

# Conservation of 19<sup>th</sup> Century Botanical Teaching Aids at the University of Tartu

Anne Arus, University of Tartu Art Museum

The University of Tartu Natural History Museum is one of the oldest museums in Estonia and houses extensive collections of historical teaching aids. Teaching aids for four plants required treatment in preparation for the museum's new permanent exhibition. The botanical models were produced around 1866–1875 by the company of a German model-maker Robert Brendel (c. 1821–1875). This presentation describes the models' origin, condition and conservation.

## Robert Brendel's Botanical Models

Robert Brendel began producing botanical models in 1866 in Breslau. From 1875 to 1898, he conducted his business in Berlin.

Brendel's models were made of a variety of basic, affordable and durable materials: *papier-mâché*, wood, cloth, horsehair, silk thread, rattan, glass and bone glue beads, feathers, gelatine, plaster and wire. The models featured removable sections to give a better overview of plant structure. Brendel's models were considered botanically accurate and efficient teaching aids. The scale of the models, highly enlarged compared to the actual size of the plants, allowed even the finest details invisible to the naked eye to be represented clearly.

The models were quick to attract interest at various exhibitions<sup>1</sup> and were purchased by many education institutions around the world. After Robert Brendel's death in 1898, his son took over the business and moved the model production to Grünewald.

The models have lost their popularity as teaching aids, but they still are valued as objects illustrating the development of the history of science. One of the largest Brendel model conservation projects in recent history took place at the University of Florence in Italy, which houses a 168-piece collection of his botanical models<sup>2</sup>. The project was a collaborative effort by various specialists: a curator, botanist, paper and object conservator. An increasing number of Brendel model collections are being made available online (Digitale Collectie Nederland, National Museums Liverpool, Universitätsammlungen in Deutschland, Utrecht Altijd etc.<sup>3</sup>).

## Brendel Models at the University of Tartu

The earliest known records of Brendel models can be found in an inventory book of the University of Tartu Botanical Gardens dating from 1921<sup>4</sup>. There are 36 records in total. In 2014–2015 I treated six botanical models. The remaining 30 are partially preserved with only fragments left of some. The collection also includes four models that resemble Brendel's but lack a company label and have a different construction and stands.

Most models in Tartu date from Brendel's Breslau period 1866–1875 as is evident from the fruitwood stands and information on the labels. The later models made in Berlin feature wooden stands covered with black lacquer<sup>5</sup>. The models from Brendel's earlier Breslau period are considered rare today.

The current research cannot determine when the University of Tartu acquired the models. It is possible that they were ordered by the director of the Botanical Gardens, Professor Heinrich Moritz Willkomm (UT professor 1868–1874). Willkomm founded a botanical museum in Tartu and supplied it with various teaching collections. His overview of the history of the University of Tartu Botanical Gardens (1873) includes a detailed description of the collections, which also mentions models of flowers, fruit and mushrooms<sup>6</sup>.

## Conservation

The objective of conservation was to ensure the models' preservation and suitability for display. The models had to be cleaned of dirt that had accumulated over decades. Loose details needed to be fixed and the visual integrity restored. In total, nine models on six separate stands required treatment: blue monk's hood (*Aconitum napellus*), water horsetail (*Equisetum limosum*, five models on three stands), Scots pine cone (*Pinus sylvestris*, two models on one stand) and common meadow-grass (*Poa pratensis*).

The models were made of various materials (*papier-mâché*, pressed cardboard, paper, wood, cork, rattan, gesso, plaster, wire, bone glue, horsehair, feathers, cloth) and painted. The models were worn, their fastenings loose and several details broken or missing. They were very dirty and covered in a thick layer of dust.

All models were cleaned using cotton buds and 2.5% tri-ammonium citrate solution in water and the loose paint layer was fixed with 25% Acronal 500D solution in water. The surfaces were primed with powdered chalk and 16% Acronal 500D solution in water. While repairing broken, loose and missing parts, I used materials that were as close as possible to original: paper pulp, Japanese paper, cork, gesso, chalk and bone glue. I restored missing parts only when I had the opportunity to make a cast of a similar detail.

All repairs were tinted with Winsor & Newton watercolours. Finally, the models were coated with extra-fine water-soluble retouching varnish by Lefranc & Bourgeois. The original paint of the models is not water-soluble, and the varnish as well as all additions made to restore the visual integrity can be removed with water.

All wooden support stands were in satisfactory condition. The original stand of the blue monk's hood model had been lost and replaced with a stand from another model. The stands were cleaned using distilled water and cotton buds and the tears and missing parts of the labels repaired with methyl cellulose and paper pulp. All repairs were painted with Winsor & Newton watercolours.

## Conclusion

The conserved and restored botanical models are displayed as part of the new permanent exhibition at the University of Tartu Natural History Museum (2016). The remaining botanical models still require treatment and are waiting for their time and new opportunities. Hopefully, this presentation will be of help in drawing attention to the University's valuable historical collections.

<sup>1</sup> F. Cohn. Ueber naturwissenschaftliche Lehrmittel für Schulen. Bericht über die Thätigkeit der Botanischen Section der Schlesischen Gesellschaft für Vaterländische Kultur (Breslau, 1873), 13.

<sup>2</sup> Graziana Fiorini, Luana Maekawa, Peter Stiberc. Save the Plants: Conservation of Brendel Anatomical Botany Models. The Book and Paper Group Annual 27 (2008)

<sup>3</sup> [http://data.collectienederland.nl/search/?qf=edm\\_dataProvider%3AMuseon&qf=nave\\_material%3Apapierach%C3%83%C2%A9&q=&page=1](http://data.collectienederland.nl/search/?qf=edm_dataProvider%3AMuseon&qf=nave_material%3Apapierach%C3%83%C2%A9&q=&page=1) (25.10.2016),

<http://www.liverpoolmuseums.org.uk/wml/collections/botany/plant-models/search.aspx?type=q&page=1&terms=brendel> (25.10.2016),

<http://www.universitaetsammlungen.de/search/volltext?fulltext=brendel> (25.10.2016),

<http://www.utrechtaltijd.nl/bekijken/zoek/?Q=brendel&All=true> (25.10.2016)

<sup>4</sup> National Archives of Estonia, 2100.12.144. Inventory of the University of Tartu Botanical Gardens (1919–1930). Archive research by Kristiina Tiideberg.

<sup>5</sup> Die Sammlungen an der Universität Wien, Objekt des Monats Juli 2014: Blütenmodell von *Aconitum napellus* (Blauer Eisenhut), [http://bibliothek.univie.ac.at/sammlungen/objekt\\_des\\_monats/009424.html](http://bibliothek.univie.ac.at/sammlungen/objekt_des_monats/009424.html) (25.10.2016)

<sup>6</sup> H. M. Willkomm. Der Botanische Garten der Kaiserlichen Univesität Dorpat (Dorpat, 1873), 42.



Blue monk's hood (*Aconitum napellus*).



Water horsetail (*Equisetum limosum*).



Scots pine cone (*Pinus sylvestris*).



Common meadow-grass (*Poa pratensis*).



Common meadow-grass, Scots pine cone and water horsetail after conservation.



Blue monk's hood after conservation.