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This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1526392> since 2015-10-13T11:13:10Z

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THE ART AND SCIENCE OF THE REDISCOVERY OF A NINETEEN-CENTURY RECORDER

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Introduction

The decline of the recorder after its baroque golden age has been thoroughly analyzed by musicologists and organologists. Far less studied is its persistency in the later musical culture. Recorder collections contain a relevant number of instruments dated from the last decades of the 18th century and well into the 19th century, documenting this persistency and adaptation to the new musical needs [Macmillan, 2008].

In some cases, the late popularity of the recorder has been a regional circumstance, like in the case of the Viennese Csakan or of some instruments for popular or military music in the Americas. Some other late recorders are unique and extravagant pieces which can be regarded as experiments or unsuccessful adaptations. However, we also find in the collections a fair number of "traditional" late recorders, some of which of very fine craftsmanship, which document a minor but diffuse use, eventually also professional.

One of these is the remarkable Noblet alto recorder of the Bate Collection of Musical Instruments in Oxford (collection #328).



Figure 1: The original instrument

This paper describes the process of making a modern copy of the instrument. The original instrument is not in good playing condition and mounts a low quality block (a consumable and interchangeable part in recorders). What should then a "copy" of this instrument be? We describe a complex process including, measurements, evaluation and tentative "reverse engineering" of wood deformation, and some artistic choices which

had to be made in order to obtain a musically meaningful result.

Methods

The original instrument was manually measured to an accuracy of about 0.05mm. Deformation of round parts was assumed elliptic and measurements refer to the principal axes. A digital CAD model of the instrument was made, reducing elliptic sections to round average sections. The resulting model displayed apparent deformations which were analyzed and compared to modern construction standards (see discussion). In particular, a marked decrease in the bore diameter was observed in regions of the bore where the wood was cut perpendicular to the grain direction and at the same time likely exposed to high humidity fluctuations. A refined "reverse deformed" model was made, and used as the basis for the construction of a first set of copies. Fabrication of the block required some artistic decision, since a copy of the ancient block would have surely led to a poor performance of the instrument. The difficult decision was taken to build the block according to today's knowledge, adapting it to the instrument body in order to produce the best sound and playability, as evaluated by renowned professional musicians. Fingering patterns of the original instrument were determined by the same musicians taking into account historical practice and playability, and the copies were tuned accordingly.

Results

The first set of copies, comprising three instruments, is shown in Fig.2. The instruments are naturally tuned at A= 430Hz, very close to the original pitch. They are playable in the usual recorder range two octaves and a third (F'-A'''), producing a very distinctive clear timbre, relatively different from the typical baroque recorder sound. The instruments have a quick and flexible response which makes them apt to playing technically

complex music. They have been used in public concerts to perform duets and trios by W.A. Mozart and F. Devienne.



Figure 2: The first set of three copies.

Discussion

The process of copying an ancient instrument described above rises a number of questions both from the scientific and artistic points of view. The purpose of the copy was not only to preserve an object belonging to cultural heritage, but also to revive a “lost” cultural element, i.e. the sound of the instrument. This required the reconstruction of a fully functional instrument. Most features of the instrument were faithfully reproduced by the physical copy and by educated scientific guesses concerning the effect of ageing and usage on the wood. The latter could be further improved by the use of FEM simulations in future studies. In fact, it seems today feasible, although not immediately available, a simulation methodology in which permanent shrinkage is predicted according to either simulated or measured humidity distribution in the instrument, and in turn used to predict the effect on the final shape of the instrument surface. However, some details of the instrument, namely the so called “voicing” areas, had to be re-invented in order to build a functional instrument (and no simulation can overcome this lack of information). This was done according to the principle of “best fit” of the voicing to the instrument body.

The result is remarkable in several respects. Firstly, the fact that the reconstructed instrument present the correct pitch and tuning confirms that the choices made during “reverse engineering” of the instrument shape are correct. Concerning the sound, the copy exhibits a very distinctive sound, where the sound of the original is clearly recognizable. The marked difference with respect to the typical sound of early baroque recorders is particularly interesting. This sound bears some similarity with sound of the contemporary viennese Csakan, but keeping the warmth and flexibility of baroque recorders, and allowing to play complex music

requiring an agile instrument with a consistent voice in all registers.

Summarizing, this copy experiment shows that an interdisciplinary work comprising modern craftsmanship, materials science considerations and expert musicianship are necessary for reviving the sound of an ancient instrument.

Acknowledgements

The Bate Collection of Musical Instruments at the University of Oxford and its Curator David Lamb are gratefully acknowledged.

References

D. Macmillan, *The recorder in the 19th century*, Ruxbury publications, 2008 ISBN 978-1-904846-33-8