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Performing Handel's *Ouverture* HWV424 for Two Clarinets and Horn: A First Encounter with 3D Printing

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Abstract

One of the most precious treasures in the Royal College of Music Museum's collection, the ivory clarinet in D made by Georg Heinrich Scherer around 1740 has been copied through 3D printing. This article presents the observations of playing such copies, including reflections over the compass and pitch of clarinets from that time, and the revelation of a magnificent sound response. The piece to be performed and recorded is the *Ouverture* HWV424 for two clarinets and horn in five movements that Handel wrote around 1741 – the same period during which Scherer built the ivory clarinet in question. In this piece, Handel promotes the clarinet's cantabile qualities alongside the trumpet-like idioms characteristic of its earliest repertory. The composer makes considerable technical demands on the players, and the 3D-printed clarinets responded with a bright and crisp quality, even in their lower register, traditionally regarded as a weak feature of Baroque clarinets. Within the project, elements of historical accuracy are inevitably challenged by questions of practical expediency. Reed position and design, for instance, reflect the experience of musicians working in the 2020s, although the performance itself aims to demonstrate a historical awareness that is facilitated by the very success of the 3D prints.

Keywords

Baroque, clarinet, Handel, historical performance, 3D printing

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Balancing Philosophical and Practical Issues

My first encounter in 2024 with a 3D print of the ivory two-keyed Scherer clarinet in the Royal College of Music Museum represented a golden opportunity and indeed proved revelatory, especially since the original is not currently in playing condition. Inevitably, I experienced the newly created instrument in the context of more than 40 years of engagement with historical performance, in which the interaction of philosophical and practical matters was ever-present in my work as a period clarinetist. The issue remains highly relevant to our recent 3D printing project some 25 years after I ventured into print on the subject: "the balance between historical accuracy and practical expediency in early music has varied wildly over the years from one individual and/or ensemble to the next and is still an important issue; curiously, however, the general public has generally remained blissfully unaware of the detail of these variations" (Lawson & Stowell, 1999, p. xii). For the current project it seemed important for the players themselves to be acutely aware of such issues.

A few decades ago there were still some forthright claims as to "authenticity," a bold term which was still enjoying widespread currency. Some claims as to historical accuracy now seem wildly extravagant. An LP by The Hanover Band of Beethoven's orchestral music from 1982 (Nimbus NI 2150) supposedly recreated the music

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"in a form he would recognize," attracting the notorious strapline "the most original Beethoven yet recorded" (Early Music News, 1982). On the other hand, Richard Taruskin's assertion that historical performance was in fact the most modern sound around was circulating in the pages of *Early Music* a full decade before its reappearance in *Text and Act* in 1995. Meanwhile, Clive Brown was quite justified in querying the historical parameters of the Beethoven "period" cycles that were then proliferating. He roundly proclaimed that the pedigree of many of the instruments was of doubtful authenticity, noting that there was infinitely more to historically sensitive performance than merely employing the right equipment, and that the public was in danger of being offered "attractively packaged but unripe fruit" (Brown, 1991).

What were (and are) we trying to achieve? A nobility of vision is represented by the late Sir Nicholas Shackleton's manifesto, a rare attempt to define a practical relationship with the past: "Our primary objective in playing historical instruments is to gain a better feeling for what classical music actually sounded like when it was first heard in favourable circumstances" (Shackleton, 1995). Another perspective was contributed by Page (2013), who defined his Credo as "the exercise of a musical imagination that is disciplined, but not finally constrained, by a body of historical evidence to which singers and players freely acknowledge a responsibility because they find it enhances their musicianship." There can be little doubt that 3D printing is already contributing an added dimension to the debate. For insightful music-making, any instrument – modern, antique, or replica – needs to work well as a piece of equipment, whatever that might mean. Yet Taruskin's view was consistently borne out by what have often been loosely if not falsely described in generic terms as "original instruments."

Improved copies of instruments have a long and distinguished pedigree. As long ago as 1932, Arnold Dolmetsch's pupil Robert Donington remarked of his teacher's reconstructions: "the old harpsichord has certain limitations [and produces] a jangle, slight in the treble but audible in the bass … . The new instruments, which remedy these historical oversights, have proved both purer and more sustained than any previous harpsichord" (cited in Dreyfus, 1983). Another classic triumph of practical expediency over historical accuracy is the case of the Baroque trumpet. Robert Barclay famously drew attention to the finger holes often added to trumpet copies so that "the so-called out-of-tune harmonics … will not be unpleasant to modern sensitivity" (Barclay, 1998). Barclay observed that the idiosyncrasies of the natural harmonic series were generally considered to be beyond reliability in the recording studio or live performance: "The vented instruments that have resulted from this recent 'invention of tradition' are often equipped with so many anachronistic features that the result is a trumpet which resembles its Baroque counterpart only superficially, whose playing technique is quite different, and whose timbre is far removed from that expected for Baroque music."

As Crispian Steele-Perkins has written, "A dedicated performer needs a good copy of a genuine antique trumpet upon which to train his or her lip, and a good modern finger-holed trumpet with which to earn a living in an environment where time is money and where there are monstrous egos to be satiated" (Steele-Perkins, 1998). Pinnock (1993) had already memorably remarked a few years earlier: "We all fall from grace at the studio door." Over the past 40 years, conductors (whose very presence is often historically anachronistic) have shown little interest in the pedigree of the instruments in their period ensembles or in the techniques involved in playing them. One prominent British pioneer typified this attitude, dreading only that unacceptable sounds would be emitted, especially from the winds. Yet he felt able to write, "Some of the publicists' myths about 'authenticity' have been exploded, but for us the simple fact remains the same: we like to use the tools designed for the job in hand. Instruments good enough for Bach should surely be good enough for us" (Pinnock, 1991).

With little organological interest from influential directors and broad international agreement as to standardization of pitch (Baroque, $a' = 415$ Hz: Classical $a' = 430$ Hz), it comes as no surprise that practical expediency has often seemed a more tractable pathway than historical accuracy. It is ironic that in 1752 Quantz lamented the lack of a uniform pitch, which would have enabled him to play a flute with a mere three joints, instead of a variety of *corps de rechange* (Quantz, 1752). He remarked that the diversity of pitches used for tuning was most detrimental to music in general and expressed the hope that a universal pitch would soon find favor.

Instruments Old and New: The Clarinet

Evidence of various kinds proves that the clarinet was formerly much less standardized than can be imagined. A further complication is that exceptional rather than ordinary instruments have tended to attract the attention of makers and players from around the world. The sound of any clarinet is moderated through mouthpiece and reed (unlike, for example, the flute or recorder), and this poses a further challenge to historical propriety, even where the evidence can be reasonably established. In the event, expediency has triumphed almost exclusively in this arena.

It need hardly be emphasized that old instruments survive in a variety of conditions; the finest are still eminently playable, but internal bore measurements are especially susceptible to change (as with the RCM Scherer clarinet), and there may also be evidence of attempts to alter the pitch. Early clarinets are sometimes not in playing condition for minor reasons (such as leaking pads) and in any event may reveal their musical potential only after several months' playing. Naturally, clarinetists of the past played new instruments and this might be considered sufficient justification for

using a replica, rather than searching for an original. But what is a copy? A realistic answer might be that it contains both old and new elements, though in a proportion not always fully comprehended by the player, colleagues, or audience. Solum (1992) has argued in relation to the flute that the greatest antiques may have tonal superiorities to the best modern replicas, although the degree of difference is not as much as generally exists between old and new stringed instruments. But as Ricardo Simian has recently observed, the discourse in relation to old and new violins is not always evidence-based (Simian, 2023). He cites Richard Sennett's book *The Craftsman* (Sennett, 2008); "[as] the violinist Arnold Steinhardt of the Guarneri String Quartet has remarked, the professional musician can almost instantly distinguish between the original and any copy." Sennett's "source" for this is simply that "almost every issue of the luthier's professional journal The Strad, is occupied with these problems." One might suppose that such an assertion is based on an instrument's response as much as its tonal qualities. Yet the controversial study by Claudia Fritz from the acoustic research department of the Sorbonne University addressed the question of whether old Italian violins are better than modern copies (Fritz et al., 2014a, 2014b). She in effect proved that professional violinists often cannot distinguish between the two, even though common knowledge continues to take Sennett's argument as indisputable fact. Simian further reports that Fritz and her team have subsequently tried to apply these results constructively, by aiming to improve the definitions of poorly framed concepts such as "better sound" through a matrix of parameters including loudness, timbre, projection and overtones.

One can be confident that such a test applied to clarinets and their players would yield similar results, whether or not 3D-printed specimens were included in the sample. I would venture to suggest that this might be the case even if metal clarinets were part of the mix. So it was with an open mind that I began to contemplate the sound and response of one of the most precious treasures in the Collections of the Royal College of Music. The ivory clarinet in D was made around 1740 by Georg Heinrich Scherer (1703–1778), who worked in Butzbach, some 35 kilometers north of Frankfurt. Even then, ivory was a rare and expensive material, unaffordable for the general population. Yet despite being easily breakable, ivory produces first-rate musical results, with a distinctive bright, crisp quality. Among the Scherer family's most prominent and celebrated customers was none other than Frederick the Great. His flute collection numbered more than 70 instruments and included an ivory example by Scherer, which disappeared from Berlin during WWII.

Handel's *Ouverture* HWV424: Mr. Charles as Inspiration?

I had thought for some time that an ideal showcase for the Scherer clarinet would be Handel's five-movement *Ouverture* HWV424 for two clarinets and horn. The music demonstrates a considerable understanding of the clarinet's character and potential in its early days, with a special emphasis on idiomatic trumpet-like figuration. The very name clarinetto denotes a small clarino, or trumpet. Yet in the Larghetto that follows the opening French overture, Handel is also quite forward-looking in promoting the instrument's cantabile qualities, as well as the effectiveness of clarinets playing together in thirds. The musical material displays a very high level of invention and was later borrowed by the composer himself. For example, the fanfare motif in the penultimate movement recurs in the Act III Sinfonia from *Solomon* (1748), widely known as 'The Arrival of the Queen of Sheba.' Although the *Ouverture* makes considerable technical demands on the clarinet players, not least across a range of chromatic notes, it is significant that nowhere does it venture outside the instrument's home key of D, which would have presented almost insuperable challenges on contemporary instruments.

Handel's *Ouverture* survives in an autograph score housed in the Fitzwilliam Museum in Cambridge, GB-Cfm: MU.MS.264.p.17. Its watermark suggests a date of circa 1741. The names of the instruments – clarinet 1, clarinet 2, and corno di caccia – are not in Handel's own hand; they are additions by his friend and amanuensis, John Christopher Smith senior. Yet, there is no reason to doubt that his labeling reflects the intended instrumentation, however unusual it may have been at the time. No serious challenge to this view has been mounted since R. B. Chatwin brought the work to general notice in 1950: "although it is possible these *clarinet* parts could have been played by exceptionally skilled trumpet players, it is very unlikely that two trumpet type instruments would be used together in such a very fully written score." In fact, the whole concept of the work is so distinctive that Handel's autograph was formerly believed to comprise merely the solo parts of a more fully scored concerto grosso. It has since been recognized that the piece is indeed self-sufficient.

How did Handel come to write this extraordinary *Ouverture*? It is very tempting to associate the work with the activities of the itinerant musician known simply as Mr. Charles, who gave a concert in Dublin in 1742 in the same venue that had hosted the premiere of Handel's *Messiah* just one month earlier. Mr. Charles had arrived in London in 1733 and over the next 24 years gave around 70 known concerts in as many as 21 cities across Britain. This first Dublin program of May 12, 1742 describes him as "the Hungarian" and "Master of the French horn." He also featured in solos on the clarinet, oboe d'amour, and chalumeau, all described as "never having been heard in this Kingdom before." The Dublin concert also included music by Handel, and Mr. Charles performed "with his second, accompanied by the best Hands in the City." In subsequent programs his immediate collaborators were identified as his wife and son. Mr.

Charles was clearly the very model of a successful touring musician, not only for his performances, but also for his compositions, teaching, business acumen, and entrepreneurship. Did he in fact introduce Handel to the clarinet for the first time, or at least provide his initial experience of virtuoso clarinet playing? In any event, Mr. Charles was perhaps exactly the sort of instrumentalist to have inspired Handel; however, nothing is certain. Why is there no evidence of any performance of the work in Mr. Charles's many concert programs? Admittedly, the clarinet was still in its infancy, but one might expect that to have increased its novelty value. Does this lack of documentary evidence suggest that the work was perhaps intended for a more informal environment – outdoors perhaps? Many such questions about the piece remain unanswered.

Towards a Performance of the *Ouverture*

The *Ouverture* does not necessarily lend itself to the sort of polished rendition that has become a feature of the digital age. Yet the opportunity to approach the original soundworld through 3D-printed clarinets proved to be far more revealing than might have been expected. The instruments responded magnificently, even in their lowest register, traditionally regarded as a rather weak feature of the Baroque clarinet. This may reflect the fact that period clarinetists have hitherto focused mainly on playing copies of a specimen by the Nuremberg maker Jacob Denner (1681–1735), son of the supposed inventor of the clarinet, Johann Christoph Denner. Indeed, it was this type of instrument that I played in a 1985 recording of Handel's *Ouverture* (CRD Records 1081/2). During that recording, I found the low register markedly weaker than on the Scherer 3D print. Handel ventures below the break (i.e., b′ flat), even in the first clarinet part, so the relative strength of the low notes is a matter of some significance. We may note in passing that Vivaldi's contemporary concertos with C clarinet RV559 and 560 are even more demanding of this part of the compass.

The RCM's Scherer clarinet is fragile; the mouthpiece is warped and the ivory has a prominent split down the outside of the barrel. Hidden damage includes severe cracking and shrinkage of the internal surface of the bore of the barrel and upper joint. Conservators have suggested that enzymes from saliva might have affected some of the ivory components, so that the damage has been caused not only by humidity but also by chemical reaction. The overall condition of the instrument has so far precluded practical investigation, even on a restricted trial basis. Yet the realigned mouthpiece is a joy to play – and, unlike that of later classical clarinets, forms part of the instrument itself, with barrel attached. As with many Baroque replicas, the 3D-printed clarinets have been lengthened to function closer to the pitch of $a' = 415$ Hz nowadays in common use. There have been further structural interventions from the players relating to bore size and intonation. The clarinets' colorful chromatic scale matches that of the Baroque horn employed for the project, a modern copy of a contemporary instrument by the Viennese maker Michael Leichamschneider. The clarinet parts require a creative approach to fingerings, including a certain amount of half-holing and inventive solutions to trills that are characteristic of Baroque woodwind playing in general. In addition, the *Ouverture* offers a few challenges in the interpretation of various rhythmic patterns. However, the response of the 3D-printed instruments certainly encourages a vivid characterization of the various movements and shows every sign of recreating the bright, crisp quality associated with ivory. After experiments with other materials, the clarinets presented to us were made with BASF Ultracur 3D RG3280 ceramic-resin composite, more expensive than the alternatives but better able to emulate the qualities of ivory. In the interests of practical expediency, we played the clarinets with the reed against the bottom rather than the top lip, which is decidedly unhistorical for the period. A future iteration of the project might well seek to revisit that element of performance practice. It seems clear that in the eighteenth century a rich variety of articulation was expected, facilitated by various technical means.

Several articulations are illustrated in the *Essai d'instruction à ceux qui composent pour la clarinette et le cor* (Paris: Mercier, 1764) by the clarinetist Valentin Roeser (1735–1782). Of a later date than the Handel and from a different European country, Roeser's work is nevertheless important as the earliest treatise on instrumentation and the first theoretical study of the clarinet. Primary source material relating to reeds dates from even later and there is sufficient evidence to suggest that they were often problematic, then as now. In this respect, our own project again veers toward practical expediency, opting for commercial clarinet reeds that have been modified and shortened at the heel. However broad our studies of style, technique, and early instruments, today's players are bound to inflect Handel with much of our experience as musicians working under conditions that prevail in the 2020s. For those of us for whom sound is our primary medium of expression, there is indeed a sense in which before the age of recording some crucial elements of music-making have effectively disappeared with little trace. Nevertheless, even under the merciless scrutiny of the microphone, we hope to have taken account of a wealth of historical evidence in bringing to life those exceptional qualities that are inherent both within Handel's music and within Scherer's remarkable ivory clarinet that occupies pride of place in the Museum of the Royal College of Music.

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