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Master-Thesis in Conservation-Restoration

STUDY AND CHOSEN RESTORATION OF TEN ELECTROSTATIC MACHINES FROM THE RIJKSMUSEUM BOERHAAVE IN LEIDEN

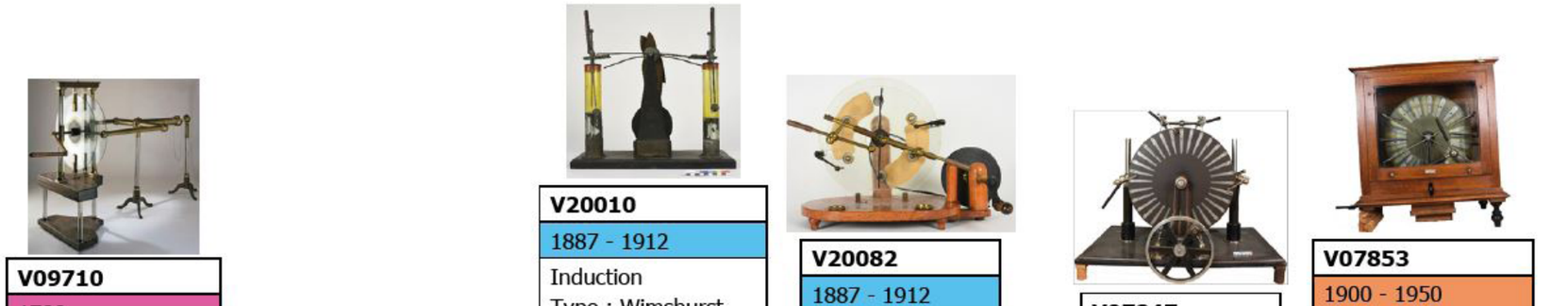

Fig. 1 : Time line with the ten studied electrostic machines. © Mathilde Sneiders, HE-Arc CR and National Museum Boerhaave, Leiden, 2022.

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SUMMARY

This thesis includes the study and restoration of a corpus of electrostatic machines from the Rijksmuseum Boerhaave in Leiden. From a conservation-restoration point of view, these electrostatic machines are very interesting. Ten scientific instruments were selected in the collection to have a good overview of the existing models. They have many constituent materials.

The study consists mainly of the documentation of the materials (wood, glass, brass, hard rubber, etc.), alterations, and questions about the functioning of the machines. Research was carried out in relation to the manufacturers and the materials present. It contributes to a better dating of the objects.

Some major or significant alterations could be highlighted and linked to this type of object : crystals on the hard rubber, corrosion between the metal and the hard rubber, corrosion of the metallic parts (brass, nickel, tin), falling of the tin foil of the sectors or Leiden jars

A treatment proposal was established for these mentioned alterations that seem important to treat. The restoration treatments were carried out on three electrostatic machines representative of these alterations : V20010, V20082, V07853. The main objectives were to stabilise the degradations and permit the manipulation of the objects.

STUDY

The detailed study includes an explanation of the functioning of two important models encountered : friction models and induction models. At times, the differences and developments between the composition of the models can be highlighted. Some machines date from the end of the 18th century (the oldest being from 1788) to around 1950. A concentration is remarkable around 1900. The three more recent apparatuses are not precisely dated, a range is given between 1900 and 1950. Depending on the dating and the results of the analyses, the identification of the materials could be more precise for these composite objects.

CONSERVATION-RESTORATION

The condition report of each ten machines gives a good overview of specific alteration that can be seen. The restoration treatments were carried out on three objects : V20010, V20082, V07853. The main alterations could be observed and identified on them.

The steps of the restoration were : dust removal ; dismantling of the apparatuses ; removal of old lubricants ; removal of the crystals on hard rubber elements (on V20082) ; removal of the corrosion products between the brass and the hard rubber elements (on V20082) ; removal of the corrosion products of the nickel-plated brass (on V20010) ; fixing of the glass (two broken discs and a broken Leiden jar) and of the tin foils coming off the Leiden jars (on V07853).

With the treatment carried out, a better stability of the constituent materials could be achieved. In addition, the visual appearance is either more uniform or more coherent with the original one.

CONCLUSION

The results of this Master's thesis provide a good first overview of these electrostatic machines. Not all the information they contain has yet been revealed. Some questions remain about some objects' particularities or elements' material. The study and treatment carried out in this thesis is a beginning.

Other lines of research can be deepened, particularly concerning certain alterations and possible conservation-restoration treatments. For example : the question of corroded nickel ferrous alloys ; the question of hard rubber and its non-uniform lightening after treatment ; the blistering phenomenon on tin elements (on sectors and Leiden jars).

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