

National Museum of American History, Behring Center
Preservation Services
Conservation Report

Object: Anatomical Model, Male
Collection: Medical Sciences
Acc. #1984.573
Date: September 29, 1999
Cat. #: 1984.573.1
Treated By: Richard Barden

DESCRIPTION

This is a papier-mâché anatomical model of the male figure, dated 1852. The exterior of the figure reveals the muscular structure of the body. The model stands with its weight on the right leg, arms at the side, and head tilted slightly down and to the right. The head, chest, abdomen, proper left arm, leg, and foot contain 28 removable sections. This model does not have genitalia. The figure is supported at the proper right heel by a threaded ferrous (steel?) rod screwed into a cast copper alloy (brass?) base. The model swivels 360 degrees around the base.

Dimensions Overall: 25 3/4"(H) x 7 1/4"(W) x 6"(D).

EXAMINATION

Examination was performed visually, with a binocular microscope and with x-radiography.

CONSTRUCTION

Examination of the area of the right foot's missing large toe reveals a ferrous (steel?) armature surrounded by what looks like a gray paper pulp that makes up most of the bulk of the body. The pulp appears to have a filler made of granular particles and short fibers. The pulp is surrounded by sheets of brown paper. This paper holds the shape of the model and is the support for the ground, paint, and varnish layers. The paper sheets appear to be covered with a white or pink ground layer. On top of the ground is the paint layer containing the details of the anatomical model. The arteries and veins are attached on top of the painted layers. There is a clear varnish layer on top of the paint.

X-radiographic examination reveals the model's internal structure: the placement, shape, and length of the armature; the fact that the arms were made separately from the body and attached by screws; and the construction method of the arteries and veins.

The arteries and veins are made of bundles of stranded wire wrapped in painted fibrous paper. The vessels are shaped into their appropriate position and held in place by ferrous brads. To branch out and thin the arteries and veins, several strands were separated from the main bundle and placed in their appropriate position. To thin the veins even more, some of the strands were cut and removed.

Visually, the ends of the armature can be seen at the tip of each toe of the right foot. The area of the missing thumb and middle finger from the proper left hand does not have an armature. X-radiography shows that each digit of the hands and feet has its own wire armature. But this wire

is not attached to any other section of the armature. This method of construction led to the loss of some of the digits of this model. The supporting leg of this model has a steel rod that goes from the bottom of the foot into the hip.

The x-radiographs were taken at 80Kv, 5mA for 180 seconds.

CONDITION

There have been no previous restoration or conservation treatments of this artifact. Structure: The model is not structurally sound. The proper left arm is cracked below the shoulder and just above the biceps. The lower section of this arm is loose and beginning to separate from the shoulder. The proper left leg is cracked from its top at the groin to the lower section of the hip. This leg is loose and beginning to separate from the body.

The model is missing the thumb and middle finger from the proper left hand. The index finger is cracked at the phalange, misaligned, and separating from the rest of the hand. The large toe of the proper right foot is missing. The rest of the toes on the right foot are cracked at the head of the phalanges and are loose. The big toe on the proper left foot is cracked at the head of the phalanges, is misaligned, and is separating from the rest of the foot.

The top removable sections of the skull, chest, left arm, and leg are misaligned and do not appear to fit into their original configuration. The sections of the calf and forearm are loose and seem easily separated from the rest of the model. The removable sections are kept in place by a system of ferrous pins and copper alloy sleeves, with the most exterior sections held in place with the addition of hooks and eyes.

Surface The entire exterior surface is covered with ingrained dirt and grime. The surfaces of all removable sections are covered with loose dirt and grime. There is a crackle pattern with flaking and lifting that varies from mild to severe on the exterior surface and on minor areas of the interior removable sections. The flaking is severe on the lower section of the back and on the front of the proper right shank. On numerous small areas, the painted layers are partially or completely missing. The top varnish layer has discolored to a tan or brown color in several small areas.

TREATMENT

Purpose of Treatment To prepare for display in the showcase exhibition *Artificial Anatomy: Papier-Mâché Anatomical Models*.

Treatment Proposal

1. Remove or reduce dirt and grime using mild organic solvents or the gentlest mechanical means necessary.
2. Secure the lower section of the proper left arm and the proper left leg with an appropriately strong, reversible adhesive.
3. Consolidate and set down the lifting and flaking paint and varnishes using a light-fast, reversible adhesive and gentle mechanical methods.

Treatment Report

1. The following solvents were tested to determine the best method for removing or reducing

the surface dirt: room-temperature distilled water; distilled water with ammonia pH 8.3 and 10.5; spittle; ethanol; ethanol: distilled water 1:1; acetone; acetone: ethanol 1:1; petroleum benzine; and toluene.

Distilled water, spittle, and distilled water with ammonia pH 10.5 were chosen for cleaning because they removed the dirt and grime most effectively. Water was especially effective. But water at room temperature caused the varnish to soften and swell. This softening and swelling would cause distortions and possible losses of the varnish. To prevent any distortions or losses, ice water was tested. This test indicated that the ice water could be used because it slows down the swelling process and allows the surfaces to be cleaned with very little or no softening or swelling. When the varnish began to swell, cleaning of that area stopped until it was dry. Then cleaning resumed. Where the dirt was more tenacious, such as on the chest, a detergent solution¹ was used. All areas where spittle, ammonia water, or the detergent solution were used were then cleaned with distilled ice water to remove any remaining residue.

2. The lower section of the proper left arm and the proper left leg were secured to the main section of the model with hide glue². To obtain the proper alignment, the model was laid on its back with weights placed on and around it to hold it in position. Wood clamps were secured to the table. Cotton twill tape was wrapped around the arm and then pulled until the proper alignment for the arm was reached. The tape was then tied off onto the handles of the clamps. This process was repeated for the leg.

3. Gelatin³ was used to consolidate the thinner lifting and flaking areas. Hide glue was used to consolidate the thicker lifting and flaking areas. A heated spatula (120_-130_ C) was used to soften the lifted areas and to assist in setting down the flakes. Silicone Mylar was used as a barrier. At times, just water and a heated spatula were enough to set down lifted areas.

PHOTODOCUMENTATION

Color slides were taken before, during, and after treatment.

¹Detergent solution consists of two drops of Orvus liquid in 75ml of distilled water. Orvus is a modified ammonium lauryl sulfate, a pH neutral synthetic detergent. Distributed by Conservation Materials, Sparks, Nev. U.S.A.

²Granular hide glue from Nicholson & Co. Cambridge, Mass. Was mixed with an equal amount of distilled water.

³Gelatin from Fisher Scientific, USA, was mixed with equal amount of distilled water.