Simon Le Noir Project update

The Simon Le Noir project was the subject of a note in *Antiquarian Horology* of June 2022 and is related to the study of an early pendulum clock signed by Simon Le Noir which may be one of the oldest pendulum clocks made in France. A first article on this subject was published in the journal *Horlogerie Ancienne* in May 2022, and the writing of a comprehensive *memorandum* was initiated.

Since this initial work, several technical and scientific studies have been carried out to check the authenticity of the mechanism. Numerous parts were analysed by X-ray fluorescence spectroscopy with the scanning electron microscope of the LGPM (*Laboratoire de Génie des Procédés et des Matériaux*) of CentraleSupélec (Fig. 1, left). These analyses allowed to classify and cluster the pieces of brass from which the various parts of the mechanism were made, according to their relative concentrations of copper and zinc (Fig. 1, right). These chemical compositions were compared with data on seventeenth-century brass from the literature and proved that the mechanism is consistent with its alleged period of manufacture. The gilding of certain parts has been also analysed and traces of mercury were identified, which are typical witnesses of the fire-gilding process in use at that time. Finally, some impurities and corrosion products were analysed ; it was thus possible to understand the conditions under which the mechanism was preserved over the last few decades, which provides essential information on its recent history, before its rediscovery in 2020. This work led to a lecture delivered to the AFAHA members on 4 December 2022. A scientific publication is currently being written.

In parallel, three parts of the mechanism were also scanned by X-ray tomography with the help of the LMPS (*Laboratoire de Mécanique Paris-Saclay*) of the Paris-Saclay Univerity. These high-resolution scans made it possible to look inside the material and, in particular, to examine specific bushes that are assumed to be from Le Noir's hand.

Finally, thanks to the support of the Arithmeum of Bonn University, a complete scan of the clock was carried out by Zeiss with the latest generation tomographs (Fig. 2). This scan will allow a deeper analysis of the mechanism, especially by looking at how certain assemblies were made and by measuring the dimensions of numerous parts invisible from the outside.

All the data related to these studies (spectroscopy and tomography) as well as the associated documents and analyses - especially the lecture of December 2022 - are, or will be, updated on the website of the project: https://agomand.github.io/asln/en/

A very significant progress has also been made concerning the historical part of the project. Indeed, two nineteenth-century documents mentioning Le Noir's clock have been found; they describe the clock when it was still complete, before the mechanism was separated from its case. These descriptions, combined with additional technical and historical analyses, seem to confirm the proposed dating of the mechanism to no later than 1658 and highlight its uniqueness. They also provide information on the previous owners of the clock and help to explain some of the technical peculiarities that were noted in the first analyses. These discoveries are the subject of an article to be published in the journal *Horlogerie Ancienne* in May 2023, accessible on the project website. The *memorandum* will also be updated accordingly.

Several other analyses, both technical and historical, are still ongoing. I welcome any suggestion, comment or hypotheses.

Augustin Gomand
augustin.gomand@laposte.net

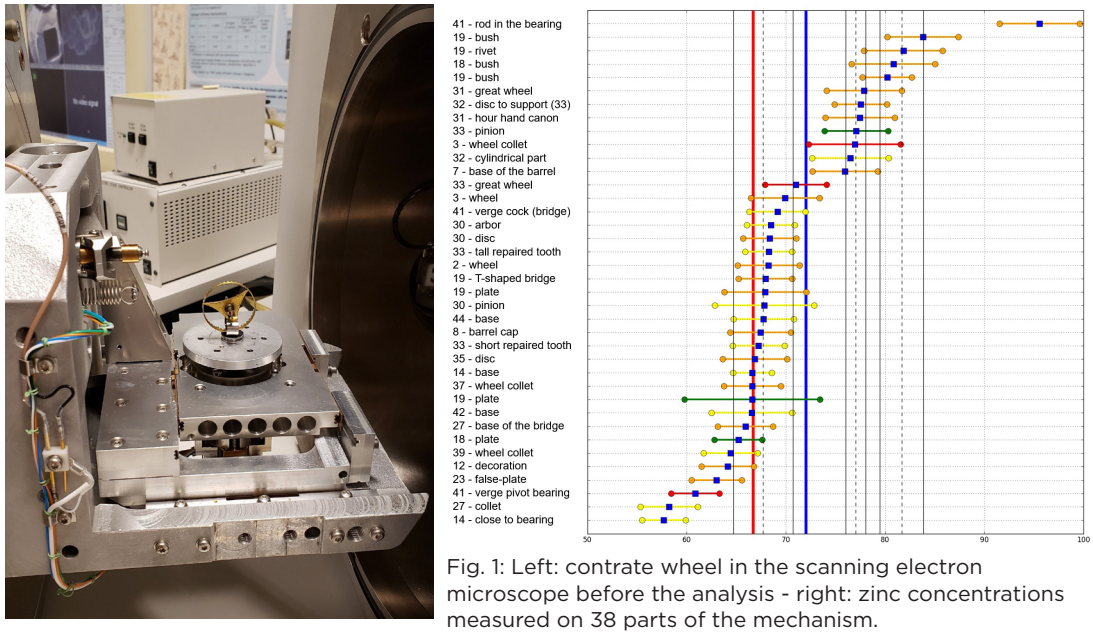

Fig. 1: Left: contrate wheel in the scanning electron microscope before the analysis - right: zinc concentrations measured on 38 parts of the mechanism.

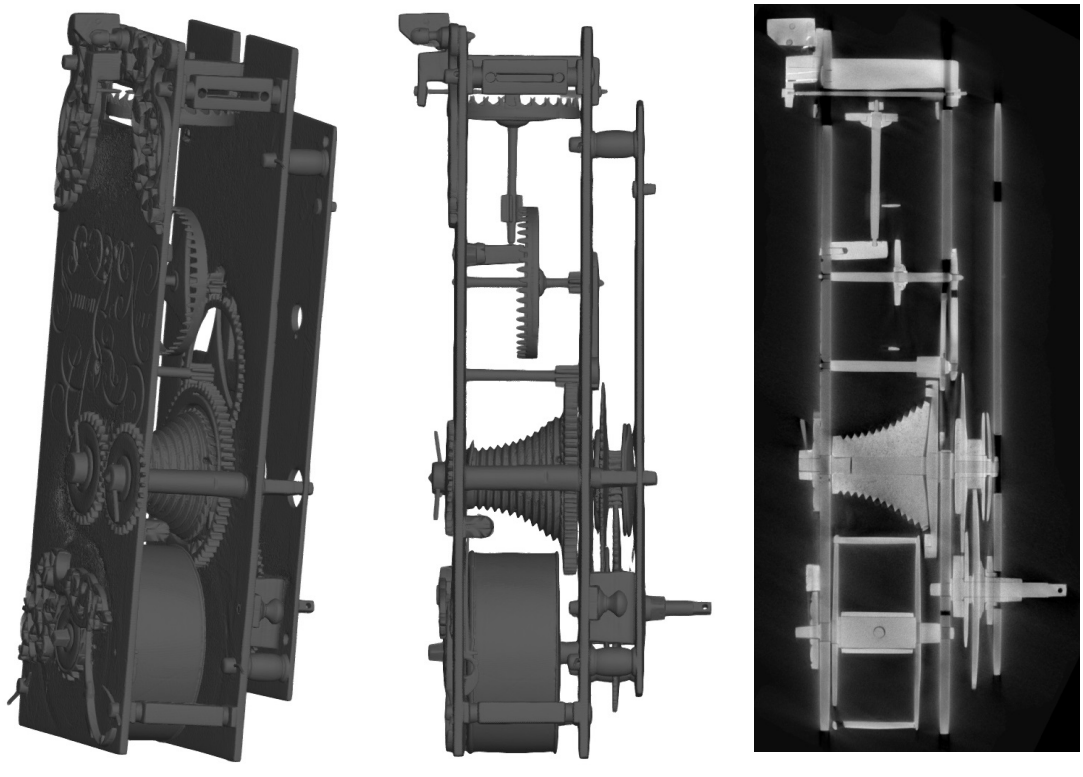

Fig. 2: Left and centre: 3D reconstruction of the mechanism by Zeiss tomography - right: cut-view of the mechanism.