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## Taxidermy of large specimens at the Muséum national d'Histoire naturelle (MNHN)

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### Abstract

Mankind has long known how to process animal hides, but taxidermy is a more recent art. It arose from the scientific requirements of natural history collectors in the 18th century. Its techniques benefited from the advance of the natural sciences and the development of new materials. Jack Thiney describes how mounting a large specimen is achieved today.

### Key words

Taxidermy, mounting, large specimens, model

### History

The history of taxidermy and the history of the *Muséum national d'Histoire naturelle* (French National Natural History Museum) are closely bound up with each other. The first attempts at mounting large mammals were made when the *Muséum* was still known as the King's Garden. The bluebuck (*Hippotragus leucophaeus*), now on display in the Extinct Species Gallery, is one such example. This specimen, whose originator and date

of assembly are unknown to us, dates from before the founding of the *Muséum* (10 June 1793). It is the most ancient large specimen known to us.

On 23 September 1793, an Indian rhinoceros, dissected by Mertrud and Vicq d'Azir, was mounted. The diagrams showing the wooden structure on which the hide was placed may still be seen in the *Muséum* central library. It is the first example of mounting on a rigid cast (known as a mannequin). A few years later, in 1798, a quagga (*Equus quagga quagga*) was mounted. Its hide was placed on a previously carved solid wooden mannequin. This animal, like the Indian rhinoceros, came originally from the royal menagerie at Versailles and was relocated to the *Muséum's* newly created menagerie (1794), where it died.

From then on, taxidermy took on even greater challenges. In 1817, an Asian elephant was mounted. Lassaigue, a mechanic employed in the King's Garden (Louis XVIII), erected a wooden framework on which the hide was placed. The fame of this elephant was augmented when a banquet for 21 guests took place inside it, as testified to by contemporary lithographs.

A new milestone was passed when in 1820 Delalande used a metal structure to mount a giraffe brought back from the Cape by the naturalist and explorer Levillant. Another came in 1840, when Poortman and Lassaingne constructed the mannequin of another giraffe from a wooden figure. Poortman also built a model out of clay to implement the taxidermy of a gorilla. This, to my knowledge, was the first time a plastic model prior to the mounting was used. Subsequently, many specimens were mounted by preserving the animal's skeleton. Clumps of straw tied with string were then attached to the skeleton to represent the muscles.

For the inauguration of the Zoology Gallery on 21 June 1889, the taxidermist Jules Terrier used a combination of existing techniques and added something completely new: modelling plaster. By using this material for taxidermy he was able to improve quality and rendering in modelling the muscular masses.

The importance Terrier attached to anatomy and research on how animals move made him a model for his successors. What's more, his contribution to the Zoology Gallery was impressive: elephant, giraffe, buffalo and more, which can be admired today in the atrium of the *Grande Galerie de l'Evolution*. Together with the taxidermist A. Quentin, he was the originator of a particularly successful diorama, staging a lioness and a scimitar oryx, very much in the style of the wildlife painters of the time. Boudarel, Terrier's pupil, succeeded him. To him we owe a book on taxidermy *L'Art de la taxidermie au XXe siècle* as well as a highly sculptural white rhinoceros, that can still be seen

today in the *Grande Galerie de l'Evolution*.

Nowadays, natural history museums are breaking new ground; bold design, leading-edge technologies and innovative techniques combine to give us a new museology. Naturally enough, the taxidermy of large specimens is also participating in these developments. Our concerns are twofold. On the one hand there are aesthetic considerations; a matter of viewing the profession as a form of animal sculpture and of adopting an appropriate fabrication protocol. On the other hand there are technical considerations, to ensure that the heritage item has a quality and durability consistent with today's museological requirements.

## Requisite preliminary research

### *Bibliography*

Knowing everything about the animal concerned is essential. Naturalist guides, journals and encyclopaedias are sources to be carefully consulted so that the animal's behaviour, habits, geographical distribution and systematic classification become familiar.

### *Iconography*

Any photographs of the subject are of value. Even if we have the good fortune to find a representation of the animal in the position it will be mounted, we will still need to have shots taken from varied angles.

Video is a valuable auxiliary resource for the taxidermist. It enables us to view the animal in movement. As well as commercially available pre-recorded footage, we can supplement any missing images by filming in zoos and animal parks. A VCR fitted with a jog-shuttle will allow

postures to be specified and will be particularly useful for studying “walking” postures.

#### ***Live observation***

While photography and film are a great help, they only give us two-dimensional images, not the real thing. Seeing animals directly, by allowing the observer to memorize volumes in three dimensions, provides an opportunity to correct the misleading effects of some photographic records.

Making rough sketches from real life, as well as being an unsurpassed means of investigation, also can suggest the idea of new postures. We should also here mention two books that are essential readings for all animal artists: *An Atlas of Animal Anatomy for Artists* by W. Ellenberger, and Volume 3 of *Animal locomotion* by Eadweard Muybridge.

### **Taking measurements**

Every time the occasion arises, one should take advantage of the opportunity to take measurements. These will enable an exact model to be made, and will facilitate the construction of the final mannequin.

#### ***Measurements before skinning***

Some reference points will disappear when the skin is removed. It is therefore important to retain a record of these. Using sketches together with measurements, it is useful to note the placement of the ears, eyes and nose, both face on and in profile. In the case of an ungulate, the hooves will remain attached to the skin when this

is removed. It is therefore necessary to make a series of measurements of the front and back legs with the hooves. It will also be useful to make a note of any features relating to the skin; the position of any significant spots or stripes, variations in the coat (for sheep), manes, etc.

#### ***Measurements after skinning***

The record is supplemented with information about the *écorché*. These measurements should be based on the fixed points of the skeleton; for the thoracic cage, the first and last ribs; for the pelvis, the ilium and ischium. But any measurement taken from pectoral girdle can give rise to errors, since this is mobile. The same applies to the vertebral column.

#### ***Measurements on the skeleton***

These usefully complement the other kinds of measurements. It is sometimes a great help to be able to pinpoint the skeleton, when this is surrounded by a thick layer of fat, as for the pinnepedians (seals, etc.), or to have the exact dimensions of the cranium or limbs. For the latter, frontal and side views are required.

### **Skinning**

This operation should be carried out very carefully. Remember that all subsequent operations depend on the care with which this is done. The incisions will possibly be made according to the position in which the specimen will be mounted. The aim is that the stitches made subsequently should be as invisible as possible<sup>①</sup>.

<sup>①</sup> The skeleton is kept in the comparative anatomy laboratory or in the mammals and birds zoology laboratory. Certain organs may be relocated to other laboratories depending on research in progress (parasitology, for example).

## Tanning

When the taxidermist is dealing with specimens of large size, he will need to call on the services of a tanner. Only this specialist, by bringing his experience and know-how to bear on the hide<sup>①</sup>, will be able to obtain an optimal tanning quality. Such quality (fineness of leather, homogeneity of processing, suppleness) will facilitate the positioning of the skin, will allow better stitching, and will stop shrinkage (the specimen will become almost completely impervious to variations in hygrometry). The final effect will be extremely lifelike; the appearance of the fur, its volume and lustre will all benefit.

However, we take care to establish what tanning procedure is being used and to draw up a full list of the chemicals used. Such information could be vital in the event of DNA amplification work being attempted. This technique has been successfully deployed on our bluebuck (*Hippotragus leucophaeus*) from skin samples taken from the specimen by South African researchers. Thus thanks to genetic studies, the systematic classification of an animal has been established almost two centuries after its extinction.

## An essential preliminary: the model

This is essential for mounting a large mammal. A model has to be made on a reduced scale from that of the mannequin to be subsequently constructed. The scale should be

chosen according to the size of the specimen: if it's too small, the details will be unclear, and if it's too large it will entail unnecessarily time-consuming work. A suitable scale for a wolf or leopard, for example, would be 1 : 5, for a tiger or oryx 1 : 6, for a zebra 1 : 8 and for a buffalo 1 : 10.

A model has a number of advantages. On the one hand, by prefiguring the final mannequin, it enables us to visualize the animal in three dimensions. The measurements we have are those of a dead animal, and we have to represent the animal in movement. We will therefore need to interpret these measurements. The model allows us to establish whether our interpretations are well-founded and to appraise the effect produced. We can, at our leisure, change the position of a foot, say, or raise the height of the withers or extend the neck, and so on. By showing the model to a specialist, we can use his or her advice to correct any possible mistakes before starting to construct the final mannequin.

Then on the other hand, a model allows us to work with the exhibit designer; the imaginary placing of the animal in a spatial setting, positioning it as part of a group, etc. The position can thus be chosen jointly with the designer according to the various constraints.

### *Making the model*

The first task is to choose the reduction scale. On the basis of this, the silhouette of the body and head are cut out from thin plywood.

<sup>①</sup> The tanner receives the fleshless, salted hide (with the lips and ears opened out).

The limbs, neck and tail are made out of steel wire. We take care that the reduction scale is strictly adhered to during these operations.

When these parts have been properly assembled, the whole structure is placed on a base equipped with a bracket so that the height can be adjusted.

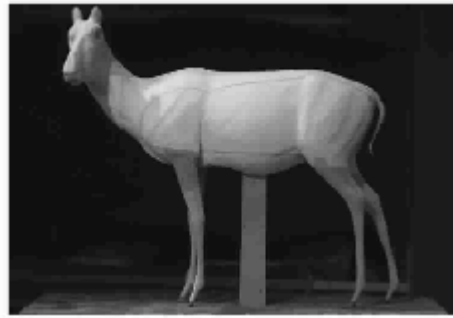
The volumes are created by means of "plastiline". This modelling clay, which doesn't dry out, is very convenient to use, since we want to have a model that can be easily altered.

When the work on the model is sufficiently advanced, a visit to the zoo may prove to be extremely useful. Nothing replaces direct observation of the animal, especially if one is able to see it move and so get the benefit of viewing it from different angles.

#### **The mannequin**

This is the life-size sculpture of the animal, on which the skin will be placed. The previously constructed model serves as the basis for making it. All that has to be done now is to scale up by the appropriate amount the dimensions of the model to obtain our life-size mannequin. We construct the mannequin in the same way as the model. The plywood should be of sufficient thickness, and the steel wire of the model is replaced by screw thread. The volumes can be created using polystyrene or polyurethane foam<sup>①</sup>. A density of 25 to 30 kg/m<sup>3</sup> is required. These materials, by virtue of being light, are very easy to work with. They can be cut using heated wire or an electric handsaw, and can be

sculpted by means of a knife, wood rasp or metal brush, and finally sanded down with glasspaper.



**Fig. 1. An example of mannequin, the life-size sculpture of an animal.**

#### ***Stratification of the mannequin***

While polystyrene and polyurethane foam offer many advantages, they also have their drawbacks. Apart from being relatively weak mechanically, doubts exist as to their long-term durability (chemical stability). They are also extremely sensitive to solvents, especially acetone. For these various reasons, it becomes necessary to stratify the mannequins before fitting the skin. Should this precaution not be taken, we would risk seeing our heritage suffer at some future date.

The principle of stratification is simple; it is a matter of applying a layer of epoxy resin to the mannequin, that is compatible with polystyrene (Resosurf 815, for example), and reinforcing it with glass fabric (preferable to glass mat), the density of which is chosen according to the strength required (from 50 g/m<sup>2</sup> to 500 g/m<sup>2</sup>). Further layers can be superimposed if this proves to be necessary. However, one must take care

<sup>①</sup> Fireproof polystyrene exists but is very expensive.

that this operation does not alter the definition of the mannequin. All data relating to the materials used are carefully inventoried. The brand, chemical composition and specification sheet are requested from the supplier so as to facilitate any subsequent operations on the specimen; cleaning, treatment with insecticide, restoration, etc. Accordingly, a system of digital archiving was set up in the *Muséum's* Conservation and Collection Department, under the supervision of the curator, Jacques Maigret.

### Fitting the skin

This operation is greatly facilitated if, upstream, the tanning has been done carefully. A soft, supple skin is easy to stitch using a half-moon needle and small diameter thread, and can be easily positioned on the mannequin, especially if a heavy paper glue (such as Quelyd glue) is used.

### Specific features and applications of taxidermy

The specificity of taxidermy lies in two key processes; on the one hand, the removal of the skin and its preservation, which ensures the scientific integrity of the specimen; and on the other, the modelling and sculpture, involving the reconstruction of a volume, the “mannequin”, which will receive the skin.

There is, however, a demand too for the representation of animals (e. g. Cetacea (whales) and Sirenia (sea cows)), whose size and the nature of their skin make them difficult to treat in this way. In such cases, the taxidermist can implement a fabrication protocol

similar to that used for the large mammals; measurements taken on the skeleton, making the model and then constructing the mannequin, with the difference that here the integument is absent, which will need to be compensated for by possibly painting the mannequin.

By exploiting his wildlife competences, the taxidermist can usefully find an extension to his profession by designing models or facsimiles of extinct species, the skin of which we will never have seen. In leaving us his superb dodo, has not Jules Terrier shown us the way?

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### 作者简介

Jack Thiney, 男, 1967 年加入法国国家自然史博物馆工作, 任藏品部动物标本剥制师, 法国国家自然史博物馆一等设计师。

# 法国国家自然史博物馆的 大型动物标本剥制术

Jack Thiney

## 摘要

人类很早以前就知道如何处理动物皮革,但是动物标本剥制术却是一门较新的艺术。它源于18世纪博物收集者的科学需要,其技术的发展得益于自然科学的进步以及新材料的发展。本文作

者阐述了制作现代大型动物标本的过程和方法。

## 关键词

动物标本剥制术 安装支撑 大型动物标本 模型

## 上海科技馆信息

### ● 南非古人类化石模型捐赠上海科技馆

9月30日晚,在世博会南非馆内举行的“南非馆旅游及遗产主题月闭幕式”上,南非科技部副部长德里克·哈内科姆将南非最著名的古人类化石模型捐赠给上海科技馆,上海科技馆馆长王小明接受了这一珍贵礼物。它将成为正在建设中的上海自然博物馆新馆展品之一。

南非斯托克方丹地区是世界上最多产和最重要的古人类遗址之一,被称为“人类的摇篮”,绝大多数早期人类化石是在那里发现的。此次捐赠的化石模型包括著名的“非洲南方古猿种化石”,其中之一是1924年发现于南非西北省内的“汤恩头骨化石”,它是人类发现的第一个南方古猿化石。该化石的发现确立了达尔文关于人类起源于非洲的观点。

### ● 华夏虎啸巡展在泰国隆重开幕

华夏虎啸展是我馆为今年的农历虎年精心策划的生肖系列展之一。继该展在本馆和南京科技馆展出后,5月,上海科技馆与泰国国家科技馆签订了友好合作备忘录,该展览成为第一个走出我馆、面向全国,走向世界的特色巡展。9月14日《华夏虎啸》开幕仪式在泰国国家科技馆位于曼谷市中心的科技广场隆重举行。泰国科技部部长李天文博士、中国驻泰国大使管木先生、泰国国家科技馆总馆长披猜·宋成先生和上海科技馆顾建生副馆长等出席了开幕式。泰方总馆长在看到逼真的老虎等标本展品后,已明确向上海科技馆提出延展3个月的请求,并获得我方的同意。

张小澜 编辑