

Italian Instruments in England, and Their Adaption for Use

Darryl Martin

It is likely that the majority of keyboard instruments used in England throughout the 16th and 17th centuries were made there. The list of makers, even from as early as the first decades of the 16th century, suggests that the demand could have been met.¹ However, there is no doubt that foreign-made instruments were also imported into the country, although it is not possible to determine how common this was. Whereas the inventories of King Henry VIII contain a reasonable number of instruments which are probably foreign, such a list is surely not representative of the country as a whole – since many of the instruments were undoubtedly gifts² rather than purchases.³

In many ways, the question about the number of continental-made instruments in England is only part of that story. Showing that Venetian-made harpsichords were in England (for example), based on several references in the inventories of Henry VIII

-
- 1 Raymond Russell, *The Harpsichord and Clavichord* (London, 1959), and subsequent reprints gives a list on p. 65 (n. 1) of about 20 makers working in England during the 16th century. The third edition of Donald Boalch, *Makers of the Harpsichord and Clavichord 1440–1840*, ed. by Charles Mould (Oxford, 1995), 693–5, lists 22 makers in England with dates starting before 1600.
 - 2 Any purchases would be included in the Privy Purse accounts. These are essentially day books in which all payments are recorded. These records are meticulously kept, given their importance (at the time) to Royal household expenditure. Non-inclusion in the Privy Purse accounts would mean that no money exchanged hands, and the items were therefore gifts. The various records relating to Tudor and Stuart musical activities have been compiled and published by Andrew Ashbee as *Records of English Court Music* in 9 volumes (Aldershot, 1986–1996).
 - 3 It should be noted that there were actually two inventories of the musical instruments belonging to the Court of Henry VIII. The first of these is dated 1542 (PRO: E315/160), and the better known one (from after the death of Henry VIII, and using the earlier one as a basis) was completed in 1547 (GB-Lbl, Harley MS 1419). Both inventories have been published in Ashbee, *Records of English Court Music*, vol. 7 (1993), and the relevant keyboard entries have been included in the present author's thesis 'The English Virginal', PhD diss., University of Edinburgh, 2003, 2 vols., as App. 1.

in which cypress is mentioned as a case wood, gives half the story. The other half is that for various reasons it is likely that a number – possibly the majority – of foreign instruments were modified to make them more useful for the playing of English music. Two examples of imported instruments – one from Venice (Queen Elizabeth's Virginal), and the other from Antwerp (the Windebank harpsichord) – show active contemporary consideration of the issues resulting from bringing foreign instruments into England, albeit that the found solutions were rather different.

The better known of the inventory entries which mentions cypress concerns two separate instruments, almost certainly harpsichords:⁴

Item. Twoo faire paire of newe longe Virginalles made harpe fasshion of Cipres with keies of luorie havinge the Kinges armes crowned and supported by his graces beastes with a gartier guilte standinge ouer the said keies with twoo caeses to them couered with blacke leather the inner partes of the liddes to the saide caeses beinge of walnuttre with sondrie antickes of white woode wroughte in the same.⁵

This entry only appears in the 1547 inventory, and the passage says that the instruments are 'newe'. By way of contrast, the other entry appears in both the 1542 and 1547 inventories:

Item oone pair of doble Virgenalles of Cipers in a case of Wainscott.⁶

Neither the decoration above the keys in the first entry, nor any outer case, has any relevance here, since it is almost certain this type of work could have been – and at least in the second example having a wainscot outer case – almost certainly was done in England.⁷ This second instrument has such a vague description that little

4 It could be argued that the description '[...] made harp fashion [...]' suggests a clavicytherium (upright harpsichord), but it is much more likely to refer to the curved bentside shape as found in a harpsichord.

5 See n. 4 for full details of where the inventories have been published in modern times. The original is in GB-Lbl, Harley MS 1419. The above wording comes from Ashbee, *Records of English Court Music*, vol. 7 (1993) (see n. 3), as copied in Martin, 'The English Virginal' (see n. 3), i, 288, and can also be seen in 158.

6 The original 1542 inventory is in the Public Records Office (PRO E 315/160) and the 1547 inventory is in the British Library (Harley MS 1419). The above wording comes from Ashbee, *Records of English Court Music*, vol. 7 (1993) (see n. 3), as copied in Martin, 'The English Virginal' (see n. 3), i, 288, and can also be seen in Russell, *The Harpsichord and Clavichord* (see n. 1), 157.

7 Although wainscot normally refers to panelling in a room, in this particular context the term wainscot refers to oak generally (in other words, that the outer case was made of solid oak).

(apart from its country of origin) can be determined. It could be either a harpsichord or polygonal virginal, and there is precedent from reliably-identified instruments to suggest the location could be any of a number of Italian cities – Venice, Rome, Verona, Brescia, Mantua, and Milan might all be possible.

On the other hand, there were fewer places where harpsichords (rather than virginals) are known to be made in the 1540s. Realistically the most likely place of manufacture for the two instruments is Venice. Rome might also be a possibility, though less likely given the break between Henry VIII and the Pope as part of his efforts to divorce Katherine of Aragon, and the evidence of other surviving instruments of that period, almost all of which were made in Venice or Naples.⁸ As shall be discussed, the instruments of Naples are notably different from Venetian instruments – primarily in their use of maple rather than cypress for their cases – and can therefore be discounted here.

As the only Italian-made instrument which can be shown to be in England during the period of the virginalists, the alterations and changes to Queen Elizabeth's Virginal are of particular interest. Made by Giovanni Baffo of Venice, and almost certainly a diplomatic gift, it is clear that the instrument was in regular use from the time of its arrival in England until the 1680s or 1690s at the least.⁹ The instrument also provides positive proof that such instruments in royal households were actually used rather than being for display purposes (or even immediately moved to storage upon arrival),

8 There is no detailed book dedicated to Italian early stringed keyboard instruments which discusses the characteristics of the various instrument making centers. It was only the publication of Denzil Wraight's PhD dissertation 'The Stringing of Italian Keyboard Instruments, c. 1500 – c. 1650', 2 vols., Queen's University of Belfast, 1997, that provided the accurate identification of many falsely-signed or attributed examples that allow a proper study of the different styles of construction. There have been many articles on individual Italian-made instruments and makers in journals such as *The Galpin Society Journal*. Perhaps the best book providing an overview is Edward Kottick, *A History of the Harpsichord* (Bloomington, 2016). From examinations of instruments with firm attributions it can be seen that most instruments (certainly before 1700) were made of cypress, the exception being earlier Neapolitan instruments which tended to have maple cases. Based on both the number of makers from the various centers listed in Boalch, *Makers of the Harpsichord and Clavichord* (see n. 1), and surviving examples Venice had more identified makers in the 16th century than the rest of Italy combined. These instruments are almost invariably of cypress (for both the case and the soundboard).

9 The identification of Baffo as the maker was first made and published by Nanke Schellmann, 'Queen Elizabeth's virginal scribbles, scratches and sgraffito', in: *Conservation Journal* (Autumn 2002, Issue 42), <https://www.vam.ac.uk/__data/assets/pdf_file/0003/177375/19995_file.pdf?srsltid=AfmBOoom4TiouNjz6flZ2dcmYgLog68QoJBS78cNf3xAWTJlki4HZRO> (accessed on 29 August 2024). The changes to the instrument in its period of historical use are described in Howard Schott, *Catalogue of Musical Instruments* [at the Victoria and Albert Museum]. Vol. I: *Keyboard Instruments* (London 1985), 30.

and it can be concluded that it was expected for instruments to be in a usable condition – in this sense meaning that the instrument could be played upon by anyone at court without difficulties such as needing to negotiate a short-octave arrangement. The alteration of instruments to allow their practical use was more important than preserving them as received, and it was probably standard practice for the ‘Keeper, tuner and maker of instruments to the King’ (who was Edmund Schetts at the time when Queen Elizabeth’s Virginal arrived in England) to make any required alterations as soon as possible after an instrument’s arrival, and probably before going on public display.¹⁰ The changes that the instrument has undergone were only minimally intrusive, and are easy to follow.

The virginal arrived in England sometime between when it was made in 1594, and the death of Elizabeth in 1603. It was probably made specifically as a gift for her, so arriving in England in 1594 or 1595 is most likely. The decoration on the front of the virginal appears to have been carried out in Venice, and for many years the instrument was attributed to Floriani, based on the similarity of decoration between signed Floriani instruments and Queen Elizabeth’s Virginal.¹¹ Its initial state had the typical Venetian compass, C/E-f³, with an f² string length of 268 mm (365 mm c² string length). These string lengths, using iron treble strings, are such that the instrument would be tuned to the lowest of the standard pitch levels in Venice, the *tuono chorista* (c. A 410 Hz). Although the pitch level is essentially fine for English music (although we can have no idea what the initial desired use of the instrument might have been), the compass with the short octave was musically limiting in England.

The lack of familiarity with a short octave in England is perhaps best illustrated by considering the correspondence around the desired purchase by Francis Windebank of a Ruckers harpsichord in 1637. The entire correspondence and an excellent interpretation of the events surrounding it can be found in an article by Paula Woods, published in the *Galpin Society Journal*.¹² In short, Windebank desired to get an Antwerp-made harpsichord, having heard they were excellent instruments, and arranged for Balthasar Gerbier to procure it on his behalf. When the instrument arrived it was found to have a short octave, and, as such, was not suitable for its intended purpose (since the family were only familiar with a chromatic bass). Clearly, at least in the amateur domestic circles inhabited by Windebank and his family, a short

10 The phrase ‘public display’ is probably a misnomer here. In practice it would be putting the instrument in a particular room where it might be played. It must be assumed that not all instruments (even those in playable condition) were publicly accessible.

11 See, for example, the virginal by Floriani now at the Grassi Museum, Leipzig, Inv. no. 33.

12 Paula Woods, ‘The Gerbier-Windebank Letters: Two Ruckers Harpsichords in England’, in *GJSJ* 54 (2001), 76–89.

octave was so unfamiliar that there had been no consideration that the purchased instrument might be arranged in that way rather than having a chromatic bass.¹³

By remaking the keyboard of Queen Elizabeth's Virginal (possibly utilising the original touchplates) while retaining the keyframe to a second state with a C-c³,d³ compass it gave a fully chromatic compass from C, while the highest string was plucked by a d³ key rather than the original f³. In effect this acts to shorten the scale, since the strings played by each note are all shorter than originally. The top note was three semitones shorter and (with the exception of some short octave notes in the bass) the other strings are a major third shorter. To explain that clearly – the top note was changed from f³ to d³, which meant that the overall pitch of the instrument was raised from c. A 410 Hz to c. A 473 Hz. This A 473 Hz pitch is English *quire pitch*, and the majority of surviving English plucked-keyboard instruments made before 1685 were at that pitch, so it is most likely that was the intended pitch of the virginal with its new keyboard. The tuning of the top string remained the same, and the great majority of the other strings were tuned down a semitone.

It would also have been possible for the person who altered the virginal to use a C,D-c³ compass at the same *quire pitch*, but then the C[#] would be missing in the bass, at a time when it would commonly be tuned to AA, as standard with English-made virginals. In any case, only four strings would need to be replaced from the original.¹⁴ The other strings would not be changed at all, and the use of iron strings in the treble of English keyboard instruments was standard until c. 1685.

In around 1685–90 the virginal was altered again, changing the C-c³,d³ keyboard to GG/BB-c³, which resulted in the string lengths being even shorter. By this period it was common in Italy to make the change from C/E-f³ to GG/BB-c³, coupled with restringing the instrument with brass wire. The overall effect on Queen Elizabeth's Virginal was to drop the pitch to c. A 425 Hz, which was increasingly common at that time, eventually becoming standard in 18th-century England. The GG/BB-c³ compass was the usual compass in the earliest English bentside spinets, most often using brass treble stringing, from c. 1685.¹⁵

13 It should be pointed out that in the second half of the 17th century England increasingly used what is commonly thought of as a GG/BB short octave. However, this should be thought of as simply adding a BB key (tuned to GG) rather than as suddenly moving from a chromatic to a short-octave bass. From the late 16th century English instruments would be tuned with the C[#] key tuned to AA (as later found in the GG/BB short octave), and the Eb key was tuned as that note in England throughout, rather than as a BB as found in continental short-octave instruments.

14 These are the three notes of the original short octave (C/E, D/F[#], E/G[#]), and the original F.

15 The first appearance of a GG/BB short octave in England is a virginal by Thomas White, probably built in 1644 (the third figure has been altered, but can be ascribed that date based on the decorator). After 1650 more surviving instruments have a GG/BB short octave rather than a chromatic bass from C.

So, as far as Queen Elizabeth's Virginal goes, the changes are well documented,¹⁶ and each change results a perfect instrument in terms of compass, stringing material, and pitch for England at the time of the respective changes. The required alterations also involve nothing more than a new keyboard or keylevers – there is no need to move the bridge at any stage. Whereas the first alteration would have only required four strings in the bass to be altered, the whole instrument would have been restrung at the second change.

Although it is clear – and there is plenty of evidence – that English-made organs were commonly built with a C- a^2 chromatic compass, a smaller F- a^2 compass – all that was needed to cover a choir's vocal range – was also used.¹⁷ It would be foolish to suggest that all keyboard instruments of the period needed, or were regularly built with, a C- a^2 compass in England, just as makers in Venice built a variety of compasses, even (in the case of Domenico) having a surviving instrument with a F,G,A- g^2,a^2 compass in the 1560s, having built with a larger C/E- f^3 compass as early as 1533.¹⁸

It is perhaps important to give a brief overview of pitch standards in 16th-century England. There were two basic pitch levels. One was for secular instruments, and became known as *consort pitch*. This pitch was approximately A 403 Hz, which is about one-and-a-half semitones below modern pitch. The second level was for vocal music, in particular music for the church, and is referred to as *quire pitch*. This was at a level of approximately A 473 Hz, that is about one-and-a-half semitones above modern pitch. There was also *organ pitch*, which is a transposition of *quire pitch*, rather than a separate pitch level in its own right.¹⁹ The compass needed for *quire pitch* was F to a^2 , but from at least the start of the 16th century, larger organs were built with a larger C to a^2 compass, but were transposing, so that the C of the keyboard produced *quire pitch* F, and the organ notes C to e^2 covered the full vocal range. Of course, by later in the 16th century keyboard instruments would often be built with compasses descending to C as standard, as composers such as John Redford and Thomas Tallis would commonly write instrumental keyboard works descending that low. However,

16 See Schott, *Catalogue of Musical Instruments* (see n. 9), 30.

17 Full discussion of both English organ pitch levels and compass (from both surviving instruments and historical documents can be found in Dominic Gwynn, 'Organ Pitch in Seventeenth Century England', in: *Journal of the British Institute of Organ Studies* 9 (1985), 65–78, and in Stephen Bicknell, *The History of the English Organ* (Cambridge, 1999).

18 Grassi Museum, Leipzig, Inv. No. 67. The instrument has been authenticated (both for the correct maker and the compass) by Wraight, 'The Stringing of Italian Keyboard Instruments' (see n. 8), ii, 142, with his number W96.

19 The various pitch standards in 16th-century England are fully covered in Bruce Haynes, *A History of Performing Pitch: The Story of 'A'* (Lanham, MD/Oxford, 2002), 86–96. *Organ pitch* is a fourth away from *quire pitch* – when the organist plays the C key the resulting pitch is *quire pitch* F. In this way the longest pipe length needs to be only 5' long rather than 8' long if the instrument was made for *quire pitch*.

one would never expect to find an instrument at *organ pitch* which only descended to F. It was only starting in the middle years of the 17th century that the intermediate pitch levels – A 425 Hz and A 450 Hz – began to be used, no doubt initially to allow tone transposition from the two 16th-century pitch standards.

It is possible that the cypress instruments in the inventory of Henry VIII would have had essentially identical alterations. Even if we can be reasonably certain that Venice was the likely place of manufacture of the instruments, there were several different designs. One common type – perhaps the best known – had a 1 x 8' 1 x 4' registration and similar string lengths to Queen Elizabeth's Virginal. Examples of this model include instruments by Alessandro Trasuntino (1530, 1531, and 1538), Vito Trasuntino (1572 and 1573), and the 1585 Bonafinis harpsichord in Brussels.²⁰ Other instruments are found with a f^2 string length of 235 mm, implying they were tuned a tone higher. Often these instruments had only a single 8' register (Domenicus Pisaurensis 1533 and c. 1570), although the common 1 x 8' 1 x 4' registration is also found (Vito Transuntino 1560, Fransiscus Patavinus 1561 and 1564, and Domenicus Pisaurensis 1563–70), or even a 2 x 8' registration (Domenicus Pisaurensis 1570, as well as instruments by Alessandro Trasuntino c. 1545 and Domenicus Pisaurensis 1554. These latter two instruments could even be designed to play a semitone higher).

Although there is no evidence of the instrument ever being in England, the 1531 Alessandro Trasuntino harpsichord (or an instrument like it) could have had the same changes as Queen Elizabeth's Virginal. Most (if not almost all) 16th century Venetian harpsichords appear to have gone from the original state to one similar to that as finally used in Queen Elizabeth's Virginal, that is from a C/E- f^3 compass and iron stringing to a GG/BB- c^3 compass with brass strings. In many instances there is also a change of nut position to take pitch into account, and in almost all cases the 1 x 8' 1 x 4' registration is changed to 2 x 8'. If they were in England the second phase of Queen Elizabeth's Virginal – that of a C- c^3, d^3 compass, would allow the instrument to play at *quire pitch* with iron strings. Another theoretical possibility would be to have a keyboard with a GG,AA- a^2 compass, playing at *organ pitch*. Using the string lengths of the 1531 Trasuntino harpsichord at the Royal College of Music as an example, altering the compass to GG,AA- a^2 would give a c^2 string length of 229 mm, or 9", which is the theoretical string length required for English *organ pitch*.

At first sight this might appear an extraordinary change to make, but that is viewed through the perspective of modern eyes. However if a player is an organist – especially in the 16th century – he would probably be more familiar with instruments with a C- a^2 compass at organ pitch. With either proposed compass there are extra notes on the keyboard (and these could always have a cover made so they do not

20 This instrument, now part of a claviorgan was previously thought of (and listed) as Bertolotti, and appears as such in Russell, *The Harpsichord and Clavichord* (see n. 1), Plate 8.

distract the player if needed), and it is entirely possible that organists were more comfortable with instruments that play at organ pitch.

Although less obviously foreign, there are various keyboard instruments in the inventories which might have been built in the southern part of Italy (Naples and Sicily), or in the southern Netherlands (Antwerp). The issue with trying to make a firm attribution to either of those areas is that it relies on a description of the wood and decoration. These various references to '[...] woode vernissshed yellowe [...]' or '[...] vernissshed yellowe and painted all ouer with redde rabeske woorke [...]'²¹ can be shown to match instruments and/or paintings from the continent. The yellow varnished wood is almost certainly maple, which was the most commonly used case material in each of the above centres. Although Antwerp and southern Italy are separated by a large distance, both places were Spanish dominions from the start of the 16th century, and the various similarities noticed when examining instruments from both places strongly shows that the makers knew, and were influenced by, the traditions of each other.

Restricting ourselves to the first 60 or so years of the 16th century, the two (Naples and Antwerp) instrument making traditions have the essentially universal use of maple for the case, as well as the very frequent use of dovetail joints, even on comparatively thin pieces. There are some differences as well. The surviving instruments (or the comparatively large number of instruments included in paintings) show that Antwerp seems to have mostly made virginals and octave clavichords during this period, whereas Naples appears to have most made harpsichords, although both high pitched virginals and clavichords were also produced. Unlike the Antwerp instruments, the high-pitched Neapolitan instruments do not appear to be at octave pitch, but rather at a fourth or fifth above the basic pitch standards. The maple was sometimes heavily flamed, and the exteriors were often painted with arabesque ('rabeske') motifs. Although the clavichords often had lids, the virginals were thin cased with a separate outer case, as is typical in Italian instruments. It is not until the latter part of the century that thicker-cased instruments of poplar were made. In southern Italy, on the other hand, the maple cases were left undecorated, although all instruments seem to require an outer case. Unlike Antwerp there are no surviving virginals at normal pitch, although one octave virginal exists. The well-known clavichords are at high – but not octave – pitch with a raised soundboard to the right of the keys (whereas the Antwerp instruments have the keys above the soundboard and a high bridge). The most common surviving instruments are harpsichords, though it appears there was no typical model.

The majority of the surviving Neapolitan harpsichords have a C/E-c³ compass, and the c² string lengths range from 277 mm, to c. 300 mm, a range that covers a little more than a semitone. The instruments have less flexibility when it comes to

21 Martin, 'The English Virginal' (see n. 3), i, 285–8.

converting them to a suitable compass and pitch for use in England given they have only 45, rather than 50 notes. One option is to simply retune the short octave chromatically to include the $F-a^2$ range. The longer-scaled instruments will work well if restrung with iron treble stringing, and could also manage to be tuned to *consort pitch* (A 403 Hz) with the brass wire, particularly if the scale was not longer than 295 mm at c^2 . The issue of such an approach is that the $F-a^2$ compass works fine for intabulations of vocal music at the correct pitch, but not all keyboard music will fit within that compass – hence the need for organ pitch with keyboards extending down to C in the first place. The other approach – one which is more invasive – would be to alter the compass to be $C-g^2, a^2$.²² The string lengths are shortened as a result of this approach.

Two Neapolitan instruments housed at the National Music Museum, demonstrate how this might be done, even though both are essentially in original condition. In both cases a speculative $C-g^2, a^2$ compass has been assumed, meaning the only structural change the instruments require is a new keyboard. The harpsichord (with a 280 mm string length for c^2) appears to have been originally designed for brass stringing at about one semitone below modern pitch. With a new compass and iron stringing in the treble the c^2 string is 223 mm, almost identical to the theoretical string length for a c^2 string length at English *organ pitch*.²³ The octave virginal, almost certainly from the same workshop as the harpsichord was probably originally intended to also be strung with brass treble stringing. Whether as an accident as a result of the almost straight bridge and nut sections, or made deliberately for a pitch a semitone lower than the common Neapolitan pitch standard, the instrument probably plays at a pitch of approximately A 370 Hz. The highest stressed (closest to breaking point) string is c^2 , which is 161½ mm long (equivalent to 323 mm for an 8' pitch) would become the $g^{\#1}$ with the $C-g^2, a^2$ compass.²⁴ This is the equivalent of 128 mm for c^2 , which would allow the instrument to play at a semitone lower than *quire pitch* with the same brass strings as on the original (excluding several in the bass where there is the short octave which would need to be restrung).²⁵ This pitch standard was known in England from at least c. 1600 onwards.

22 It would also be possible to use a $C, D-a^2$ compass if the $g^{\#2}$ was felt more important musically to retain than the low $C^{\#}$.

23 As shown earlier, the string should theoretically be 9", which is 228½ mm. The actual difference amounts to less than half a semitone.

24 Because this is the highest stressed string there is no point in giving the string lengths for the 'c' or 'f' strings with the altered compass.

25 The calculations involved here should be explained for clarity. It is not clear if English instruments had a standard string length to frequency relationship for brass treble strings as they did for iron. However, if it is assumed that they used the same safety margin as in instruments from other schools with a known string length and pitch (in this case Hamburg which had a 285 mm string tuned to c^2 at a pitch of 408 Hz (142.5 mm for c^3), it can be

One instrument from this tradition that is perhaps worthy of a little more consideration is an unsigned instrument in the Royal College of Music, London, commonly known as RCM175. This instrument is Neapolitan in style, having all of the characteristics of the earlier instruments as just discussed here, but was probably made in the period between 1580 and 1610. There has been much published discussion about the instrument's original state in which even the original number of keys is not clear. It was generally accepted to have been built with 48 keys, until research by Grant O'Brien argued that it was 50 keys. His arguments led towards a virtual reconstruction which had a C/E-c³ compass, but with five split accidentals for D/F[#], E/G[#], d^{#1}/e^{b1}, g^{#1}/a^{b1}, and d^{#2}/e^{b2} (but not the expected enharmonically-split keys in the tenor region).²⁶ A more recent study of this instrument by Denzil Wraight, at the instigation of the present author in which he addresses all previous research (including his own) assisted by high quality photographs taken specifically for this purpose shows that the present 50-note registers have been cut from the original single register, confirming the 50 note compass.²⁷ Previous research by Wraight has shown the existence of marks on the soundboard which indicate the bridge has been moved from an earlier position along its full length (rather than just in the treble as had previously been argued).²⁸ These marks on the baseboard show that the enharmonic compass was not correct as each mark was separated by 12 notes (except in the bass), and according to the marks the original compass was C/E-f³, the most common compass in the 16th century. Based on the original bridge pin marks as found on the soundboard and the original nut position (as marked on the baseboard) the original string lengths can be determined. The original string length for f³ is 134 mm, for c³ is 175 mm, and for f² is 250 mm. These give equivalent lengths for c² of 357, 350, and 333 mm respectively.

Although there is no evidence to support the suggestion that the instrument was in England during the historical period (and, in fact, the mouldings on the replacement nut suggests the work was done in Florence in the period c. 1730), the present state of the instrument, having a C,D-c³ (50 note) compass, with 2 x 8' registers, would be ideal for a harpsichord in England in the late-16th or the 17th centuries.

The C,D-c³ compass is essentially the same as found in surviving English-made instruments from the period c. 1570 to around 1650. The English instruments included the C[#], which would almost invariably be tuned to AA, though the organ part of the Theewes claviorgan never had pipes for that note, no doubt due to the extra length

calculated that a string 128 mm long will reach a pitch 185 cents higher, which converts to a pitch of A 454 Hz.

26 See Grant O'Brien, 'The Single-Manual Italian Harpsichord in the Royal College of Music, London, Cat. No. 175: An Organological Analysis', in: *GSJ* 62 (2009), 55–99.

27 It should be pointed out that although O'Brien argued for a 50 note compass he did not believe the present register was original, without stating his reasoning.

28 Wraight, 'The Stringing of Italian Keyboard Instruments' (see n. 8), ii, 337.

those low-tuned pipes would require. Whereas the long original treble string lengths would not allow the instrument to play at even the lowest Neapolitan pitch levels with brass wire, this pitch level might be attainable with iron treble stringing (despite there being no other evidence of iron treble stringing in Naples or the surrounding area).

The alterations to the instrument, in which the compass has been changed to have d^3 as its highest note, and both the bridge and nut being moved to reduce the string lengths has now resulted in lengths of 111 mm for d^3 , 129 mm for c^3 , 195 mm for f^2 and 255 mm for c^2 , which give the equivalent c^2 string lengths of $248\frac{1}{2}$, 258, 260, and 255 mm respectively. Taking the longest of these lengths (260 mm) as the basis, the harpsichord could comfortably play at a pitch around A 440 Hz – A 450 Hz with brass treble strings.²⁹ As previously mentioned, a pitch standard of A 448 Hz was known in England from c. 1600, and there are surviving 17th century plucked keyboard instruments built for that pitch standard.³⁰ It should be noted, however, that brass treble stringing was not used in England until c. 1670–1680, albeit English makers would have been familiar with it both from some Italian instruments, and the wire would have been available as it was used on citterns, bandoras, and orpharions.

As shown, some Italian instruments are – as to be expected – easier to convert to a usable English compass and pitch than others. Further, the requirements in mid 16th-century England were rather different than those of 100 or so years later. That said, all of the alterations (whether those that actually happened to instruments, or changes in the abstract that could happen) are comparatively simple with the exception of the real changes that took place to RCM175. In fact, many Italian instruments had greater changes to keep the instruments up-to-date in Italy. These types of changes could obviously be carried out in England as well, but have generally not been discussed here since once larger changes are being considered the options become larger and more speculative. But of the less complicated changes, it can be shown that Queen Elizabeth's Virginal – the only Italian instrument that can positively be shown to have been in England in the period up to 1650 – was altered twice in its history to keep it usable for English musicians of the respective periods, and that other 16th-century Italian instruments could also – usually be simply making a new keyboard and some minor restringing – could also be converted to English requirements of the 16th and 17th centuries.

29 The present author has strung a number of clavichords with a 260 mm c^2 string length to A 460 Hz without any noticeable problem of excessive string breaking.

30 Three surviving English virginals were built for this pitch level, the earliest being the 1661 James White instrument (formerly in Bunratty Castle, Ireland).

Bibliography

- Andrew Ashbee (ed.), *Records of English Court Music* in 9 volumes (Aldershot, 1986–1996)
- Stephen Bicknell, *The History of the English Organ* (Cambridge, 1999)
- Donald Boalch, *Makers of the Harpsichord and Clavichord 1440–1840*, ed. by Charles Mould (Oxford, 1995)
- Dominic Gwynn, ‘Organ Pitch in Seventeenth Century England’, in: *Journal of the British Institute of Organ Studies* 9 (1985), 65–78
- Bruce Haynes, *A History of Performing Pitch: The Story of ‘A’* (Lanham, MD/Oxford, 2002)
- Edward Kottick, *A History of the Harpsichord* (Bloomington, 2016)
- Darryl Martin, ‘The English Virginal’, 2 vols., PhD diss., University of Edinburgh, 2003
- Grant O’Brien, ‘The Single-Manual Italian Harpsichord in the Royal College of Music, London, Cat. No. 175: An Organological Analysis’, in: *GSJ* 62 (2009), 55–99
- Raymond Russell, *The Harpsichord and Clavichord* (London, 1959)
- Nanke Schellmann, ‘Queen Elizabeth’s virginal scribbles, scratches and sgraffito’, in: *Conservation Journal* (Autumn 2002, Issue 42), <https://www.vam.ac.uk/__data/assets/pdf_file/0003/177375/19995_file.pdf?srsId=AfmBOoom4TiouN-jz6fIZ2dcmYgLlog68QoJBS78cNf3xAWTJlki4HZRO>
- Howard Schott, *Catalogue of Musical Instruments* [at the Victoria and Albert Museum]. Vol. I: Keyboard Instruments (London 1985)
- Paula Woods, ‘The Gerbier-Windebank Letters: Two Ruckers Harpsichords in England’, in *GSJ* 54 (2001), 76–89
- Denzil Wraight, ‘The Stringing of Italian Keyboard Instruments, c. 1500 – c. 1650’, 2 vols., Ph.D. diss., Queen’s University of Belfast, 1997