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Niks Aan-Spare Ribs: An interactive exhibition about skeletons

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Vertebrate skeletons are both important and frequent exhibits in natural history museums and sometimes in zoos (Tunnicliffe and Yonally, 1999). However, little has been written about the response of visitors to them and how museums endeavour to engage the visitors in what the skeletons can 'tell' them. Skeletons, particularly the human one, are studied in school from the earliest years and people build up a mental model of them. Moreover, knowledge of the composition of the vertebrate skeleton plateaus at a specific level amongst the public in which they know of bone units such as the ribs and the leg bones and have a vague idea of the overall pattern (Tunnicliffe and Reiss, 1999). Tunnicliffe (1998) found that visitors recognised the animal from which the skeleton came and referred to it as such.

Niks Aan - an interactive exhibition about skeletons

On July 29th the exhibition Spare Ribs (Niks Aans in Dutch) was opened at the National Museum of Natural History, Naturalis, in Leiden, the Netherlands. In this exhibition, the museum uses about 400 outstanding specimens of their skeletal collection to explain in a playful and understandable way the relationship between the skeleton and locomotion.

Of course, there are many ways to show such an enormous diversity of skeletons to the museum visitors. An obvious method would be a systematic approach, arranging all skeletons of the five classes of vertebrates according to order and family. Naturalis has used this taxonomic approach in their

permanent exhibition 'Nature's Theatre' about present day diversity of life. For the skeleton exhibition, a storyline was used in order to explain processes that cause diversity in vertebrate skeletons. Since there is a strong relationship between the shape of the skeleton and locomotion, the exhibition team decided to arrange the skeletons according to different ways of locomotion. As a result, the diversity of skeletons was reduced to a number of basic skeleton shapes that correlate with locomotion types. A terrestrial animal for example, has to push itself off the ground in order to move forward, whereas, an aquatic animal has to have a streamlined body shape in order to reduce the turbulence of the water.

The next step in the exhibition design was to relate the adaptations of the skeleton to locomotion and translate this into a drawing of a simplified skeleton, the so-called 'prototype' that illustrated these characteristics. Also, the prototype had to illustrate the fact that the morphology of the skeleton of all vertebrates is generally the same. In every prototype the different parts that play a role in locomotion, the forelimbs, hind limbs, backbone, pelvic girdle and shoulder girdle, were given a particular colour. The graphic design of the simplified skeletons was carried out using similar shaped blocks and bars, without unnecessary detail. The result was a set of thirteen different, cheerfully coloured animal skeletons that seem to have run away from a toyshop.

For every locomotive type a certain animal species that matched the typical characteristics of the relationship between skeleton and locomotion was chosen as a model in order to create the prototype. In this way the dog was the model for the locomotion type 'walkers: quadrupeds' (figure 1); the pigeon for the 'flyers' (figure 2); the perch for the 'swimmers: fish' (figure 3), etc. The development of the prototypes was carried out in cooperation with the University of Leiden (biology, department ethological morphology).

The thirteen prototypes were built as small three-dimensional models and were shown in an exhibit with the real skeletons of the animals. The exhibit explained, in a simple

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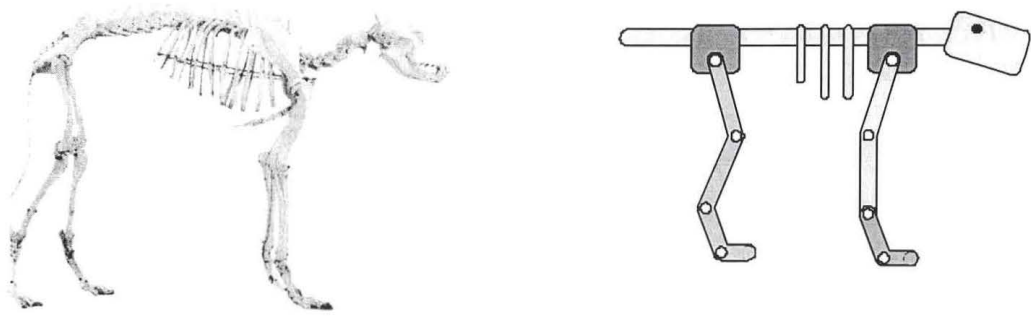


Figure 1 The dog was used as the prototypes for the quadrupeds

tortelduif



Figure 2 The pigeon was used as the prototypes for the flyers



Figure 3 The perch was used as the prototype for swimmers

way, the adaptations of the skeleton to different ways of locomotion.

In the rest of the exhibition, skeletons of animals that have similar ways of locomotion are grouped together. Each group can be recognized by a drawing of the prototype that represents a certain way of locomotion. With a so called 'pointer bone' (a cast of a bone of a dog or baboon), that can be collected at the entrance of the exhibition, the visitor can touch the coloured parts in the drawing of the prototype. When touched, the corresponding

bones in the skeletons in the exhibit are lit up by numerous small lights. In this way, the similarity of skeletons between animals that share the same way of locomotion, becomes clear at a glance.

Besides animal locomotion, there was also an exhibit about locomotion in humans. Form and function of the human skeleton is explained by a number of interactive exhibits about joints and muscles and an X-ray film of a moving human skeleton. A computer puzzle about the human skeleton, using different

bones to create a complete skeleton, is very popular with all visitors: young as well as old. An impressive wall of about twenty metres in length, decorated with about 200 animal skulls, completed this exhibition about bones and skeletons. The skulls were systematically arranged: mammals, birds, reptiles, amphibians and fish were grouped together. Within each group, the skulls were arranged according to food preference. At the mammal section, the visitor could find information about the adaptation of the skull (especially the teeth) to food preference. The wall with skulls comprised two interactive games that could be played with the pointer bones mentioned above. The dog game showed which skull belonged to which dog breed. The bird game showed the relation between human tools and the way different bird species used their bill. Finally, the visitors could test the knowledge they gained from visiting the skeleton exhibition by playing different computer games. Pictures of skeletons shown at the exhibition were to be categorised according to locomotion type in as few turns as possible. In the same way, the visitors were invited to categorise pictures of animal skulls according to food preference (carnivore, herbivore or omnivore). The memory game was about recognizing pictures of different animal species: the challenge to visitors was in how many turns could they you collect all pairs?

The gallery was quite dark creating a mystical atmosphere. The use of 'black light', which is frequently used in discos, added to this. The awe and wonder with which some visitors viewed the results of the interactives were very noticeable. Each interactive part of the skeleton is colour coded so that all the skeleton labels have the same colours but the overall arrangement is different according to the locomotory mode of the group, bipedal walkers for example have long hind limbs whilst wrigglers have no limbs. The dim lighting made it very difficult to read information labels and any other labels. Also the text type size was rather small, but had the font size been increased more of the glass would have been covered with text. The labels were in Dutch and in English.

The Response of Visitors

The Research

The museum was interested in the responses of the visitors to the skeleton exhibit in particular and whether the zoological messages of the exhibition were received and understood by the visitors. It was decided to carry out two pieces of work. First of all to video and record the conversations of visitors looking at the skeletons. Secondly to interview visitors before and after they visited the exhibition with an emphasis on form and function of the skeletons.

Videoing was carried out opposite the skeleton of an elephant and next to a case of 'flyers'. This location was chosen because there was an alcove in which the researcher (SDT) could sit with the video camera and not impede the flow of visitors. Visitors were also asked, in Dutch, by a visitor studies student to fill in questionnaire. The analysis of this was intended to elicit whether visitors had, firstly, understood and, secondly, found out new information from the exhibitions. The questionnaires would also indicate how much the public responded positively to the exhibition. The response to the questionnaire is reported elsewhere (Tunnicliffe and Laterveer -de Beer, submitted). Thirdly, the museum, hoped to find out how successful the advertising and other activities about the exhibit, Niks Aan, had been. Additionally, observations of visitors were planned to find out how long they stayed in the exhibition and which routes around the exhibition they chose for themselves.

The conversations at the exhibits were recorded on video and were subsequently translated. There were 42 audible conversations. The content of these conversations are reported elsewhere (Tunnicliffe and Laterveer -de Beer submitted). Each incident was watched and re-watched until the behaviour was clear and this was recorded. The different behaviours were read and re-read and grouped into different categories. Twenty-nine visitors were observed in the exhibition over seven hours. Over ten hours were spent videoing singletons

or groups of visitors looking at the exhibits.

Visitors overall responses to the exhibition

The average length of stay was 20 minutes. A number of visitors were not comfortable with the level of lighting.

Use of the Bone Accessory

Visitors responded in a variety of ways to the potential interaction. Some visitors' had no bone and just walked past the skeletons glancing as they passed. Others with no bone stood and looked and even tried to press the labels with their finger, we suspect modelling behaviour observed in other visitors' with bones. Those visitors with bones displayed a variety of behaviours, and some visitors' employed several. They did not use their bone and frequently the interactive bones were reported not to work. Of the visitors observed, 82% picked up a bone at some point in their visit and 65% did so at once.

There were 61 videoed encounters at exhibits containing skeletons. Of these 19 were families, 5 adult singletons, 19 two or more adults and 12 children alone. Of these 37 used a bone, 7 used something else such as a pencil finger or a torch. Five people used the bone as a pointer and 12 used nothing.

The different actions of visitors were noted and totalled. Visitors used the bones in a variety of ways other than that for which they were designed. The variety of uses were as follows:

- 'Touchers and walkers' lightly tapping the label as they walked past
- Scribblers - visitors just 'scribbled with the bone on the label surface' without any meaning and if they lit up a skeleton it was a bonus, this was more a control need approach because it was possible to make the lights work. Often these visitors were working alone. Some visitors tried to light up every light. Others were content with one set illuminated.
- Controlled touchers carefully touched a part of the label and lit up a part.
- Extensive touchers systematically lit up one

part after another either at random or in a planned controlled manner.

- Teachers - usually an adult with a child. More than one person pointed at the label and the skeleton and planned the lighting of the exhibits.

In summary visitors ignored, looked, touched and focused their interactions. Some visitors did all 4 responses and some varied their response at different exhibits.

Conclusions

Interactive resources for involving visitors with exhibits provide a means of bringing visitors into closer contact both physically and in 'minds on' terms. However, the interaction resource itself can become the exhibit and the main focus. Visitors do not know what is expected of them when they enter a gallery and, unless the instructions or information about interactive opportunities and the means of achieving this, are very prominently and carefully displayed, the visitors are likely to miss the information. Hence the missing of this vital information from the point of view of the curator's gives the opportunity for visitors to make up their own interactions as they progress around the exhibit or to realise they have missed out on something provided when they have started viewing.

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