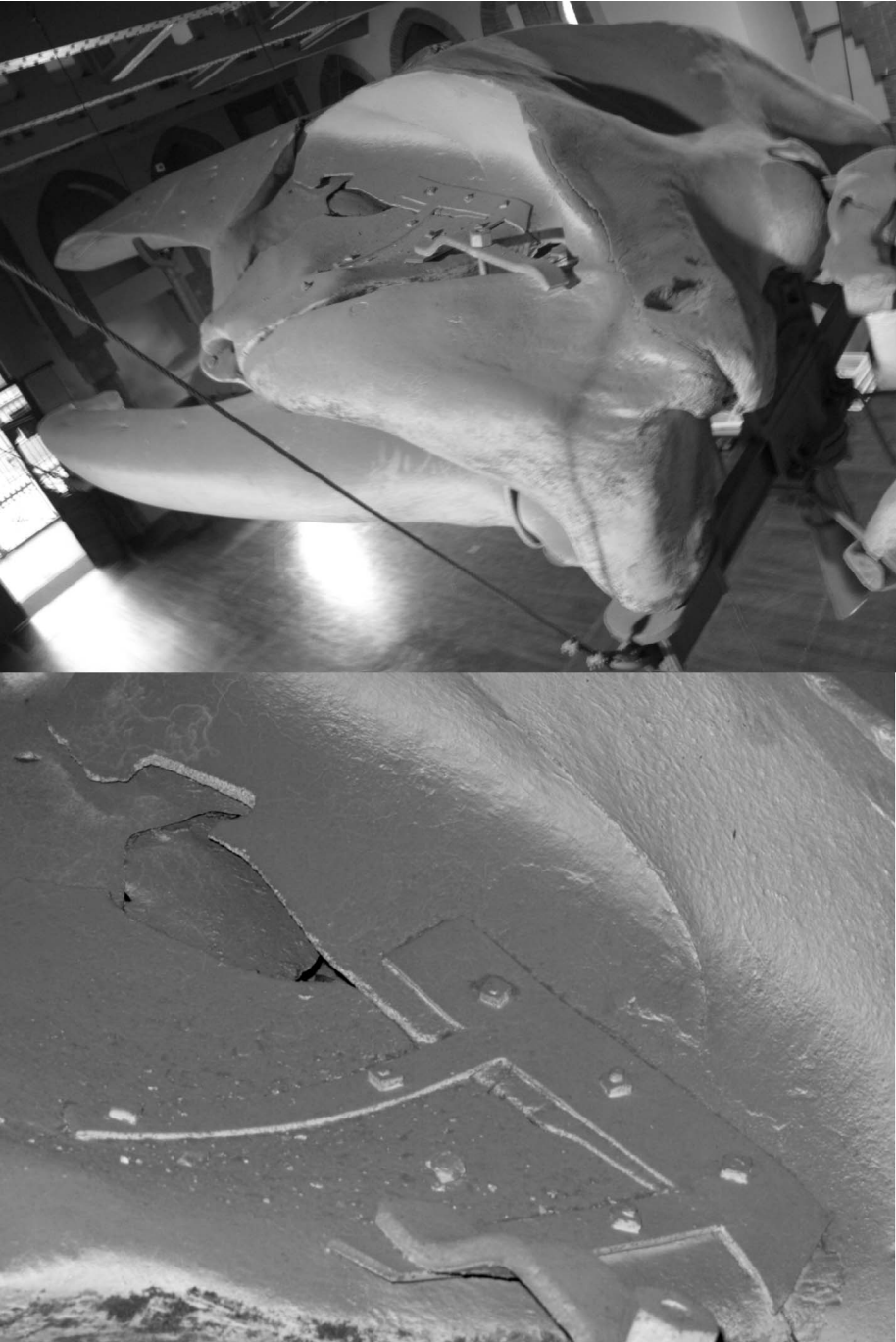


Figure 11. Overview and detail of the fracture and the repair in the cranium. ©B. Font—MCNB.

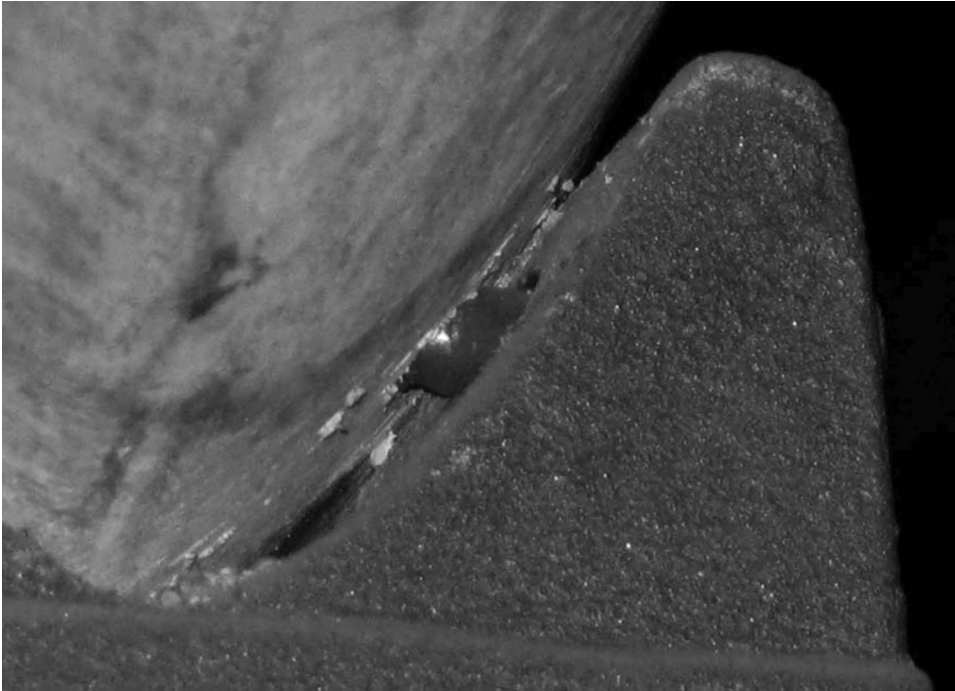


Figure 12. Oxidized iron bolt, with visible migration of the oxidation products to the bone. ©B. Font—MCNB.

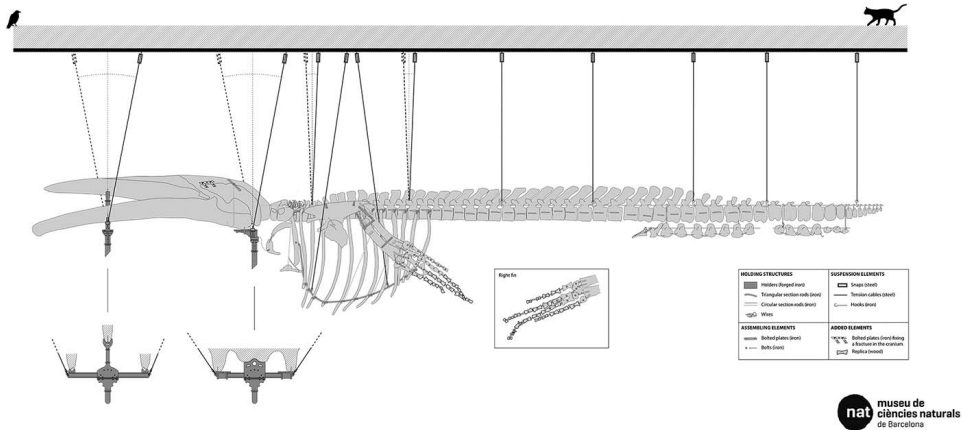


Figure 13. Elevation and detail map of the mounted skeleton documenting its position and support structure before the 2010 dismantling. ©M. Pérez—MCNB.

Efforts to maintain the delicate balance between the scientific and educational uses of natural history collections and the conservation of their heritage value are necessary (Pequignot 2016). To achieve such a balance, the MCNB’s Laboratory of Preventive Conservation and Restoration took to heart the importance of detailed and accurate documentation, an activity that is part of our ethical code, as is the dissemination of the results of our work (American Institute for Conservation 1994).

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