Journal of Natural Science Collections

Title: A whale skeleton is moved

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Source: Garcia-Franquesa, E. (2018). A whale skeleton is moved. *Journal of Natural Science Collections*, *Volume 5*, 115 - 124.

URL: http://www.natsca.org/article/2441

A whale skeleton is moved

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Received: 27/07/2017

Accepted: 29/11/2017

Citation: Garcia-Franquesa, E., 2018. A whale skeleton is moved. *Journal of Natural Science Collections,* 5, pp.115-124.

Abstract

The largest specimen in the collection of the Museu de Ciències Naturals de Barcelona (MCNB), the skeleton of a Fin Whale *Balaenoptera physalus* (MZB 83-3084), was suspended as a mounted exhibit from the ceiling of the Museum's temporary exhibition hall from 1986 onwards. However, in 2009 the MCNB was modernised and enlarged with the addition of a new building, which involved the moving of the skeleton from where it presided over the staircase of the main hall of the public entrance to the new building to be mounted as if in the act of diving. The 100-year-old bones of its skeleton were dismantled, all bones conserved, moved in mounted sections to the new building, and rehung there from the ceiling. The whole project took two years to complete and culminated in the final challenge of suspending the skeleton in its new position. In the end, the complexity of the task was far greater than we first imagined due to an unforeseen incident during the dismantling process, the great quantity of dirt and fat on the bones, and the delicate work required to position the fragile skeleton above the staircase. In order to ensure that the skeleton was safely mounted and posed no danger to visitors, numerous specialists had to be employed on the project. Greater coordination then expected was required during the work and many working days were long and highly intense. The fruitful teamwork that characterised the whole project was the key to ensuring that this much-beloved specimen continues to be displayed for visitors to enjoy.

Keywords: Fin whale, mounted skeleton, conservation treatments, transport, new location, structure

The whale skeleton in the collection of Museu de Ciències Naturals de Barcelona

Museu de Ciències Naturals de Barcelona (MCNB) possesses a mounted skeleton of an adult Fin Whale *Balaenoptera physalus* Linnaeus, 1758 (MZB 83-3084) that beached at Cap Ras (Llançà, Girona) in June 1862. The skeleton was purchased by the Rector of the University of Barcelona; its bones were prepared in the sea and then transported to Barcelona, probably by boat. The skeleton was mounted and displayed in the main hall of the University of Barcelona until its museum closed in 1917. The MCNB Board decided to acquire part of the University's collection. A carpenter dismantled the whale skeleton and transported it to the Martorell Museum, where it was remounted on a large platform supported by iron columns. Due to a lack of space, in 1923 the zoological collection of the Martorell Museum was transferred to the nearby building of the Castell dels Tres Dragons. The Museum's archives record that the skeleton was installed on the first floor of this museum in 1925. In 1947, the whale was moved onto the ground floor using a system of pulleys to lower the heaviest parts of the skeleton. In 1986, the Museum began renovation of its ground floor, and henceforth the skeleton was suspended from the ceiling. The team that carried out the reforms was led by the architect Cristian Cirici (Studio PER, Arquitectes. Pep Bonet and Cristian Cirici). From 1986 onwards, the ground floor of the Castell dels Tres Dragons was used for temporary exhibitions, presided over by the whale skeleton, and is to this day still known as the Sala de la Balena (the Hall of the Whale) (Figure 1).

The modernisation of the MCNB and its new building

In 2009, the MCNB set in motion a project aimed at modernising and enlarging the space devoted to exhibitions and other activities. The new building, designed by Herzog & de Meuron and constructed in 2004, is an original, blue-coloured triangular building, known as the Forum Building. The project to adapt this new space for use as a museum was carried out by the same architects. It was decided that the whale skeleton would be suspended above the stairs of the main entrance in a natural, eye-catching position. Herzog & de Meuron accepted the challenge of designing a new position and shape for the skeleton. Its installation in the new building was complex; it first had to be taken down from the ceiling of the Castell dels Tres Dragons, and then removed to be examined and restored, as it was not possible to work in the new building. When work on the skeleton was complete, it was returned to the Castell, ready to be moved to its new emplacement. Mounted sections of the skeleton were transported to the Forum Building and, finally, remounted over the stairs in the main entrance hall. Many different experts from a great variety of disciplines were needed to perform all the various phases of the operation.

Before being taken down, the skeleton and the structure that had supported it since 1986 were closely examined and documented. Graphic documents with drawings and photographs of the whale suspended from the ceiling were taken (Pérez et al., 2011) and incorporated into a highly valuable document describing the history of this specimen in the Museum's collection. This study revealed that the skeleton had accumulated a large amount of dirt and foreign bodies over the years, probably dating from its original emplacement, which had led to severe degradation and damage to the bones.

Figure 1. Mounted skeleton at Castell dels Tres Dragons (Barcelona) in 1986–2010. Image: © MCNB / Jordi Vidal.

Dismantling

The skeleton took a week to be dismantled, in June 2010. Scaffolding was erected, and a system of pulleys was used to take down each bone. Firstly, the joints were dismantled one-by-one, labelled and prepared for transport. On the day the cranium was to be taken down, after dismantling the hemimandibles, the support of the chondrocranium became unstable and this section of the skull broke at its most fragile point where the nasal bones and the maxilla and premaxilla bones join. The resulting collapse caused these bones to break and the condrocranium to splinter into a number of fragments (Figure 2).

Figure 2. Fragments of the maxilla and premaxilla. Image: © MCNB.

When the skeleton was completely dismantled, a fresh examination of the bones, especially of the cranium, revealed that the skeleton had in fact been painted. Also, old fractures in the cranium and a loss of bone matter were detected, and it was found that, during previous mountings, many perforations had been made in the bones of the skeleton. The accident was probably the result of a series of circumstances including the position of the cranium in its original emplacement, just a few centimetres below the ceiling, which made it impossible to observe exactly where the bones had previously been broken. In the Museum archive there was no record of any previous conservation work or treatment, or any details of previous installations. The accident caused us to reassess the objectives of the project. First of all, we discussed whether or not it was still feasible to suspend the skeleton as planned. Other proposals included suspending it in another site and the replacing of the original cranium with a replica. However, we eventually decided to continue with the original project, a decision that greatly affected how the subsequent phases of the project were carried out, given that we were aware that the difficulty and risks involved had increased significantly. When taking decisions, it was essential to ensure that the skeleton would not put visitors at risk and that the skeleton itself would be maintained intact. We employed two companies with specific expertise to take charge of the suspension of the whale from the ceiling, and all the parties involved had to dedicate more human resources to the project than initially planned.

Conservation

All the bones belonging to the skeleton were transported to the laboratory of the Catalan Institute of Palaeontology Miquel Crusafont (ICP) on the campus of the Autonomous University of Barcelona (UAB), around 20 km from the city of Barcelona. The members of this institute's conservation team had previous experience of working with the skeletons of large mammals in the MCNB collection. A platform was purpose-built to support the weight of the skull, and all the bones were labelled. We found that all the iron pieces from the previous mountings had rusted (screws, internal and external supports, and wire braces) and that pieces of wood had been used to plug holes. Pieces of old putty dating from previous restoration work were also found. Almost all of this material was removed by hand. The remains of cartilage, above all on the scapulae, were also extracted manually. Before beginning, different types of cleaning treatments were tested, and results showed that the best option was washing in warm pressurized water with a 1% neutral soap solution, followed by brushing by hand (Figure 3). The removal of the external layers of dirt, and then the paint and fat, were carried out successively without allowing the skeleton to dry in between treatments. The specimen was dried at the end of the process, in the shade in the open air and then under temperature-controlled conditions indoors. All superficial grime was removed with pressurised warm water, while the paint was removed using warm water, 1% neutral soap, water pistols and brushes. Under the paint, a thick black layer was found (Figure 4), which was removed by washing in warm water and 1% neutral soap, and using water pistols and brushes. However, the most difficult part of the restoration was the removal of the thick layers of fat, which had not been detected by the pre-restoration examination. The initial aim was to remove the fat using a sparingly applied acetone solution. In the end, a different type of treatment involving more staff had to be employed. Each bone was bathed in a 0.5% sodium hydroxide solution, with 1% neutral soap and tensoactive Teepol G (20% sodium sulphate 20%, and 25% linear alkylbenzene sulphonate acid) to eliminate the surface tension and enhance the degreasing of the inside of the bones. This alkaline solution had a pH value of 10 and helped provoke the exudation and dissolution of the lipids in the bones. Each bone was left for 3–4 days in the solution, up to three times if necessary, and five times in the case of the cranium (Figure 5). Once this process was finalized, the effects of the solution were neutralized by bathing bones in water for as many days as they had been subjected to the degreasing treatment. In the end, a pH value of 7 was reached. To avoid the spread of moulds, a Timol 0.5% solution in water was used. After all these treatments were completed, the bones were bathed in water with 15% diluted 96% alcohol. Rust stains were eliminated using 5% oxalic acid in water applied with paper tissue, and neutralized subsequently with water and tissues until a neutral pH was reached. Previously, tests with hydrogen peroxide and acetic acid were performed.

Bones were dried in specially prepared, dry, well-ventilated spaces with no direct sunlight. All bones were consolidated with vinyl resin (Mowilith-60) diluted in 5% acetone and 10% alcohol. In the end, despite the complexity of treating so many bones with such high fat content, and the sheer weight of the cranium and mandibles, the results were highly satisfactory. The conservation work was performed by seven specialists over a period of five months, under the direct supervision of the Museum staff. A full report including copious graphical material was drawn up of the whole process. Subsequently, an article has been published in a journal devoted to conservation tasks in which the different phases are explained in detail (Val et al., 2012).

Once all the bones had been cleansed, were fat-free and strengthened, the tasks of reconstructing the broken bones and putting the finishing touches to the conservation work began. Small fragments and cracks were joined using the two components of a powerful epoxy resin, ADEKIT A135. In some cases, ARALDIT 2020 was injected. The internal anchorage of the large bone fragments was performed using stainless-steel rods penetrating 8–10 cm into the bones, and ADEKIT A100 epoxy resin injected into the points of incision of these rods. Bone mass lost due to breakages and previous restoration work was replaced by an epoxy putty (NURAL 35-Pattex). The finish to the repair work was toned down so that it would be immediately recognisable. The broken part of the cranium that was restored was given a finish with a more neutral tone than the original colour, using acrylic paint on the consolidated part of the bone mass. Once the conservation tasks were over, the bones were transported back to the Castell dels Tres Dragons by the company Art% S.L, where a space was set aside for the remounting of the skeleton (Figure 6).

Figure 3. Cleaning tests with pressurized water designed to remove the black dirt under the paint. Image: © MCNB / ICP.

Figure 4. Black dirt underneath layers of paint on the skull. Image: © MCNB / ICP.

Figure 5. Elimination of the fat at the beginning of the first washing of a number of vertebrae. Image: © MCNB / ICP.

Figure 6. After conservation, the skull was transported in a custom-made box. Image: © MCNB.

Figure 7. All conserved bones were studied and labelled before being fitted together. Image: © MCNB.

Installation

The Museum sought other experienced companies to install the skeleton. There were no precedents for the installation of a skeleton of this size above the stairs of a museum entrance hall, and this part of the project was by far the most complex. In the end, the Museum opted for a multi-disciplinary team consisting of Museum staff and experts from external companies, in which all parties provided expertise in their own fields. Finally, the companies Gabinete de Estudios Ambientales (GEA) and Canarias Conservación, specialists in the assembly of skeletons, and with experience in installing whale skeletons, were chosen for the project. The companies Grop S.L. and Art% S.L., both specialists in setting up exhibitions and transporting works of art, and with long experience in working with delicate and fragile loads, were also chosen. The architects from Herzog & de Meuron, in conjunction with the structural architect Nacho Costales (Bomaimsa), designed the project and supervised the hanging of the skeleton from the ceiling above the stairs.

A team of six workers from GEA/Canarias Conservación worked in May–July 2011 on the remounting of the skeleton. First, all the bones were arranged in order in the main hall, and each was subject to detailed scrutiny (Figure 7). All the bones were studied, documented (orifices, losses, deformations, restorations, etc.) and then photographed. Next, they were weighed on a digital scale or, as in the case of the largest bones, with a digital dynamometer using a block and tackle suspended from the ceiling. Finally, all bones were measured; the results were published by Carrillo et al. (2014). The size and weight of each bone provided valuable information for manufacturing the structures that would sustain the weight and volume of the complete skeleton.

The skull

The skull was not fully mounted at the ICP, since its final appearance would depend on the nature of the structure to be used to suspend it from the ceiling. GEA used stainless steel to join the maxilla and premaxilla to the nasal and frontal bones. The fractured parts of the skull – in particular, the vomer – were reinforced with epoxy resin and glass-fibre fabric, applied over the consolidated bones. A stainless-steel rod was used to join the hyoid apparatus to the cartilage. High-density polyurethane foam was used to reconstruct the jugal bones and the left-hand ascendant maxilla process. The structures joining the skull and the jaws were made from stainless steel so that the mounting can be taken down if need be (Figure 8). In collaboration with the architects, an independent external structure for the skull was designed and built to withstand the weight of this part of the skeleton when hanging from the ceiling, and to absorb the tension in the cables supporting the specimen from the ceiling. This structure was made of stainless steel and possesses a number of rings for anchoring the cables used to suspend the skeleton. Detailed information and images can be found in Costales (2016). A temporary wheeled platform was also built, on which the skull and jaws were placed for transport to the new museum.

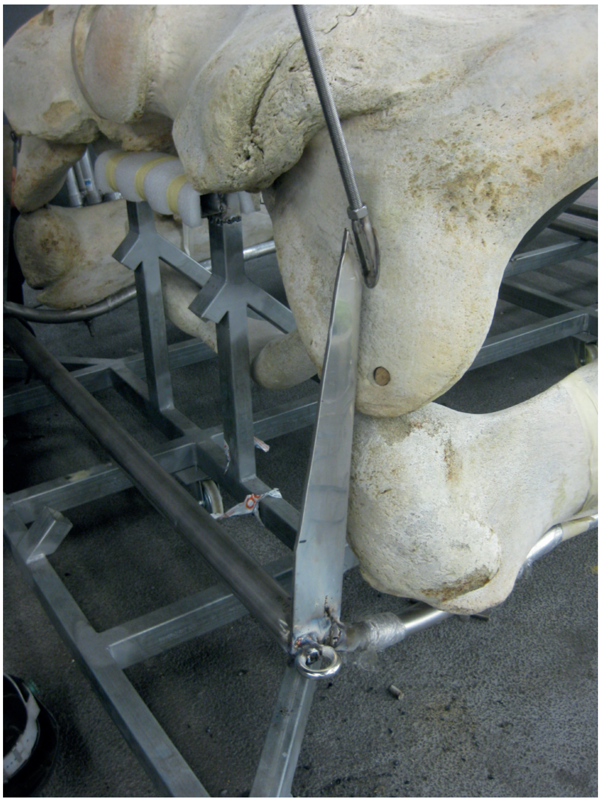

Figure 8. Joining of the cranium and mandibles with stainless-steel material. Image: © GEA.

The spinal column

The spine was split up into four sections, each with a maximum length of 4 metres, a size determined by the maximum transportable length and, above all, by the capacity of the elevator in the new building. For each of the four parts of the spine, a wheeled platform was manufactured. Holes were drilled in the central parts of all vertebrae except the atlas, with either a 47-mm- or 16-mm-diameter hole in the case of the final six caudal vertebrae. The extracted bone segments are preserved in the Museum's collection. Then, a steel tube – 44-mm wide with 2.7-mm-thick walls – was passed through all the vertebrae of the spine (Costales, 2016). A total of 50 polyurethane intervertebral discs were manufactured and placed, with protection from neutral material, between the vertebrae. This type of material is mouldable. To prevent the vertebrae rotating and to ensure that the project was reversible, the vertebrae were soldered to a tube using two stainless-steel plates (40 x 3 mm and 10-mm long) (Figure 9). Two perforations in the plates were made for two stainless-steel screws (60 x 40 mm). All the vertebrae were threaded onto the stainless-steel tube except for the final six caudal vertebrae, which were placed on a threaded rod. The anchorages for the cables suspending the spine from the ceiling of the new building were installed as follows: 10 specially made pieces were placed in the posterior part of cervical 1, in thoracic vertebrae 8 and 12, in lumbar vertebrae 5, 7 and 13, and in caudal vertebrae 3, 5, 10 and 14. Each anchorage consisted of three 16-mm threaded sections of rod, two placed in the upper part, one in the lower part, joined to the tube via a perforation and soldered together. Finally, the corresponding haemal arches were attached. The stainless-steel tube supporting the spinal column is arched to give the skeleton a more natural swimming/diving position. Four groups of cables support the steel tube to prevent any buckling (Costales, 2016).

Figure 9. Plates in the vertebrae designed to prevent movement. Image: © GEA.

The thorax

The ribs were attached to the transverse processes of the vertebrae using hooks in the bone – one at the head of each rib and the other at the far end of the process of each vertebra – that were joined by nuts, washers and security bolts. The thoracic cage has a number of built-in reinforcements: a stainless-steel plate linking the rear part of the first pair of ribs, and four steel tubes reinforcing the inside of the thorax, which guarantee that the inclination of the thoracic cage – once suspended – would not damage the steel plates.

Pectoral region

When the skeleton was dismantled, a number of fin bones fins were found to have been replaced at an unknown date by pieces of wood. Substitutes for these missing bones – replicas of the corresponding bones on the opposite fin – were made: 32 phalanges and the radial carpal bone of the left fin were manufactured from polyurethane reinforced with Eporai 450 resin. The two fins were installed with all their bones or their substitutes in the appropriate positions and attached using stainless-steel rods with screw threads, washers and bolts. The two fins were transported separately. To attach the scapulae to the thoracic cage, three holes had to be drilled in the scapulae and in the ribs. The mounting of all the bones is described in the final report prepared by GEA, illustrated with a full range of photographs depicting the details of all the materials used in each part of the skeleton.

During the mounting of the different parts of the skeleton, the design of the structure needed to support the weight of the skeleton in suspension was decided upon. The challenge was taken up by Herzog & de Meuron, the architects who had designed the Forum Building. In the end, a joint proposal for the structure was made by the specialists of all the participating companies.

Transport to the new building

Four wheeled platforms were built with nylon bearings and lifting platforms to support the mounted and immobilized skeleton. These platforms were manufactured out of tubular stainless-steel sections (like the support structures) with ISO metric 12 screw threads and fastenings. The actual transport was carried out using rigid trucks equipped with lifting platforms and isothermal chambers to guarantee the temperature and humidity conditions (T 20ºC, H.R. 50–55%) established by the Museum. The company in charge of the transport decided not to wrap up the largest and most fragile bones to allow visual checks to be made of the sections of the spinal column and skull parts.

Suspension from the ceiling

The company Art% S.L took charge of the installation of the skeleton above the stairs. Aluminium scaffolding was erected with different modules to allow for two work levels in the area between the top of the stairs and the ground level, where the entrance door from the street is located. Before installing the skeleton (but with the scaffolding already in place), vertical and horizontal movements were tested using an object with a similar volume to the whale's thoracic cage (the largest part of the skeleton) to establish the best position for the spider crane (model URW-376). Once the precise movements required had been defined, and taking into account that there would also be a highly complex system of cables, the crane was placed on a raised part of the first floor, to the left of the stairs, almost vertically in line with the final position of the skull.

The main factors that determined how the installation was carried out were the aesthetic effect required for the skeleton and the many cables it hung from, and the extreme fragility of the conservation work carried out on the skull, which was treated like any other highly delicate specimen. Of the two, the first of these factors was the most difficult to resolve. The fact that there were no completely vertical cables to take the strain of the skeleton obliged the respective companies to carry out a series of tests and trials to gauge the initial position of the thoracic cage, the part of the skeleton that was judged to be the most appropriate starting point for the whole composition. In the end, the thoracic cage moved 25 cm from its theoretical position once suspended, a displacement that was corrected so that it would hang in exactly the desired position. There was no need to alter the position of the skull once it was hung, due to the number of cables used and their more vertical positions (albeit never in fact completely vertical) compared to the cabling used for the thoracic cage (Figure 10).

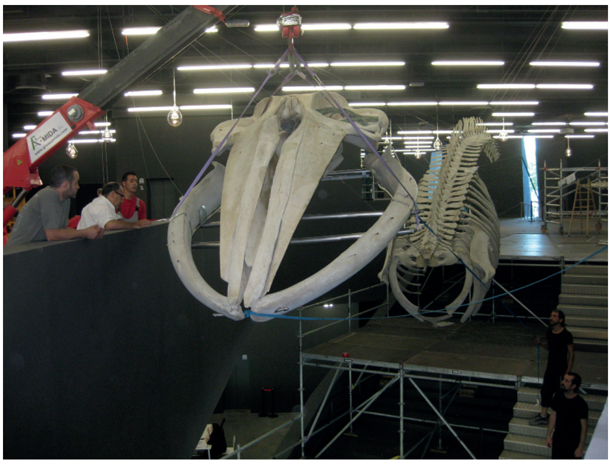

Figure 10. Skull suspended by a crane before being attached to the rest of the skeleton. Image: © MCNB.

Once the reaction of the cables to the suspension of the parts of the skeleton was understood, the remaining parts of the specimen were installed much more easily and with fewer difficulties than expected.

One of the issues that most complicated the hanging was the natural position given to the skeleton. During the pre-mounting phase, the specialists and architects had decided on a position for the skeleton that took into account the dimensions of the stairs and the final position of the whale. Any change in the initial position and inclination of the thoracic cage (the first section of the skeleton to be hung) would provoke changes in the positioning of the tail parts. Although the planned measurements were followed to the final millimetre, the flexibility of the cables (over 10-metres long in many cases) generated a problem that became noticeable as the work progressed: the natural curve of the tail meant that the skeleton almost touched the ground of the first floor; thus, the slant of the thoracic cage had to be modified. As a result, other smaller rectifications and changes in tensions to take advantage of the strength of the most vertical cables had to be implemented. Throughout the work, A4 steel was used in all the elements in the composition of the skeleton, both in the parts that joined the different sections of the skeleton and in the smaller pieces that were used elsewhere in the mounting. A Genie work platform was used to correct the attachment and position of one of the fins, due to the small change in the overall position of the skeleton. Once all these modifications were completed, a full review was carried out by the architects to check whether or not the skeleton was stable; to date, no movement has been detected. Finally, once the project had been concluded successfully (Figure 11), the new installation of the skeleton was opened to the public.

Evaluation

Some of the many reasons why a museum chooses to move a large skeleton include the opening of an exhibition, the need to study or conserve the specimen in question, or a desire to change its position (Larkin, 2016). In our case, the motive was the opening of a new MCNB building for exhibitions. The project started with the gathering of as much documentation as possible about the specimen and about similar projects. We visited the Toulouse Natural History Museum (France) on a number of occasions to gather information, and a few weeks

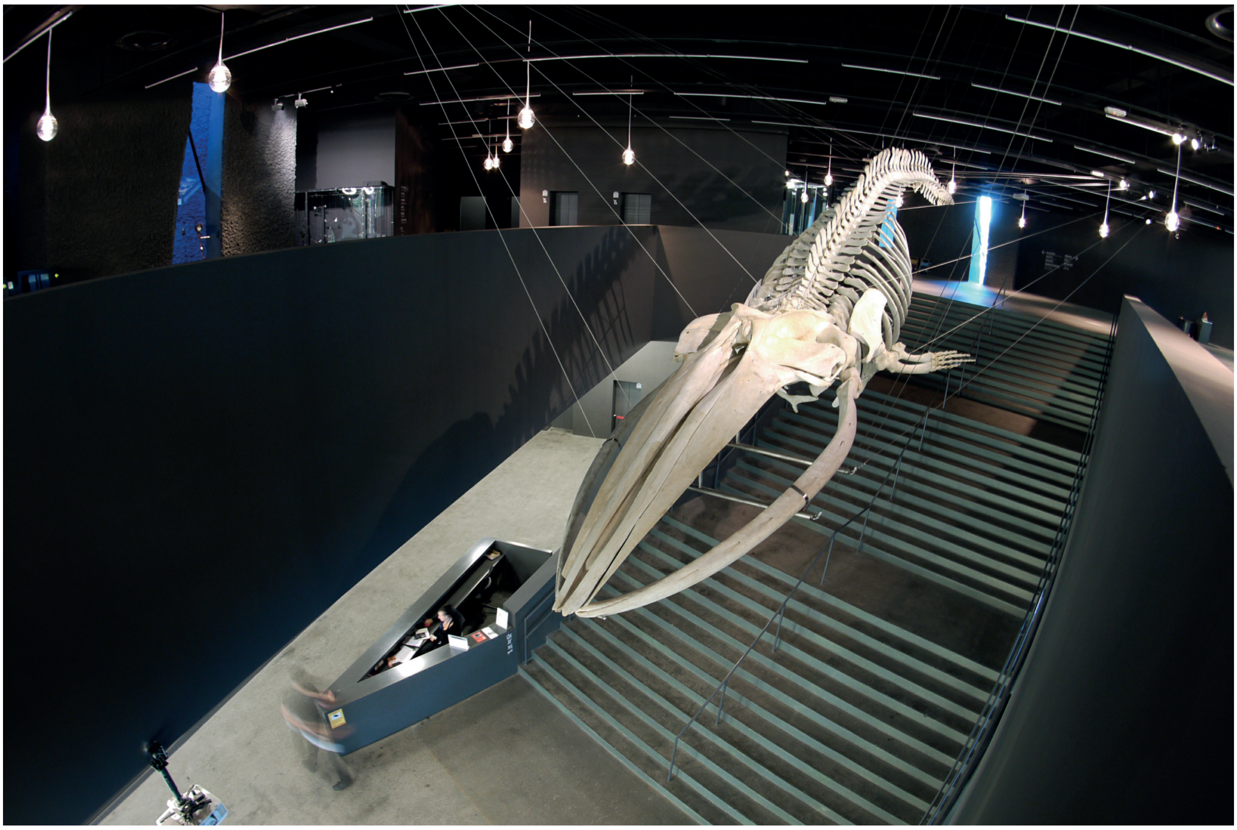

Figure 11. Skeleton exhibited from July 2011 in the Forum building. Image: © MCNB / DISE-Vicente Zambrano.

before ending work in Barcelona, museum staff were present at the mounting of a large skeleton in the Museo Nacional de Ciencias Naturales, Madrid (Spain). As well, meetings were held with the companies involved before work got underway. The fragility and the difficulty in manipulating the skeleton was evident from the very first days of the project, above all after the breakage. Thus, during the rest of the project the main goal was to avoid at all costs any further incidents, above all to the previously damaged part of the skull. The skull is undoubtedly the most fragile part of the skeleton; its large, heavy bones readily become unstable, as the centre of gravity of the whole skeleton is further forward than its geometrical centre (Costales, 2016). On occasions, the idea of abandoning the suspension of the skeleton over the stairs was mooted; nevertheless, our fears and doubts were transformed into a large dose of collective awareness of the problems, which in the end was one of the keys to its success.

The conservation-restoration team's previous experience and their enormous effort ensured the success of the work undertaken. The cleaning and degreasing techniques used were similar to those employed on other marine mammals, as described by Larkin et al. (2015). Nevertheless, although the sheer size and weight of certain bones of an adult Fin Whale pose additional difficulties, evidence of the success of the operation is perfectly visible in a visit to the Museum to view the skeleton.

The mounting of the skeleton parts and its transport to the new building were carried out without further incident. The design of the structure supporting the skeleton and the way in which it is anchored to the ceiling are novel and somewhat risky undertakings –– even so, for the architects involved, the whale skeleton is in fact a relatively light structure! The most worrisome factors that had to be taken into account were the need to ensure that the skeleton was not damaged in any other way, that all the bones were well preserved in the long term, and, above all, that visitors to the new public spaces in the Museum would not be put at risk. Thus, in the final design the cranium is supported by a metal structure that is suspended from the ceiling by steel cables. None of the individual bones are subjected to any pressure or tension from the ceiling since the whole skeleton is traversed by a tube supported by the cables welded to the ceiling. The expertise of the company – well-versed in working with highly valuable, often very fragile and voluminous works of art – that undertook the delicate task of suspending the skeleton from the ceiling was a guarantee that the most complex part of the whole operation and the handling of the skeleton would be performed correctly.

The skeleton of this Fin Whale, measuring 18.30 m in length and weighting 1,162 kg, has been on display in the MCNB since July 2011. The inauguration of the whale in its new site was marked by a press conference and the event was highlighted in many news broadcasts. The whale was a beloved feature of the previous museum and continues to be a key element in the new exhibition. The display of such an impressive and iconic specimen captures the attention immediately of visitors and is a superb way of describing its history as a museum specimen and of offering clues as to the biology of the species (Hawkins, 2006). The whole project was filmed and the museum display on the specimen includes a film-loop of the process (https://vimeo.com/55256040), which gives a good idea of the work involved and helps people appreciate more fully the work that the Museum undertakes.

Since the installation was finished, six years ago, the state of conservation of the bones and the general structure has been closely monitored. The substitution of the old metallic parts with new ones that respect the bone structures, together with the removal of the accumulated fat and rust that had never previously been carried out in this specimen (Pérez, et al., 2011), ensures that the bones are today much better conserved than ever before. The possible appearance of more fats could alter and age the materials used to adhere and conserve the bones, and render them fragile and ineffective (Val et al., 2012). Detailed monitoring will guarantee that lipids can be eliminated whenever and wherever necessary.

As a chordate curator, I was put in charge of the complex tasks of moving the largest specimen in our collection – at that time suspended from the Museum ceiling – from one position to another. Obviously, my training as a biologist was not suitable for designing such a project and putting it into practice. In the Museum we had some experience of restoring large skeletons and of mounting small skeletons, and had also set up a preventative conservation laboratory a few years previously. The project began with a team of experts in various fields but this changed overnight after the breaking of part of the cranium. Henceforth, we had to focus on finalizing the project and avoiding any further damage to the skeleton. All the care and common sense that I used from the beginning was not enough to prevent the breakage. If I ever have to undertake a similar project, I would lengthen the preparatory phase, keep an even closer watch over the whole project, and work with experts right from the start of the project. Many lessons were learnt during the project, which all involved recall as a period of great intensity interspersed with numerous unforgettable moments. The installation of the skeleton in its new home was a positive experience for many people and the proof of its success, the result of the keen eyes of architects, restorers and biologists, is there for all to see.

Acknowledgements

I would like to thank all those who participated in project during the two long years that it lasted: the Museum staff, the Catalan Institute of Palaeontology, the Gabinete de Estudios Ambientales (GEA)-Canarias Conservación, Art% S.L, GROP S.L and the architects of Herzog & De Meuron and BOMAINPASA. Without their personal and professional dedication and commitment, and their enjoyment of the challenges posed, the project would not have been a success. Thanks are also due to Jordi Segura and Nacho Costales for their help with the writing of this article, and to the two anonymous reviewers whose comments helped make significant improvements to the text.

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