Chapter 11

TRADITIONAL AFRICAN WOOD ARTEFACT PRESERVATION BY IONIZING RADIATION

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11.1. INTRODUCTION

Formed over five decades, the Ivani and Jorge Yunes Collection is a precious artistic and bibliographic collection that spans 23 centuries and five continents.

The Ivani and Jorge Yunes Collection is diverse. Items include paintings — old masters, European, French and Italian paintings, and Brazilian and international modern paintings — and sculptures, drawings, prints as well as Asian, African, colonial Brazilian and Latin American art. It also includes sacred art, tankards, icons, ivories, silver, furniture and decorative art. Its library brings together mostly Brazilian publications, including first editions and rare periodicals.

The collection also includes examples of traditional African art, primarily artworks created on the basis of the visual aesthetics in force on the African continent during the nineteenth and early twentieth centuries, the period of European colonization. Like European art, African objects are diverse in terms of culture, function and aesthetics. Artworks include terracotta, funerary urns, masks, statues, weapons, jewellery, musical instruments, everyday objects, busts and art from the Benin court, representing African ethnic groups from Central Africa — Angola, Cameroon and the Democratic Republic of the Congo — and from West Africa — mainly from Côte d'Ivoire, Ghana, Mali and Nigeria [11.1].

In 2021, 1700 items from this private collection were donated to the Oscar Niemeyer Museum in Curitiba, Brazil. The arrival of this collection marked a significant milestone for the institution, expanding its non-Eurocentric focus with the inclusion of the African artworks. The Oscar Niemeyer Museum is the largest art museum in Latin America, covering 35 000 square metres, and currently houses more than 9300 objects in its collection.

During the cataloguing process of the artworks, the presence of termites and woodboring insects was detected, and the conservators discussed possible measures to mitigate this issue. Initially, the collection managers considered

the possibility of treating the affected objects with pesticides, as some objects in the collection had already been treated with such chemicals in the past. A comprehensive evaluation of the available alternatives led to this option being rejected, as treatments with chemicals can damage organic objects by fading colours, staining and causing textile fibres to become excessively rigid and brittle, among other undesirable effects [11.2]. In addition, the handling of objects that have been treated with pesticides can cause health problems.

Since gamma irradiation is a safe and non-toxic method, it is an important alternative for sustainable conservation practices [11.3]. The Multipurpose Gamma Irradiation Facility at IPEN in São Paulo had already been used for disinfestation of many kinds of cultural heritage materials made of paper, wood, leather, textiles, feathers and other materials [11.4], with many ethnographic objects from the collections of the Museu Afro Brasil and the Museum of Archaeology and Ethnology of the University of São Paulo, for example, being treated.

11.2. PREPARATION OF THE TREATMENT

Around 1500 wooden items from the Ivani and Jorge Yunes Collection that had been contaminated by insects were packed in special boxes and sent to the Radiation Technology Centre at IPEN in accordance with the established protocol [11.5]. The collection's staff were advised on what type of packaging could be used and how the objects were to be delivered for treatment at IPEN. The team selected objects with active infestations after a conservation assessment was undertaken. A list of the selected objects was created with information relevant to their identification (Fig. 11.1). Because radiation doses are cumulative, it is important for conservators to keep a record of radiation treatments with ionizing radiation.

FIG. 11.1. Selection of items to be treated with gamma radiation.

The objects were packed in rigid plastic boxes and protected with bubble wrap. The collection's team members were responsible for transporting the items to IPEN. The irradiation facility has an area for loading and unloading materials, where the boxes were received and stored (Fig. 11.2).

The decontamination process took 15 days owing to the number of artefacts to be treated (Fig. 11.3). For the effective elimination of woodworm and adult insects, a radiation absorbed dose in the range 2–3 kGy was applied, since insect larvae may not be eliminated by smaller doses. The measured values were recorded in the final dosimetry report.

FIG. 11.2. Receipt of boxed items at the Nuclear and Energy Research Institute's irradiation facility.

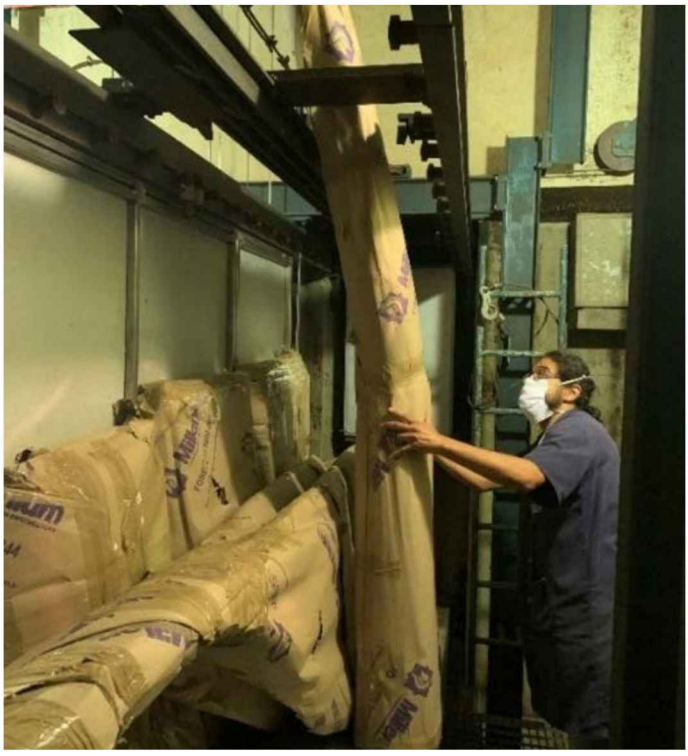

FIG. 11.3. Items of various sizes collected from inside the irradiation chamber.

11.3. AFTER THE TREATMENT

Following their treatment with ionizing radiation, the artworks were cleaned and restored, where necessary [11.6]. All stages of the treatment were documented and monitored by conservators, and information on the work done is stored in the records of the Oscar Niemeyer Museum.

After the treatment was completed, some of the objects were selected to be included in the *Africa, Artistic Expressions of a Continent* exhibition at the Oscar Niemeyer Museum (Fig. 11.4) — works of art that were previously part of a private collection can now be seen by the public.

In order to keep the collection in a good condition, the Oscar Niemeyer Museum will continue to implement good preventive practices, such as pest and climate control in its storage and exhibition areas. Since treated materials do not become radioactive, a new infestation may occur if objects are returned to a vulnerable environment [11.7], hence preventive conservation measures will be needed.

FIG. 11.4. Exhibition of artworks at the Oscar Niemeyer Museum.

11.4. CONCLUSIONS

Collections of cultural and historical significance often face biological degradation from insects and fungi owing to inappropriate storage conditions. When these attacks spread within collections, prompt action becomes essential in order to eradicate contamination and prevent the loss of valuable objects.

The use of gamma radiation for treatment provides a rapid and effective solution, ensuring the disinfestation and disinfection of materials. This method poses no danger during handling and produces no toxic residues, prioritizing the safety of people and the environment.

Collaborative partnerships with cultural institutions play a pivotal role in utilizing ionizing radiation technology to contribute to the preservation of cultural heritage materials.

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