# Hendrik and Fredrik Richters: combined articles by Jan Bouterse published in 2014/2015 in the FoMRHI Quarterly

## Introduction

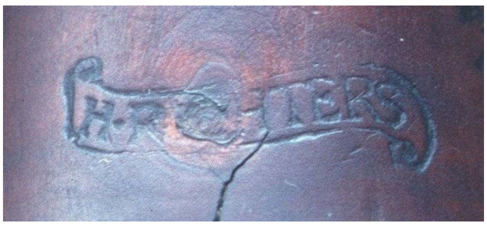
### The makers

Hendrik Richters (1683-1727) and Fredrik Richters (1694-1770) were two brothers who became renowned for their lavishly made oboes. There are between 35 and 40 exemplars by these makers in museums and collections. Flutes were also made in their workshop in Amsterdam; of these instruments, only one (a soprano recorder) is known to survive to this day. Both brothers stamped their instruments with their initials and name and a cloverleaf underneath (the cloverleaf's stem is bent to the left in Hendrik's instruments, and to the right in Fredrik's). It is not known who Hendrik, the eldest of the brothers, was apprenticed to. One tenor oboe at the Musée de la Musique in Paris presents a different stamp, with the name H. Richters in a scroll.
A large number of oboes by the Richters brothers survive: around thirty by Hendrik and five by Fredrik. Among the latter there is an oboe with a different stamp. It may have been built by Fredrik-II Richters, the son of Jan Richters, the older brother of Hendrik and Fredrik-I by whom he was trained. In addition to the abovementioned instruments, there are six anonymous exemplars (among which the present oboe) that are wholly or largely made in the style the Richters brothers. It is uncertain if they were made by these makers (or one of their followers) or if they even be contemporary forgeries.

### The makers’ marks

Hendrik Richters

Fredrik Richters



Hendrik Richters   tenor oboe

Fredrik Richters - 2

Articles in the FoMRHI Quarterly Nos. 126 and 128 (2014) and No. 129 (2015)

see about the FoMRHI (Fellowship of Makers and Researchers of Historical Instruments) the website www.fomrhi.org and for the bulletins www.fomrhi.org/pages/all-bulletins

- Jan Bouterse: 'The oboes of Richters: about methods of research in woodwind instruments - Part 1: '*FoMRHI Quarterly 126* (2014), Comm. 2000, pp. 8-23
- Jan Bouterse: 'The oboes of Richters: about methods of research in woodwind instruments - Part 2: 'Points of departure; a close look at a boxwood oboe by Hendrik Richters', *FoMRHI Quarterly 128* (2014), Comm. 2011, pp. 6-19
- Jan Bouterse: 'The oboes of Richters: about methods of research in woodwind instruments - Part 3: 'Methods of compariong instrumentss', *FoMRHI Quarterly 128* (2014), Comm. 2015, pp. 33-44
- Jan Bouterse: 'The oboes of Richters: about methods of research in woodwind instruments - Part 4: 'The keys', *FoMRHI Quarterly 128* (2014), Comm. 2016, pp. 45-54
- J. Bouterse: 'The oboes of Richters: about methods of research in woodwind instruments - Part 5: 'Acoustical design of the instruments: lengths and tone-holes', *FoMRHI Quarterly 129* (2015), Comm. 2022, pp. 17-27
- Jan Bouterse: 'The oboes of Richters: about methods of research in woodwind instruments - Part 6: 'Acoustical design of the instruments: the bore profiles', *FoMRHI Quarterly 129* (2015), Comm. 2022, pp. 28-43


Recent photo of the oboe by Hendrik Richters in the Rijksmuseum Amsterdam, inv. no. BK-NM-11182.
More information about this instrument in Rob van Acht, J. Bouterse & P. Dhont: *Niederländische Doppelrohrblatt-instrumente des 17. und 18. Jahrhunderts - Dutch double reed instruments of the 17th and 18th centuries* (Laaber 1997). The oboe is listed there as H. Richters Ea 7-x-1952. In my dissertation (Dutch woodwind instruments and their makers, 1660-1760), the oboe is listed as H. Richters No. HR 4.

See my website www.mcjbouterse.nl/dutch-ww-instruments/lopendelijst-NL-instrumenten.pdf for an updated list of all Dutch woodwind instruments from the Baroque period. On that website also a description, measurements and pictures of a boxwood oboe by Fredrik Richters (ex collection Han de Vries, now in the Amsterdam Rijksmuseum): www.mcjbouterse.nl/dutch-ww-instruments/F.Richters-oboe%20-RMA%20BK-2018-72-Xk.pdf.

**FoMRHI Comm. 2000** **Jan Bouterse**

## The oboes of Richters: about methods of research in woodwind instruments

## Part I: checking the source material

Of all Dutch 18th-century woodwind instruments, the oboes with the stamps of Richters and Rijkstijn form a special category. Many (but not all) of them are made in a very luxurious style, in ebony with elaborately turned ivory rings and often silver mounts and engraved keys. I was able to find information about thirty oboes with the stamps of Hendrik Richters, four with those of Fredrik Richters (1694-1770), two oboes in the Richters' style but with the maker's marks of H. Rijkstijn and finally six unstamped oboes in the Richters/Rijkstijn style.
A number of these are discussed by the American musicologist Cecil Adkins in an exhaustive (and price winning) article in the *Journal of the American Musical Society* (1990, Vol XVI, p.42 - 117)*: 'Oboes beyond compare; the instruments of Hendrik and Fredrik Richters'. Phillip T. Young, in his book *4900 Historical Woodwind Instruments* (London, 1993)* refers to Adkins' publication as the 'definitive study of the Richters oboes'. But as I have shown in § 9.8 (p. 458 - 478) in the English translation of my dissertation *Dutch woodwind instruments and their makers, 1660-1760* (Utrecht, 2005)*, the information in Adkins' article is not complete and sometimes not correct, caused by confusion about the makers' marks on some oboes. Some doubts about the observations and conclusions by Adkins were for me reason to reflect about the methods and objectives of research in musical instruments.

The first task in scientific research is to check all basic information, for instance, how accurate are the descriptions and measurements of the instruments? Where are the oboes of Richters now, and where and what type of can information be found about these instruments and their makers? Answering these questions is the main object of this communication, the first in a short series of articles.

Another reason to return to the oboes by Richters (and Rijkstijn, and oboes in Richters style) is the extraordinary fact that so many (40) of these instruments have survived.** That gives us the possibility to use specific statistical techniques in assessing technical aspects. Adkins did that in his article where he compared the bore profiles of the oboes. But I have some question marks about his methods and conclusions. Comparing musical instruments is interesting and important. It is good to give attention to the fundamental aspects of this field of research. I'll do that in a following part of this article, to be published in the next FoMRHI-Q.

* I refer to these publications as Adkins 1990, Young 1993 and Bouterse 2005.
** It is not common to find such large groups of surviving instruments of the same type by one maker from the first decades of the 18th century. In Young's *4900 Historical Woodwind Instruments* I found just a group of 27 alto recorders by Bressan, 33 bass recorders by Johann Christoph Denner and 31 alt recorders by Johann Wilhelm Oberlender-Senior. Later on in the 18th century, with the growing popularity of the traverso, we see that similar large quantities of these instruments survived. See the 38 traversos by Scherer (father and son) and 44 by Stanesby-Junior. Nota bene: in both groups of instruments by Scherer and Stanesby we find many traversos made in ivory; luxuriously made instruments have likely a better chance to survive the years.

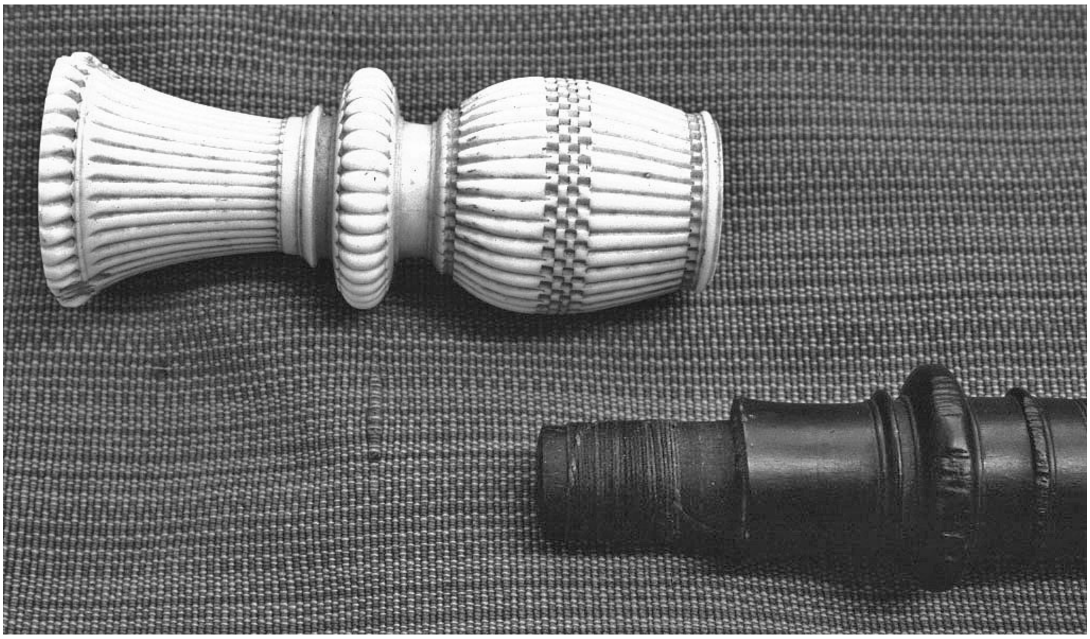
**Characteristics of the oboes by Hendrik and Fredrik Richters: a short introduction**

A characteristic feature of many of Hendrik Richters' ebony oboes (but not on instruments by Fredrik Richters) is their decorative ivory turning, which appears in other Dutch instruments further only once on a *sixth flute* by Willem Beukers (Library of Congress, Washington D.C., Inventory number: 1257/5). A well-known example from France is a three-section traverso with ivory mountings by the Paris maker Rippert, which instrument is in the Engadiner Museum at St. Moritz. However, decorative ivory turning probably originated in Germany, where in the first half of the 17th century Nuremberg flute-makers began to specialize in *Passigdreherei* (patterns of undulating lines) and ivory carving.

Adkins 1990 supplies an illustration of a *tour à guilloche*, the French name for a 'rose-engine lathe' on which such work can be done. Basically, this machine permits a chisel to perform a controlled forward or lateral movement geared to the lathe's rotating axle. With the aid of templates, a specified number of elements (24, 32 or 36 in the case of Richters' oboes) such as ridges, undulating lines etc. can be transferred to the work in hand. Ivory is the ideal material for such embellishments. Furthermore, Adkins tells us that ivory lends itself well to being carved and finished with the chisel of a decorative lathe, and that any subsequent cleaning or sanding would only spoil the effect of the results produced by the chisel.

*The oboe on this and the next page is HR17 by Hendrik Richters, Bate Collection, Oxford, England. Inventory number: 2037. Characteristic of many oboes by this maker are the luxurious materials he used: ebony, ivory mounts and silver keys.*

Ornamental turning was a hobby of some royal houses. In the Rosenborg Castle in Copenhagen the lathe of the 1730's of the Danish Queen Sophie Magdalene is preserved, together with a showcase full of ivory trophies, most of them with much more complicated ornaments and patterns than we find on the oboes by Hendrik Richters.



*C-key with rebus and Bacchus on oboe HR 18 (Oxford, Bate Collection)*

Another feature of many oboes of both Hendrik and Fredrik Richters are the silver keys or mounts. These keys are often engraved with floral motives, pictures of dancing (or even drunken?) people, sometimes on the lower part of the c-key Bacchus on a barrel (see photo) and a rebus on the upper part of the key: *Vat den tijd en leer de wereld kennen* (Grasp time and learn the world).

Frederik Richters was married to a niece of the silversmith Hildebrand van Flory, a family connection that has prompted suggestions that this was the reason why Van Flory executed the silverwork on the Richters' oboes. Adkins claims that Van Flory's mark can be seen on two oboe keys: the e-flat key of oboe no. HR1 and the c-key shank of oboe no. RS1. The mark is allegedly visible on the reverse of both keys. Adkins based his observations, as he himself said, on observations made by Rob van Acht. I myself have not seen any silver marks, but that was also caused by the fact that during my research the regulations for inspecting the instruments became more strict, with the result that it was not longer allowed to remove the keys.

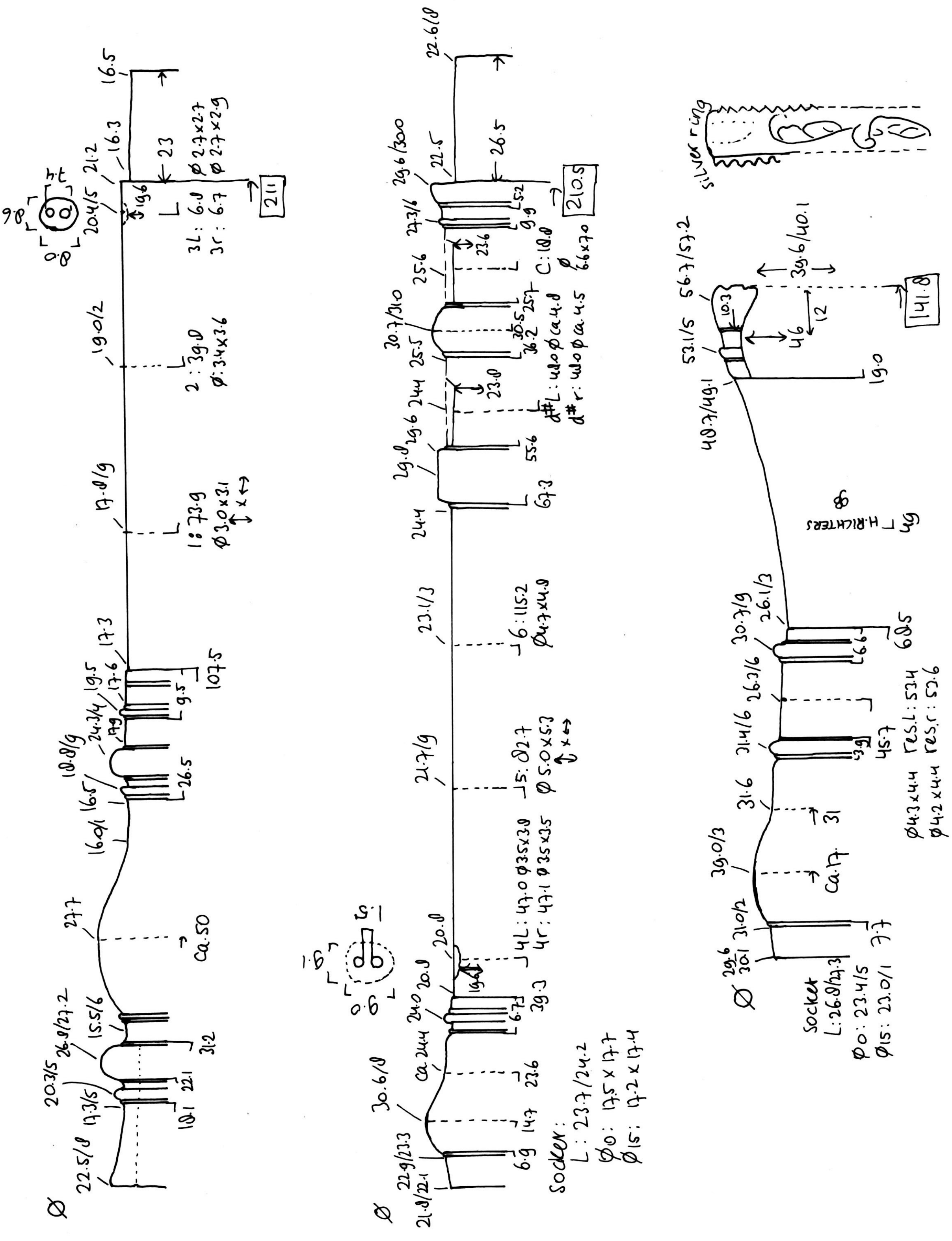
*Silver mounts and ornaments on the oboe HR8 by Hendrik Richters (Gemeentemuseum Den Haag, Inventory number: MUZ-1933x284).*

**The Scheurleer and Boers collections**

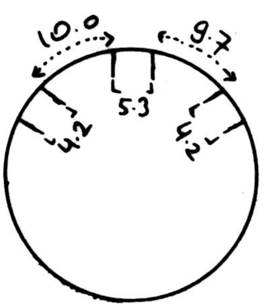
In the catalogue *Niederländische Doppelrohrblattinstrumente des 17. und 18. Jahrhunderts - Dutch double reed instruments of the 17th and 18th centuries* (Laaber 1997) by Rob van Acht, Jan Bouterse and Piet Dhont (ABD 1997), a large number (fourteen) of Richters oboes are described, all of them in possession of, or given on loan to, the Gemeentemuseum Den Haag (The Hague). Most of these oboes were part of two (former) collections, those of Boers and Scheurleer. The instruments of the Scheurleer collection, with inventory numbers ending -1933, are still preserved in the depots of the Gemeentemuseum. The Boers collection however, which was given on loan (in 1952) by the Rijksmuseum in Amsterdam to the Gemeentemuseum, has recently been sent back to Amsterdam. This because the Gemeentemuseum has reduced its activities on musical instruments in the last years to an absolute minimum. The instruments of the Boers collection, which had in Den Haag inventory numbers ending x-1952, regained in the Rijksmuseum the old numbers from before 1952. There is however uncertainty about some instruments. The oboe HR7 by Hendrik Richters (Ea 17-x-1952) doesn't occur in the most recent inventory of the Boers Collection. The same applies to the unstamped oboes Ea 4-x-1952 and Ea 5-x-1952.

Another oboe which was on loan (from a private Dutch collection), no. 9 by Hendrik Richters came just too late to be presented in the catalogue of Dutch double reed instruments. I do not know if this instrument has been returned to its owner. There has been much confusion about the status of this instrument: more than one temporary inventory number was suggested (and some of them maybe used in a few publications) before it was established as Ea 1-x-1996.

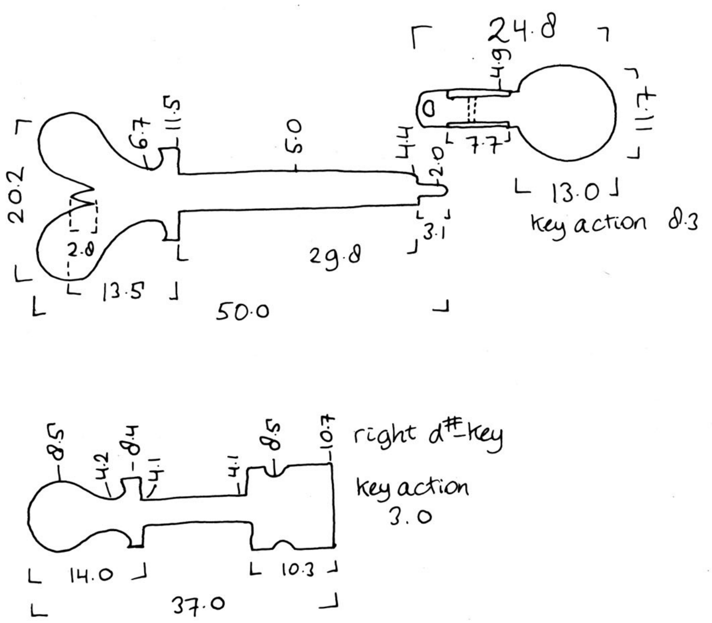
See the list further in this article for a survey of all old and new inventory numbers, and the names of the collections.



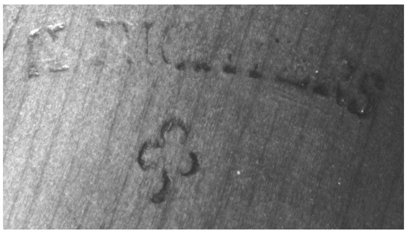
*Oboe HR9 by Hendrik Richters, in European boxwood (perhaps unstained), silver bead(s) and brass keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1996-x0001 (Ea 1-x- 1996)***.**

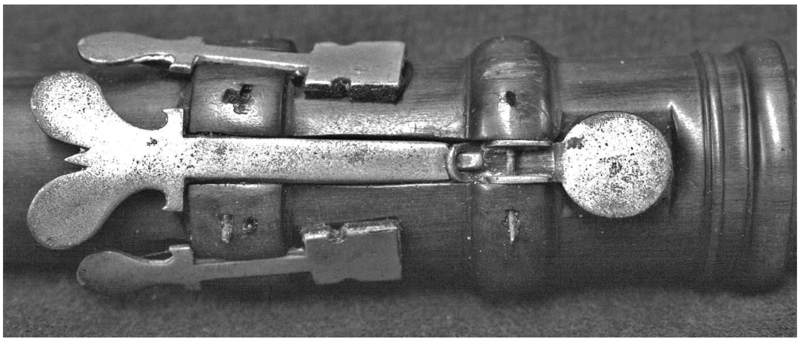


*cross section*
*upper key ring*




*Dimensions of the keys of oboe HR 9 by Hendrik Richters*





**Description of the oboe HR9**

Boxwood oboe* with brass keys and one silver ring, loosely fitted at the lower bell ring. Other rings or mounts must have been fitted at the socket rims of both middle joint and bell, but are lost (see the oboe H. Richters-no. 27 for a similar instrument, with all mounts still there). The finial (not so highly flarerd, and without a finial cup) is turned from a separate piece of wood, but looks orginal; four cracks in the wall of the bell flare are glued.
The stamps: H.RICHTERS with a cloverleaf, the short stem pointing to the left.

On this oboe, all holes for the pivot pinss are drilled through the key rings. On many ebony oboes by Richter, these holes are ‘blind’, which means that there is no exit of the hole and that there is only one side to put the pivot pins in. The oboe HR9 instrument is in perfect playable condition; a pitch of  a=415 Hz was without any problems possible.

* There has been some discussion about the wood of which the instrument is made. The wood has relatively wide growth rings, the colour of the wood is now brown (probably caused by impregnating with oil, shortly before the instrument was given on loan to the Gemeentemuseum), it looks now very much like yew or a similar soft wood. On a pho-to, taken some years before, the colour is however a much more light yellow, as like unstained boxwood.

**The Richters family, a summary**

No new information about the Richters family has turned up since I did the research for my dissertation. I give here a summary of the most relevant facts. At least three members of the Richters family made musical instruments. They all were born and lived in Amsterdam, but the Richters came originally from Laer, a town near Münster in Westphalia, Germany. Frederich (Fredrik Coenraats) Richters, born in or around 1650, was a turner in Amsterdam who in 1676 married the 24-year-old Maria Masen from Krefeld. This marriage did not last long, for in 1680 Frederik Richters wed the 21-year- old Catrina Jans. She was the mother of (at least) three sons: Johannes (1681), Hendrik (1683) and Fredrik (1694). Hendrik, Fredrik and a son of Johannes, became instrument makers. We know that because in 1731 a contract was drawn up (by notary *Hendrik van Aken*) under the terms of which *Fredrik Rigters*, a son of *Johannis Richters*, was apprenticed to *Fredrik Richters*. There are also two woodwind makers with the name Fredrik Richters.

Hendrik Richters died on October 20 1727. An inventory was made which shows what a wealthy man he was. He owned several properties. The contents of his house were valued on December 16 1727. The list of musical instruments makes interesting reading: '4 old, broken *fluitrottingen*, 24 *moffe fluyten*, 9 ivory *fluiten*, *1quart fluit* with ivory, 7 *fluyt doesen*, 1 of them old, 2 *feselette fluyten* , 2 *traversos*, 3 old *alt(fluiten)*, 3 *basfluiten* and 1 unassembled *basfluit*, 1 old bassoon, 2 yellow oboes and 1painted black, 3 new oboes and 1 old, small oboe, 1 *hobo de moer* (oboe d'amore), 9 *salmooys* (chalumeaux) and 5old violins.'

> Some remarks on this list: the *fluiten* were probably recorders; *fluyt doesen* were surely recorders (flûtes douces); *fluitrottingen* walking stick recorders. *Altfluiten* are not by definition the same instruments as modern alto recorders in f1, but *basfluiten* were bass recorders in F. *Feselette fluyten* were likely flageolet recorders. 'Moffe' in *moffe fluyten* means probably 'German', which however doesn't automatically mean that these instruments were traverso's (German flutes, as opposed to English flutes, which were recorders). I have never found in old Dutch inventories or other sources instruments which were named 'German flutes' or 'English flutes'.

There is no proof that Hendrik Richters made the flutes which are listed in the inventory. We know only about oboes with his stamp; the same applies to Fredrik Richters. Most woodwind makers of the time in Amsterdam (and elswhere in Europe, as far as I know) made all types of instruments (recorders, traversos, double reed and sometimes also single reed instrumets). Hendrik and Fredrik Richters were exceptions to this rule.

Fredrik Richters married (in 1729) *Maria Reringh*, a niece of the renowned Amsterdam silversmith *Hildebrand van Flory* (1657-1754). After the death of his brother Hendrik, Fredrik moved into his house and workshop on Nieuwe Leliestraat; twelve years later he moved to a house on the opposite side of the street, where he lived until his death in 1770. On April 22 1716 Fredrik Richters was named among the ten leading, best-qualified turners of Amsterdam in a list compiled by *Abraham Joosten* at the request of the municipal aldermen. Like his brother Hendrik, Fredrik Richters had no offspring to succeed him in the workshop. He left about 15,000 guilders at his death, in those days a large sum of money, some of which he left to the children of the silversmith Hildebrand van Flory.

**Makers’ marks of Richters**

There is a strong family resemblance between the stamps used by the brothers Hendrik and Fredrik Richters: H.RICHTERS and F.RICHTERS, curved, and not in scrolls. Many of the stamps on ebony Richters oboes are somewhat indistinct, making it hard to tell whether there is a full stop between their respective initials and surnames; in some cases one of the serifs on the right-hand side of the H or F could be construed as that type of full-stop. On the best impressions, though, the full-stop is quite distinctly centred at half-letter height. Below the name is a clover leaf; the short stalk on Hendrik Richters' oboes clearly bends to the left, Fredrik Richters' slightly longer stalk describes a smaller curve to the right.
Reasonably good impressions are found on H. Richters' oboes nos. 13 and 24. In the stamp on Hendrik Richters' oboe no. 9 his name and initial are ca. 12.5 mm wide, the letters are 1.5 mm high and the clover leaf (with stalk) is 3 mm high and 2 mm wide.
On Fredrik Richters' oboe no. 1 his name in full occupies ca. 120 mm, the letters are 1.8 mm high and the clover leaf with the slightly longer stalk is 4.2 mm high.


*stamp on F. Richters oboes 1, 3 and 4*


*stamp on F. Richters oboe 2*


*common stamp on oboes of H. Richters*


*stamp on tenor oboe (HR30) by Hendrik Richters*


*stamp on oboe 1 by H. Rijkstijn*

There are however two exceptions to the aforementioned stamps. On Hendrik Richters' only tenor oboe (no. 30) the name H.RICHTERS is placed in a scroll ca. 18 mm wide and 2.8 mm high in the middle, without a clover leaf or other marks. The other exception is F. Richters' oboe no. 2: stamped between the maker's name and the clover leaf are the letters IS. The name is a little wider on this oboe (ca. 14.3 mm) and the letters are slightly taller (ca. 2.3 mm). It is tempting to say that this instrument could have been made by the younger Fredrik, the son of Johannes Richters (IS interpreted as Johannes’ Son?).

Two oboes, made in the Richters’ style, have a different maker’s name: H.RYKSTYN, in a flat curve, no scroll, 14 mm wide, the letters 1.6 mm tall with below the name a 4.0 mm tall clover leaf, its stalk bending towards the right. This stamp looks very much like those used by Hendrik and Fredrik Richters. The stalks on Hendrik Richters' oboes are relatively short and bend to the left; Rijkstijn's stalks are relatively short and bend to the right, and Fredrik Richter's are relatively long and bend slightly to the right.

On the Rijkstijn-oboe No. 1 the stamps are on all joints clear and give no reason for confusion. However, the names stamped on oboe no. 2 are anything but distinct, being blurred and crumbling at the edges. The most legible of them is on the bell, where it is situated on the 'waist' between the resonance holes. Adkins 1990 writes that the American oboe-maker Mary Kirkpatrick reported a Richters stamp over which Rijkstijn's was superimposed. However, personal inspection revealed no trace whatsoever of a Richters stamp. Because the clover leaf clearly differs from the one found on the Richters brothers' stamps but does resemble the clover leaf on Rijkstijn's oboe no. 1, there can be no doubt as to the instrument's provenance, and both Richters can be ruled out as its makers.

No biographical data pertaining to a maker by the name of H. Rijkstijn were found. Because also Rijkstijn's stamp bears a marked resemblance to the stamp used by the Richters family, Rijkstijn may have learned his trade from them; the year, 1761, engraved on Rijkstijn's oboe no. 1 dates him as a contemporary of Fredrik I- Richters (1694-1770) rather than Hendrik Richters (1683-1727). Although the surname Rijkstijn was found in the archives (Amsterdam), there does not appear to be any connection with an instrument maker.

Finally, a few oboes have been found without makers' marks. Some of them are beautifully made, likely by Hendrik or Fredrik Richters. Some other instruments, however, show one of more irregular details; maybe that they come from other makers who tried to make oboes in the style of Richters.

The distribution of Hendrik and Fredrik Richters' stamps is remarkably consistent: above fingerhole 1, between holes 5 and 6 and on the bell flare. The stamps are not always distinct on the hard ebony. Over-zealous cleaning of the oboes has not benefited the crispness of the impressions either.

**The instruments and their collections**

Concerning the inventory numbers: HR1 (etc.) are the numbers I have used in my dissertation *Dutch woodwind instruments and their makers, 1660-1760* (2005). The numbers beginning with 'MUZ' refer to the new classification in the Gemeentemuseum in Den Haag; the Ea-numbers are from the previous classification (which was used in the catalogue *Niederländische Dopperrohrblattinstrumente des 17. und 18. Jahrhunderts - Dutch double reed instruments of the 17th and 18th centuries* (Laaber 1997) by Rob van Acht, Jan Bouterse and Piet Dhont (ABD 1997). I have also given the numbers given by Adkins 1990 and Young 1993.

Concerning measurements and drawings: most of the oboes I have checked *in situ*, which means in the museum or private collections where they were preserved. If possible and permitted, I have taken measurements of the oboes. Most of these data are published in Appendix C of my dissertation (Bouterse 2005), in which also are included summaries of the measurements I have taken for the drawings in ABD 1997.

Concerning photos of the oboes: in ABD 1997 the oboes are depicted in full length (the joints mounted); of some instruments close ups of keys and rings are given, I have not personally checked the instruments with an * (such as * HR10 in Bonn).

**The oboes by Hendrik Richters**

HR1- oboe in c1, ebony, decorative ivory turnery, engraved silver keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1933x0286 (Ea 286-1933).
Adkins: HGM 286-1933 Young: H.Richters - 1
Description, measurements (also pitch measurements) and drawings in ABD 1997.

HR2- oboe in c1, ebony, decorative ivory turnery, engraved silver keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1933x0436 (Ea 436-1933).
Adkins: HGM 436-1933 Young: H.Richters - 2
Description, measurements (also pitch measurements) and drawings in ABD 1997. Close up photos in Bouterse 2005.

HR3- oboe in c1, ebony, decorative ivory turnery, engraved silver keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1933x584 (Ea 584-1933).
Adkins: HGM 584-1933 Young: H.Richters - 3
Description, measurements and drawings in ABD 1997.

HR4- oboe in c1, ebony, decorative ivory turnery, engraved silver keys; Rijksmuseum Amsterdam, Netherlands, inv. no. BK-NM-11430-85 (ex Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: Ea 7-x-1952).
Adkins: HGM 7-X-1952 Young: H.Richters - 4
Description, measurements and drawings in ABD 1997. Close up photos in Bouterse 2005. Photo on the website of the Rijksmuseum.

HR5- oboe in c1, ebony, decorative ivory turnery, keys missing; Rijksmuseum Amsterdam, Netherlands, inv. no. BK-NM-11430-79 (ex Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: Ea 8-x-1952)
Adkins: HGM 8-X-1952 Young: H.Richters - 5
Description, measurements and drawings in ABD 1997. Close up photos in Bouterse 2005. Photo on the website of the Rijksmuseum.

HR6- oboe in c1, ebony, decorative ivory turnery, engraved silver keys; Rijksmuseum Amsterdam, Netherlands, inv. no. BK-NM-11430-11 and/or BK-15605 (ex Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: Ea 15-x-1952)
Adkins: HGM 15-X-1952 Young: H.Richters - 6
Description, measurements, some photos and drawings in ABD 1997.
Photo on the website of the Rijksmuseum (under BK-15605).

HR7- oboe in c1, ebony, plain ivory rings and unengraved silver keys; Rijksmuseum Amsterdam, Netherlands, inv. no. BK-NM-11182 (ex Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: Ea 17-x-1952).
Adkins: HGM 17-X-1952 Young: H.Richters - 7
Description, measurements (also pitch measurements), drawings and close up photos in ABD 1997. Photo on the website of the Rijksmuseum.

HR8- oboe in c1, ebony with silver mountings and engraved silver keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1933x284 (Ea 284-1933).
Adkins: HGM 284-1933 Young: F.Richters - 2 (by Adkins and Young 1993 attributed to Fredrik Richters, by Young 1982 to Hendrik Richters).
Description, measurements (also pitch measurements), drawings and close up photos in ABD 1997. Also close up photos in Bouterse 2005.

HR9- oboe in c1, European boxwood (perhaps unstained), silver bead(s) and brass keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1996-x0001 (Ea 1-x- 1996).

Not in Adkins 1990, Young 1993 and ABD 1997; description and measurements (also pitch measurements) and photos by the author in Bouterse 2005.

* HR10- oboe in c1, ebony with ivory turnery and silver keys; silver repair band in bell. Beethoven Archive, Bonn, Germany. Inventory number: Zimm. 93.
Adkins: BBA Zimm. 93 Young: H.Richters - 9
Description, photos and concise measurements in Rainer Weber, *Zur Restaurierung von Holzblasinstrumenten aus der Sammlung von Dr. Josef Zimmermann im Bonner Beethoven-Haus,* Celle 1993. One pitch indication by Rainer Weber. A summary of the measurements in Bouterse 2005.

* HR11- oboe in c1 , ebony, decorative ivory turnery, engraved silver keys; Museum of Fine Arts, Boston Ma, U.S.A. Inventory number: 1985.705.
Adkins: BMFA 1985.705 Young: H.Richters - 19 (ex Van Tricht; misspelled *Van Tright* by Young)
Adkins 1990 gives some measurements (in graphics or tables) of this instrument.

HR12- oboe in c1, ebony, decorative ivory turnery, engraved silver keys; Muziekinstrumentenmuseum MIM Brussels, Belgium. Inventory number: 1981.
Adkins: BMI 1981 Young: H.Richters - 23
Description, concise measurements andsome photos by the author in Bouterse 2005.

HR13- oboe in c1, ebony, decorative ivory turnery and engraved silver keys; private collection, London, England.
Adkins: LGO (Guy Oldham) Young: H.Richters - 22
Description, measurements and photos by the author in Bouterse 2005.

HR14- oboe in c1, ebony, decorative ivory turnery and engraved silver keys; private collection (Han de Vries), Amsterdam, Netherlands.
Adkins: AHV-1 Young: H.Richters - 16
Description, concise measurements (no bore measurements) and photos by the author in Bouterse 2005. See also Phillip T. Young, *Loan exhibition of historic double reed instruments* (University of Victoria, 1988), No. 15; and Han de Vries & Helen Tilmanns: *Hobo d'amore, the collection of oboes (1680-1980) of Han de Vries* (Rijkmuseum Twente, 1999).

* HR15 oboe in c1, ebony, decorative ivory turnery and engraved silver keys; private collection in Boston (ex-Piguet, Switzerland).
Adkins: BMP Young: H.Richters - 13
Measurements by Mary Kirkpatrick, published in the appendix by Mary Kirkpatrick to the article by Michel Piguet, 'Die Oboe im 18en Jahrhundert; Versuch einer Chronologie verschiedener Oboentypen anhand von Messungen und Betrachtungen von neunzehn Instrumenten aus der Sammlung M. Piguet', Basler, *Jahrbuch für historischer Musikpraxis* 12 (1988), p. 81-107. A summary of the measurements in Bouterse 2005.

* HR16- oboe in c1, ebony, decorative ivory turnery and engraved silver keys; Metropolitan Museum of Art, New York, U.S.A. Inventory number: 53.56.11.
Adkins: NYMMA 53.56.11 Young: H.Richters - 11
Adkins 1990 gives some measurements (in graphics or tables) of this instrument.

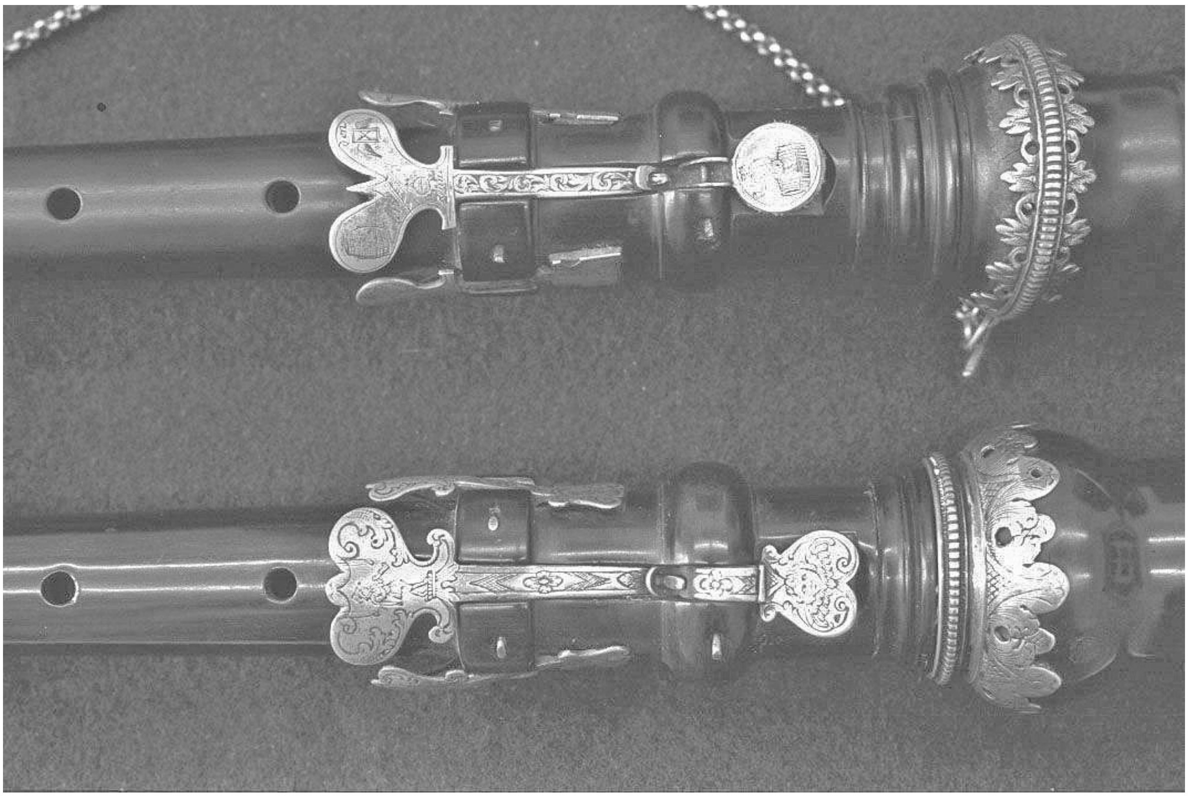
HR17- oboe in c1, ebony, decorative ivory turnery and engraved silver keys; Bate Collection, Oxford, England. Inventory number: 2037.
Adkins: OBC 2037 Young: H.Richters - 20
The Bate collection published 1989 a drawing by Dick Earle with measurements of this oboe. Description, a summary of the measurements and photos by the author in Bouterse 2005.

HR18- oboe in c1, European boxwood with an ivory ring, silver band and engraved silver keys; Bate Collection, Oxford, England. Inventory number: 2040.
Adkins: OBC 2040 Young: H.Richters - 24
Description, measurements and photos by the author in Bouterse 2005.

* HR19 oboe in c1; private collection, Tokyo, Japan.
Adkins: TMH (Masashi Honma; ex Bruce Haynes) Young: H.Richters - 17
No measurements and description of this oboe.

HR20- oboe in c1, ebony, decorative ivory turnery and engraved silver keys; National Music Museum (formerly: America's Shrine to Music Museum), Vermillion SD, U.S.A. Inventory number: 4547.
Adkins: VSM 4547 Young: H.Richters - 18 (ex Han de Vries)
Description, concise measurements and photos by the author in Bouterse 2005.

HR21- oboe in c1, ebony, decorative ivory turnery and engraved silver keys; Library of Congress, Washington DC, U.S.A. Inventory number: 158.
Adkins: WLC 158 Young: H.Richters - 8
Description, concise bore measurements (from an unpublished drawing by Adkins which is in the museum archive) and photos by the author in Bouterse 2005.



*C-keys on the oboe HR23 (above) by Hendrik Richters and the unstamped oboe RS04 (now in Paris); both instruments with silver ornaments, no ivory mountings.*

* HR22 oboe in c1; private collection, New Paltz NY, U.S.A.
Adkins: NPMZ (Michael Zadro) Young: H.Richters - 15
According to Adkins 1990, only a middle joint with one key of this instrument survived.
No measurements of this oboe.
HR23- oboe in c1, ebony with silver mountings; Kunsthistorisches Museum, Vienna, Austria. Inventory number: 653.
Adkins: VSAM 653 Young: H.Richters - 10
Only measurements of the lenghts of the three parts and photos (by the museum and by the author) in Bouterse 2005.

HR24- oboe in c1, European boxwood brass keys, bell by Borkens; Horniman Museum, London, England. Inventory number: 14-5-47/120.
Adkins: LHM 14-5-47/120 Young: H.Richters - 12
Description, measurements and photos by the author in Bouterse 2005.

HR25- oboe in c1, ebony, decorative ivory turnery and engraved silver keys; private collection, Grouw, Netherlands.
Not in Adkins 1990 and Young 1993.
Description, measurements and photos by the author in Bouterse 2005.

*HR26- oboe in c1, European boxwood; private collection (Andreas Glatt), Antwerp, Belgium.
Not in Adkins 1990 and Young 1993.
No description or measurements of this instrument.

HR27- oboe in c1, European boxwood; Stichting Museum Vosbergen, Netherlands (ex Drents Museum, Assen, Netherlands. Inventory number: H1911-2a).
Not in Adkins 1990 and Young 1993.
Concise description of this instrument by the author in Bouterse 2005 (Appendix C).

HR28- oboe in c1, ebony, decorative ivory turnery, brass keys; collection of the London antique dealer Tony Bingham (1997), who sold it to a private collection in America.
Not in Adkins 1990 and Young 1993.
Concise description of this instrument by the author in Bouterse 2005 (Appendix C).

*HR29- oboe in c1, ebony, decorative ivory turnery, silver keys; private collection, New Zealand.
Not in Adkins 1990 and Young 1993.
A few photos (see Bouterse 2005, Appendix C), but no description or measurements of this instrument.

HR30- tenor oboe in f1, stained European boxwood, ivory rings and silver keys; Musée de la Musique, Paris, France. Inventory number: E.1185.
Young: H.Richters - tenor oboe 1
A drawing with full measurements of this oboe by Jean-François Beaudin was published by the museum in 1987. Description, some photos and a summary of the measurements by the author in Bouterse 2005. Photo on the website of the museum.

**The oboes by Fredrik-I and Fredrik-II Richters**

FR1- oboe in c1, ebony, engraved silver rings and (plain) silver keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1933x0439 (Ea 439-1933).
Adkins: HGM 439-1933 Young: F.Richters - 1
Description, measurements (also pitch measurements), drawings and close up photos in ABD 1997. Some photos in Bouterse 2005.

FR2- oboe in c1, ebony, plain ivory rings and engraved silver keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1933x0624 (Ea 624-1933).
Adkins: HGM 624-1933 Young: F.Richters - 3
Description, measurements, drawings and close up photos in ABD 1997. Some photos in Bouterse 2005.

FR3- oboe in c1, stained fruitwood, silver mounts and keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1933x0434 (Ea 434-1933).
Description, measurements, drawings and close up photos in ABD 1997.

FR4- oboe in c1, stained European boxwood, plain ivory rings, silver keys; private collection (Han de Vries), Amsterdam, Netherlands.
Adkins: AHV-2 Young: F.Richters - 4
Description, measurements and photos by the author in Bouterse 2005. See also Phillip T. Young, *Loan exhibition of historic double reed instruments* (University of Victoria, 1988), No. 16 and Han de Vries & Helen Tilmanns: *Hobo d'amore, the collection of oboes (1680-1980) of Han de Vries* (Rijkmuseum Twente, 1999).

**Unstamped oboes in the Richters style**

RS1- oboe in c1, stained European boxwood, silver mounts and engraved silver key Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: Ea 4-x-1952.
Adkins: HGM 4-x-1952 Young: F.Richters - 6
Description, measurements and drawings in ABD 1997.

RS2- oboe in c1, ebony(?), silver mounts and engraved keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: MUZ-1933x0442 (Ea 442-1933).
Description, measurements and drawings in ABD 1997.

RS3- oboe in c1, ebony(?), silver mounts and engraved keys; Gemeentemuseum Den Haag, The Hague, Netherlands. Inventory number: Ea 5-x-1952.
Adkins: HGM 5-x-1952 Young: F.Richters - 5
Description, measurements and drawings in ABD 1997.

RS4- oboe in c1, ebony with silver keys and mounts; Musée de la Musique, Paris, France. Inventory number: E.999.9.3.
Description, measurements (only lengths of the joints) and photos by the author in Bouterse 2005. I discovered this oboe when it was in the collection of the Kunsthistorisches Museum in Wien/Vienna (ex-collection Arnold Rotschild. inv. no. AR 1912); since c. 2000 this oboe is in the museum in Paris.

RS5- oboe in c1, ebony with silver keys and mounts; Waddeson Manor, Aylesbury, Buckinghamshire, England.
Adkins: BWM Young: F.Richters - 7
Description, measurements (by the author) and photos (by the museum) in Bouterse 2005.

RS6- oboe in c1, stained European boxwood with silver mounts and engraved silver keys; private collection, on loan to Han de Vries, Amsterdam, Netherlands.
Description, measurements and photos by the author in Bouterse 2005.

**H. Rijkstijn**

1- oboe in c1, brown-stained European boxwood, silver mounts, brass keys and the inscription *Douwe de Boer, Anno 1761*; Frysk Museum, Leeuwarden, Netherlands; on loan to Han de Vries, Amsterdam, Netherlands.
Description, measurements and photos by the author in Bouterse 2005.

2- oboe in c1, ebony, ivory mounts and silver keys; private collection, Lausanne, Switzerland.
Adkins: LDB Young: H.Richters - 21
Description, measurements and photos by the author in Bouterse 2005.

**Some comments to the instrument lists**

At first: because of the privacy I can not give the names and addresses of some small private collections. Other owners however are well known, such as the oboist Han de Vries in Amsterdam.

Bruce Haynes (Canada) and Andreas Glatt (Antwerp) passed away in recent years; I do not know about where the Richters oboes which were in their collections are now.

I personally examined the following Hendrik Richters oboes (i.e. in situ and taking detailed measurements): nos. HR1-9, 13, 14, 18, 20, 25 and 30. The descriptions and/or measurements of oboes HR11, 12, 16, 21, 23 and 28 were less detailed. For the following instruments I was able to consult existing descriptions and/or measurements: nos. HR10, 15, 17 and 30. Some photographs of no. HR 29 were provided by the New Zealand flute-maker Alec Loretto, but no further information about this oboe was available. For oboes HR19, 22, 26 and 27 I had virtually no information at my disposal - such information as there was came in the form of descriptions, measurement data or photographs from Piet Dhont (personally) and from Cecil Adkins' article of 1990 in the case of nos. HR19 and 22. I myself have written extensive descriptions and collected detailed measurements of all the Fredrik Richters oboes and all the unstamped instruments in Richters' style as well.

The above lists differ in some aspects from those of Adkins and Young, the latter's being based on Adkin's. Not only have new instruments been discovered (or rediscovered) over the past few years, but a few oboes of whose existence nothing had been known were not yet attributed, or if they were, it was to the wrong maker.

As I mentioned before, the oboe cited by Adkins in Lausanne (listed by him under *LDB*) was attributed by him to Hendrik Richters with the information that the stamp on it is superimposed by a stamp with the name Rijkstijn (Adkins had been told this by the American oboe maker Mary Kirkpatrick). The results of my own investigation gave me no convincing reason to assign the instrument to Richters.

More problematical was the attribution by Young and Adkins of oboe no. HR8 to Fredrik Richters. Close scrutiny of the stamp has dispelled any remaining doubts, this instrument was surely made by Hendrik Richters. Adkins' following attribution to Fredrik Richters of the oboes Ea 5-x-1952 and Ea 4-x- 1952 in The Hague (based on the similar design of the keys and other silver fittings to HR8) is thus doubtful, even if the latter instrument's date (1744) cannot have been made by Hendrik Richters either.
The discovery of a stamp enabled oboe Ea 434-1933 in The Hague to be attributed to Fredrik Richters, despite Young's statement that this instrument, contrary to earlier information, does not bear Richters' stamp. Adkins, emulated by Young, also attributed the oboe at Waddesdon Manor (no. RS5) to Fredrik Richters, but except for a monogramme on one of the silver fittings, the letters of which can be interpreted as FR, this instrument is unstamped. In order to avoid any misunderstandings, all the unstamped instruments in the list are specified as 'unstamped oboes in the style of Richters'.

For information about historical records and previous owners of oboes by Richters and Rijkstijn see my dissertation (Bouterse 2005), par. 4.21 (Richters) and 4.23 (Rijkstijn) and Appendix B (*Reports of Dutch woodwind instruments in sale catalogues and inventories between 1700 and ca. 1830*).

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**Research questions**

It is obvious that the information of this group of 42 oboes is rather diverse. Dealing with all those data from various sources is not easy; it is therefore important ‘to know what you want to know’ about the instruments and their makers.
Of enerally interest is, first, all additional (but in most cases vary seldom available) basic information: what is known about the history of each oboe? Who were previous owners and players? What is the meaning of inscriptions? Can we see how old the instrument is? Are there invoices with prices, fingering charts, reeds and staples, boxes or covers or musical scores coming with the oboes, and so on?
Secondly, there is the group of data which results of examining and measuring the oboes: are the instruments complete? Are all parts original? Which are unique or odd features? What is the condition (damages, traces of repair, traces of playing)?
In the third place comes all information about the playing characteristics of the instruments: what can be said about sound, pitch and other acoustical properties?

After these three categories of information comes the evaluation of the data. Many questions can be asked. For instance: i

- Is it possible to date the oboes, is there any development visible?
- Is it possible to assess the way the oboes were designed and made?
- Can anything be said about the relation between the oboes by Hendrik and Fredrik Richters and those by other Dutch woodwind makers?
- Were these oboes not only good looking instruments, but had they also good playing qualities?

In my next article I will discuss some methods how to answer these questions.

Scientific research is only possible when there is exchange of information and when there is room for critical response. Don’t hesitate to contact me, let me know your comments. I’ll do my best to answer you, directly or in an article. My e-mail address: info@mcjbouterse.nl.

**The oboes of Richters: about methods of research in woodwind instruments**
**Part 2: Points of departure; a close look at a boxwood oboe by Hendrik Richters**

In Part 1 of this article (see Comm. 2000 in FoMRHi-Q. 126, March 2014) about the oboes by the members of the Richters family (and two confusingly similar instruments with the stamp of H.Rijkstijn), I ended with the remark that you need ‘to know what you want to know’. That is important in many fields of modern scientific research: formulating in advance one of more theses or questions helps you to do the research in a structured way. However, finding the right questions is not always easy and poses also a danger in the study of musical instruments. In my opinion is it just good that you must have an open mind to each instrument that crosses your path, and that you are not too much distracted by a thesis or theory that was posed beforehand. Let the instruments speak for themselves!

Of course, it helped me in my research very much that I had some experience in examining woodwind instruments and knew - because I had also made copies of them - which aspects are important or interesting to look at. But that open mind has to be there at the start of your research. Only then you will come closer to the instruments and their makers.

I mentioned at the end of Part 1 of this article some questions:

- Is it possible to date the oboes; are there earlier and later instruments; is there any development visible in the oeuvre of the Richters family?
- Is it possible to assess the way the oboes were designed and made?
- Can anything be said about the relation between the oboes by Hendrik and Fredrik Richters and those by other Dutch (and other European) woodwind makers?
- Were these oboes not only good looking instruments, but did they also have good playing qualities?

These questions are rather diverse in nature and answering them demands insight in various facets (technical, historical, musical) of research. That entails that it is important - even with an open mind as starting point - to focus on a systematic approach. That means also that all information about the instruments must be checked thoroughly and that the researcher must be aware of the complications in comparing data from various sources. There is always the possibility of the presence of errors or inaccuracies in measurements (including data the researcher compiled him or herself) and so there are other pitfalls which can lead him or her down false tracks.

I am posing these questions because this article is in part written as an addition - with some critical notes - to what Cedil Adkins wrote in his article in the *Journal of the American Musical Society* (1990, Vol XVI, pp. 42-117): ‘Oboes beyond compare; the instruments of Hendrik and Fredrik Richters’. Because this article was seen by Phillip T. Young as the ‘definitive study of the Richters oboes’ (*4900 Historical Woodwind Instruments*, London, 1993. p. 186, footnote 7), I have to be careful with my comments - I hesitate to say that this article is a definitive study. I also think that it is good to give some information about the background to my own work.

What was my point of departure for this article? I started *c*.1980 the hobby of making woodwind instruments and was soon drawn to the exciting world of historical recorders, traversos and oboes. I discovered some of these instruments by Dutch makers and I became interested in their history and backgrounds. I visited the Gemeentemuseum in The Hague, where curator Rob van Acht just had started his work on three catalogues of Dutch woodwind instruments. Subsequently I was asked to contribute to these books, which were published in 1991, 1997 and 2004. In the meantime I extended my research to Dutch baroque woodwind instruments in other collections, which resulted in writing a dissertation (*Dutch woodwind* *instrument and their makers, 1660-1760*, English translation published 2005). In all those years I continued making instruments, mainly recorders and traversos, but also a few oboes.

Which questions became important for me? As a woodwind maker, I am interested in how the oboes were designed and manufactured. That includes a wide variety of technical issues, such as the properties of the materials which were used (for instance: how thick and dry were the wood logs from which the oboes were made?) and the tools (how many reamers did the Richters brothers use for one instrument?). But from that point of departure I became increasingly interested in the background of the Dutch woodwind makers and thence in the cultural and political developments in the Netherlands at the end of the 17th century, and so on. The instruments, however, always came first in my research, they are the actual point of departure.

For my dissertation about Dutch woodwind instruments, the goal was to examine as many instruments as possible by myself. So I have examined 34 of the 42 oboes by (or in the style of) Richters and Rijkstijn which are listed in part 1 of this article. I have to make a few remarks about this examinations:

a) Not all of the oboes were examined by me with the same thoroughness; I did not always have the equipment or time to do so, or it was not permitted to take specific measurements.

b) Some oboes were already measured and described by other people, not in such detail that I could use their data for making an exact copy, but sufficiently for me to use them for my general research purposes.

c) There is always the problem in comparing assessments (such as measurements of the bore profiles of the oboes, or the angles at which toneholes are drilled) of various researchers, which were made with different techniques. It is good to know who made the measurements, with which type of tools, whether they only made sketches, and whether the research was intended for personal use only. If so, it is advisable to make a new drawing of the oboe (scale 1:1). It may happen that you will find then some errors or missing data.

Meticulously measuring and describing the oboes may help us to find clues to answer the questions mentioned before. However, we must be aware of the relative importance of the results. For instance: bore measurements given in hundreths of a millimetre - how were they achieved and how accurate are they really? In the catalogue *Dutch recorders of the 18th century* by Rob van Acht, Hans Schimmel and Vincent van den Ende (Celle 1991) the list of bore diameters was the result of goniometric calculations, rather than direct measurements. Dividing numbers did the trick, resulting in those overestimated accuracies!

d) It is helpful for your research - I even dare to say that it is vital - to have experience in making baroque oboes yourself. Only then you will learn how to look at (and measure) particular parts of the instrument. On the other hand: some instrument makers are not always interested in details which are acoustically not important (such as characteristics of the makers' marks).

e) The best way to know a historical instrument is to have it over a long period of time in your own workshop. I do know that because I had that chance for a few recorders and traversos, and I learned a lot about these instruments. I am still waiting for an interesting baroque oboe...

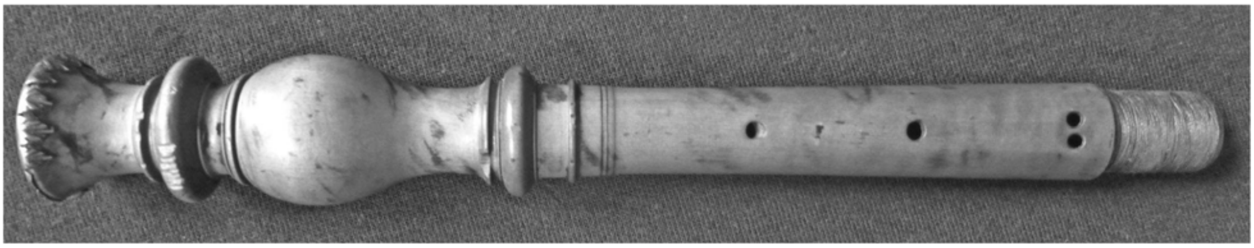
f) If you want to examine the acoustical qualities (playing characteristics) of a baroque oboe, you must of course play the instruments, which also includes having experience in making reeds and staples. Only then you might for instance give an answer to the question whether the oboes by Richters were adapted to the wishes of the players.

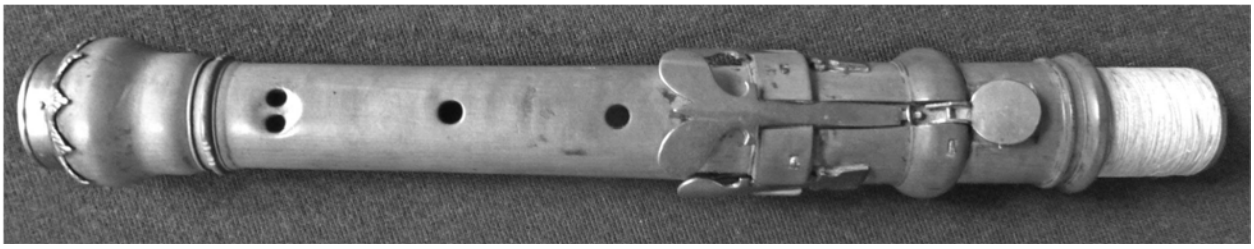
I can tell the readers of this article that while I have some experience in making baroque oboes, I must admit that I am far from being a good player and often need assistance from people who have much more experience than I ever will acquire. For the catalogue of Dutch double reed instruments in the collection of the Gemeentemuseum in The Hague (Laaber 1997) we have asked the professional baroque oboist Piet Dhont to play the instruments.

In my dissertation (par. 1.14.1) I described the situation:
‘Oboes, shawms and bassoons present an additional problem: these instruments can only be played with a reed mounted on a staple. However, not one single original reed is still extant, and only for a few bassoons and racketts have what might conceivably be the original crooks survived. Because the technical properties of these instruments depend heavily on the sizes and qualities of the reeds and staples, it is impossible to draw scientifically valid conclusions from measurements taken in the course of occasional examinations. To a certain extent it is however possible to compare the results of one person playing different instruments during one session. Piet Dhont employed this strategy to examine the Dutch oboes in the Gemeentemuseum Den Haag. In the first place the results of this examination are relative: the timbre and tuning of one particular oboe were compared with those of other instruments in the collection’. Conclusion: comparative playing can give useful results. Playing one oboe by one person may give interesting information for him or her, but can hardly be used for a scientific publications.

**Examination of an oboe by H. Richters from the collection of the Drents Museum, Assen, Netherlands**

In part 1 of this article, I have given this oboe the number HR27. I had seen this instrument only once, after the publication of my dissertation in 2001 and 2005. Before that time the oboe was in storage away from the museum, temporarily out of reach for the curator. As it is now on loan to the Museum Vosbergen in Eelde (a village not far from Assen), I had the opportunity to examine and taking pictures of the instrument. Even some playing was allowed, which is quite an exception nowadays in the world of museums of musical instruments.





I have chosen this oboe as an example how to do a critical examination of a historical instrument, with some notes on methodical aspects of the research.

**1- Type of instrument, history**

This instrument is clearly a baroque oboe, in three parts, in the discant or descant* size. This is the most common type of baroque oboe, with the fundamental tone c1. At the back of the middle joint an inventory number is written in white paint: H1911-2a.

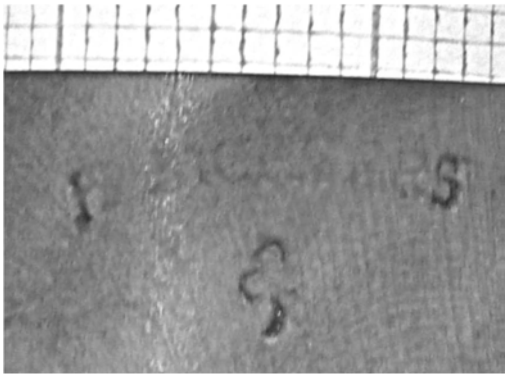
The instrument is complete, all parts are original. There is no information about previous owners of the oboe; no staples or reeds, a cover or documents have come with this instrument.

Notes: *The term discant or descant (or even soprano) in relation to the baroque oboe is nowadays seldom used. Bruce Haynes preferred the name hautboy for the baroque oboe, but as far as I know he has no followers (Bruce Haynes, *The Eloquent Oboe: A History of the Hautboy 1640-1760*, Oxford, 2001).

**2- Maker's marks**

The oboe is stamped with a maker's mark on all joints, but only the stamp on the bell (photo) is reasonably sharp: H.RICHTERS in a slight curve (not in a scroll), with a clover leaf below the name, the stalk of this leaf bending to the left. The shape and size of the stamp on the bell correspond to those on other oboes by Hendrik Richters.* The traces of the stamp on the upper joint are very indistinct and hardly to discern.

The positions of the stamps: on the upper joint above tone hole 1**, on the middle joint between the holes 4 and 5; on the bell in the middle of the bell flare.

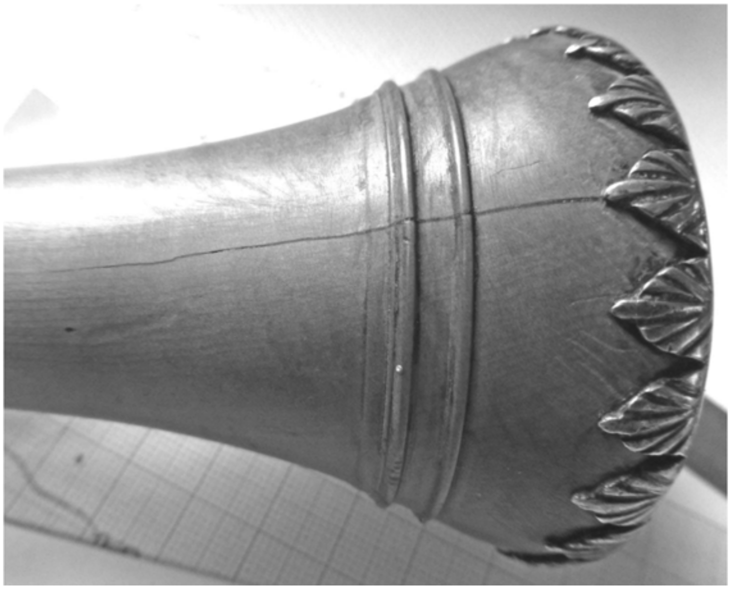


Notes: *Comparing makers' marks from different instruments is not easy, measuring their dimensions on curved surfaces is tricky. The best way is to do all your measurements yourself, using the same method (for instance using graph paper - see photo - instead of callipers for assessing the length of the stamps).
** On most other oboes by H. Richters this stamp is between toneholes 1 and 2.

**3- Materials**

*Wood:* the oboe is probably made of European boxwood, the radial surface of the wood at the front of all joints.* The colour of the wood is now light-to-middle brown, with darker spots (tortoise-shell imitation). The curator of the Vosbergen Museum told me that the oboe was very dirty when it arrived in his collection. Maybe that by cleaning the instrument a bit of the original colour was lost (see photos on the previous page).

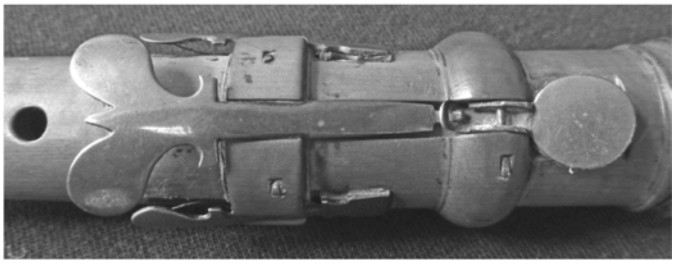
The inside (bore) of the bell is painted black, which is unique for a Dutch baroque oboe. Was it done by Richters or (much) later by a person who has restored the crack in the wall of the bell?



*Crack in the wall of the bell*

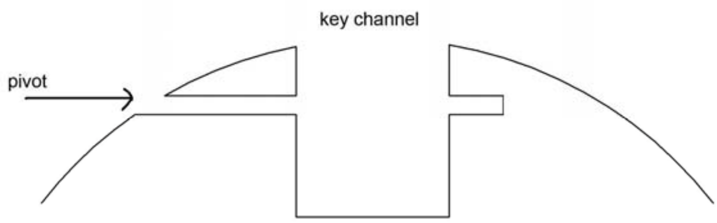
Note: * The only way to assess the species of the wood with certainty is analysis with a microscope. But that means taking a piece of wood from the instrument, which is not desirable. I wrote in my dissertation (para 1.7.2, p. 28): ‘Because woodwind instruments are often highly polished, stained and/or varnished, the determining features are often difficult to discern, warranting room for doubt in a number of cases - not in certain catalogues and publications, though, which boldly identify various kinds of wood without the slightest hesitation. But because those selfsame publications fail to cite any determining criteria, for instance the difference between ebony and the wood of the African grenadilla-tree, these and other woods are listed here [in the dissertation] with reservations.’

*Metal rings*: there are four brass rings attached to the finial of the upper joint, the socket rims of both middle joint and bell, and at the bell rim. These brass rings have triangular lips which are carved with acanthus-leaf patterns. The ring at the finial covers most of its upper face. The ring at the bell rim is attached to the wood with metal pins, whose ends protrude a little through the wood.



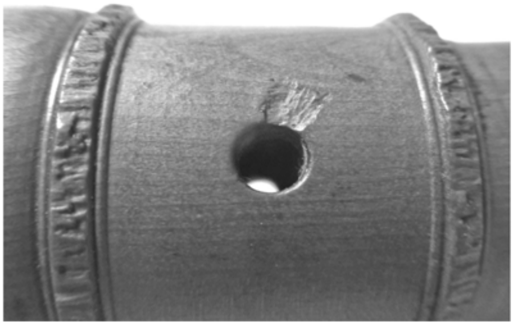
*Keys*: there are three keys; one long key in two sections for c1, and two short keys in one piece for playing d-sharp/e-flat. The keys are well made, in the common design for the period that the instrument was made, and fit (and move) perfectly well in the key channels.
The holes for the pivots of the key are - and this is characteristic for many oboes by this maker - ‘blind' (see drawing), which means that the pivots can only be pushed in from one end.

*Cross section through upper part of the lower key ring, with key channel and blind pivot hole.*



As the pivots hardly protrude from the holes, no attempt was made to remove them. That means that I could not assess exactly the size and shape of the key holes and the key channels. The material of the key springs could not be assessed as well; but it is clear that - as on the other oboes of Hendrik Richters - the springs are attached (shoven) in the key channels. The key pads are made of a felt-like material; it was not possible to assess whether these pads are original.

The threads on the tenons of the upper and middle joint have different colours and are clearly not original.



*The waist of the bell with resonance holes and ‘nibble damage’ at the beads.*

**4- Damage and condition**

There is some damage clearly visible on the oboe, but that damage does not detract from the overall attractive look and generally fine preservation of the instrument. The three parts have not become crooked, in cross-section there is only minor oval warping*, the keys are functioning well, the tone holes are in good condition, the bore of all parts is clean with smooth surfaces.

Concerning the damage:

- There is a crack in the bell, which runs from halfway down the flare to the lower. The crack has been glued, but there is no information or indication when that was done and by whom.
- There is ‘nibble damage' at several beads of the wood (see photos). This damage is peculiar, because these beads seem to be not very vulnerable, and the other surfaces of the wood are just remarkably smooth and well preserved.
- Five lips (out of seventeen) are missing from the brass ring at the finial.

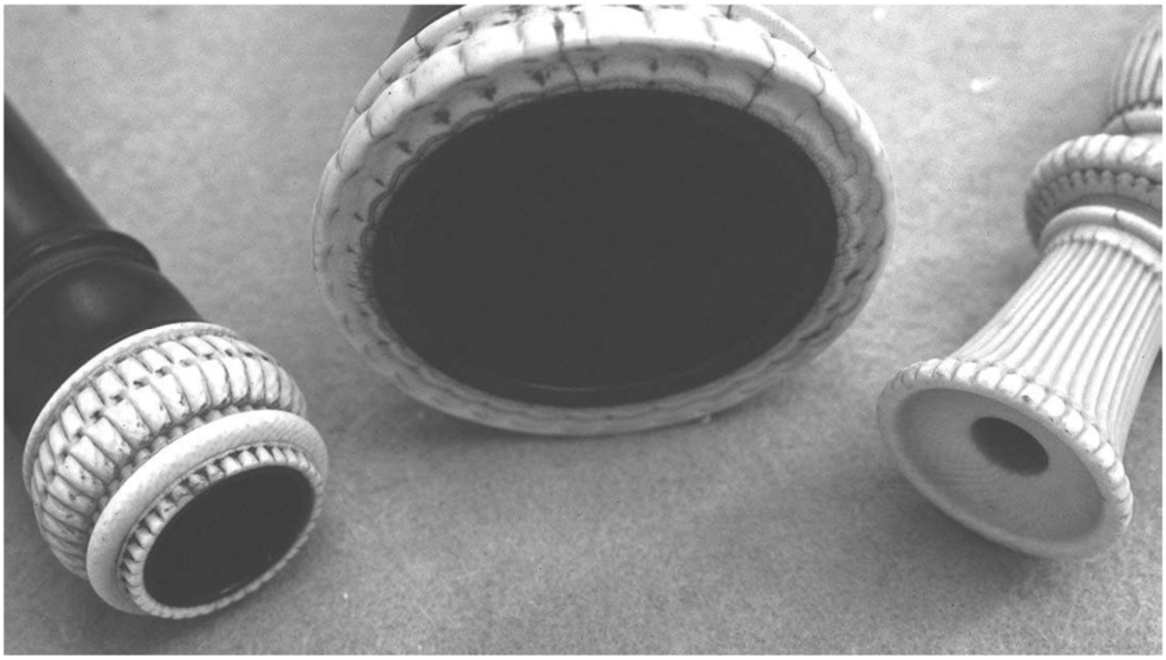
*Baluster of the upper joint with some damage at the brass mounting (missing lips) and to the rings and beads of the wood. The darker spots on the wood (tortoise-shell imitation) are clearly visible.*

Note: * This can be seen as an indication that in about 300 years the wood of this oboe has not shrunk very much.

## 5- Outer design (turnery, proportions)

The oboe is designed in the general style of many Dutch oboes from the beginning of the 18th century, with elegant and expressively turned elements as the baluster and socket groups and a widely flaring bell.* The finial has - like other boxwood oboes but unlike most oboes in grenadilla-wood by Hendrik Richters - a finial which is not widely flaring with a cup (see photo of oboe HR12 in Brussels for an example of a finial with a (shallow) cup).
Bruce Haynes follows in his book 'The eloquent oboe' (Oxford 2001) a classification of the baroque oboe from a study by Eric Half-penny (1949, 'The English 2-and 3-keyed Hautboy', Galpin Society Journal 2: 10-36). At p. 81 he classifies the oboes of H. & F. Richters (and of some other Dutch makers) in 'type A3'. From the text: 'This type shows unusally sharp flares at the finial and short bell and an 'empathic roundness' (he is referring to Adkins 1990) at the balusters.'

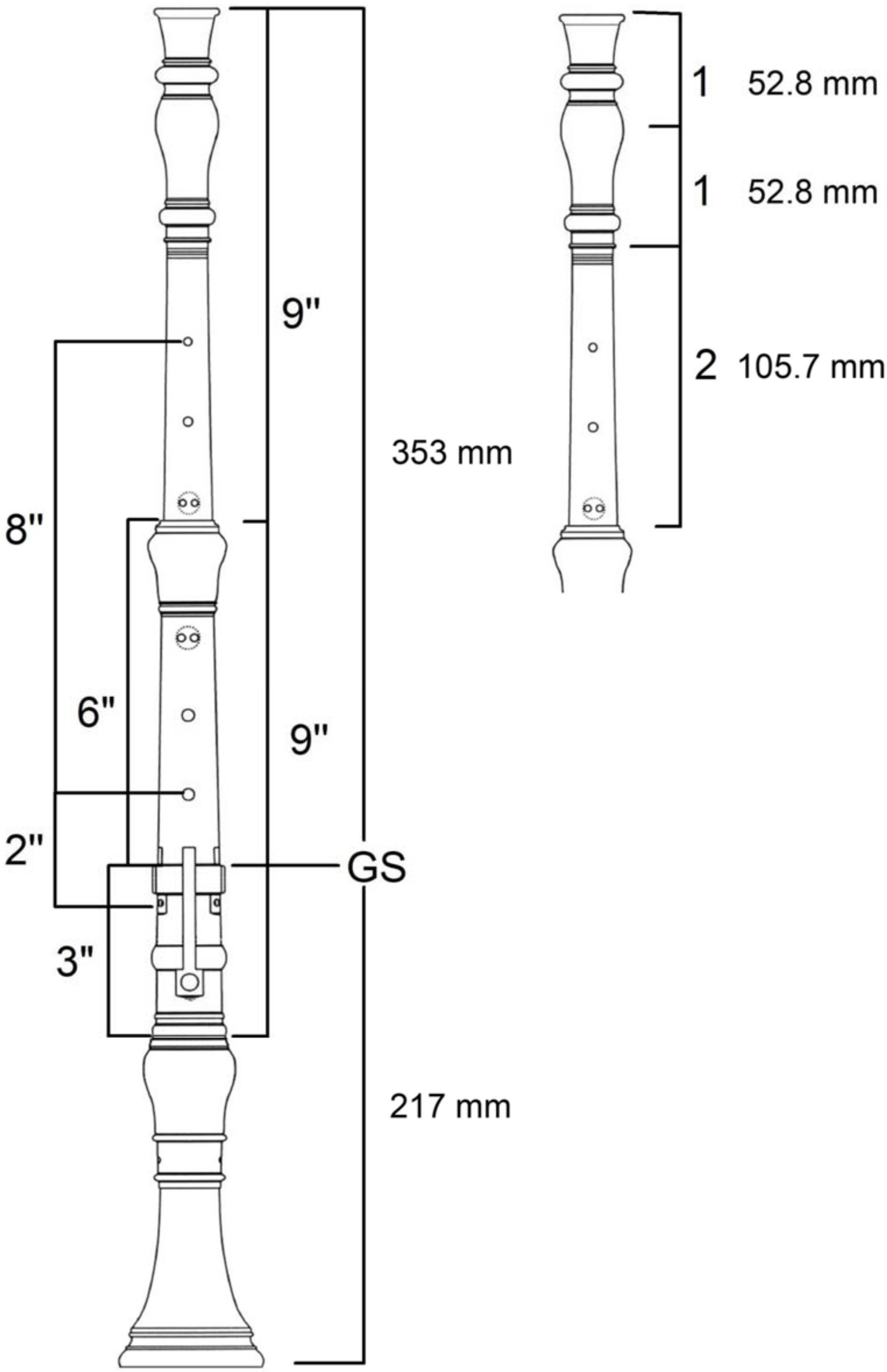
The key rings of the middle joint have the usual shape: the upper key ring with a flat top, the lower key ring rounded, both rings with small flanking beads. Characteristic of the oboes of Richters is that a small bead group just above the lower key ring is missing.



*Oboe HR12 by Hendrik Richters (MIM, Brussels)*

Note: * Adkins writes on p. 43: 'The overall shape of the oboes is consistent and typical of the bold patterns of the early Dutch style'.

It is obvious that assessments as 'elegant','expressive', 'bold'or 'empathic roundness' are rather (or sometimes even very much) subjective. For better understanding, I have given in my dissertation (para 1.9) some definitions of terms which were used in characterising the turnery of the instruments: 'Expressive or lively: turnery characterised by noticeable differences in diameter at fairly short intervals . . . Elegant: this term is used here to indicate a well-balanced combination of attractive curves and beads with carefully finished details . . .'




For the design in relation to the proportions of this oboe we must know the length of the sections. At first I look at the oboe with all parts mounted (the tenons are not visible). The lengths of the upper and middle joint are almost the same (211.5 and 212 mm), the bell measures 146.5 mm. We find similar lengths on other Richters oboes.

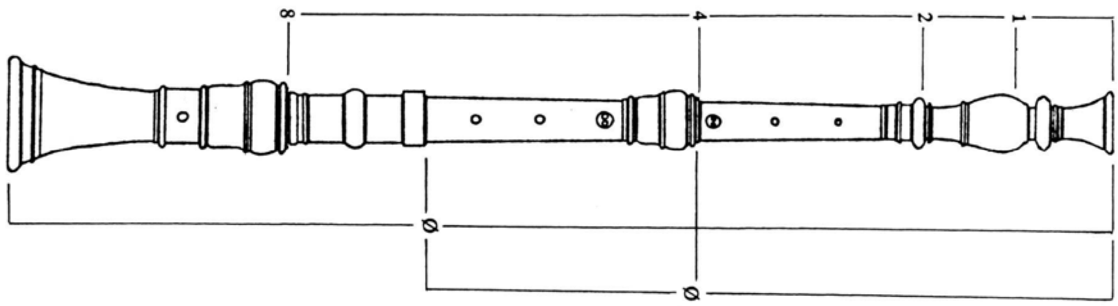
I suppose that he used the *Amsterdamse Voet* (Amsterdam foot), with a length of 282.6mm, which means that both visible sections of both joints are 9 *duimen* (inches) long. There is not such a nice round figure for the length of the bell. However, there is very close to a ‘golden section’ from the top of the upper key ring. Is that why Richters made the bell that size? On several other oboes by him the bell is shorter, about 142 mm, which is 6 Amsterdam inches.

Some other proportional relationships seems to be present, such as the distance between fingerholes 1 and 6 (see drawing above, where I used the profile of another oboe for adding the figures). There are, however, a couple of remarks to be made. At first, I am not sure how, in relation to the proportions, the length between the toneholes was measured by Richters: from the centres of the holes, or the upper or lower edges? At the exterior of the instrument, or where they occur in the bore (which would give slightly longer lengths, as hole1 is drilled under an angle upwards).

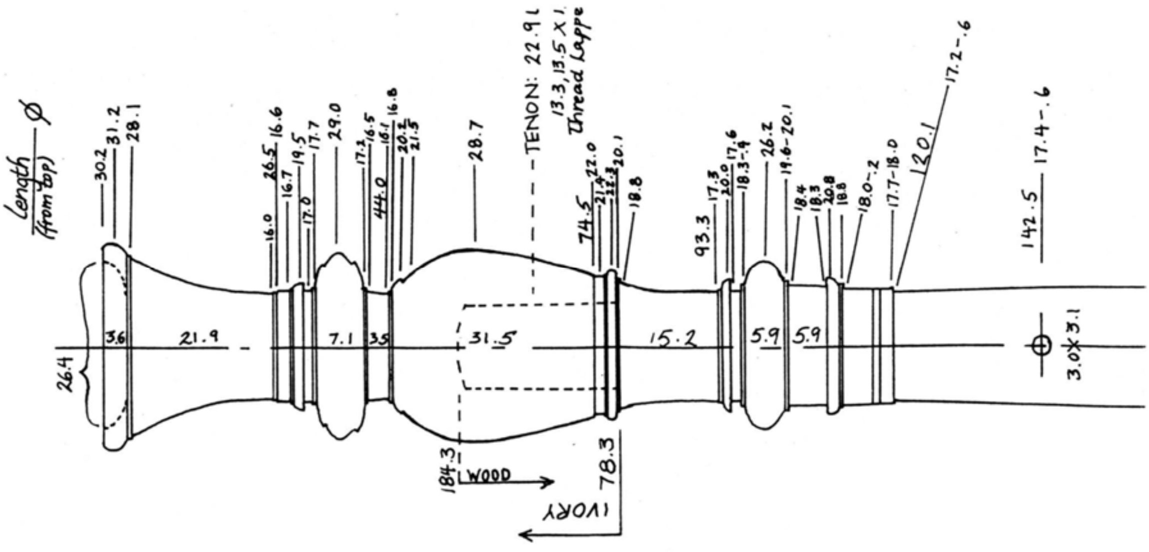
Adkins gives on p. 51 of his article in the *AMIS Journal* a drawing with proportions of another oboe by Hendrik Richters (but without referring to the possible units such as the foot-length which was maybe used by the maker). As far I can see, the oboe he describes is HR17 in the Bate Collection in Oxford (with the inventory number 2037), where he too found a golden section at the upper key ring for the whole oboe. This despite the fact that the upper joint is (because of a more flaring finial) longer, at 214.2 mm. I checked his calculation, and was not convinced by his results. The major (longer part) of the golden section is about 5.5mm too long. The relationship appears better when the length of the upper joint is measured from the bottom of the finial cup of this instrument (which is 3.6 mm deep).

The golden section of the instrument in Assen fits better (even much better) when we considerate (and accept) inaccuracies in measurements of 0.5 mm over a length of 200 mm.

For the baluster of the oboe in Assen I found other, and more convincing relationships (also using different measuring points, see the drawing on the previous page) than Adkins for the instrument in Oxford (see illustration below). His 1-2-4 proportion really does not fit; however the proportions from Assen instrument can be applied to the Oxford oboe, but only with the bottom of the finial cup of that instrument as reference point.




*Proportions of an oboe by Hendrik Richters, from Adkins, Oboes beyond compare.*

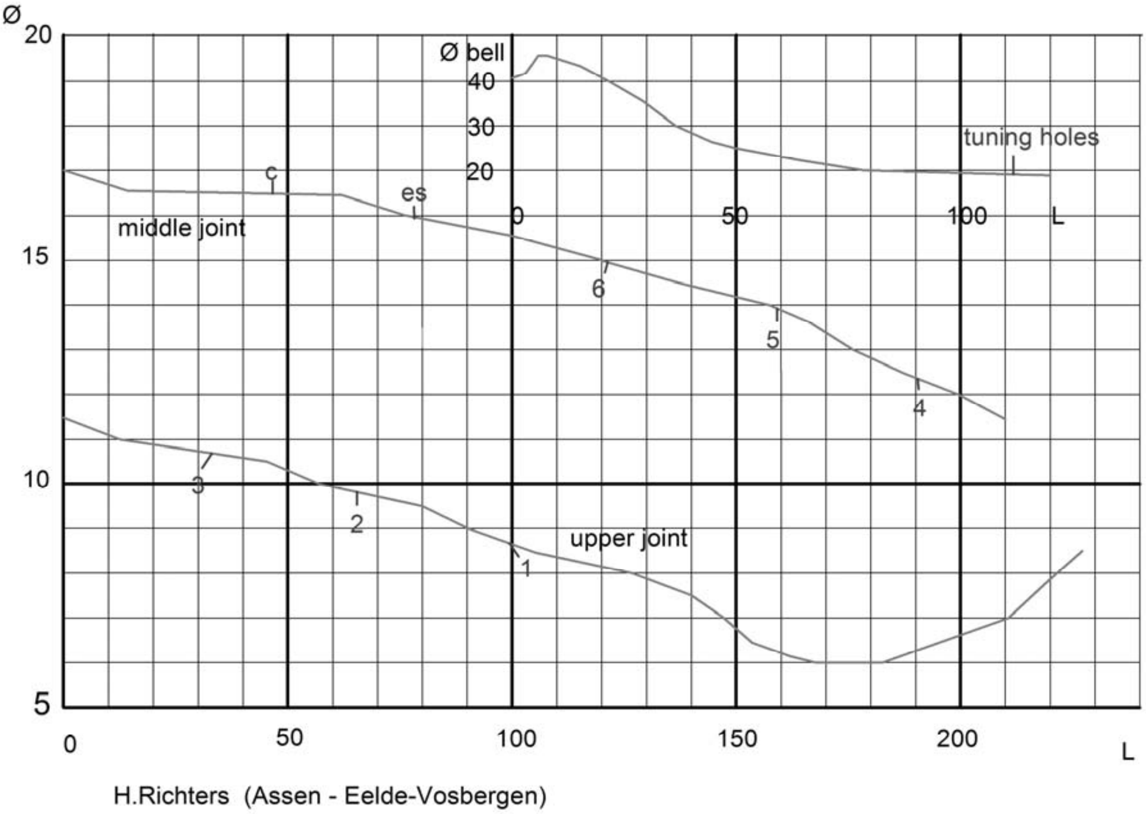



*Measurements of the baluster of the oboe 2037 by Hendrik Richters (Bate Collection, Oxford, drawing by Dick Earle, 1989)*

Do we know whether Richters really used proportions as mentioned above, or that he just was copying a standard model of a baroque oboe, designed by himself, or by other makers?
In another article by Cecil Adkins: ‘Proportions and architectural motives in the design of the eighteenth-century oboe, *Journal of the American Musical Instrument Society*, vol. XXV, 1990), he puts the question of proportions in the context of that time (p. 98): ‘But while there is ample evidence of the use of geometric and proportional systems in architecture, no written records concerning the use of these systems in the design of instruments are known to exist. Indeed, the proportional nature of instrument design is not even apparent to the undiscerning or casual observer, giving rise to questions regarding its validity and usefulness.’
And on p. 104: ‘When historic oboes are analyzed according to any of these schemes, many variations result, even among instruments by the same maker. Changes in decorative features, acoustical modifications, and manufacturing mistakes are only a few of the adjustments that contribute to the differences, and as a result it is often not possible to discern the original concept.’ Adkins quotes Herbert Heyde (*Musikinstrumentenbau*, Leipzig 1986): ‘Were the proportions knowingly applied, or were they simply the consequence of empirical procedures?’

From my own observations I have learned that all possible proportions can be found on historical woodwind instruments, if you are looking long enough and accept small differences. And there can be several causes for these differences between ideal and just not ideal proportions. One example: shrinking of parts of the instruments in the cause of the years.

**6- Inner design (bore profile)**




*In these graphs the bore dimensions of upper and middle joint are drawn in a scale of 10:1 to the length of these joints.* The bore of the bell is drawn in a scale of 1:1 (diameter to length). All diameters are related to the lower end of each joint (= 0 in the length scale).The toneholes are indicated with 1 to 6, the keyholes with es (=e-flat, or d#) and C.*

The dimensions of the bore are - in combination with the position and size of the toneholes - of the greatest importance for the acoustical qualities of woodwind instruments. The bore profiles are - even more than the shapes of the turned exterior - consistent and typical for the instruments of each woodwind maker. It is therefore important to give ample attention to these aspects.

We see that the profile of the bore of this instrument is characteristic for the oboes by both Hendrik and Fredrik Richters. Firstly, the walls of the bore of the upper and middle joint are very smooth, no irregularities such as reamer marks are visible. Concerning the bore diameters: in the top joint is the opening for the staple and reed, with a diameter of 8.5 mm. After that opening the staple or counter bore tapers over a length of about 40 mm to a minimum diameter 6.0 mm (which is surprisingly narrow for an oboe of the Richters family). After the narrowest section (Adkins uses here the term ‘interstice’) the bore gradually widens, not in a straight line but in one of more ‘waves’ (parabolic curves) to a diameter of 11.5 at the lower end.* The bore of the middle joint begins after the socket at about the same diameter and widens again in a more or less parabolic curve to 16 mm at the d#-key-holes, after which we see that the graph of the bore becomes much flatter, to Ø 17 mm at the lower end. The bore of the bell begins - after the socket - wider (Ø 18.8 mm); which means that there is a step of 1.8 mm with the bore at the lower end of the middle joint; but this is common for baroque oboes. The bore of the bell at first only gradually widened, and follows after the waist section the profile of the flare of the bell to a maximum diameter of about 47.7 mm, which is at 8 mm from the lower end. Then follows the bell lip which has an opening of about 41.0 - 41.5 mm.

Note. *The graphs on the previous page are based on comprehensive measurements with in the top and middle joints rather large diameter steps of 0.5 mm. The graphs are not very detailed and can therefore be a bit misleading; for instance no conclusions can be made from them about how many reamers were used by Richters for each joint. For a more critical assessment of the bore profiles of these joints (and for making a copy of this oboe), more extensive data are needed, for instance with diameter steps of 0.1 to 0.2 mm.

## Table 1 with the length and bore measurements of a selection of oboes by Hendrik and Fredrik Richters and by Rijkstijn

| Oboe | Lengths of sections* I, II and II and total | L hole 1-6* | Ø bore upper joint top- min. - bottom | middle joint min. - max. | bell min-max -lip |
|---|---|---|---|---|---|
| HR7 | 211 + 212.5+ 148.1=571.6 | 188.7 | 8.8 - 6.4 - 11.4 | 11.8 - 17.1 | 18.3- 44.5- 41.9 |
| HR9 | 211 + 210.5 +141.8=563.3 | 189.1 | 8.4 - 6.4 - 11.1 | 11.3 - 16.2 | 19.1 - 46 - 40.5 |
| HR18 | 209 + 211 + 142.1= 562.1 | 186.2 | 8.7 - 6.6 - 11.4 | 11.6 - 16.7 | 19.6 -47.5-c. 44 |
| HR24 | 210 + 212.5+158.5**=581 | 188.0 | 8.3 - 6.3 - 11.2 | 11.8 - 16.3 | 20.0-43.9- 40.6 |
| HR27 | 211.5+212 + 146.7 = 570.2 | 187.3 | 8.5 - 5.8 - 11.5 | 11.5 - 17.0 | 18.5-47.5- 41.5 |
| FR4 | 211.5+209 + 144.7 = 565.2 | 186.0 | 8.6 - 6.2 - 11.5 | 11.1 - 17.0 | 19.7-c. 47- 44.4 |
| Rijkst-1 | 212.2+209.5+144.6= 566.3 | 183.1 | 8.5 - 6.2 - 11.6 | 11.0 - 17.0 | 19.4-50.9 - 46.7 |

*: length of the sections without tenons; L hole 1-6 = distance between holes 1 and 6, measured between the centre of the holes at the exterior of the instruments;
**: *bell bij Borkens; HR7 = Hendrik Richters, Rijksmuseum Amsterdam, inv. no. BK-NM-11182 (ex Gemeentemuseum Den Haag Ea 17-x-1952); HR9 = Hendrik Richters, Gemeentemuseum Den Haag, inv. no. Ea 1-x-1996; HR 17 = Hendrik Richters, Bate Collection, Oxford, inv. no. 2037; HR18 = Hendrik Richters, Bate Collection, Oxford, inv. no. 2040; HR24 = Hendrik Richters, Horniman Museum, London, inv. no. 14-5-47/120; HR27: Hendrik Richters, Drents Museum Assen/Museum Vosbergen Eelde; FR4: Fredrik Richters, collection Han de Vries; Rijkst-1: H. Rijkstijn. Frysk Museum, Leeuwarden, Netherlands; on loan to Han de Vries, Amsterdam, Netherlands. The oboes HR7 is made from ebony wood, the other oboes from boxwood.*

The most conspicuous detail of this oboe is for me the small diameter (6.0 mm) of the narrow bore (interstice) in the upper joint. On other instruments of Hendrik Richters (see table above and table 9.8 on p. 471 in my dissertation), the diameter is there at least 6.3 mm. Because no signs of excessive shrinking of the wood in other places of oboe HR27 can be seen, I have to believe that this narrow sector of the bore is original.

I can't resist here the temptation to note another proportion. Herbert Heyde assumes on p. 191 of his book *Instrumentenbau* (Leipzig 1986) for oboe HR23 (Kunsthistorischese Museum, Vienna) a relation of 1:7 from the smallest diameter in the upper joint to the bell opening (6.3 to 44 mm). On HR27 there is a similar relation, from 6.0 to (just under) 42 mm.
We have seen that Richters might have used the Amsterdam foot, with a *duim* (inch) of 23.55 mm; divided by 4, the result is 5.88 mm (measured 6 mm). The diameter of the bore at the lower end of the upper joints is 11.5, which can be seen as 2 *duimen* (11.7; measured: 11.5 mm*), the bore at the lower end of the middle joint as 3 *duimen* (17.6, measured 17.0 mm**). This 1:2:3 proportion was found by Heyde on other oboes. There might be another relation, as the diameter of the bell lip can be seen as 7 *duimen* (is 41.2 mm, I have measured 41.0 to 41.7 mm). However: this 1:2:3:7 proportion fits rather nicely on this oboe, but not so much - because of the much wider interstices - on the other instruments by Richters and Rijkstijn.

Notes: * The deviation at the lower end of the upper joint can easily be explained because of contraction of the wood at the tenon. ** The value of 17.6 is more or less the mean of the diameters at the lower end of the middle joint and the upper end of the bore of the bell.

## 7- Tone holes

As usual on oboes from the first decades of the 18th century, we see two small double holes at 3 and 4. Within each pair, the holes have about the same size. Hole 1 is slanted slightly up-wards (about 2 mm), hole 3 slightly downwards (between 1.5 and 2 mm). Hole 6 is also, but very slightly, slanted downwards. Because it is was not possible to remove the keys, the key holes could nog be measured accurately. Hole 2 is a bit undercut, at the other holes hardly any undercutting was visible.* All holes are in original condition. There are no signs of wear visible around the holes, the same applies to the keys. As a result it is not possible if this oboe was played in the past mainly with the left or with the right hand in the lower position.

Note: * The only reliable way to assess the shape and size of tone hole undercuttings is making a cast of them (in dentist wax or something similar).

## 8- Playing

This oboe by Hendrik Richters is in excellent playing condition, and as it is allowed in the Museum Vosbergen to play the instruments for a short time, I was able check the pitch of some notes. But I already mentioned a problem: as no original reeds and staple(s) did survive, one has to find the best (or at least) a suitable combination of staple and reed and to discover how far the staple must be put in the top bore. Thas was not so easy: one has to find a good connection between the top notes of the first register ($b^1$, $c^2$) and the lowest notes of the second register ($c\#^2$, $d^2$) and also a good relation between $b^1$ and the fork fingered b-flat$^1$.
I can give here only a few impressions. In comparison with other oboes with about the same dimensions, it was possible to play this instrument by Hendrik Richters at a pitch of (or close to) $a^1$=415 Hz. But playing at a slightly lower pitch (for instance $a^1$=410 Hz) was for me, as a not experienced player, a bit easier.

## 9- Discussion

This is an example of Hendrik Richter making not only expensive, elaborate oboes (with ebony, machine-turned ivory mountings, carved silver keys), but also more simply executed instruments. But this boxwood oboe also proves that Richters paid full attention to its finishing (for instance the high quality of the turning), and that there are no major differences from the other instruments in the aspects which are acoustically important (bore profile, tone holes). Which proves in turn that Richters made all of his oboes to the same high musical standard. The brass mountings and the mottled stained colouring in tortoise-shell imitation are unique for Hendrik Richters; both features remind me to an oboe with the stamp of I. Beuker* in the Gemeentemuseum Den Haag (inventory number: Ea 285-1933; see the catalogue of the museum for more information and more photos of this instrument**). The brass mountings are very much identical to those of the Richters oboe; it is therefore not far fetched to assume that they were made (or provided) by the same person.***
A last remark about the proportions and relations to the *Amsterdamse voet* which can be seen on this oboe. I have already made some restrictions to these observations. Richters may have used these proportions, but how strict was he doing so? It might be a complete coincidence that on this instrument some of the proportions seem to fit better than on other oboes by the same maker.

*Bell of the oboe by I. Beuker*

Notes: * There is hardly any information about one or two woodwind makers with the name Jan (or Jan Barend) Beuker who lived in Amsterdam (see par. 2.3 of my dissertation). ** *Niederländische Doppelrohrblattinstrumente des 17. und 18. Jahrhunderts – Dutch double reed instruments of the 17th and 18th centuries* (Laaber 1997) by Rob van Acht, Jan Bouterse and Piet Dhont. *** Were the brass parts of the oboes made by the Richters (and other woodwind makers) themselves? I have not found - with one possible exception - information in the archives about suppliers of materials (wood, ivory, metals) or components (finished keys and mountings) to the woodwind makers. The exception is found in the marriage of Fredrik Richters, Hendrik's younger brother, with Maria Reringh, a niece of the silversmith Hildebrand van Flory (1657-1754), who might have provided the keys and other silver parts for some of the oboes. See my comments about this in part 1 of this article.

## Conclusion

In the description of the boxwood oboe by Hendrik Richters in the Museum Vosbergen I have made a few links to other instruments by the same and by other makers. To answer the questions which I considered on the first page of this communication, we must look at the whole group of oboes by Hendrik & Fredrik Richters and Rijkstijn. Because so many of their instruments have survived, we must (and can) do that systematically. In part III of this series I will discuss some methods. What can we learn from the instruments? And what can further be said about their playing qualities?

**Correction:** In Comm. 2000 in the list a list of the oboes by Richters and Rijkstijn I mentioned that oboe HR 18 by Hendrik Richters has engraved silver keys. That is not true, this instrument has brass keys.

## The oboes of Richters: about methods of research in woodwind instruments

## Part 3: Methods for comparing instruments

What are the characteristics of the oboe (HR 27) which I looked at in Part 2 of this article? Has this instrument specific or even exceptional qualities? The answers are of interest for players wo want to know more about its musical possibilities or impossibilities; for woodwind makers who not only want to make a copy of the oboe (and must know if the present condition is a good enough as a point of departure) but who also are interested in the way of working and thinking of Hendrik Richters and his colleagues. These aspects are also important for musicologists and historians who are studying aspects of musical life in the early 18th century.

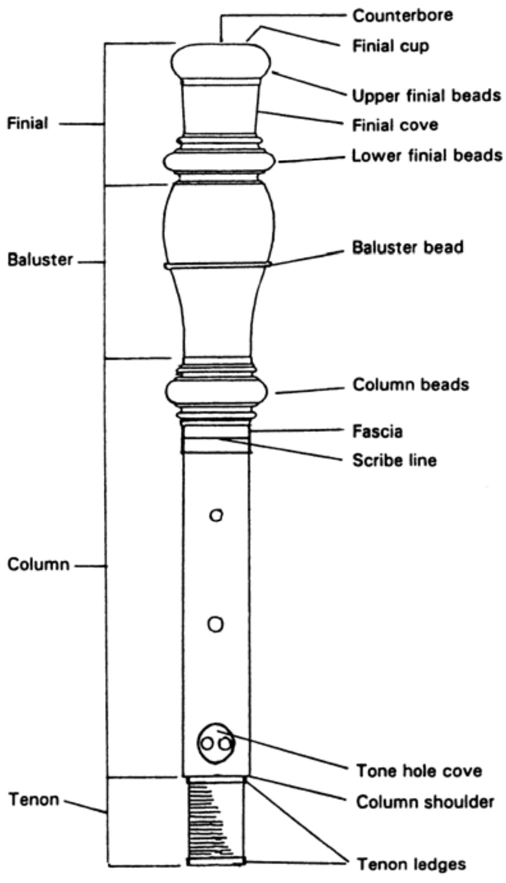
How do I come closer to the secrets of the oboe? The next step after measuring and describing is comparing the instrument with other oboes by the same maker. Therefore I have chosen three other boxwood oboes by Hendrik Richters (HR9, HR18 and HR24; see Table 1 in Part 2 for information about the collections and inventory numbers.

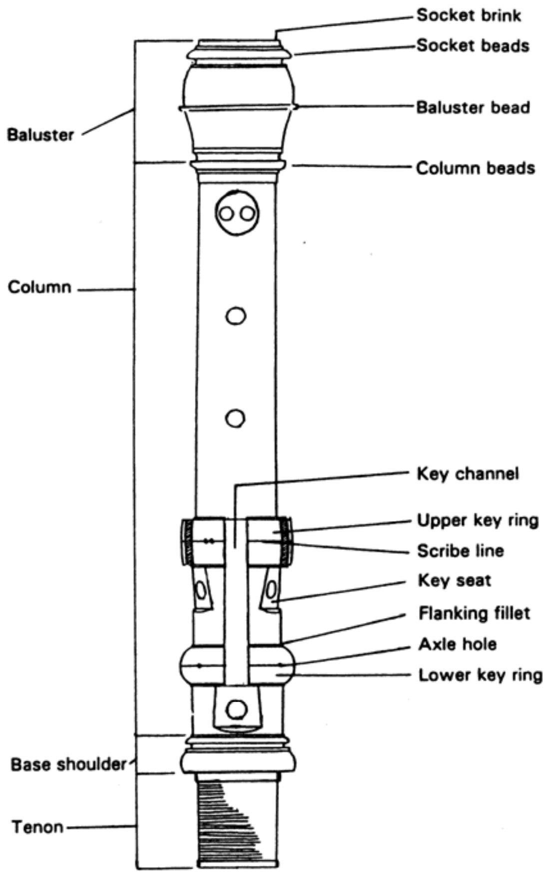
For this article I have looked at the baluster profiles, the keys and the bore diameters of these oboes. But before doing that, I want to say something about a vital point in methods of research: the use of a proper terminology for or the different parts of the instruments, followed by the ins and outs of comparing baluster profiles from drawings and photos.

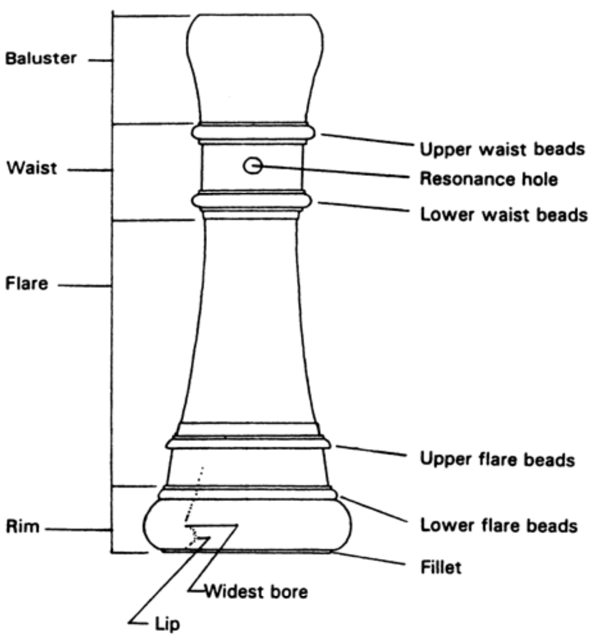
### The search for a proper terminology

Comparing instruments means: looking meticuously to the overall design and finishing of the details. Describing these matters mean that you must have a proper terminology. And that is not so easy, for instance finding the right words for details of the turnery. In writing the catalogue *Dutch double reed instruments of the 17th and 18th centuries* (Laaber 1997), we had the problem of finding terms in English and German, coming from the Dutch language in which we had hardly any sources we could use. Other languages have sometimes interesting alternatives. For instance: the German language has the nice word ‘Wulst’, which is defined in the *Deutsches Wörterbuch* (German dictionary) by Wahrig as a ‘längliche Verdickung, länglicher Auswuchs’ (elongated swelling or bulge). A ‘Herzwulst’ or ‘Zapfenwulst’ is then a socket bulge; but Bruce Haynes prefered for the bulges on the oboes the term ‘baluster’ or ‘socket baluster’. The Dutch language has (in my opinion) no useable terms for this section of the oboe (and of other woodwind instruments). Each woodwind maker uses his own terminology (or doesn’t have any), also books about wood turning give rarely solutions. In particular the smallest elements of the turnery are lacking definitions and it is just there where the Dutch language with the common use of diminutives provides such fine alternatives: ‘ring -ringetje’, ‘rand - randje’, ‘band, bandje’ etc. for beads, flanking beads, fillets, ledges.

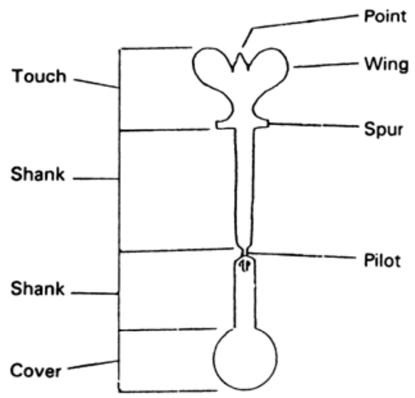
The drawings on the next pages are from Haynes 2001 (*The Eloquent Oboe*), the catalogue of Dutch double reed instruments from 1997 and from my dissertation (2005). These drawings show that for several oboe parts architectural terminology was used (such as baluster and column) but also that there are diffences in interpretation of some elements (key flap or key cover).



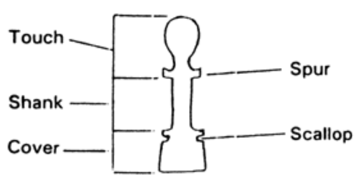



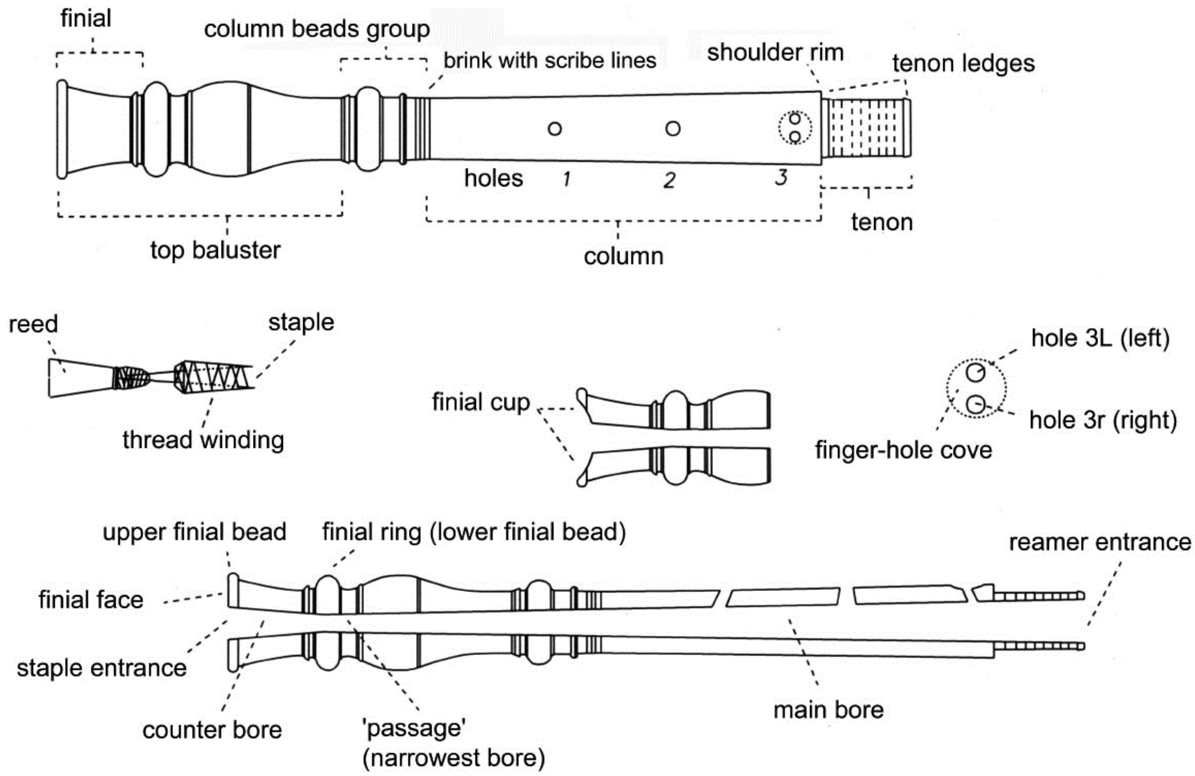

UPPER AND LOWER GREAT-KEYS



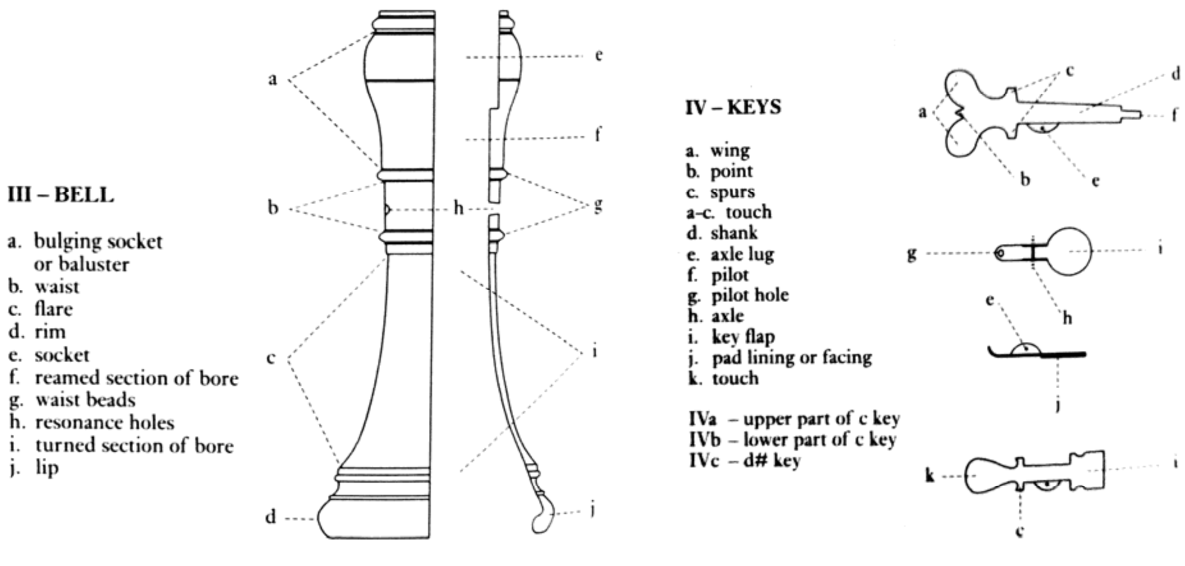

SMALL-KEY



*From Bruce Haynes, The Eloquent oboe (Oxford 2001), fig. 2.1 en 2.2.*




*From Jan Bouterse: Dutch woodwind instruments and their makers, 167-1770 (Utrecht, 2005)*



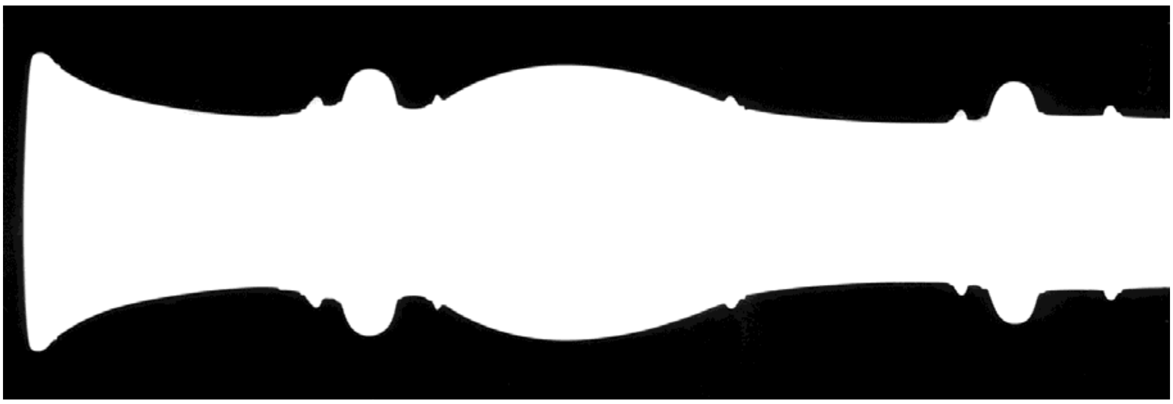

*From Rob van Acht Jan Bouterse and Piet Dhont: Dutch double reed instruments of the 17th and 18th centuries (Laaber 1997).*

**Comparing baluster profiles from drawings and photos**

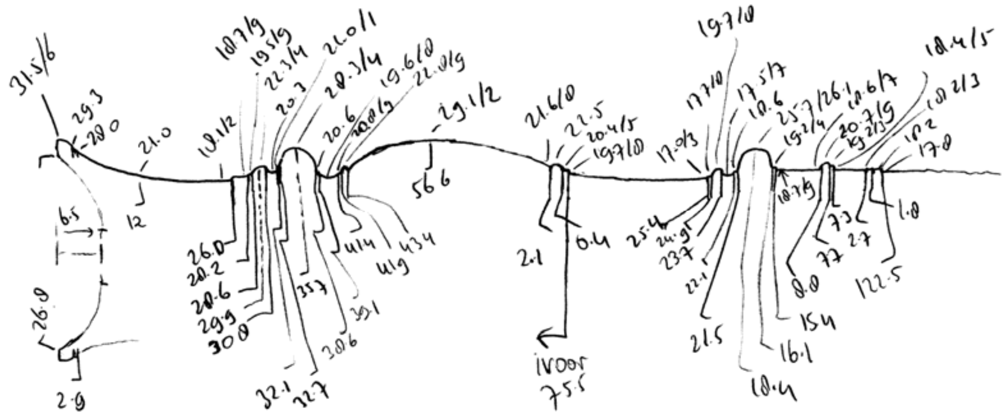
The best way of comparing instruments is having the instruments all at the same place and having also plenty of time to carry out the work, taking measurements and photos in always the same conditions and in a standard procedure. That is not easy, and I myself developed such procedures only in a later phase of my research. In retrospect, the data which were gathered about an instrument are never so detailed as I should wish. For this article, I went back to the Gemeentemuseum in The Hague to take new photos of two oboes by Hendrik and Fredrik Richters, which instruments I saw 18 years ago for the last time, when I was working with Rob van Acht and Piet Dhont for the catalogue of Dutch double reed instruments of the 17th and 18th centuries (Laaber 1997). Yes, I recognised the two oboes (HR2 and FR2 in the list in Part 1 of this article in Comm. 2000) very well, but had also forgotten some aspects such as the finishing of the turnery and the overall impression, the 'personalities' of both instruments. Despite the luxurious construction (ebony wood, ivory mounts, engraved silver keys), neither of the instruments have an exuberant appearance. That is maybe caused by their age, the ivory of both oboes being rather dirty, and the keys of FR2 a bit dull. However, closer inspection of the profiles of the balusters show the high quality of design and finishing of the turnery.

I give here examples of how we have tried to record the profile of the baluster of the oboe FR2 by Fredrik Richters (which instrument has the additional stamp IS under the name, may-be it was made by Fredrik Richters-2, who was the son of the elder brother Johannes Richters

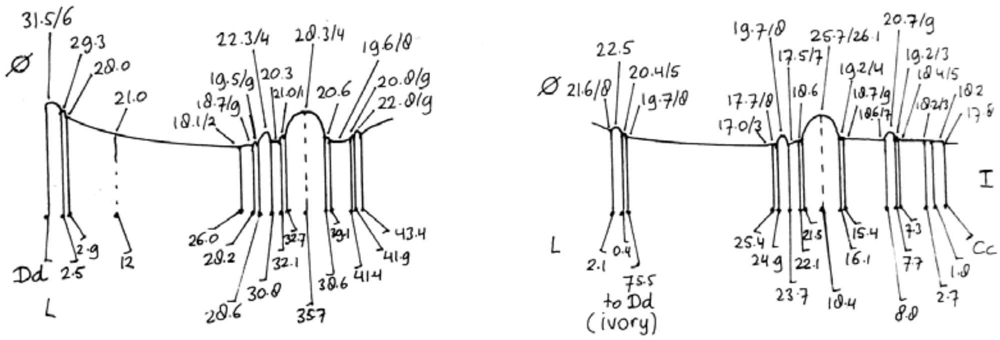
*Photo of the baluster of FR2*



*Silhouette picture of FR2 (the instrument put in the dark room upon a piece of photographic paper, the light of the enlarger put in the highest position to reduce the parallax).*



*Draft drawing of the baluster of FR2, with measurements (archive Jan Bouterse).*




*Drawing of the finial and colun beads of the same instrument as published in the catalogue of 1997.*

It is obvious that each of these four depictions has its good qualities, but also its restrictions. The photo has the usual problems with parallax, only in the centre of the photo do you see the profile as on the drawings. The silhouette shows beautifully the smooth and 'schwungvoll' (lively) curves of the profile, but the detaling of the smallest flanking beadlets and ledges is not very clear. In both drawings the pencil stripes do suggest that the elements are all sharply bordered, which is not or not always the case. A problem: how to draw elements with a width of 1 mm accurately in the right scale when the pencil line is 0.5 mm thick.

I have made some additional close-ups of the 'lower finial beads' (terms by Bruce Haynes), which give more information about the finishing of the smallest details. Such close-ups are vital for modern woodwind makers who want to turn the wood in the same style as Richters did.

**The other boxwood oboes by Hendrik Richters**

There are five oboes in boxwood with the maker's marks of Hendrk Richters. I have no photos or other data of HR26, which was in the possession of Andreas Glatt, woodwind maker in Antwerp; he died in May 2013 (the present location of the oboe is unknown).

Oboe HR9 was given on loan in 1996 to the Gemeentemuseum in Den Haag (Inv. No. Ea 1-x-1996). This oboe has brass keys and one silver ring, loosely fitted at the lower bell ring. Other rings or mounts must have been fitted at the socket rims of both middle joint and bell, but are lost. The colour of the wood is light-to-medium brown, but this is probably caused by impregnating with oil a short time before the oboe came to the museum. On a photo, taken some years before, the colour is much more light yellow, like unstained boxwood. However, there are still some doubts of the instrument is made of boxwood: the grain of the wood is very fine, but the growth rings are rather wide and just too clearly visible. The finial is made of a separate piece of wood, but looks orginal; four cracks in the wall of the bell flare are glued. The instrument is in perfect playable condition and came just too late into the collection for us to put in the catalogue of 1997.

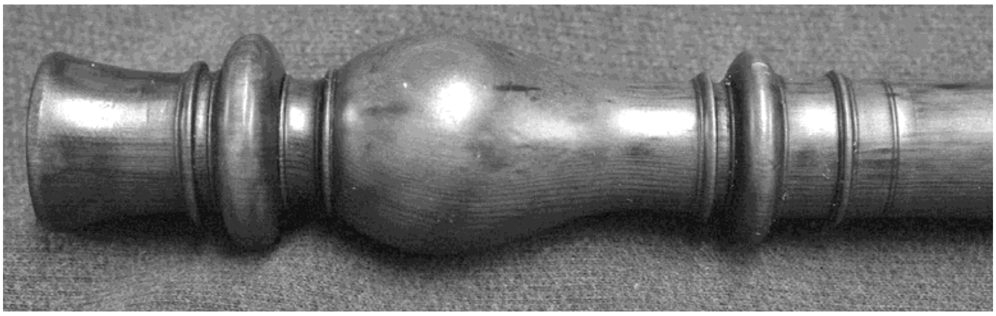
Oboe HR 18 is in the Bate Collection in Oxford (Inv. No. 2040). The boxwood (no doubts here) is stained brown, the keys are made of brass. There is an ivory socket ring at the bell, but that must be a repair, because the fitting of this ring is far from perfect. A silver ring is mounted at the bell rim, but there are no traces of other rings (at the socket balusters or the finial). The upper part of the c-key is probably not original, with its deviating touches. The pivots of the keys are also renovations, and are clearly a bit too thick: a piece of wood at the key ring has broken off. The bell has four long cracks, all of them seem to have been repaired; there is also some damage at the finial; but the profiles of this instrument are - as of other boxwood oboes by Richters) beautifully turned.

Oboe HR24 in the Horniman Museum in London is made of dark brown lacquered boxwood and has brass keys. The bell is made (and stamped) by Philip Borkens (Amsterdam, 1693-after 1760), who probably added this bell to the instrument because the original one was lost or badly damaged. It is also likely that Borkens lacquered not only the new bell (which he made in his own style, quite different from the original bells of the Richters-oboes), but also the upper and middle joint. This upper joint is made of a piece of boxwood with a strongly undulating grain. After many years, the wood did shrink not evenly, causing a kind of irregular warping. Not only the finial is made of a separate piece of wood (just as on HR9), but also the base shoulder in the middle joint. The keys, in a simple traditional model, are beautifully made.

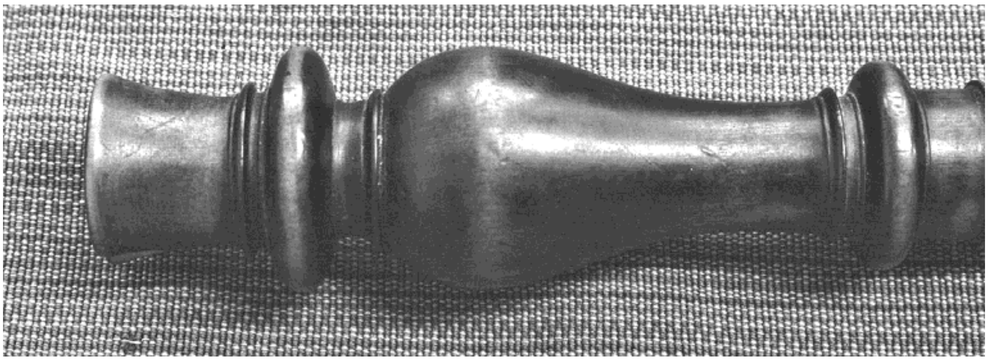
Finally, the only tenor oboe HR30 by Hendrik Richters which survived the years (in Musée de la Musique in Paris, Inv. No. E.1185) is made of dark stained boxwood, with thick ivory rings. The stamp on this instrument (see photo right) is quite different from all other Richters oboes: his name in a scroll, no further marks. Was this an early instrument by him? It is made much more in the style of the oboes by Richard Haka (1646-1705).

Was Hendrik Richters perhaps apprentice in his workshop? We don't know, there is no proof for this theory. But somewhere and somehow Richters must have learned the trade.

## Baluster profiles of four boxwood oboes by H. Richters



HR9

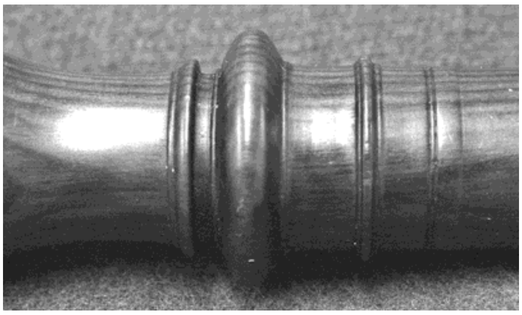


HR18

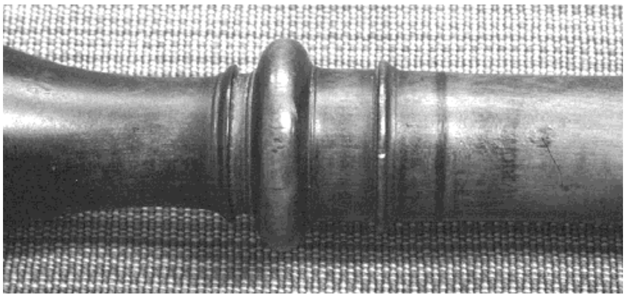
HR24

HR 27

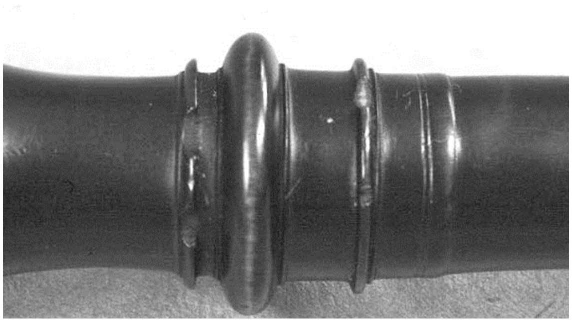
The photo of the baluster of HR27 is taken from a closer distance, which caused more parallax: a more oblique angle to the beads at both ends of the baluster. One way to solve these problems is to take more photos from different points of view: see the next page.



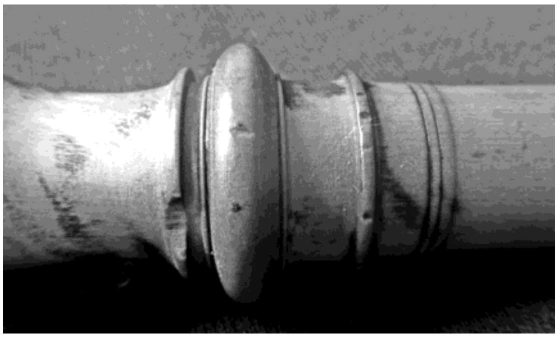
HR9



HR18

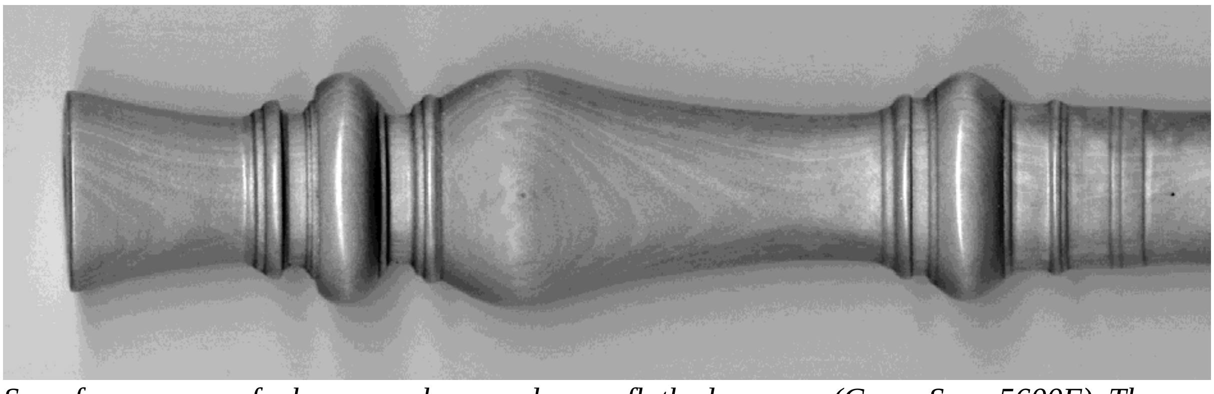


HR24



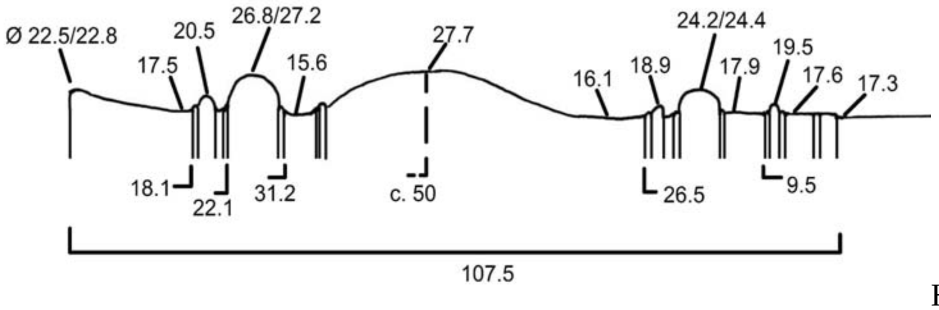
HR27

There is one modern technique to make beautiful depictions of the profiles of oboes and other woodwind instruments: put the parts under the flap of a flatbed scanner and make a scan. The lens of the scanner moves lengthwise over the bed, and is always straight above the object. One problem: not all flatbed scanners produce sharp images of three dimensional objects and in the instruction manuals of the scanners the possibility of this technique is never mentioned (and the people in the computer shops also don't know about it). Another problem: sometimes you must make corrections (in Photoshop or similar program) to adjust the relation between heigth and length of the scan: instrument parts appeared elongated on my computer screen.
And of course it is in normal circumstances not possible to take your scanner to a museum (I even never tried it) and get permission to use it. But at home I often scan parts of instruments, using the data for technical drawings.

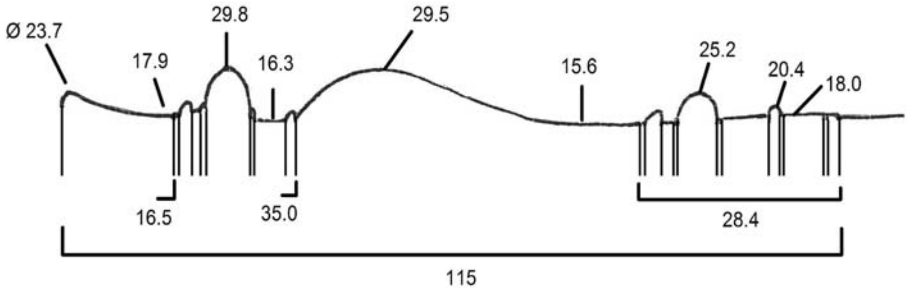


*Scan from a copy of a baroque oboe, made on a flatbed scanner (CanonScan 5600F). The smallest details are not so finely turned by me as Richters did on his oboes...*

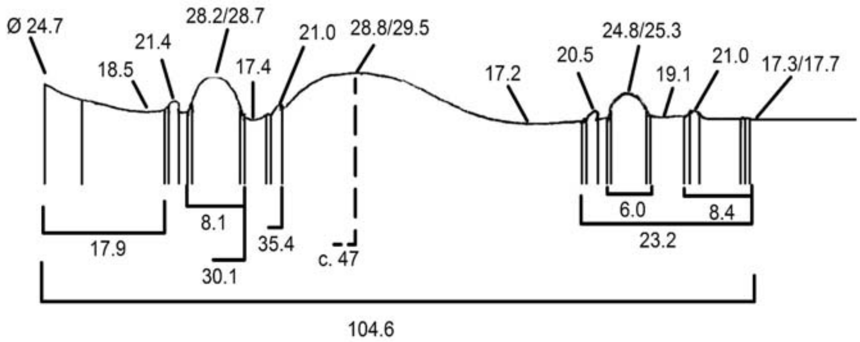
**Schematical drawings of baluster profiles of four boxwood oboes by Hendrik Richters**



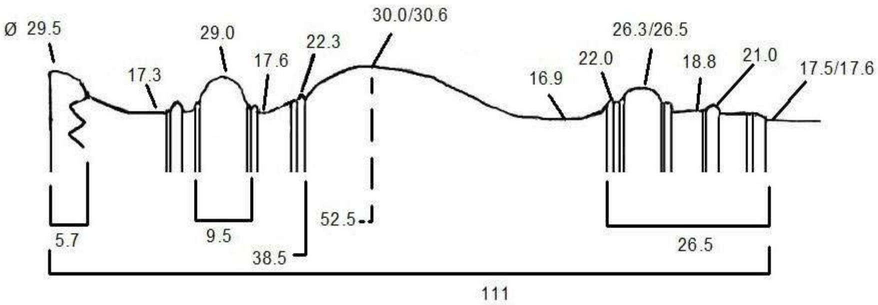

HR9



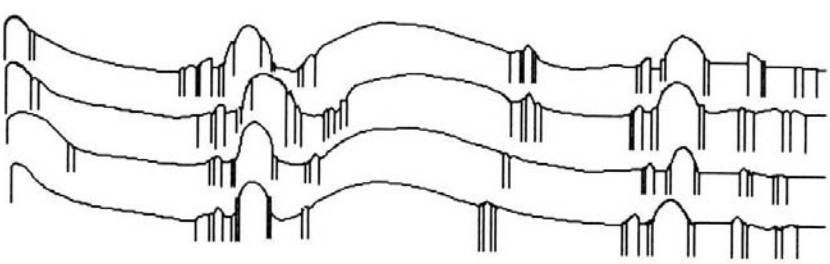

HR18




HR24



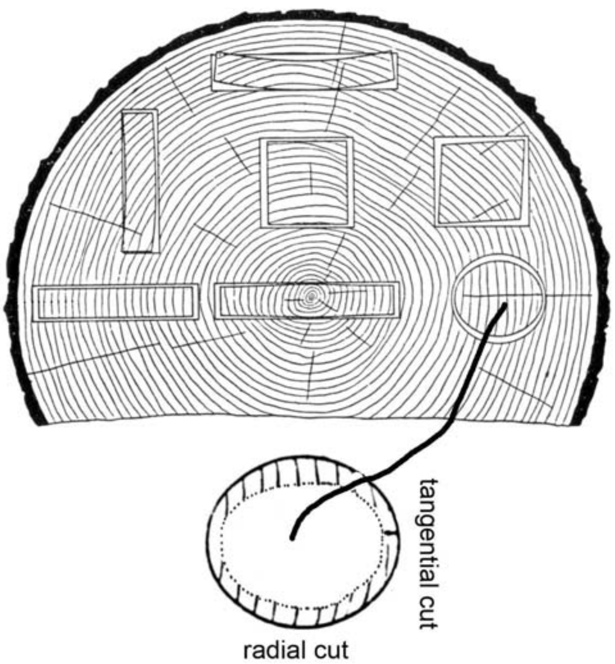

HR27



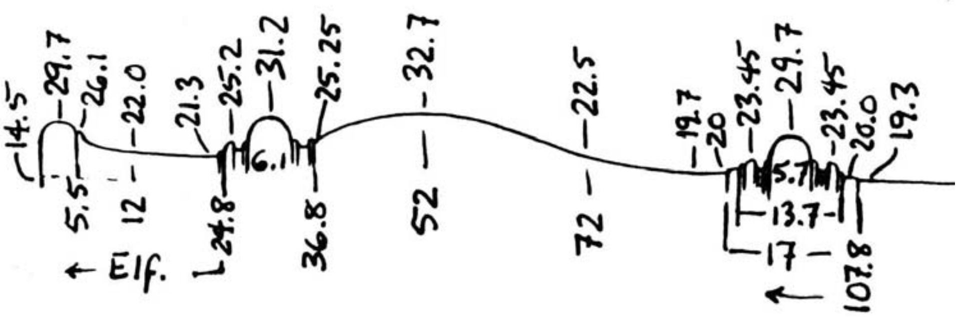
Adkins 1990, from figure 5 (p. 47): baluster profiles of some oboes by Hendrik Richters.

The schematical drawings on the previous page of profiles of the balusters of four boxwood oboes by Hendrik Richters are made on a computer, based on draft drawings. These types of drawings have their restrictions, they are not very accurate; which is also clear when we see the drawings which Adkins made in 1990 for his article (he didn't mentionwhich Hendrik Richters oboes' baluster profiles are depicted). I made my drawings only to add a selection of measurements. Because of shrinking of the wood of the oboes, there has been some warping, resulting in oval cross sections, with two diameter values (minimum and maximum). On many drawings of woodwind instruments you will find only one measurement (in most cases probably only the maximum diameter). In the four examples I have given the mininum and maximum values in these drawings only on a few points on the profiles, but actually warping occurs over the whole instrument.

On HR24 we find the most warping, probably caused by the irregular structure of the wood. Usually we find the maximum values of the diameters in tangential section (see figure below), as wood logs will shrink more parallel than perpendicular to the growth rings (but I have found on other woodwind instruments a few exceptions).

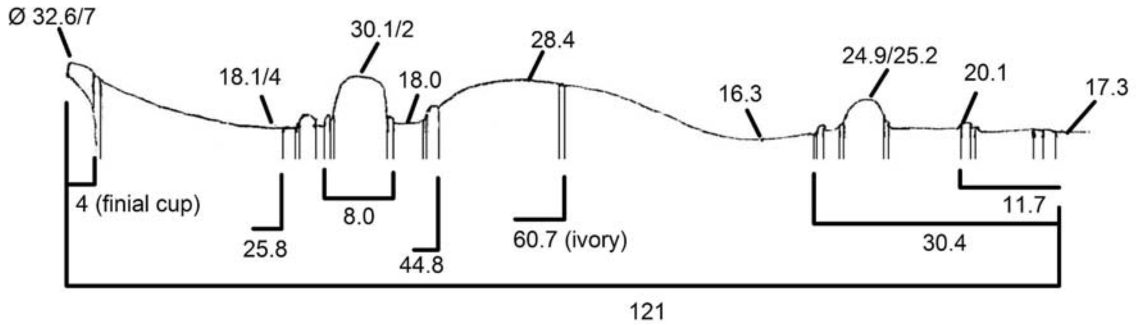



Three of the four boxwood oboes by Hendrik Richters have - as on most Dutch baroque woodwind instruments - the radial cut (or radial face) at the front of the joints. On HR24 this is less clear; the fingerholes about between radial and tangential.




I.H. Rottenburgh

By way of comparison the baluster profiles of two other oboes. On this page you can see the profile of the baluster of a boxwood oboe with ivory rings (‘Elf.’ in the drawing) by I.H. Rottenburgh (Brussels, 1672-1765) in the collection Michel Piguet (he died in 2004; I do not know what happened to his instrument collection; drawing by Mary Kirkpatrick, published in an appendix to the *Basler Jahrbuch für historische Musikpraxis* XX, 1988). There is not so much difference in diameter for the beads and rings, but the thinner parts have much thicker diameters.




*Drawing and photo of baluster of FR4*

Fredrik Richters’ oboe FR4, in the collection of Han de Vries in Amsterdam is perhaps th
Most beautifully executed and preserved of all boxwood oboes by Hendrik and Fredrik Richters, stained dark brown and with long ivory mounts (and silver keys). This instrument has a finial cup (with a depth of 4 mm), which makes the finial longer and also wider.

**The balusters: a conclusion**

The conclusion after this long introduction is - perhaps disappointingly - short: comparing the baluster (and other) profiles of oboes using data and depictions from various sources can be tricky. But for me it is clear that the balusters of the top joints of the four boxwood oboes by Hendrik Richters are never exactly identical. They contain all the same elements (apart from one or two indistinct of the smallest flanking beads), but there are always differences in the lengths and diameters of each of the elements. These differences are generally small, which is the result of freehand turning. The same variations can be seen on the ebony oboes by the same makers. I do not agree with Cecil Adkins who says that the wooden tubes differ little (less than 0.1 mm) in the diameter or the placement of the decoration, and that these tubes may have been turned with the aid of a jig or a device to the lathes on which the ivory mounts were turned (ornamental turning).

It is in spite of the differences clear that the boxwood oboes are turned by the same and very skilled maker: the profiles are bold, lively, expressive, or (in the German language): schwungvoll (‘swinging’), and very beautifully finished. Actually, the beauty of these baluster profiles shows up better than those of the oboes with ivory balusters which are ornamentally turned.

A closing remark: it is not only not so easy to record the shape and details of the profiles; it is also difficult to reproduce these balusters: just when you try to copy them as exactly as possible, there is a big chance that you will lose the freedom of the liveliness of the profile.

**FoMRHI Comm. 2016** **Jan Bouterse**

## The oboes of Richters: about methods of research in woodwind instruments

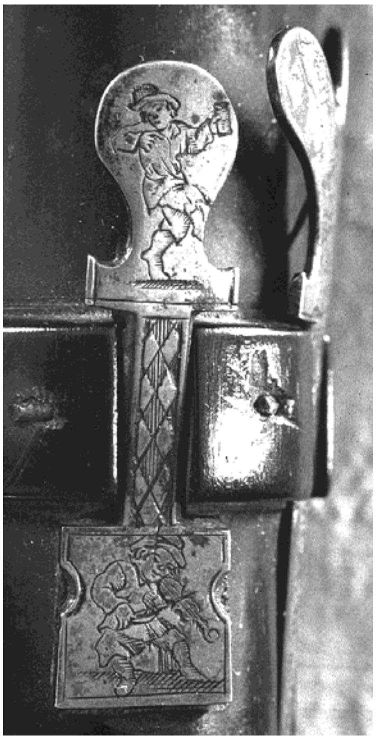
### Part 4: The keys

Before we focus on the keys of the boxwood oboes, some remarks must be made about the ebony oboes by Hendrik and Fredrik Richters, many of them being famous for their silver-work: mounts and keys, often engraved with a variety of images. I can not give here a complete survey of all silverwork, but restrict myself to a few remarks about the silver keys of some oboes, concentrating on instruments which are missing in Adkins 1990 (see his article for more photos of other silverwork) or where I have a different interpretation about the engravings.


I have taken some new photos of the keys of HR2. On the touch of the c-key is the rebus: ‘Vat den tijd en leer de wereld kennen’ (Grasp time and learn to know the world).

On the flap of the c-key rides Bacchus on a barrel. Musicians are depicted on the flaps of the d#-keys: a violinist and a woodwind player.

Who are the persons on the wings of the small keys? Adkins thinks that they are dancers, but I suggest that on the left key is a drunken man (on some other keys we see him with a tankard in his hand, see the photos of the small keys on the next page) , and on the other key his angry wife. If you grasp the time by drinking from the barrel, you must take the consequences!

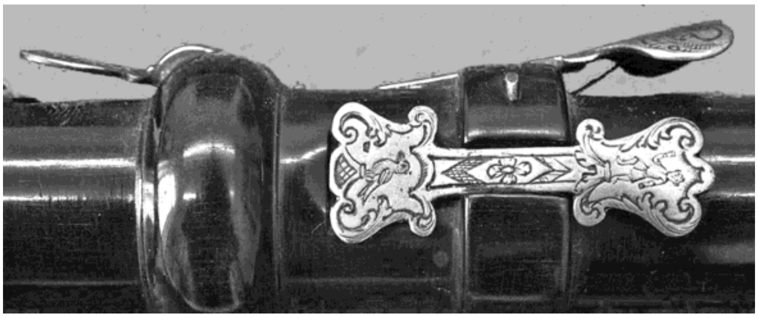


The engravings on oboe HR25 (in a private collection in Friesland, and not in Adkins 1990) are more detailed, once again with musicians and drunken dancers. The right wing of the c-key of this oboe has been trimmed a bit. I do not think that it was done by somebody to make some money out of the silver, but by a player who wanted to have more distance between the c-key and the small key. This is also an indication that the oboe was played with the right hand below and that this oboe was not merely an ornamental object.

In Part 1of this article (Comm. 2000) I wrote that Fredrik Richters was married to a niece of the Amsterdam silversmith Hillebrand van Flory, who is the likely provider for the some (or even most of) the silver work for the instruments of Hendrik and Fredrik Richters. I was, however, restricted in my research (I didn't get permission to remove the keys) and was

unable to find these, or any other marks, on the oboes, but neither on keys and other silver work of other woodwind instruments by Dutch makers.

A few oboes have silver keys with deviant shapes and engravings. I saw the oboe on the left in this photo when I was in 1994 in the collection of the Kunsthistorisches Museum in Wien (Vienna), to see the other oboe, (right) which is made and stamped by Hendrik Richters (HR23). After finishing my inspection of that instrument, I was asked to help bringing it back to the exhibition. And there I saw the other oboe, unstamped, but clearly made in the style of Hendrik or Fredrik Richters (RS4, and not in Adkins 1990). The oboe had in Vienna the inventory number AR 1912, but several years later I discovered that the same oboe was in the Musée de la Musique in Paris, with the inventory number: E 999.9.3. What had happened? the oboe was part of the collection of musical instruments of Alphons von Rothschild, which were looted in 1938 by the Nazis. After 1947 the instruments were placed in Austrian museums. In 1999, the Austrian government finally announced the return of these artworks to the Rothschild family, who decided to auction them off (at Christies, London).



*Left e-flat/d#-key of RS4*

*Keys of HR8*

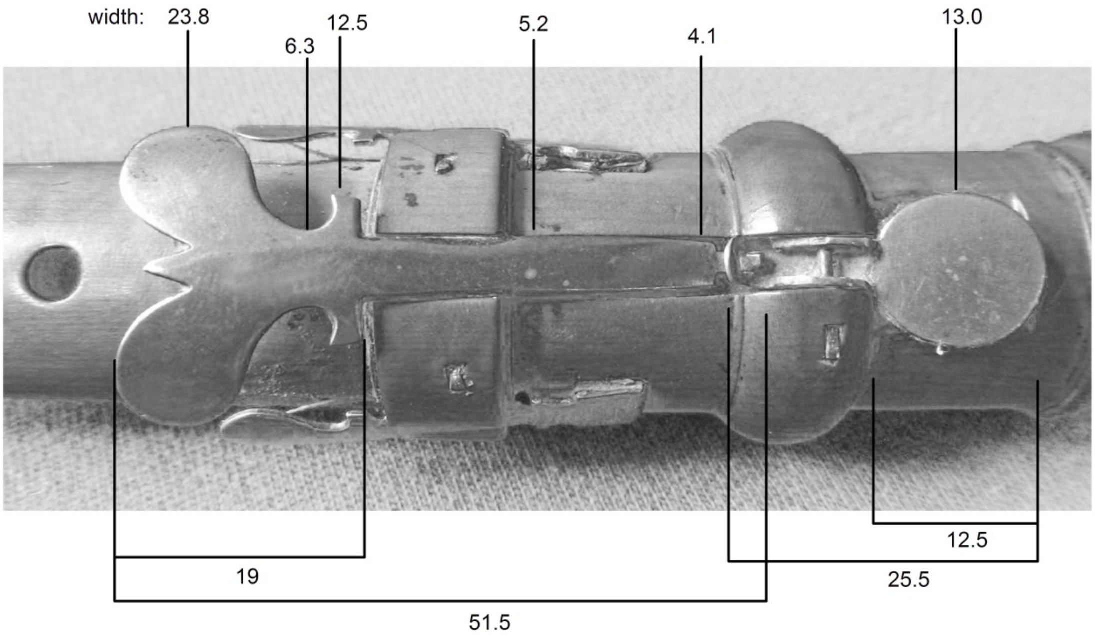
The keys of RS4 are made in the same style as those on HR8, but are not identical. In my dissertation (Bouterse 2005) I wrote: ‘The keys are an exceptional element of oboe no. HR8, due not only to their shapes but also to the engravings. The wings of the great or c-key differ in shape from the familiar 'Mickey Mouse' ears on most of the other makers' oboes. Young uses the term ‘swallowtail’, but exactly what he means by that is unclear (Young 1993, 4900 Historical Woodwind Instruments, p. 186). The wings of HR8 oboe are in fact more or less crescent-shaped, the part formed by the piece of the c-key that protrudes above the key ring being shaped rather like a sports trophy or an exotic ropical fish. The ears of the finial correspond with the wings, the protruding undersides of the bell with the key's cudgel-shaped, outstretched arms ('fists').

### Survey of characteristics of the keys of the oboes by Richters, in Richters-stijl and by Rijkstijn

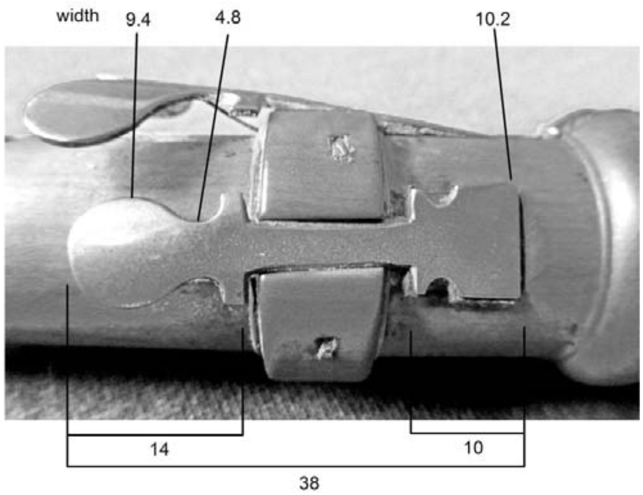
*instrument - keys: material and description (material of keys; engravings)*

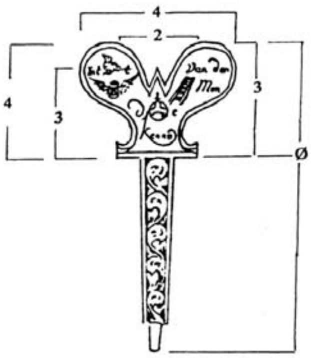
HR1 - silver; floral-Bacchus, dancers-musicians
HR2 - silver; rebus-Bacchus, dancers-musicians
HR3 - silver; rebus-Bacchus, dancers-musicians
HR4 - silver; floral-flower, dancers-musicians
HR5 - keys are lost
HR6 - silver, small, single wing of c-key; exotic animals
HR7 - silver; no engravings
HR8 - silver, crescent shape, musicians-seraph, dancers and birds
HR9 - brass, no engravings
HR10 - silver; rebus-Bacchus, dancers-musicians
HR11 - silver; rebus-Bacchus, dancers-musicians (?)
HR12 - brass keys, not original
HR13 - silver; rebus-Bacchus, dancers-musicians
HR14 - silver; floral-Bacchus, dancers-musicians
HR15 - silver; no engravings
HR16 - silver; rebus-Bacchus(?), dancers-musicians
HR17 - silver; rebus-Bacchus, dancers-musicians
HR18 - brass, no engravings; wing of c-key not original
HR19 - silver; only left key original, with engravings
HR20 - silver; wing of c-key (with rebus) is recent replacement; fool’s head, dancers-musicians
HR21 - silver; deviating rebus-double head, dancers, musicians
HR22 - silver; only c-key with engravings
HR23 - silver; rebus-Bacchus, dancers-musicians
HR24 - brass; no engravings
HR25 - silver; musicians (cherubs)-rose, dancersmusicians
HR26 - no information
HR27 - no information
HR28 - brass; no engravings
HR29 - no information
HR30 - tenor oboe in f, brass keys in Haka-style, no engravings
FR1 - silver; no engravings
FR2 - silver; rebus-Bacchus, dancers-musicians
FR3 - silver (original?); with floral elements
FR4 - silver; no engravings
RS1 - silver; (slightly) deviating shape, crested birds and on cover of c- key the inscription: ‘MM 1744'
RS2 - silver (original?); with upside down Bacchus, dancers-musicians; wing of c-key- broken off
RS3 - silver, crescent shape (as HR8), wing of c-key and right d#-key broken off
RS4 - silver; strongly ‘lobed' key shapes, musician-seraph, dancers - birds
RS5 - silver, with christian symbols, rose on lower part of c-key
RS6 - silver, with single wing of c-key, floral motivs and small broom
Rijkstijn1 - brass keys, no engravings
Rijkstijn2 - silver, no engravings

**The keys on the boxwood oboes**

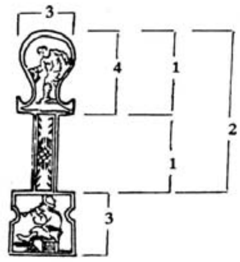



The keys on most boxwood oboes by the Richters are more simple: all of them made from brass and without engravings.
On the photos left the c-key and right d# (or e-flat) key of HR27, with some dimensions. See the nice curvature of the shank and touch of the great key.



HR 21

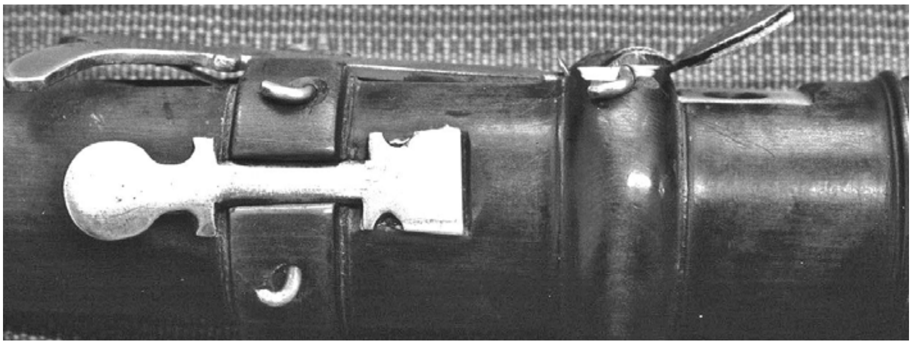


HR 20

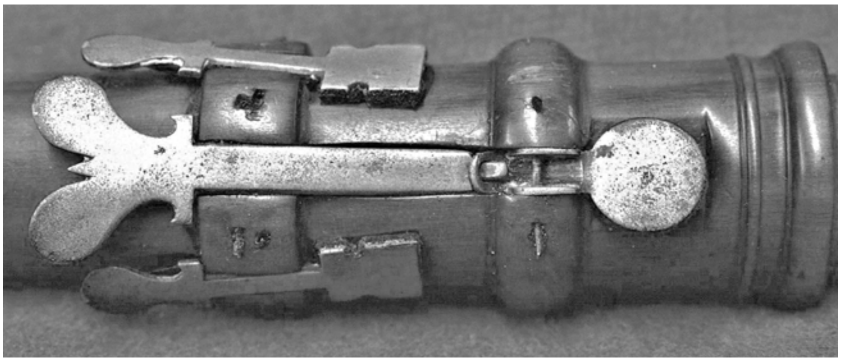
Cecil Adkins found some proportions (figure right, from Adkins 1990, p. 51), but he didn’t give the original dimensions in millimeters. So how precise are his calculations? On HR27 (and other oboes) the proportions fit more or less accurately. But on each oboe, there are small differences in the dimensions of the left and right small keys, so what are we bothered about? The keys on HR27 are original, so are the axles (or pivots, both terms are used by instrument makers). The axles on this oboe are however very short and cannot be removed easily.

*C-key of HR18*

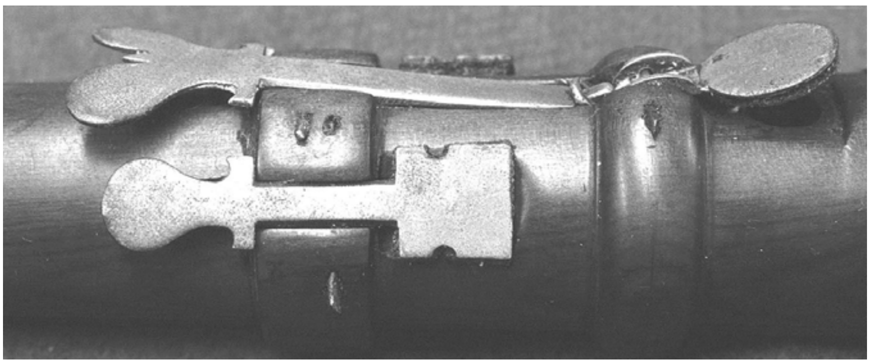
The hooked axles on HR18 (Bate Collection, Oxford) are surely not original. They are rather thick (1.4 mm) and maybe forced in the lower key ring, which resulted in a piece of wood that broke away. The touch of the c-key is cut down, or the whole upper section of the key is not original

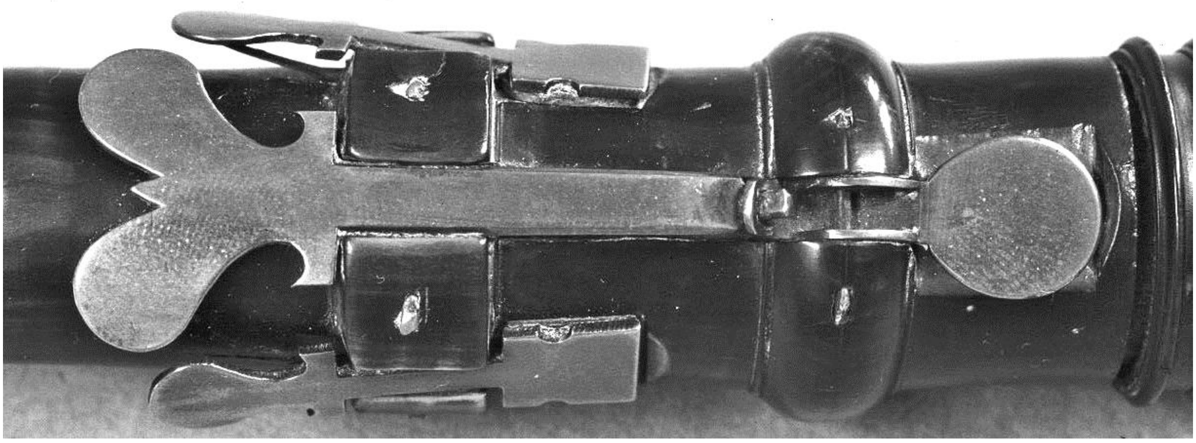


*E-flat/d# key of HR18*

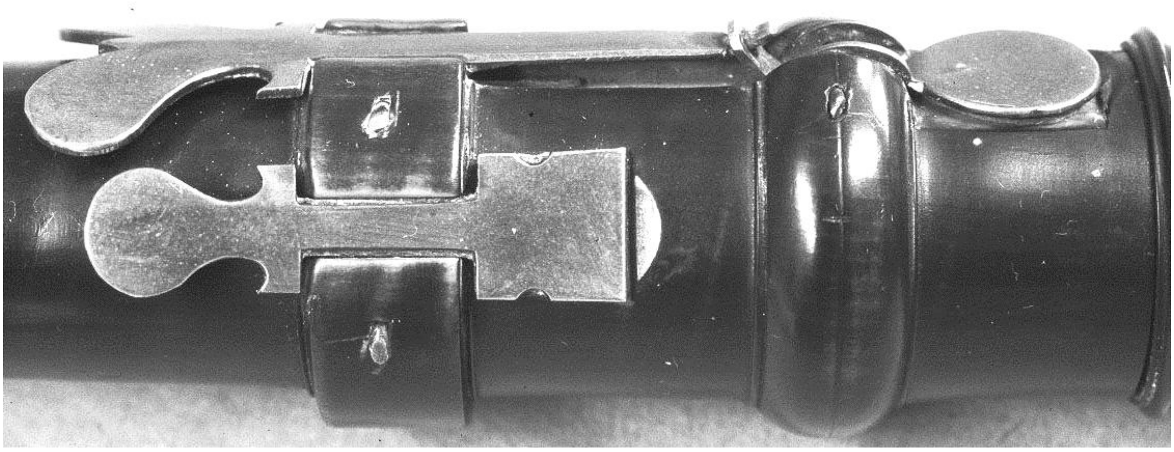


The keys of HR9 are rather corroded. The axle holes on this instrument are not blind, but drilled through the key ring. That makes it easier (but sometimes hard enough) to remove the axles.





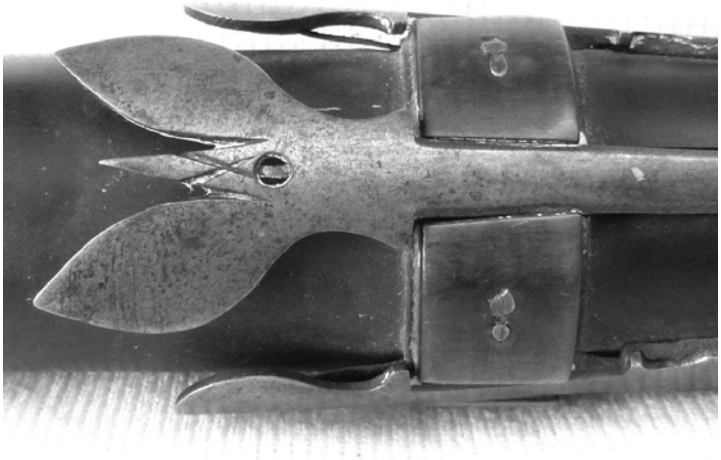
*HR24: keys*



The keys on HR24 are for me the nicest of the four boxwood oboes: a perfect combination of strength and elegance, with beautiful curves from the touches to the tips of the spurs. These keys are as beautiful as, or even more so than the more famous silver ones with their engravings. The brass keys on the four boxwood oboes are all made in the same style, only showing minor differences in shape and size. Were they made by the same person, even by Hendrik Richters himself, of were they provided by specialized craft-men? And what was the order of work: were the middle joints of the oboes made first, and were than the keys designed (or adapted) so that they fitted well in the key channels and seats (and so on?). Or were the keys point of departure for the oboe maker? With the right tools, making of keys is not so difficult and it is easier to do most of the work on an instrument yourself than to be dependent on providers.

As I said before, a problem for the investigations was that in most collections I didn't get permission to remove the keys from the channels. On many instruments removal would indeed very difficult without damaging the axles or the wood around the axles.

But making the oboes, the Richters brothers had to put keys in and remove them. The only way to do that with blind axle holes is to make axles which protrude for some millimeters. When the keys are removed many times, the ends of the axles got damaged, as we can see on the photos of HR2 on the first page of this article.



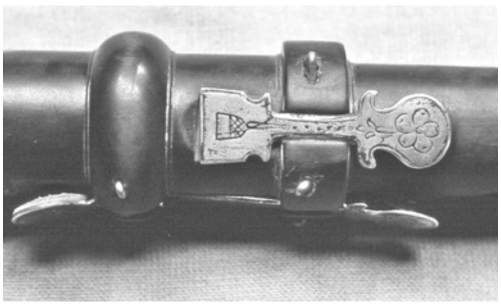
*Left photo: Abraham van Aardenberg (1672-1717) cut off the ends of the axles in this oboe (Gemeentemuseum Den Haag, Ea 444-1933) in line with the surface of the key ring. It is likely that these axles and the keys have never been removed after the oboe left the workshop, about 300 years ago. Right: this is the only Dutch instrument on which I have seen a serial number (VI), carved in the brink of the tenons of both upper and middle joint. Similar carved numbers are known from traversos by F.G.A. Kirst, who lived about half a century later (ca. 1750-1806).*

On the oboe HR5 the keys and their springs and axles are lost so that you can measure the channels accurately.

On only one other instrument (RS6) I had the chance to remove some of the silver keys, so that I could have a look at the brass springs, which are pushed into the channels (I have never seen springs riveted to the keys on Dutch baroque oboes).

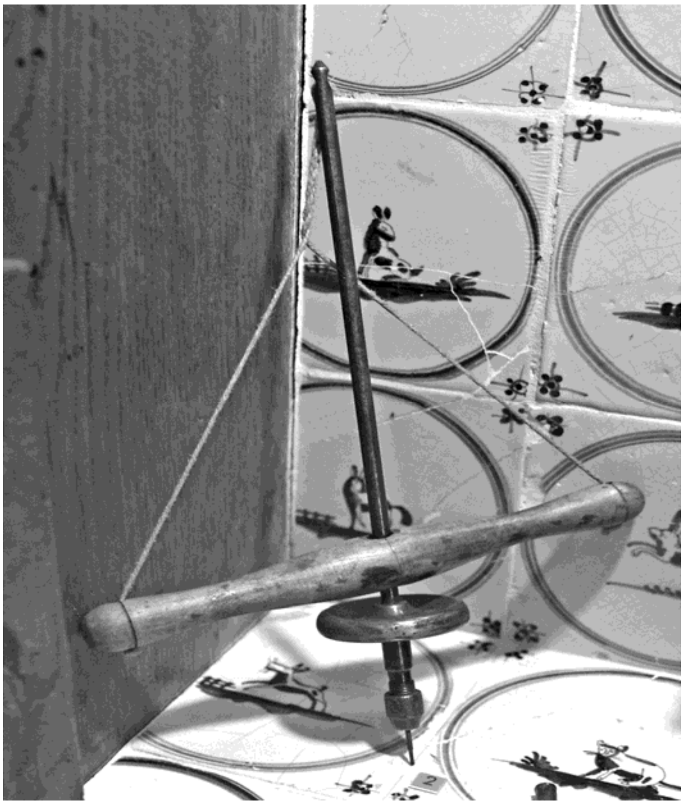
Oboe RS6 is made of boxwood and has no makers' marks. The holes of the key axles are blind (see photo left).

*Oboe RS6 after some keys are removed; below, keys of RS6*



The design of the profiles is very much in the style of the Richters brothers. A silver ring on the bell has an inscription: ‘Klaas Gerbens, Anno 1753'. That rules out Hendrik Richters as maker of this oboe; but dates on inscriptions give not always certainty about the year in which the instrument was made. The keys are a bit odd: the pad of the c-key is very small, but that may have been caused by cutting off some of the silver. As for the engravings on the keys (with floral motifs and a broom on the flap of the right small key); are they original? Likewise there are doubts also about the axles: they are very thick (1.5 mm), with hooks.

**Making keys and axle holes**



I already mentioned that it is not too hard to make good working keys for an oboe. But for making really nice shaped keys you need a lot of experience, and the same can be said about the engravings. Drilling the axle holes is another task for the oboe maker. How did they do this? I saw in a small local museum (Appingedam, Groningen, Netherlands) between the tools of a workshop of a jeweller this simple drill I suppose that in the 18th century similar devices were used: by moving the bar up and down the rope becomes twisted, which gives the rotation (forwards and backwards) for the drill.

And how to drill very small (narrow) holes? I myself use sometimes a steel needle, which I flattened for a greater parth of its length on a grinding stone. That grinding causes a wire edge, which I do not remove. That results in a diameter of the hole which is slightly wider than the original diameter of the needle. It is likely that the old oboe makers used similar drills.

**The keys: a conclusion**

The silver keys with their engravings and sometimes unusual (even exotic) design are unique in the world of baroque woodwind instrumants and give the ebony oboes (often, but not always, with ivory mounts) by the Richters family an even more luxurious appearance.

But wat was the meaning of the engravings with the rebus, Bacchus on a barrel, musicians and drunken or dancing people? Were these depictions ment to be funny, or showing some wordly wisdom, or both? I see some analogies with vanitas still lives (popular in Holland at the end of the 17th century), with their warnings against a wealthy lifestyle.

Were these luxuriously made oboes orderded as presentation pieces? But for which people: rich merchants, nobility, or even musicians? Because several of these oboes show traces of more or less intensive playing: internal cracks in the ivory finial mounts (as a result of desintegration of the ivory by enzyms from the saliva of the players ) and keys which were trimmed for easier handling. Other types of damages (such as broken beads) may have other causes.

After inspecting so many of these black-white-silver oboes, it was a pleasant surprise for me to see the oboes in boxwood with their simple, but beautifully shaped brass keys. And these instruments were not see easy to make: for a woodwind maker, it must have been quite a lot of work to fit an oboe with brass mounts and to stain the wood in tortoiseshell imitation (HR27). We don't know the various prices of the oboes. But as in Richters' days the costs for the materials outweighed those for labour rather much, I expect that the boxwood oboes with brass keys were considerably cheaper than those in ebony, ivory and silver.

Despite the sometimes striking and varied appearences of the keys, we must also conclude that the technical design and placing on the instruments  of Hendrik and Fredrik Richters is actually always the same and rather conservative. We will see that the same can be said about their internal design. The next and final article in this series about methods of research in woodwind instruments will be about toneholes and bore profiles of these oboes.

**The oboes of Richters: about methods of research in woodwind instruments**

**Part 5: Acoustical design of the instruments: lengths and tone-holes**

**Introduction**

This is the fifth article in a series about the oboes by (or in the style of) Hendrik and Fredrik Richters and two very similar instruments with the stamp of H. Rijkstijn. These oboes are particularly famous for their luxurious appearance. They are often made from expensive materials such as ebony, with ivory mounts and silver rings and keys which are on several instruments elaborately turned and engraved. But the Richters oboes in boxwood with brass mounts and keys (where the profiles of the balusters and the shapes of the keys are not distracted from by the embellishments) - show also the great craftsmanship of their makers.

Were these oboes made (and sold) as show objects, maybe as promotional gifts between rich people? Or were they in the first place musical instruments, for experienced or even professional players? After our studies of the exterior aspects oboes such as the turned profiles and the keys, it is time to concentrate on the acoustical design: the length of the parts of the oboes, the tone-holes and (see part 5b) the bore profiles.

The previous articles in this series dealt with:

- Part 1 (Comm. 2000): Checking source material: list of instruments, biographical data of the Richters family.
- Part 2 (Comm. 2011): A close look to a boxwood oboe by Hendrik Richters, a methodical approach to this instrument.
- Part 3 (Comm. 2015): Methods for comparing instruments; the search for a proper terminology; comparing baluster profiles from drawings and photos.
- Part 4 (Comm. 2016): - Survey of characteristics of the keys of the oboes by Richters, in Richters-stijl and by Rijkstijn; making keys and axle holes.

**Length, sounding length and 'visible length'**

Sounding length (SL) is a term often used by woodwind makers and researchers. The SL is defined as the length of the vibrating air column of a woodwind instruments with all tone-holes closed; SL is an indication (a calculation tool) for comparing pitches of instruments. SL is also sometimes used - perhaps rather confusingly - for the separate parts of the instrument. SL is then what you see of a joint when all parts of the instrument are mounted. For instance for the middle joint of a baroque oboe: it is the length of that joint without the tenon to the bell (and leaving aside the length of the socket at the other end). Maybe that 'VL' (visual length) is a better term than SL.

In table 1 I have summarized the most important SL measurements of the oboes. The bells have no tenons, so their visual length is also the actual length. For the top joints with a finial cup I have measured the distance from the bottom of that cup.

The first conclusion is that there are no two oboes with exactly the same lengths of the separate parts; however for the total length there are several instruments with a length between 565 and 567 mm (565.2 mm = is 24 *duim* of 23.55 mm derived from the Amsterdam foot). Some other oboes have a longer total length of about 571 mm. In part 2 of this series I have given the theory that for oboe HR27 this length fits better in a golden section proportion. But I must add this golden section does not fit perhaps so nicely for other instruments with about the same length.

**Table 1: Length and bore measurements of the oboes by Richters and Rijkstijn**

| *instrument* | *SL (VL) sections and total* | |
|---|---|---|
| | I + II + III = total L | L1-6ext (*L1-6 int*) |
| HR1: | 209.8 + 211.4 + 146.2 = 567.4 | 187.5 (*189*) |
| HR2: | 210.0 + 210.2 + 146.0 = 566.2 | 185.7 (*186.5*) |
| HR3: | 209.2 + 210.2 + 142.9 = 562.3 | 185.8 (*187.5*) |
| HR4: | 207.7 + 210.5 + 141.1 = 559.3 | 189.2 (*189.5*) |
| HR5: | 209.5 + 211 + 146 = 566.5 | 186.5 (*187.5*) |
| HR6: | 209 + 211.5 + 145.5 = 566 | 187 (*188.5*) |
| HR7: | 211.1 + 212.5 + 148.1 = 571.7 | 188.7 (*191*) |
| HR8: | 213.9 + 211.0 + 146.7 = 571.6 | 185.6 (*186*) |
| HR9: | 211 + 210.5 + 141.8 = 563.3 | 189.1 (*189.5*) |
| HR10: | 212.5 + 210.5 + 160.5* = 583.5 | 185.8 (*no measurements*) |
| HR11: | total length: 566 no further measurements | |
| HR12: | 210.0 + 211 + 145.4 = 566.4 no further measurements | |
| HR13: | 209.3 + 211 + 144.6 = 564.9 | 186.8 (*189*) |
| HR14: | ca. 211 + 214 + 149.1 = 574.1 | 189.1 (*189.5*) |
| HR15: | 209.4 + 214.2 + 150.0 = 573.6 | 186.3 (*187*) |
| HR16: | total length: 572 no further measurements | |
| HR17: | 210.6 + 211.0 + 146.2 = 567.8 | 187.0 (*187.5*) |
| HR18: | 209 + 211 + 142.1 = 562.1 | 186.2 (*188*) |
| HR20: | 212.5 + 210.2 + 146 = 568.7 | 187.0 (*no measurements*) |
| HR21: | no measurements | 187.8 (*no measurements*) |
| HR23: | ca. 212 + 209 + 147 = ca. 568 no further measurements | |
| HR24: | 210 + 212.5 + 158.5** = 581 | 188.0 (*190*) |
| HR25: | 210 + 210 + 145.8 = 565.8 | 185.7 (*187.2*) |
| HR27: | 211.5 + 212 + 146.7 = 570.2 | 187.3 (*189.5*) |
| FR1: | 210.0 + 210.0 + 146.8 = 566.8 | 186.0 (*186.5*) |
| FR2: | 209.9 + 209.5 + 146.5 = 565.5 | 185.8 (*187*) |
| FR3: | 215.2 + 211.2 + 145.2 = 571.6 | 183.6 (*184*) |
| FR4: | 211.5 + 209 + 144.7 = 565.2 | 186.0 (*186.5*) |
| RS1: | 209.5 + 210.3 + 147.2 = 567.0 | 187.7 (*188*) |
| RS2: | 210.5 + 208.2 + 144.0 = 562.7 | 183.9 (*184*) |
| RS3: | 204.7 + 211.0 + 145.6 = 561.3 | 185.7 (*186*) |
| RS4: | ca. 212 + 211.5 + ca. 150 = ca. 573.5 no further measurements | |
| RS5: | ca. 217 + 211 + 148.2 = ca. 576.2 | 184.0 (*184.5*) |
| RS6: | 210 + 211 + 145.5 = 566.5 | 185.2 (*185.5*) |
| Rijkstijn-1: | 212.2 + 209.5 + 144.6 = 566.3 | 183.1 (*183.5*) |
| Rijkstijn-2: | 204.4 + 211.5 + 144.0 = 559.9 | 185.0 (*185*) |

HR = Hendrik Richters; FR = Fredrik Richters; RS = Richters-style*; Boxwood instruments in italics (F3 = in stained fruitwood)*.
**SL/VL**= sounding/'visual' length (length of the joints without tenons; SL/VL of head joints is measured from the bottom of the finial cup); L1-6ext = distance from centre of hole 1 to the centre of hole 6, measured at the outside of the oboe; between brackets L1-6int: the distance between these two holes inside the bore of the oboes
**: a huge silver 'skirt' is attached to the flare of the bell, making the bell ca. 15 mm longer than it was before.   **: bell made by Philip Borkens*

The SL/VL's for the top joints vary for the oboes by Hendrik and Fredrik Richters from 209.3 to 215.2 mm; the variation is SL/VL's for the centre joints is about the same: from 209.5 to 214.2. The average of both series of lengths is about 212 mm, which is 9 *duim* (211.95 mm). The total SL gives us a useful indication for the pitch of instruments as traversos and recorders, but we also need information about the bore profiles. For instance: a wider bore over the whole length of these instruments means generally a lower pitch, and the same can be said for a conical bore which narrows more strongly towards the lower end.

**The sounding length and the oboe bells, with a short excursion to the traverso**
Can we use the sounding length in the same way as a useful variable to characterize certain acoustical aspects of the baroque oboe? There are some complications. The SL is on wind instruments never the same as the corresponding theoretical wavelength, which of course must be divided by the factor 2, because on recorders, traversos and oboes there is for the tones of the first register only the length between the antinodes, which is half the wavelength.

On a traverso the vibrating air column protrudes when all fingerholes are closed at both ends of the instrument: at the mouthhole and at the lower end of the bore. Only at these points, just outside the instrument, can the air vibrate freely, and there are for the lowest note (the fundamental) the two antinodes of the soundwave. For calculating the length of a traverso with a specific pitch, you must know the correction factors for how far the air column protrudes at both ends (mouthhole correction and end correction).

> Example: I have made copy of a renaissance traverso in d1 (modern pitch). The wavelength (divided by 2) for the d1 is 586 mm. The mouthhole correction for a mouthhole with a diameter of 10 mm is about 40 mm, the end correction about 7 mm. That makes 47 mm, which subtracted from 586 gives a sounding length of the instrument of 539 mm. The SL on my copy is a bit shorter (535 mm), what is caused by the mouthhole which is a bit smaller (8.5 x 9 mm) which results in a slightly bigger correction. See for the formulas for these and other corrections Otto Steinkopf: *Zur Akustik von Blasinstrumenten* ('About the acoustics of wind instruments', Moeck Edition 4029, Celle 1983).

Opening successively the tone-holes shortens the soundwave and so we can play higher tones. But as with the lower end of the instrument, the antinodes of these higher tones clearly stretch further in the bore than just after the lowest open tone-hole. There is a formula for each tone-hole correction, which include factors for the size of the hole, the diameter of the bore and the thickness of the wall.

The oboe has, however, not a foot, but a flared bell with two tuning or resonance holes in the upper half. Where is the end of the vibrating air column when all tone-holes are closed? Not at the lower bell rim, but somewhere between that rim and the tuning holes.

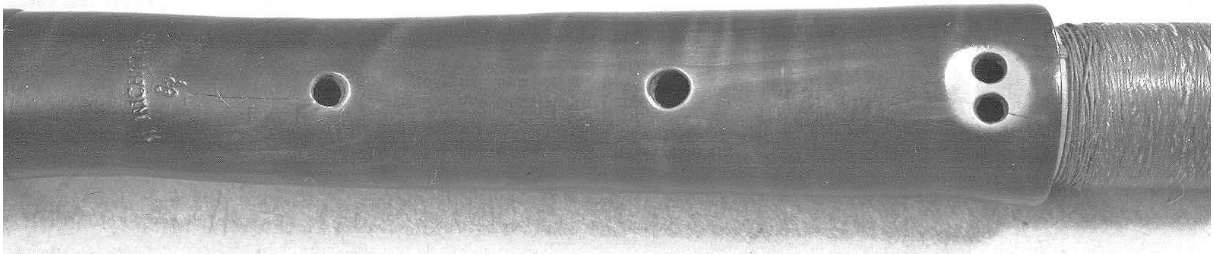
Otto Steinkopf, writes concerning these bells: '*Die Schallstück- oder Becherformen der Holzblasin- strumente sind so unterschiedlich, dass sie schwer rechnerisch zu erfassen sind'* (The shapes of the bells of woodwind instruments show so much variation, that it is difficult to find ways to carry out calculations). It is hardly possible for a baroque oboe to calculate the length of the bell, the bore profile and the place and size of the tuning holes.

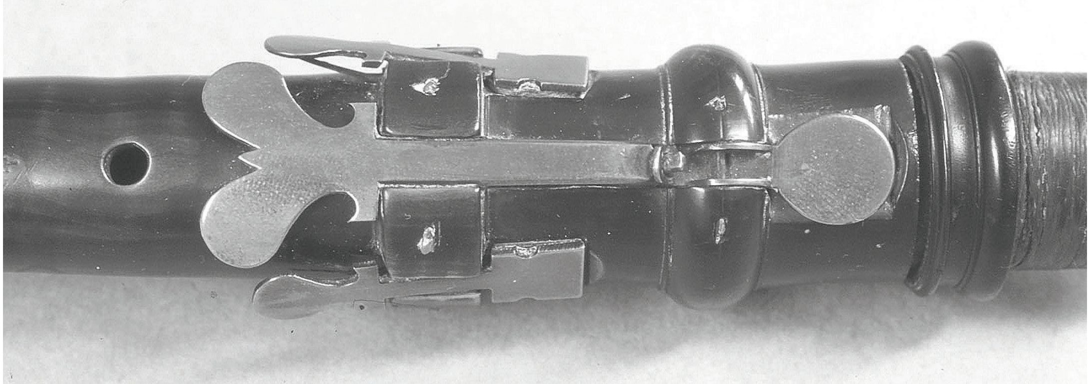
Oboe HR24 (a boxwood oboe by Hendrik Richters in the Horniman Museum in London) is interesting because its bell is by another woodwind maker from Amsterdam, Philip Borkens (born 1693, still active in 1761). This bell is probably not the result of an accidental interchange of parts. I think that Borkens added this bell to the Richters oboe because the original bell was lost or badly damaged. He lacquered not only the new bell but also the upper and middle joint in a dark brown colour, just in the style of Borken's clarinet in the Gemeentemuseum in The Hague (inv. no. Ea 306-1933).

The bell which Borkens made is interesting because it has completely different dimensions: it is over 10 mm longer than the longest original bells by Richters, but the tuning holes are just much closer to the upper end of the bell. What is the effect of this other design? The only way to find out is to make a copy of this oboe with two different bells.

Another interesting aspect: the upper end of the bell by Borkens is smooth, turned without a group of socket beads. This type of bell profile is not uncommon: see oboes by Thomas Stanesby (1668-1734), I.H. Rottenburgh (1772-1765), Charles Bizey (active from 1716 to 1752) and other woodwind makers. I suppose that the bells with a group of socket beads are the older ones, but the other type were introduced rather early in the 18th century or even already at the end of the 17th century. But why? Perhaps because at the shoulder at the lower end of the centre joint is already a group of beads; two groups of connecting beads was perhaps for some woodwind makers visually not ideal.

Photo left: the bell by Philip Borkens for the oboe HR24 by Hendrik Richters. Photos below: fingerholes 1 - 3 on the top joint of this oboe. We can just see that hole 1 is slanted slightly upwards. The wood of both upper and centre joint of this oboe has warped rather curiously: the surface has become undulating in some places (see photo below). The brass keys are beautifully made; the axle holes are not blind, but go through. But we don't know what Borkens might have changed here.





**L1-6: the distance from hole 1 to hole 6**
At the other end of the oboe is another problem for the determination of the SL. The length and dimensions of the counter bore is not relevant for the sounding length, but the length and profile of the staple (and how far that is inserted in the counter bore of the oboe) is very much so, as of course are the dimensions of the reed. As there are no original staples and reeds preserved for Dutch oboes, modern players and instrument makers must make these most important parts by trial and error. Choosing a reed and staple is a very individual matter: the pitch of a baroque oboe may vary 30 cents or sometimes even more when played by different players. Instead of the sounding lengths of the joints or the total length of the oboe, I have chosen the distance between the (centres of the) first and sixth fingerhole (L1-6) as parameter which is likely to be more relevant to compare the pitch of the oboes.

> Bruce Haynes used in *The Eloquent Oboe'* another distance, from the top of the oboe to hole 6; another option is the distance from hole 1 to hole 8 (the hole of the C-key), or from the top of the instrument to hole 8.

In table 1 I have not only given this distance at the exterior of the instruments (L1-6ext), but also, as hole 1 is sometimes drilled obliquely upwards and hole 6 downwards, the distance in the bore (L1-6int).

Holes 1 to 6 on most of Hendrik Richters' instruments are drilled straight and slightly undercut (generally speaking, the most pronounced undercutting is in holes 5 and 6). Holes 1 and 4 are sometimes drilled at a slightly upward angle, with a shift of no more than 1 mm, holes 2 and 3 (and occasionally 6) sometimes at a downward angle (with a shift of 0.5 mm). It is not always clear whether the holes were drilled at an angle or merely undercut on one side (measuring these aspects is not an easy job). Hole 1 on oboe no. HR24 is drilled at a fairly pronounced ascending angle; on oboe no. HR7, by way of exception, the tone-holes 5 and 6, the key holes and the tuning holes are more undercut. The tone-holes on Frederik Richters' instruments are always straight or as good as straight, and slightly undercut.

The variation in the L1-6int (see table 1) of the instruments is surprisingly small: from 187 to 191 mm for the oboes of Hendrik Richters (remarkable: 9 *duim* is 188.4 mm); some instruments by Fredrik Richters, in the style of Richters and by Rijkstijn are somewhat shorter (to 183.5). That is a variation of 2% for the oboes of Hendrik Richters, and 4% for all oboes. These percentages correspond with variations in pitch of 35 and 70 cents respectively. That seems very much, but considering the use of a wide range of possible reeds and staples, it is also conceivable that a group of experienced players can play the oboes by Hendrik Richters at the same pitch. Bruce Haynes (*The eloquent oboe*, p. 93) writes: '*On the hautboy (unlike the recorder and clarinet), notes can quite possibly be 'bent' to accommodate pitch levels as much as 40 cents apart on the same instrument. Not only there are differences between players, but the same player can alter the pitch of a single instrument by using reeds of different dimensions'.*

The variation of L1-6 is in the selection of Dutch oboes in table 2 (see next page) slightly bigger than for the instruments of with the Richters stamps; the shortest being about 185, the longest one (Boekhout no. 18) about 195 mm. These variations correspond by and large with the variations in the pitches of the oboes, such as which were assessed by Piet Dhont in a comparative playing session for the catalogue of Dutch double reed instruments (Van Acht, Bouterse & Dhont, 1997). What does that mean? That the oboes by Richters are instruments which stand at the centre of the Dutch tradition of their time.

Richard Haka's oboe no.17 has a L1-6int of about 195 mm. The American oboe maker Mary Kirkpatrick made last year a copy of this instrument and found it perfect playable at a pitch of a1=405 Hz. I myself made copies of Van Heerde no. 13 and Wijne no. 13, which with a length of about 188 mm for L1-6int were played at a1=415 Hz. I give these examples as an indication for what we may expect of the oboes by Richters.

**Table 2: Length and bore measurements of a selection of oboes by other Dutch woodwind makers**

| | *SL sections and total* I + II + III = | total L | L1-6ext (+ means: L1-6int is 2 to 4 longer, ++ means: L1-6 is up to 6 mm longer than L1-6ext) |
|---|---|---|---|
| Abraham van Aardenberg | | | |
| | no. 14: 213.1 + 214.3 + 156.1 = | 583.5 | 181.2++ (L1-6ext is ca. 187) |
| | no. 15: 210.5 + 214 + 152.7 = | 577.2 | 181.5++ (L1-6ext is ca. 187) |
| Willem Beukers | | | |
| | no. 12: 210.2 + 210.5 + 150.8 = | 571.5 | 185.3 |
| | no. 14: 212.4 + 214.6 + 150.2 = | 577.2 | 189.6 |
| Thomas Boekhout | | | |
| | no. 18: 213.2 + 214.4 + 153.6 = | 581.2 | 194.8+ |
| | no. 19: 211.3 + 215.5 + 143.1 = | 569.9 | 185.0 |
| Philip Borkens | | | |
| | no. 6: 215 + 212 + 148.7 = | 575.7 | 190.7+ |
| Richard Haka | | | |
| | no. 17: 214.6 + 216.4 + 146.4 = | 577.4 | 192.4+ |
| | no. 21: 210.7 + 211 + 141.6 = | 563.3 | 189.1+ |
| Van Heerde | | | |
| | no. 12: 211 + 210.5 + 147.6 = | 569.1 | 184.8 |
| | no. 13: 210.5 + 211.5 + 152.1 = | 574.1 | 187.8+ |
| Coenraad Rijkel | | | |
| | no. 4: 210.8 + 216 + 140.5 = | 567.3 | 187.1(+) |
| | no. 6: 212 + 214 + 148.0 = | 574 | 187.2(+) |
| Jan Steenbergen | | | |
| | no. 10: 212.1 + 213.8 + 146.6 = | 572.5 | 193.6+ |
| | no. 11: 212.3 + 210.1 + 149.3 = | 571.7 | 192.1+ |
| Engelbert Terton | | | |
| | no. 10: 211.9 + 215.7 + 148.5 = | 576.1 | 191.7+ |
| | no. 12: 212 + 216.5 + 146.4 = | 574.9 | 188.8+ |
| Robbert Wijne | | | |
| | no. 13: 212.7 + 212.5 + 149 = | 574.2 | 188.5+ |

*The numbering of the oboes is the same as in the lists in my dissertation (Bouterse 2005). Nota bene: oboe no. 13 of Robbert Wijne doesn't mean that there are twelve other oboes by this maker; the lower numbers (1 to 12) are in his case for recorders and traversos.*

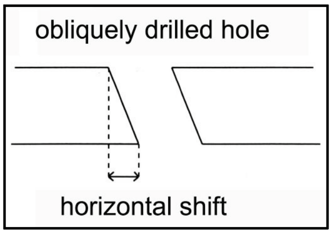
**The tone-holes of the Richters oboes; how they affect pitch and sound**

It is not really possible to write separately about tone-holes and the bore profiles of the oboes. Or to separate that information from playing characteristics of the instruments. On p. 92 of his book *The eloquent oboe* Bruce Haynes writes: '*Tone-hole size is not linked to bore size*'. He mentions that of the large-holed instruments he had seen, some oboes by Denner are always with a narrow bore, while another by Stanesby junior is unusually wide. Another remark by Haynes is important: in a footnote on p. 93 he says: '*In this case* [altering the pitch of an oboe by using other reeds and staples]*, the internal intonation requires adjusting the size of the lowest tone-holes: as the pitch goes up, they must be enlarged'.* That means that if we see an oboe with these lower holes which are unusually wide (wider than on other instruments by the same maker), that that instrument might be altered by a player.

It is therefore that one of the questions that must be asked is whether the tone-holes of the Richters-oboes are in original condition. In table 3 the variations are listed of the size of several tone-holes of the oboes for which I have collected measurements. The exterior diameters of the wood (Ø-ext) at these holes are added too.

> Nota bene: as it was not always possible or allowed to remove the keys, the size of these holes could not be assessed with the same accuracy as the other holes. Therefore the many 'circas' (c.) for the sizes of hole for the great key (hole 8).

Measuring the position and size of the tone-holes is not so easy: holes are sometimes drilled obliquely and can be undercut as well. The positions of an instrument's tone-holes are represented in the tables of this article as the distance from the middle of one hole to the lower or upper edge or edge of the shoulder of the relevant section of the instrument. In the case of obliquely drilled holes there is a difference between their position on the outside (surface) of the instrument and their harder to determine internal position, which is acoustically more relevant. Various researchers indicate the angle at which such holes were drilled; another method is to indicate the degree of horizontal shift. Both methods are however inaccurate when fingerholes are not only drilled at a slant but are moreover undercut.




Why are fingerholes drilled at a slant? That is not only to get these holes in an easier reach of the fingers or to achieve a more regular spacing of the holes in a group of three: a hole which is drilled at an angle is also longer than a straight hole and that has - together with the shape and mount of undercutting - influence of the sound and other playing characteristics of the tone. One of them is the relation between the main tone and the corresponding fork-fingered tone on that hole (for instance: hole 2 and the tones b and b-flat, fingered respectively 1 and 1 . 3). Another aspect is the 'resistance', a concept that is not easy to define. When producing a tone on an oboe, the player aims for a precise and well-balanced attack, whether he is playing legato or piano, staccato or louder. For a successful result it helps if the player encounters a certain degree of resistance from the instrument, so that the tone will not go off uncontrolled in all directions. Resistance does not depend solely on the quality of the reed, but also on the oboe's bore and the size and shape of the tone-holes. Generally speaking, a player encounters less resistance from a relatively wide bore and large tone-holes than from a narrower bore and holes. Additional factors are the effective local thickness of the oboe wall at the tone-holes and the angle at which the hole is drilled. Bruce Haynes (Haynes 2005, p. 91) writes that undercutting makes a note louder and brighter in tone colour, and makes it easier to push up or down in pitch. It makes also it sound more easily. Of a tone-hole has sharp edges where it enters the bore, it speaks less easily, thereby causing the player to blow harder than usual to overcome the initial inertia.

Cecil Adkins mentions that in the Richters oboes he assessed undercutting is not common in the top joints. Six of these eighteen oboes have the first hole drilled upward between 10 or 15 degrees. Four of the second holes slant downward and one upward. For the double third holes he observed that the two holes were joined together in the bore. According to Adkins there is much more variation in fingerhole size and placement on the middle joints, and the undercutting is minimal.

**Table 3: Relation between tone-hole size and wall thickness of the oboes by Richters and Rijkstijn**

| *instrument* | *hole 2* | *hole 5* | *hole 7 (d#)* | *hole 8 (C)* | *tuning hole (bell)* |
|---|---|---|---|---|---|
| (smallest diameter / Ø-ext of hole) | | | | | |
| HR1: | 3.5/18.6 | 5.2/21.1 | 4.5/24.2 | c. 6.3 | 4.1/27.8 |
| HR2: | 3.6/19.4 | 4.8/21.4 | 4.3/24.6 | c. 6.6 | 4.3/28.2 |
| HR3: | 3.5/19.1 | 4.4/21.0 | 4.1/24.1 | c. 6.0x6.2 | 4.1/28.6 |
| HR4: | 3.4/18.9 | 4.8/21.5 | 4.5/24.8 | c. 6.0 | 4.2/27.0 |
| HR7: | 3.4/19.0 | 4.4/22.5 | 4.6/25.4 | 6.4x6.8 | 4.7/26.6 |
| HR8: | 3.5/19.0 | 4.6/21.7 | 3.8/25.1 | c. 6.0x6.4 | 3.9/28.0 |
| HR9: | 3.4/19.2 | 5.0/21.9 | 4.5/24.7 | c. 6.6x7.0 | 4.2/26.2 |
| HR13: | 3.7/19.0 | 4.6/21.2 | 4.0/24.4 | c. 6.7 | 4.0/28.6 |
| HR15: | 3.5/18.8 | 4.7/22.5 | 5.9/25.7 | 7.0x7.6 | 5.0/26.9 |
| HR17: | 3.5/19.0 | 4.7/21.1 | 4.5/24.8 | 5.9x6.1 | 4.0/28.2 |
| HR18: | 3.5/18.7 | 4.5/21.9 | 4.1/25.6 | c. 6.2 | nm/ 27.2 |
| HR20: | 3.4/18.9 | 4.9/21.5 | 4.8/24.3 | 6.0 | 4.1/27.6 |
| HR21: | 3.5/17.9 | 4.8/20.7 | 5.7/24.3 | 6.3 | 4.1/27.6 |
| HR24: | 3.5/19.2 | 4.6/22.4 | 4.3/25.7 | c. 6.5 | 4.7/nm |
| HR25: | 3.5/19.3 | 4.7/21.9 | 4.0/25.8 | 5.7x6.1 | 4.2/27.6 |
| HR27: | 3.4/16.8 | 4.5/21.7 | c. 5 /25.0 | c. 6.5 | 4.0/27.0 |
| HR30 (tenor): | 3.6/22.6 | 4.6/25.9 | 5.5/30.4 | 7.6x7.8 | 4.9/34.5 |
| FR1: | 3.3/19.3 | 4.5/21.5 | 3.9/25.0 | 6.0x6.1 | 4.0/29.0 |
| FR2: | 3.3/18.9 | 4.6/22.0 | 4.2/25.4 | c. 6.4 | 3.9/28.5 |
| FR3: | 3.4/18.8 | 3.8/22.0 | 3.6/25.5 | c. 6.2x6.6 | 3.6/29.5 |
| FR4: | 3.6/19.0 | 4.4/21.3 | 3.7/25.2 | 6.2x6.4 | 4.1/28.6 |
| RS1: | 3.2/18.9 | 4.4/21.4 | 3.8/25.8 | 5.9x6.1 | 3.9/29.6 |
| RS2: | 3.4/18.0 | 4.3/21.2 | 4.8/24.7 | c. 6.2x6.7 | 3.8/30.1 |
| RS3: | 3.5/19.2 | 4.4/22.3 | 4.2/27.3 | c. 6.2x6.5 | 4.1/30.1 |
| RS5: | 3.5/nm | 4.7/nm | 4.0/nm | c. 6.0x6.2 | 4.2/nm |
| RS6: | 3.4/19.0 | 4.6/21.9 | 4.4/25.0 | 6.3x6.5 | 4.0/29.4 |
| Rijkstijn-1: | 3.2/18.9 | 4.5/21.7 | 3.5/25.6 | c. 6.0 | 4.1/27.9 |
| Rijkstijn-2: | 3.4/18.6 | ca. 5.8*/23.0 | 3.8/ca. 27 | c. 5.5 | nm/28.5 |

*Explanation: before the slash the smallest diameter, after the slash the local outside diameter (= Ø-ext); of hole 8 (the hole for the great key): only diameter (min x max) of the hole.*
*HR = Hendrik Richters; FR = Fredrik Richters; RS = Richters-style; nm= not measured.*

What conclusions can be drawn from the data in table 3? About possible enlargements of the holes, there is only one suspect: oboe HR15 which belonged to the oboe player Michel Piguet. Holes 7 and 8 as well as the tuning holes on the bell are larger than on all other instruments. I have not seen this oboe myself, so I don’t know if there are any traces on the holes (such as sharper corners or irregular undercutting) which are indications of an enlargement by a player. Oboe HR21 has also a rather large 7th hole, but the lower holes have normal sizes.
Oboe FR3 have very small holes 5 and 7 and tuning holes on the bell. But this is a slightly odd instrument, the stamps are rather vague, but the ‘F’ of the name and the cloverleaf are unmistakable from the maker’s marks of F. Richters. The wood of this oboe (fruit wood?) is rather dull, and so are the metal rings; further are the keys probably not original: the quality of the engraving doesn't match the design of the mounts. The tenon of the upper joint is a replacement, there are several deep cracks in the middle joint and bell. Conclusion: this instrument does not (in its present condition) match quality of the other oboes by Fredrik Richters.

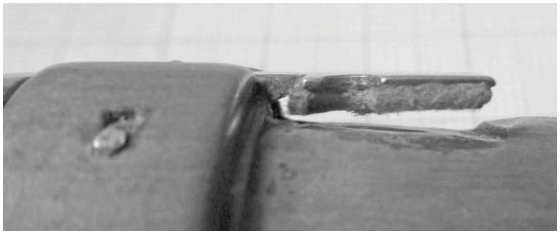
Bruce Haynes says that the Dutch oboes from the end of the 17th century and persisting until possibly as late as the 1760s belong to 'Type A3'*, which '*shows unusually sharp flares at the finial and short bell and an 'emphatic roundness' at the balusters'.* Then he continues: '*Aggre- gate tone-hole size* [which is the total of the diameters of fingerholes 1, 2, 4 and 5] *is typically on the small side, average 15.8, but the bores are relatively wide; the length is standard (AL about 328).'*

* Haynes follows in *The eloquent oboe* (p. 81) a classification of Eric Halfpenny, which was published in the article 'The English 2- and 3-keyed Hautboy' (*Galpin Society Journal* 2, 1949, p. 10-26). 'AL' is the distance from the top of the oboe to hole 6.

Comparing hole sizes of the oboes by Richters with those of other European makers exceeds the scope of this article. I must confine myself to a selection of data of the oboes by Richters only, see table 3.

About hole 2: the variation in size of this hole on the oboes is small, on most instruments it is 3.4 or 3.5 mm. Only four oboes have smaller holes (two by Fredrik Richters) and three have larger holes. And these larger holes don't mean that the corresponding lower holes are bigger as well. I cannot further see any relation between the size of the hole and the Ø-ext at the hole. Hole 5 is on average between 4.4 and 4.8 mm, only two are smaller (FR3 and RS3) and three are larger (HR1, HR9 and HR20, respectively 5.2, 5.0 and 4.9 mm), again with no relation to the size of the other holes on these instruments. Hole 5 on Rijkstijn measures 5.8 mm, but both hole 5 and 6 on this oboe are not in original condition and look now more overcut than undercut. See the photos of this oboe on the next page.

There are two complication for hole 7. At first, it is not only the size of the hole that we must take in consideration, but also the action of the key. A low key action means that the key is 'shadowing' the hole below, and on many Dutch oboes I have seen indeed a rather low key action (for instance on HR27, see photo right).



Secondly, there is the question about the relative pitch of the tone played with holes 1 to 6 closed and the small key pressed (opening hole 7). We were confronted with this point during the preparations for the catalogue of Dutch double reed instruments in the Gemeentemuseum in The Hague (1997), for which professional baroque oboe player Piet Dhont was asked to assess the acoustical properties of the instruments. On several Dutch oboes, these tone appeared to be rather flat, more a d-sharp than a e-flat. What does that mean? It is a complicated matter, involving the aspect of the temperament in which the oboes were tuned and which kind of music was played on them.

From para. 9.6.3 of my dissertation: ... *'it was apparent that a few critical forks in the first octave of some oboes were easier to play than on others. On Boekhout's no. 18, for instance, f1 played well without recourse to the small-key, at the same time - but from a technical point of view not influenced by that instrument's easier-speaking f1- the tones d-sharp/e-flat1 and d-sharp/e-flat2 sound relatively high; this is the direct consequence of the fairly large hole of the small-key. Other oboes have an f1 that speaks less easily, the small-key having to be used for this tone. On these 'd-sharp/f-sharp oboes', moreover, the tone d-sharp/e-flat is often somewhat low in both octaves (the small-key's hole is often little too), making it more practical to use them as a d-sharp than as an e-flat, based on a mean-tone temperament'.*

**Table 4a: pitch and some playing characteristics of oboes by Hendrik and Fredrik Richters (table 9.10 in Bouterse 2005)**

| | *pitch of a1* | *remarks* |
|---|---|---|
| HR1* | 412-415 Hz | f1 needs d-sharp-key, d-sharp1/d-sharp2 not very flat; sound character and quality are between those of HR6 and HR7 |
| HR2* | 410-415 Hz | f1 easy, d-sharp1/d-sharp2 a little flat, c-sharp3 and d3 slightly difficult |
| HR6* | 415-417 Hz | f1difficult, d-sharp1/d-sharp2 rather flat; this oboe has a direct attack, is very sensitive to fluctuations in wind pressure |
| HR7* | 410-415 Hz | f1 and b-flat1 easy, d-sharp1 a little flat, b2 slightly difficult; the sound of this oboe is somewhat modest |
| HR8* | 408-412 Hz | f1 slightly difficult, but d-sharp1/d-sharp2 not too flat; the sound of this instrument is not so much free (somewhat stopped) as of other Richters oboes |
| HR9* | ca. 415 Hz | d-sharp1/d-sharp2 are flat, f1 needs d-sharp-key; beautiful sound |
| HR10 | 430-435 Hz | |
| HR13 | ca. 415 Hz | |
| HR30 | < 400 Hz (after Haynes) or ca. 405 Hz (after Cottet) | |
| FR1* | 412-415 Hz | f1 easy, also without d-sharp-klep; d-sharp1/d-sharp2 not (too) flat; because of cracks, this oboe could only be played during a short time |
| FR2* | 408- 412 Hz | f1 reasonably easy, d-sharp1/d-sharp2 rather flat; very good oboe, perhaps even a little more modest than HR7 |

*Explanation: *: these instruments are from the Gemeentemuseum Den Haag (The Hague). HR10 is the oboe in the Beethoven Archive, Bonn, Germany, HR13 in a private collection in London, HR30 is the tenor oboe in the Musée de la Musique in Paris.*

**Table 4b: Aggregate tone-hole sizes (ATS)**

| | | | |
|---|---|---|---|
| HR1: 16.4 | HR2: 16.6 | HR6: 16.5 | HR7: 15.3 |
| HR8: 15.8 | HR9: 16.5 | HR27: 15.6 | |
| FR1: 15.5 | FR2: 15.8 | FR4: 15.6 | |

*The aggregate tone-hole size (ATS) is the total of the average diameters of fingerholes 1, 2, 4 and 5.*

Table 4a shows the results of the playing sessions in The Hague, complemented with data from some instruments in other collections. Oboe HR10's extremely high tuning (a=430 Hz) was undoubtedly measured as such, but fails to tell us very much, partly due to the lack of reed and staple measurements. The Richters oboes at The Hague can sound as much as a semitone lower than the instrument in Bonn, in tunings varying from a=408 to 416 Hz. In view of their only slightly differing lengths, this variation is remarkable and difficult to account for. Oboe no. HR9 was one of the highest-sounding instruments, probably because it had been recently oiled. However, this cannot account for the differences between the tunings of nos. HR1 and HR6 for example, or HR8 and FR2 (none of which were oiled).

I have had in recent years discussions with players about the sound of the f1 on baroque oboes. While on recorders and traversos the second register is the intensive register (see Steinkopf, pp. 9 and 49), which among other things means that the fork-fingered notes are critical (it is only restrictedly possible to change the pitch of these by adding a finger down in the fork), the intensive register for oboes is the first register. The f2 in the second register (with 1 2 3 4 6) is never problematical, but the f1 sounds often a bit muted with this fingering. Opening hole 7 (by pressing the small key) gives on such instruments an improvement. But oboe players do not like pressing the keys when it is not strictly necessary. Piet Dhont has discovered that the f1 speaks and sound better when he puts a small ring of paper in the bore of the middle joint, just below the socket to the upper joint. This narrows the bore at that point and has not much negative consequences for other tones; Piet uses this technique often in concert. Michel Piguet (I met him only once in Basel, in the coffee room of the Musikhochschule) told me that for a good f1 the shape of the bore of the bell is important; the properties of the tuning holes on the bell may affect the f1 as well. But so much depends on the reed and staple, which I discovered when American oboe maker Mary Kirkpatrick sent me some of them which see has made herself: with her reeds I had for the first time no problems at all with the f1 on one or two of my own copies of Dutch baroque oboes.

Is there a conclusion? It is hardly possible to find a tendency or relations between the properties of the tone-holes and the pitch and other characteristics of the tones of the oboes. But larger holes mean generally a louder sound. Give the aggregate tone-hole sizes (ATS) a clue? HR7 has a 'somewhat modest sound' and an ATS of only 15.3; HR9 has a 'beautiful' (and perhaps also louder) sound with a higher ATS of 16.5. But the relation is by far not so obvious for the other instruments in tables 4a and 4b.

How to compare these numbers with those given by Bruce Haynes, in Appendix 2 of *The eloquent oboe*? I have calculated for HR14 (Bate Collection, Oxford, No. 2037): 15.9, and Haynes 15.85; for FR4 (collection Han de Vries, Amsterdam) I measured 15.6 and Haynes 15.8; but for the oboe 17 by Richard Haka (Gemeentemuseum Den Haag, Ea 6-1952) I have 16.2 and Bruce Haynes 17.15, which is considerably more and has nothing to do with a different rounding off of the measurements. My impression is that adding hole sizes is a bit dangerous technique: it means also that you are adding the inaccuracies which always occur when measuring these holes (which is not so easy at it seems).

Bruce Haynes mentioned an average ATS of 15.8 for Dutch baroque oboes. This value seems also to be the average ATS of the oboes by Hendrik and Fredrik Richters. As we saw before too, the lengths of the joints and the distance from hole 1 to hole 6 are on their oboes never extreme and there is no sign that the brothers (and other family members) were involved in experiments in making new types of oboes. The standard model of their instrument was good enough to meet the expectations of the people who were interested in buying them.

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## The oboes of Richters: about methods of research in woodwind instruments

### Part 6: Acoustical design of the instruments: the bore profiles

The interior (bore) is in a literal and figurative sense the heart of each woodwind instrument. In making an oboe (and most other types of woodwinds) the bore also comes first, before turning the exterior. Drilling and reaming the bore in a piece of wood is a precise job, because the bore profile is most important for the acoustical properties of the instrument: it defines very much the acoustical properties, such as the pitch. The position of the tone holes is also for the greater part related to the dimensions of the bore.

The profile of the bore is largely established by the shape of the reamers which were applied. With a specific reamer you can generally make only one, and usually clearly defined, bore profile. Bore profiles are therefore often better parameters for finding relations between instruments than other stylistic characteristics such as the turned exteriors. For instance: it is possible to find clues who might have made an oboe that has no maker's marks.

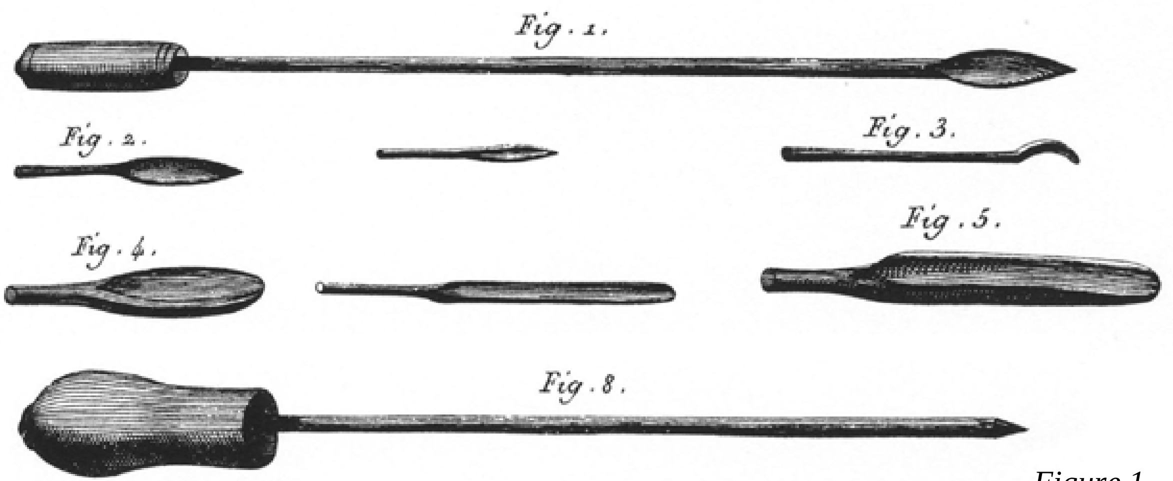



*Figure 1*

Figure 1 is the well-known picture of the woodwind makers tools from the *Encyclopédie ou dictionnaire raisonné des sciences, des arts et des métiers* by Diderot and d'Alembert (1751-1780). It shows pointed drills (fig. 1 and 2) as well as short reamers (fig. 4 and 5), more or less in the shape of a spoon (fig. 4). The tool of fig. 3 is probably a 'scraper', for widening a bore over a short distance, for instance close to the fingerholes.

These tools are used while the wood is turned on a lathe. The lower (right) end of the wood is supported by a so-called fixed 'steady', allowing one to push the drill or the reamer against the centre of the end of the wood. No original tools of Dutch woodwind makers from the 17th and 18th centuries did survive (I do not know about reamers of other European makers) and I do not know whether the drills and reamers in the *Encyclopédie* are correctly rendered (some depictions of musical instruments in this book have rather odd details). Various tools, such as reamers or drills, are depicted on an engraving of a woodwind maker's workshop (from 1698) by the German artist Christoff Weigel (see figure 2, next page). Several of these tools have a cross bar at the end, which makes it much easier to push them steady into the wood. The reamers against the back wall have a very strong conical profile; but for which type (or part) of instrument were they designed? They are not unlike the tools used until the 20th century by makers of wooden shoes in Holland.

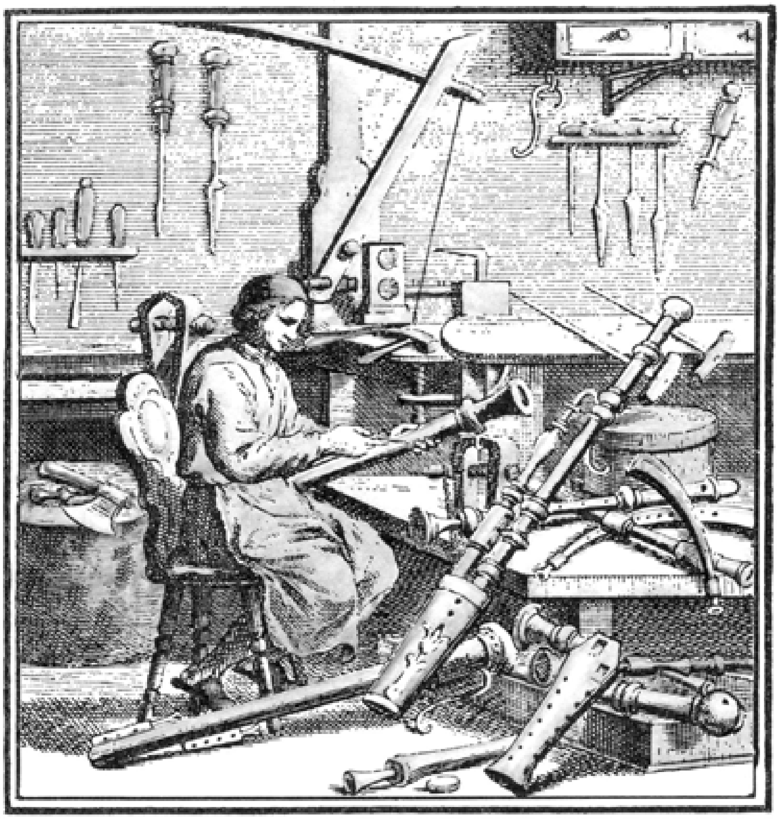


*Fig 2: the workshop of a woodwind maker, by Christoff Weigel (1698).*
*The metal tools of instrument makers were surely made (forged) by local blacksmiths.*

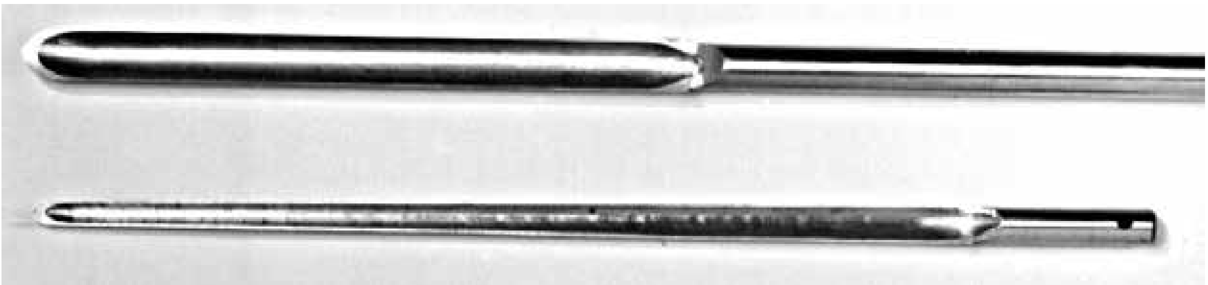


*Figure 3: modern reamers for woodwind instruments, from the website of the firm of Joseph Böhm (Germany). These reamers are made on a modern computerized metal lathe.*

Cecil Adkins gave full attention (18 pages in his 76 p. long article, Adkins 1990) to the bores of the Richters oboes. He opens with the following remark: '*The congruity of the bores is surprising when one considers the simple tools available for shaping bores in the 18th century. Each of the Richters bores was shaped through the use of multiple reamers ... and as a result the bore profiles in the upper two joins are complex, often with marks of three different reamers.'* But this is actually in my view too easy a conclusion from Adkins, for instance: were the tools really so simple, and did that affect the congruity or incongruity of the bores? The illustrations in Adkins' article are not very convincing (I must admit how difficult it is making photos of bores) and he gives in his article only a selection of measurements. It is good to put some question marks on his observations, but I am also aware that I myself can also give only concise data to support my own conclusions. That is why I will mainly concentrate on pointing to the dangers of this important part of woodwind research.

Another remark: there is always a relation between the techniques and comprehensiveness of measuring an instrument and the scope for interpreting the results. One of the research questions is about the accuracy applied by the Richters in making their oboes, and how accurate we nowadays have to be in assessing the instruments to answer that question.

**Table 5: Bore measurements of the oboes by Richters and Rijkstijn**

| *instrument* | *Ø bore upper joint, top - min. -bottom* | *middle joint, top - bottom* | *bell top - max. - bell rim* |
|---|---|---|---|
| HR1: | 8.9 - 6.3 - 11.0 | 11.6 - 16.5 | 18.7 - 41.4 - 36.3 |
| HR2: | 8.5 - 6.6 - 11.2 | 11.8 - 17.0 | 19.3 - 47.7 - 42.9 |
| HR3: | 8.5 - 6.4 - 11.6 | 11.5 - 16.7 | 19.5 - 44.2 - 40.3 |
| HR4: | 8.8 - 6.4 - 11.1 | 11.7 - 16.2 | 18.8 - 44.3 - 41.3 |
| HR5: | 8.5 - 6.6 - 10.9 | 11.9 - 16.5 | 19.5 - 44.8 - 41.3 |
| HR6: | 8.8 - 6.5 - 11.1 | 11.6 - 16.9 | 19.0 - 46.8 - 41.3 |
| HR7: | 8.8 - 6.4 - 11.4 | 11.8 - 17.1 | 18.3 - 44.5 - 41.9 |
| HR8: | 8.9 - 6.7 - 11.4 | 11.2 - 16.5 | 19.5 - 50.1 - 45.4 |
| HR9: | 8.4 - 6.4 - 11.1 | 11.3 - 16.2 | 19.1 - 46 - 40.5 |
| HR13: | 8.9 - 6.5 - 11.5 | 11.6 - 16.9 | 19.3 - ca. 50 - 43.9 |
| HR15: | 8.4 - 6.4 - 11.2 | 11.6 - 16.6 | 18.2 - 44.3 - 41.3 |
| HR17: | 8.5 - 5.6/6.8* - 10.7 | 11.4 - 16.2 | 19.1 - 43.9 - 39.7 |
| HR18: | 8.7 - 6.6 - 11.4 | 11.6 - 16.7 | 19.6 - 47.5 - ca. 44 |
| HR20: | 8.7 - 6.3 - 11.3 | 11.7 - 17.4 | 18.4 - 42.2 - 36.8 |
| HR21: | 8.3 - 6.3 - 11.4 | 11.4 - 15.8 | 19.5- 43.9- ca. 36.5 |
| HR24: | 8.3 - 6.3 - 11.2 | 11.8 - 16.3 | 20.0 - 43.9 - 40.6 |
| HR25: | 8.7 - 6.3 - 11.3 | 11.5 - 16.5 | 19.2 - 42.5 - 37.4 |
| HR27: | 8.5 - 6.0 - 11.5 | 11.3 - 17.0 | 18.8 - 47.5 - 41.5 |
| FR1: | 8.4 - 6.4 - 11.4 | 11.5 - 16.9 | 19.6 - 49.8 - 45.5 |
| FR2: | 8.4 - 6.2 - 11.2 | 11.0 - 16.7 | 18.9 - 42.1 - 38.6 |
| FR3: | 9.6 - 6.1 - 10.5 | 11.7 - 16.7 | 19.2 - 46.0 - 44.5 |
| FR4: | 8.6 - 6.2 - 11.5 | 11.1 - 17.0 | 19.7 - ca. 47 - 44.2 |
| RS1: | 8.6 - 6.5 - 11.5 | 11.4 - 17.1 | 19.5 - ca. 49 - 45.5 |
| RS2: | 9.4 - 7.4 - 13.0 | 12.2 - 17.7 | 20.2 - ca. 48 - 45.2 |
| RS3: | 8.0 - 6.4 - 11.9 | 12.0 - 16.8 | 19.9 - 46.9 - 43.2 |
| RS5: | 8.8 - 6.4 - 11.4 | 11.8 - 16.6 | 19.4 - 52.0 - 48 |
| RS6: | 8.8 - 6.4 - 11.1 | 11.3 - 16.2 | 19.8 - 49.2 - 44.5 |
| Rijkstijn-1: | 8.5 - 6.2 - 11.6 | 11.0 - 17.0 | 19.4 - 50.9 - 46.7 |
| Rijkstijn-2: | 8.1 - 6.0 - 11.0 | 11.1 - 17.9 | 19.0 - ca. 44 - 41.7 |

HR = Hendrik Richters; FR = Fredrik Richters; RS = Richters-style; ca. = circa
*: *This oboe has a ivory finial which is put on a wooden ferrule. In this case the bore of the ferrule has apparently shrunk rather much (to a minimum diameter of 5.6 mm) and has a big step to the bore of the finial.*

Table 5 gives the bore diameters for the three parts of each oboe. For the top joint at the entrance of the counter bore, the minimum bore at the interstice and at the lower end. For the middle joint just after the socket and at the lower end; for the bell just after the socket, for the widest point just before the bell rim, and of the bell rim. This table has its restrictions: it gives only concise information about the internal design of the oboes. Joints with aberrant bore profiles do not emerge instantly, with the exception of the top joint of RS2, which has deviant minimum and maximum bore diameters (the other joints of this oboe have also details - such as the keys - which are rather odd, the instrument has sustained a fair amount of damage and was probably kept under adverse conditions as well). But to get more information and not to drown in a sea of tables with hundreds of bore measurements, we have to go a different way.

## Assessing and comparing bore profiles: the use of graphs

The best way to examine bore profiles of baroque oboes is to make graphs of the measurement results, and to do that systematically. There are in these measurements always two combined data: the diameter of the bore and the position (length or depth) for that diameter in the bore. Or even the diameters at that point. Because of shrinking the wood can warp, the bore in cross section becoming oval: there is often a maximum and a minimum diameter. But only on a very few instruments (i.e. HR9, see fig. 9) has this warping to be taken in account in comparing the bore profiles. For this article I have generally used the maximum diameters, as these are likely more representative for the original state of the oboes. Warping as result of irregular shrinking of the wood of course also affects the exterior of the instruments - but that is too often not reported in descriptions or recognizable in measurements!

Using graph paper, I put the length on the X-axis, and the diameter values on the Y-axis. To get a better view of the bore profile, I 'blow up' the diameters of the upper and middle joints with a factor 10. But that is not convenient for the much wider oboe bell: for that part I give the diameters 1:2 to the length measurement. Nota bene: this 1:2 scale means that this graph gives the actual shape of bore profile (because if gives the radius of the bore 1:1).

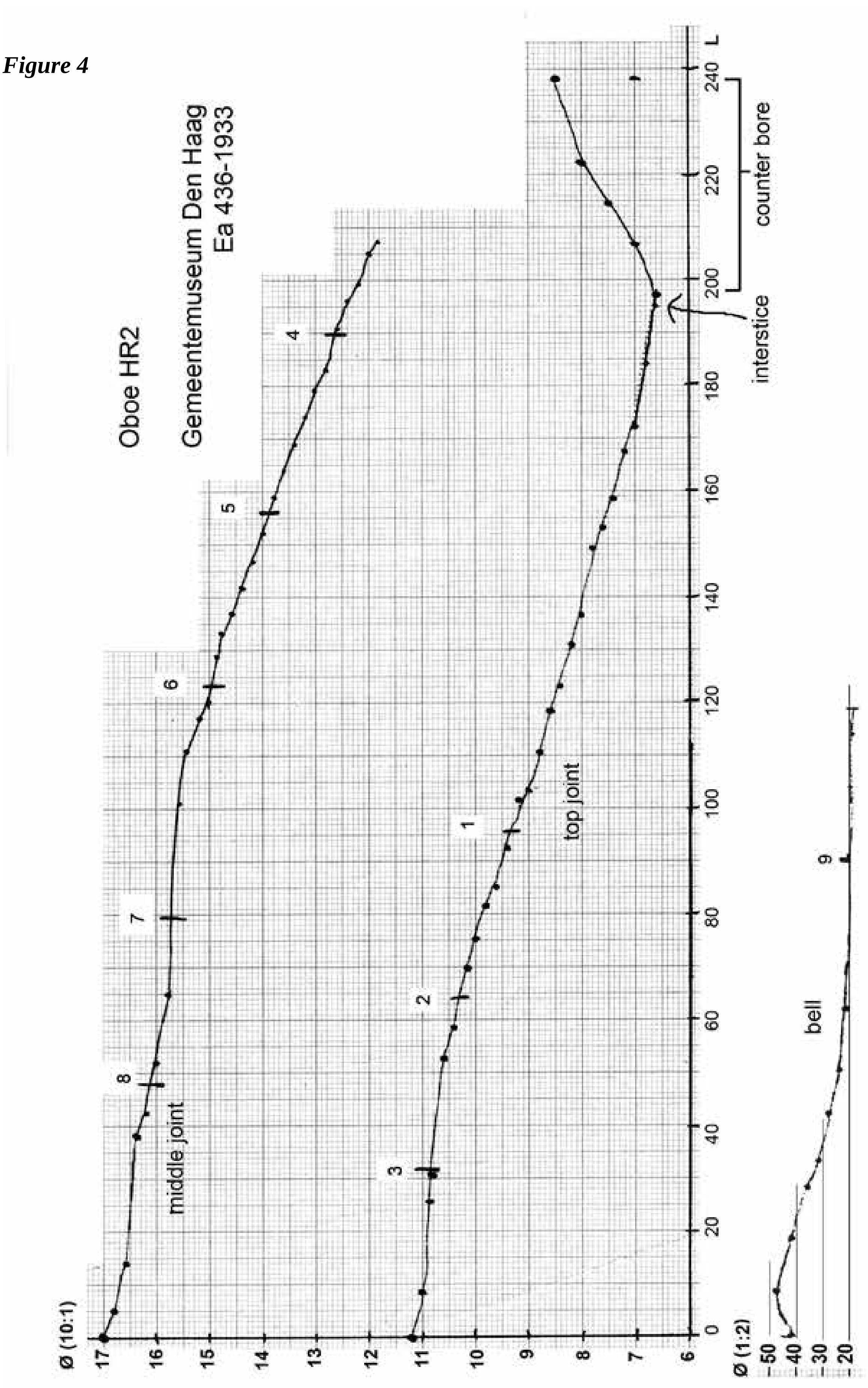
Figure 4 (next page) gives the graphs of the bore of HR2, a representative instrument of Hendrik Richters (see the first part of this series, Comm. 2000, for information about the numbering of the oboes by - or in the style of - Richters and Rijkstijn).

The tone holes are numbered 1 to 9; 7 is the hole for the small key, 8 for the great key, 9 are the resonance or tuning (or vent) holes on the bell. The bores are measured from the lower end (L 0) of each joint. It is immediately clear that the profiles of the bores of the upper and middle joint are not straight conical over the whole length, but that they have sections with a different conicity. In the middle joint is the steepest part of the slope from the top (Ø 11.8 mm) to just after hole 6; the conicity is here between 1:25 to 1:30 (a difference of 3.7 mm over a length of 97 mm). From L 0 tot about L 110 is the slope much flatter, with a difference of only 1.5 mm over a length of 110 mm. The bore is near hole 7 almost cylindrical.

The bore of the top joint of this oboe has an almost straight course from hole 2 until L 170: from Ø 10.5 to 7, a difference of 3.5 mm over a length of about 120 mm, which means a conicity of about 1:35. The bore is in the lower end of this joint flatter, from L 0 to L 55 narrowing from 11.2 to 10.5 mm. There is a step in the bore (Ø 11.2 to 11.8 mm) between the upper and middle joint (leaving the bore down in the upper joint may give more stability in the critical octaves played on holes 5 and 6). There is even a bigger step from middle joint to the bell (Ø 17.0 to 19.3). This second step is common for many baroque oboes and seems to be necessary for some tones to speak and sound well. It is much less clear of the steps between the top and middle joints (which occur very often, see table 5) are intended by the maker as well. The question must be asked whether these steps are caused by tenon contractions. These contractions (or compressions) can be expected when players (or instrument collections) leave their instruments assembled, especially when the wrappings are tight. I also think that warping is promoted when after playing the parts are not dried properly, causing rapid changes in humidity of the wood.

I have seen many tenon contractions on historical recorders and traversos. They are easily recognizable, especially where the bore becomes wider after the opening (fig. 5). However, such obvious contractions are exceptions on the many (mainly Dutch) baroque oboes which I have investigated. Or they are more difficult to distinguish, such as small contractions where the bore has only slightly shrunk over a short distance. The graphs of the bores of HR2 (fig. 4) give no clear evidence for contractions. It is however possible that the bores of upper and middle joint of HR2 are wider over the first 20 mm; but if so, I think only a little bit.

***Figure 4***



Oboe HR2
Gemeentemuseum Den Haag
Ea 436-1933
Ø (10:1)
Ø (1:2)
L
middle joint
top joint
bell
counter bore
interstice

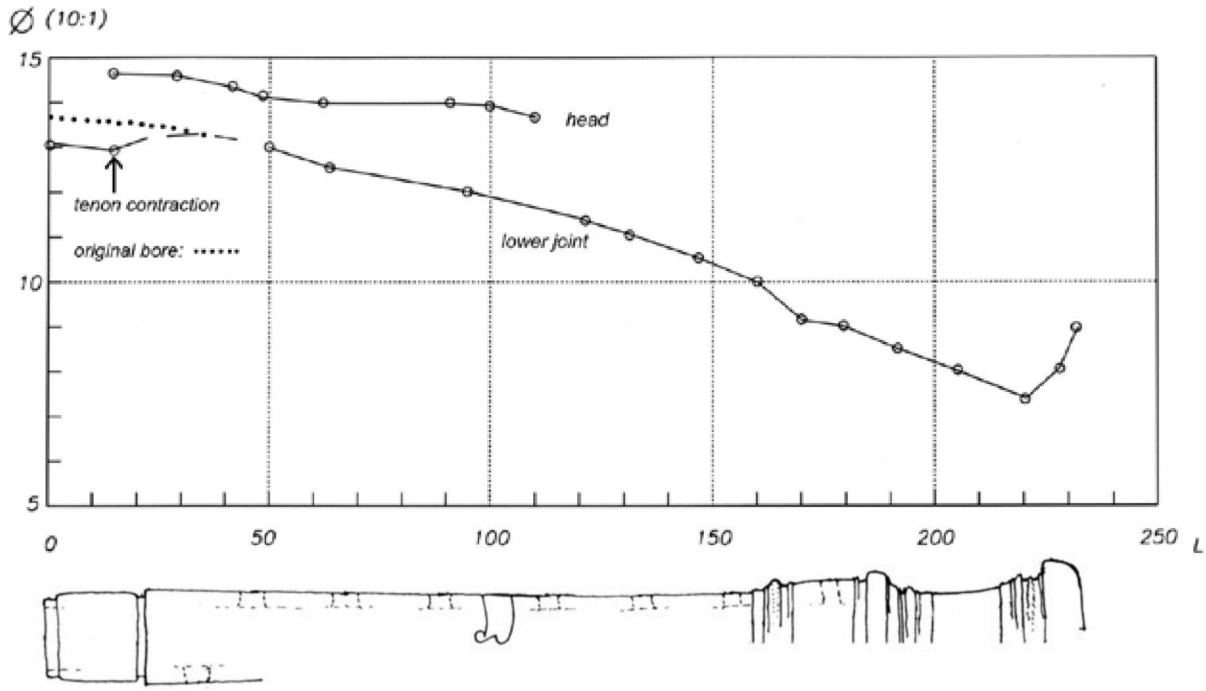



*Figure 5: graphs of the bore of a soprano recorder by Steenbergen (collection Frans Brüggen). There is a contraction at the tenon of the lower joint. From the graph may also be concluded that there is a 'reamer end' at L 170 in the lower joint, suggesting that Steenbergen used (at least) two reamers for the lower joint. But this conclusion comes actually from only one single point in the graph (Ø 9.2 at L 170), which was drawn using only a summary of the measurements which Fred Morgan made of the instrument. Graphic representations of bore profiles can therefore sometimes be rather suggestive and deceptive (especially graphics which are made using spreadsheet programs). Most important advice: go always back to the source, check measurements of other researchers (making graphs reveal sometimes errors they have made) and - if possible - take measurements the instruments yourself.*

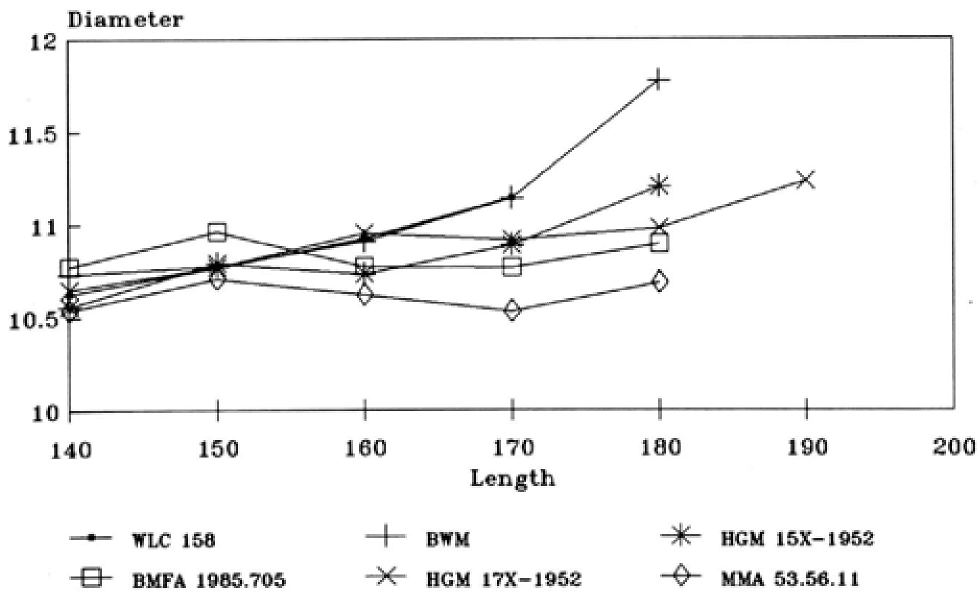



*Figure 6: from Adkins 1990:* FIGURE 56. Tenon Compression in the Lower 50 mm of the Richters Top-Joint Bores.

Cecil Adkins touched in his article about the Richters' oboes (Adkins 1990) also the question of tenon compression. See fig. 6 where he gives schematic bore graphs of the lower 50 mm of the top joint bores six oboes. The oboes BMFA (which is HR10) and MMA (HR16) probably have some tenon compression, but not very much. In a table on p. 94 the tenon contractions are given for 21 oboes; the degree of compression is given by Adkins as a number, from 0 to 10, which correspond with 0 to 0.3 mm. On p. 94 of his article he suggests that there is the possibility that the compressed area might be the result of something other than tenon pressure. In oboe HR11, an instrument whose bore was not measured be me, he saw active tool marks in the 30 to 50 mm area. The chambering which left these tool marks could have been done with a spoon shaped reamer, such as depicted by Diderot. Has Hendrik Richters made some bore corrections while tuning the instrument? I myself have not seen such tool marks: in most oboes by Richters and Rijkstijn are the bores very regular and smooth.

**Comparing graphs**

By using graph paper that is not too thick, it is possible to compare the graphs by superimposing the papers and holding them against a light. It is a simple technique, but it gives for the upper and middle joints a lot of information which is much more difficult to obtain when you use statistical methods. For instance: the bores of the middle joints of HR2 and HR9 are very much identical, but with a shift of 30 mm, with the result that the bore of the middle joint of H2 is in the top half about 1 mm wider. Similar differences can be seen between the oboes HR9 and HR18 and HR9 and HR27 (see fig. 7).

Why did Hendrik Richters do this? For the upper joints of the same oboes there is no such a shift. But can we conclude that one long reamer was used for the middle joints?

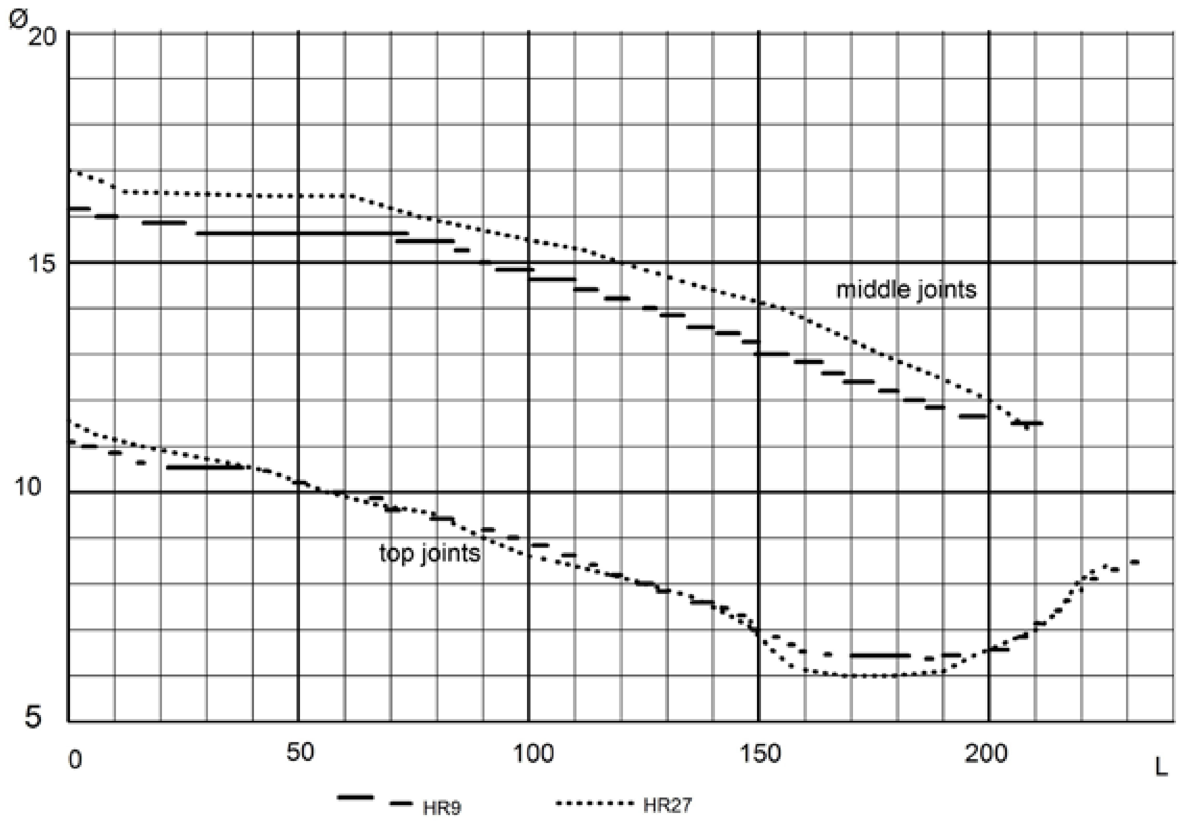



*Fig. 7: The bore profiles of HR9 and HR27. The joints of HR9 are on cross section rather oval, the lines in the graphic connect the minimum and maximum depth (length) for each of the bore gauges (which were used with diameter steps of 0.2 mm).*

Superimposing graphs is the best way to discover similarities or differences in bore profiles, such as the conicity of (parts of) the bores. But for the bell bores is the method of superimposing not so enlightening, this because of the different scale of these graphs: the lines come often very close and only big differences in design will be revealed (see fig. 8, in which two oboes in Richters style have some deviating bell bore profiles). The variations in the bell bore profiles are caused by the way they were made: not by using reamers with fixed dimensions, but by turning on a lathe. These differences in the bell bores are also acoustically not important: making the bore of the bell (for instance) 0.5 mm wider does hardly change the sound and pitch of the tones, whereas in the top joint the same 0.5 mm makes a huge difference.

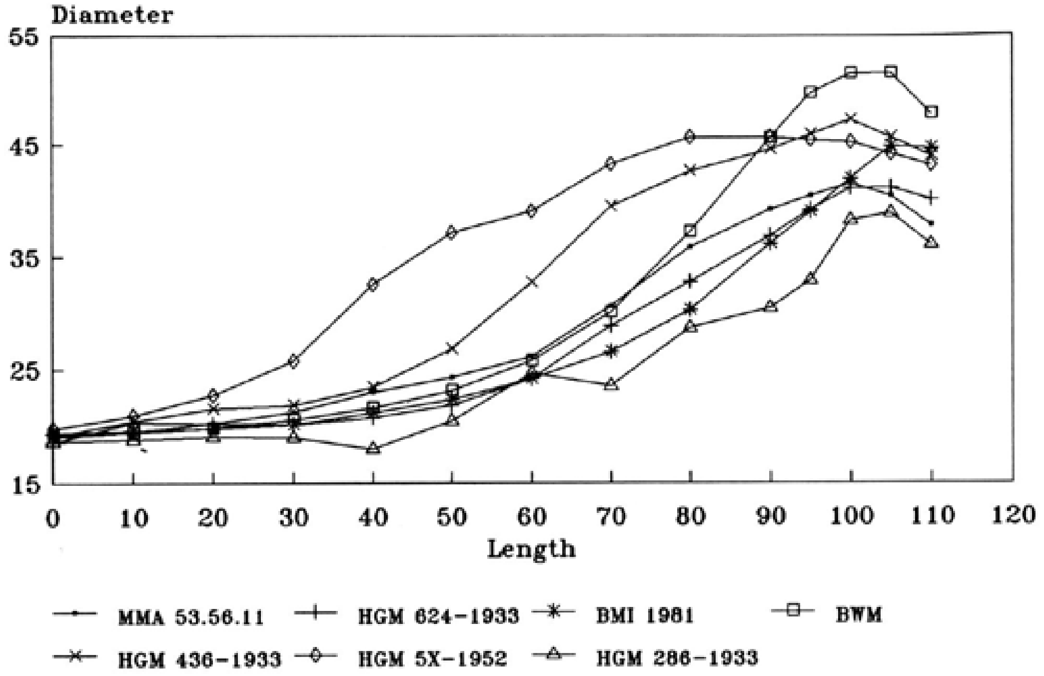



*Fig. 8: bell bore profiles (from Adkins 1990, fig. 66). MMA = HR16; HGM 624 = FR2; BMI = HR12; BWM = RS5; HGM 436 = HR2; HGM 5-x = RS3; HGM 286 = HR1.*

Apart from the scale of the graphs there is another issue: the accuracy of the measurements. Not in the sense of how precise each assessment of an internal diameter is, but with what diameter or length intervals the measurements are taken (see also the remarks I have made to figure 5). The method I mostly use is measuring the length (or depth) in the bore where a gauge with a specific diameter touches the wall of the bore. For the top and middle joints of the most important or rare oboes in the collection of the Gemeentemuseum in The Hague I used diameter intervals of 0.1 mm. For other instruments intervals of 0.2 mm were used (and of 0.1 mm for the interstices). For oboes in other collections, where there was often not much time for taking measurements, I have used sometimes intervals of 0.5 mm: enough to have an approximate impression of the bore profiles, but surely not enough to assess smaller differences and peculiarities.

An example: the bore of oboe HR2 was measured with diameter intervals of 0.2 mm; for the bore of the bell of that instrument the following diameters were choosen: 19.3*, 19.4, 19.5, 20.0, 21, 22, 24, 28, 32, 36 and 42mm. The bell rim and the widest point ca. 10 behind that rim were measured separately (42.9 and 47.7 mm).

* There is an error in the catalogue from 1997: the smallest diameter of the bell bore is not 18.3, but 19.3 mm.

**About statistical technics**

In his article from 1990 Adkins compares the bores of the Richters oboes by resorting to standard deviation, a term from mathematical statistics. As far as I was able to determine, Adkins adopted the following procedure: every 10 mm he determined the diameter of an oboe joint's bore, beginning at the narrowest place in that bore. This yielded a series of numbers which he compared (correlated) with a similarly obtained series from the same joint of a different oboe. He probably took then the difference between each pair of numbers to use in a new series that was processed statistically. In this manner the corresponding joints of two oboes were compared with one another; the closer their resemblance, the smaller the difference in the diameter of the bore and the smaller the value of the standard deviation calculated by Adkins. His conclusion is that the bores of the oboes by Hendrik and Fredrik Richters that he examined bear a statistically and demonstrably closer likeness to each other than is the case of instruments by, say, Beukers, Haka, Steenbergen and Terton, the bores of whose oboes (chosen at random) he compared in pairs each time.

Adkins does put the use of standard deviations into perspective on p. 91 of his article: *'The use of standard deviations of the bore segments simplifies the comparison of the amount of divergence in bore congruity throughout the length of the instruments; however, the effects of these differences on the pitch and tone of the several instruments that have been played are not obvious, since there has been no opportunity to bring them together for extensive testing.'* Adkins goes on to conclude: '*The consistency of design and dimension in the upper segments suggests that the concept of the top-joint bore was well established in the minds of the Richters-brothers, and that they found little in its variations to cause problems. Further, the use of multiple reamers gives this bore section the kind of arch (i.e. parabolic profile) that produced the full tone and powerful low register preferred by many northern eighteenth- and nineteenth-century makers. If these reamers had been used simply to chamber the top segment for the adjustment of certain pitches, timbres, or ease of speech, one would expect the same sort of variation between the intervals of the arches that is found in the rest of the instrument where such techniques are known to have been applied. Indeed, it seems logical to conclude that the bore variations in the two lower segments of the oboes directly relate to voicing corrections needed because of the lack of precision in the manufacture of the top joints.'*

. . . On which I comment: Adkins combines a variety of interesting aspects here, such as the accuracy with which old oboe makers worked, the sound-concept of the oboes and the technique of bore-correction. In that light, his conclusion that makers had a clear-cut idea of the upper-section bores, and that bore corrections were still subsequently needed is paradoxical. The question is whether these corrections were actually carried out on the Richters oboes, seeing that the bore profiles of most instruments pursue a very regular parabolic course, with hardly any variation in the smoothness of the bore walls.

We observe a problem in the use of the standard deviation method described above as a means of comparing two bores with virtually identical profiles (and conicity) but slightly different dimensions. This is because such bores display the same or even bigger differences in standard deviation than two bores whose dimensions do not appreciably differ but do not have the same conicity either. In the first case the same reamers could have been used; in the second case this is improbable. Adkins points out the problem of 'shifted bores' (fig. 51 in his article), when the reamer is inserted further into one instrument than another. The conclusion is that even when the bores of two instruments are not related in terms of absolute dimensions, the maker did use the same reamer(s). All this is immediately apparent when the bore diagrams are superimposed, showing where bores are identical and where they differ and, for instance, where the top-joint passage (interstice) is.

**Some observations**

Comparing the graphs of a group of 25 oboes is a useful method of research, but it is a problem where to start. The outcomes of the observations are rapidly becoming confusing, there is so much to see. A systematical research is required, concentrating on some clearly defined aspects. I selected the following questions (as explained above, only the bore profiles of the top and middle joints are taken in account in comparing the graphs):

a- Are there oboes or oboe joints with identical bore profiles?

b- Is it possible to establish how many reamers were used for each oboe joint?

c- About divergent (parts of) bore profiles: can they be explained?

d- Are there notable differences in the bore profiles of the oboes of Hendrik and Fredrik Richters?

e- What is the relation between the oboes in Richters-style and by Rijkstijn with the instruments of Hendrik and Fredrik Richters?

**Question (a)**

- There are no Richters oboes with completely identical bore profiles for all three joints. This corresponds with the observation (see part 5 of this series) that there are no two oboes with exactly the same length of the joints - nor (see part 3) with exactly the same execution of the exterior profiles and embellishments. There are no historical records that Hendrik and Fredrik Richters sold oboes as matching pairs, nor I have seen records in sales or inventories of such pairs (see Bouterse 2005 par. 4.21 and Appendix B for more information about these sales and inventories).
- There are oboes with identical or almost identical bores of the top joints (the counter bores may differ, see below). For instance RH1, RH3, RH4 and RH6. The bore of this part of RH18 is also almost identical, but with a 'horizontal shift' of circa 5 mm (HR18 has a slightly wider bore). This is an indication that for these oboe parts only one single reamer has been used.
- RH1 and RH6 have also much identical bores in the interstices and counter bores, but RH4 is here quite different. Within the group of upper joint of these oboes mentioned above, there are, however, regularly differences in the profiles of the counter bores and interstices. Sometimes these differences are caused by reamers that were put further in: for instance between HR1 and HR9, where the minimum diameter of the interstice of HR9 is longer, because the reamer for the fingerhole section in HR1 is circa 10 mm put further in the bore. But minimum and maximum diameters and conicity vary sometimes much more. There might be an easy explanation for that: counter bores could have been adapted by the players (or by the oboe maker) according to the shape of their preferred staples. But this explanation is perhaps too simple, because I have no further proofs of such adaptations.

**Questions (b) and (c)**

- There are some oboes with differences in the bore profiles of the top joints, which differences are not easy to explain. In Part 2 of this series (Comm. 2011) is the boxwood oboe HR27 presented. There is much the same profile when the graph of the top joint is superimposed on that of HR9, but between L150 and L200 there is a huge difference. HR27 is here (the section which includes the interstice) much narrower, see fig. 7. The section of the bore between fingerhole 1 and the interstice is very important for the quality of several tones, and I suppose that the oboe makers 300 years ago must have known that very well. Hendrik Richters must have used here different drills or reamers. Apart from the question: why?, there is also the question: when? Was this an early instrument in his career and decided later to make wider top joint bores? Or was this just a late instrument, when he was using drills or reamers which had become a bit smaller in diameter, the result of many sharpenings?

- The middle joints show also variations in bore profiles. Some graphs have a regular parabolic shape: from the lower end towards the socket at the top with gradually stronger conicity. Other oboes, such as HR1 or HR27 (see fig. 7) there are two sections: a steeper one at the top (with the fingerholes 4 to 6), and a flatter one at the lower one (with the holes for the small and great key). Both types of bore profile can be made with only one, or with two or more reamers. There is sometimes between two oboe bores an obvious ‘horizontal shift’ (a reamer which is put further in the bore) over the whole length of the middle joint, which can be seen as an indication that only one reamer has been used. But between other instruments there is mainly a difference in dimensions of the ‘flat’ (wider) section. Tenon compression is one possibility for that, the use of different reamers the other.

If Hendrik and Fredrik Richters had used systematically two reamers for the middle joints of their oboes, I should have expect clearer sections in the bore profiles, and also some shifts between two sections (when one reamer was put further in the bore, and the other one not).

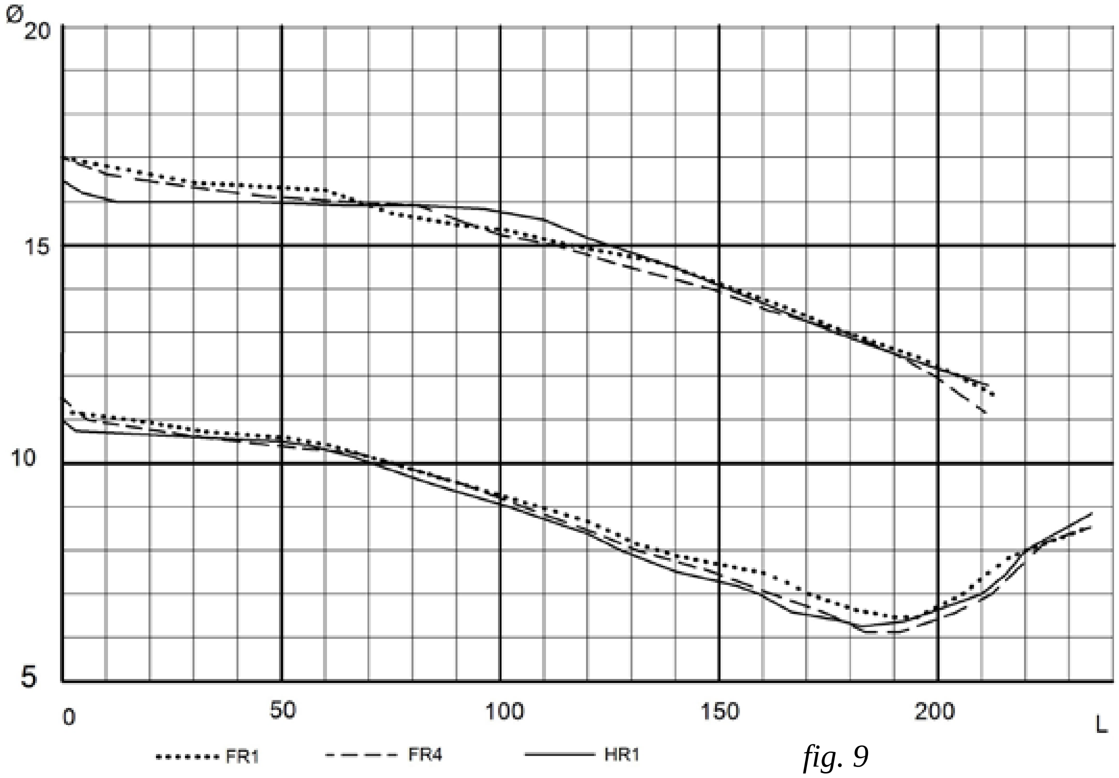


*fig. 9*

**Question (d)**

- Figure 9 shows the bore graphs of three oboes, two by Fredrik and one by Hendrik Richters. It is clear for me that the bore profiles are related, but the question is how closely. The top joint bore of FR1 is wider than FR4, especially from L 110 onwards including the interstice. These bores must have been made with different reamers or combinations of reamers. The differences between FR4 and HR1 are smaller: the same reamer(s) could have been used. The differences between FR1 and FR4 for the middle joint bores are small and can be explained by shrinking of the wood, tenon contractions or even by the effects of polishing the wood after reaming. But how vigorously was that done? The German restorer Rainer Weber (who died in February last year) didn’t mention it in his restoration report of HR10 *(Zur Restaurierung von Holzblasinstrumenten aus der Sammlung von Dr. Josef Zimmermann im Bonner Beethoven-Haus*. Celle 1993.) that this instrument was polished, but he found traces of polishing slate (or comparable stuff) when he did microscope research in the bores of other woodwind instruments. HR1 is in the middle joint wider between L80 and 130, at the same time the bore is also markedly ‘flat’ between L10 and L90. It is not quite clear what the acoustical effect is of that bore profile: it is hardly possible assess deviations in bore profiles separately from all other parameters (for instance wall thickness). As a matter of fact, I wasn’t able to find systematic differences between the bores of the oboes by the brothers Fredrik and Hendrik Richters. I do not know how closely they have worked together; there is also the complication that two persons with the name Fredrik Richters have separately made and stamped oboes. The other Fredrik was the son of an older brother (Johannes Richters) and was in 1731 apprenticed to his uncle Fredrik (Hendrik Richters died on October 20 1727). It is possible that the oboe FR2 was made by this second Fredrik, because of the different stamp with ‘IS’ below the name Richters.

**Question (e): The oboes in Richters style**

- RS1: this oboe is a very beautiful instrument in brown stained boxwood, with silver mounts and chain and engraved silver keys, designed and turned completely in the Richters-style.

The instrument, which is not stamped with maker’s marks has an inscription on c-key with the year 1744. It is also unlikely that this oboe was made by Hendrik Richters. The bore of the top joint comes close to that of FR2. In the middle joint is RS1 slightly wider between L80 and 120. The bore of the middle joint is also much alike those of FR1 and FR4.

- RS2: this oboe has a rather irregular bore, very wide in the interstice. I doubt that this instrument was made in the workshop of one of the Richters brothers.
- RS3: the centre joint and bell of RS3 are possibly made of a light-coloured wood varnished and stained in a dark colour. The upper joint is of real ebony and has some elements of the turnery which are slightly unconventional and do suppose that this joint was not originally made for this instrument. The bore of the middle joint resembles much of that of HR18, but the very strong tenon compression is strange.
- RS4: I have no information about the bore profiles of this instrument.
- RS5: this oboe with its gorgeous silver keys and mounts has an upper joint which bore profile is - with some horizontal shift - not unlike that of HR3 and HR4. The counter bore at the top is a bit strange, different in shape from all other oboes I have seen (fig. 12). The bore of the middle joint is in the lower part rather wide, more or less like HR27, but there are also similarities with FR3 and FR4. It is difficult to say who made this oboe: Hendrik, Fredrik-1 or Fredrik-2 Richters.
- RS6: this is an enigmatic oboe. It is made of dark brown stained boxwood, with silver keys and rings. The ring at the bell rim has

*Fig. 10: Oboe RS6*

*Fig. 11: inscription on the bell rim of RS6*

an inscription (Klaas Gerbens), probably the name of the (first) owner of the instrument and further the year Anno 1753 (fig. 11). The oboe is made in the Richters style, but there are some deviating details, of which is the touch of the C-key the most obvious. It is made in the shape of a d#-key (fig. 10), and is thus too small to be used properly.
The bore of the top joint if RS6 is a bit irregular (fig. 12), but that is maybe caused by a bore correction. At L130 is the diameter of the bore 8.5 mm, that is about 0.5 wider than most other oboes in this article. The middle joint has a strong tenon compression (from L0 to bout L40). The family name Gerbens was common in Friesland. Maybe that the oboe was made by a woodwind maker wo lived in this province.

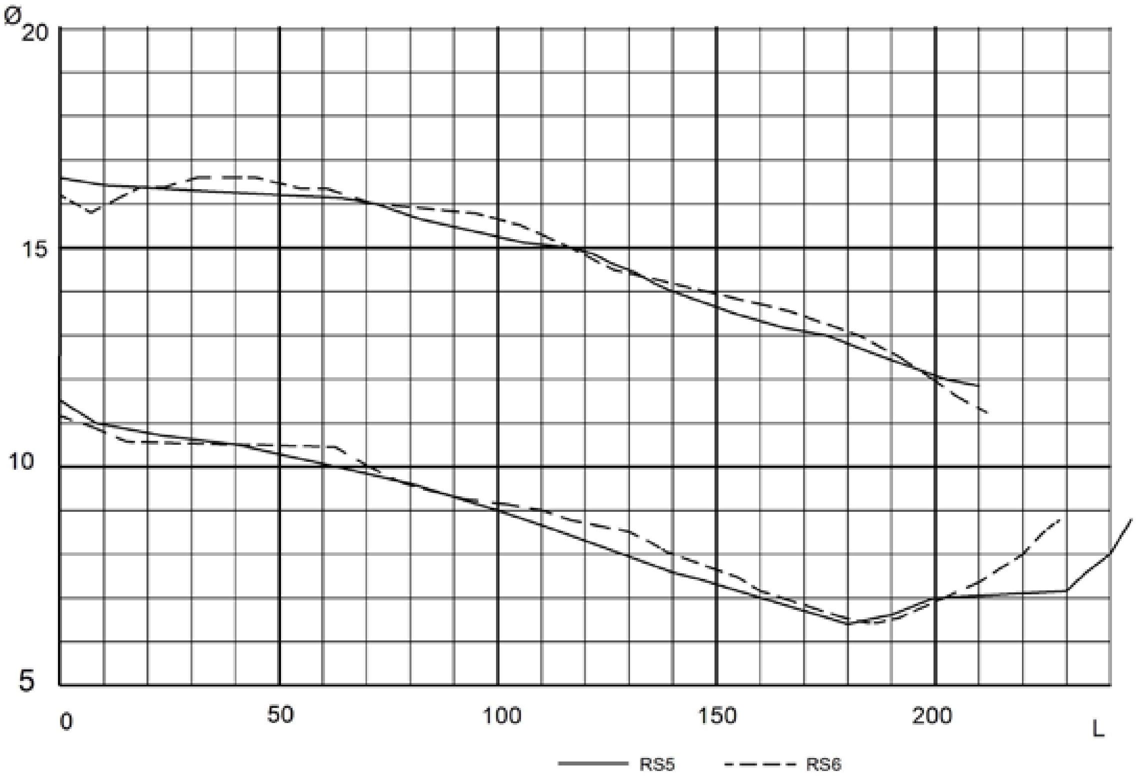



*Fig 12: bore profiles of RS5 and RS6*

**Question (e): the oboes stamped Rijkstijn**

Nothing is known about a woodwind maker with the name H.Rykstyn (in modern Dutch spelling: H.Rijkstijn). I have not found records of this familyname in the Netherlands. Maybe there is a relation to the name Reichstein, which occur in Poland and Germany.

There are two oboes with the stamp of Rijkstijn, both made in the style of Richters, including the stamp with a clover leaf. All the joints of RS1 (which is made of boxwood) are distinctly stamped H.RYKSTYN in a flat curve, no scroll, exactly in the same style as the stamps of Hendrik and Fredrik Richters. Stamped below the name is a 4.0 mm tall clover leaf, its stalk bending towards the right. This stamp looks very much like those used by Hendrik and Fredrik Richters, but it is in mirror image. The names stamped on RS2 (which is made of ebony and is - apart from the fingerholes 5 and 6 - preserved very well) are anything but distinct, being blurred and crumbling at the edges. Adkins wrote that the American oboe-maker Mary Kirkpatrick reported a Richters stamp over which Rijkstijn's was superimposed. However, personal inspection revealed no trace whatsoever of a Richters stamp. Because the clover leaf clearly differs from the one found on the Richters brothers' stamps but does resemble the clover leaf on Rijkstijn's oboe no. 1, there can be no doubt as to the instrument's provenance, and both Richters can be ruled out as its makers.

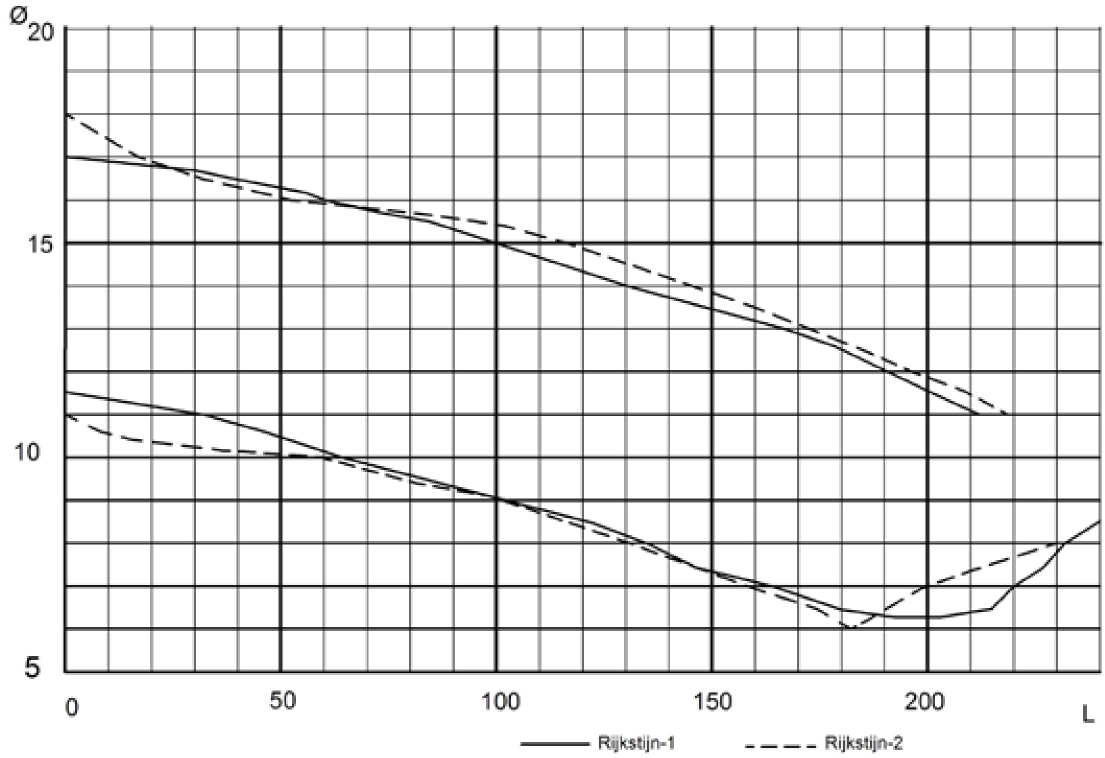



*Fig. 13: bore profiles of two oboes by Rijkstijn*

Concerning the bore profiles of the Rijkstijn oboes: in the top joints the bores between L60 and 160 are almost identical (see fig. 13), but Rijkstijn-2 is wider between L0 and L60, and the counter bores differ very much. The bores of the middle joints are - with some shift - not far apart in the section of the fingerholes 4 to 6, but the graphs do not give enough information for drawing conclusions about the number of reamers that were used. There is much similarity with the oboes by Hendrik and Fredrik Richters. But that is also because there are these variations in their instruments.

The oboe Rijkstijn-1 comes from the collection of the Frysk Museum in Leeuwarden, the capital of the province Friesland. It has an inscription on the bell rim, similar to RS6, again with a name and a date: *Doue de Boer*, *Anno 1761.* And just as with RS6 I will consider the possibility that this oboe was made in Friesland, and that Rijkstijn could have lived there. But did he learn the profession of making oboes in the Richters workshop in Amsterdam, or was he just copying their instruments? If that is the case, he did it very well. Maybe he had problems stamping his name on the hard ebony wood of oboe no. 2, but apart from that and the problems with the lower fingerholes (which are maybe widened in a very sloppy way by a player), it is a very fine and luxuriously executed oboe.

## Conclusions

The execution of many oboes by Richters and Rijkstijn is very special, with luxuriously and nicely finished materials and a high quality of the turned profiles. The bore profiles and tone-holes are also nicely finished as well, but these elements do not stand out from the (many) oboes from other makers. The acoustical concept of the oboes is also not extraordinary and can be described as ‘middle of the road’, the Richters brothers always playing safe without the introduction of novel ideas or experiments. There are differences for the lengths of the joints, the bore profiles and the tone-holes, but these differences are not big, they are maybe accidental or can be explained as adaptations or minor corrections. Sometimes these differences are rather enigmatic: for instance why has HR27 so much wider a bore in the middle joint than HR9? The much narrower section just before the interstice of HR27 is also puzzling.

The only way to find an answer to these questions is making exact copies of both instruments and then exchanging the parts. Or even better: to make several copies of the joints with variations in the bore profile, and try these out on the original oboe (which is maybe allowed on HR27). But you must be also a good player, who has experience on several baroque oboes and who knows how to assess the differences between the instruments, and who has several combinations of reeds and staples at his or her disposal. I believe that’s the only way to discover the secrets of these variations in bore profiles (and other parameters).

The question is how the Richters brothers made their oboes: strictly after the wishes of the player who ordered an instrument, or in a more free way, where they used a standard concept which was perhaps flexible enough to make some adaptations afterwards, if necessary.

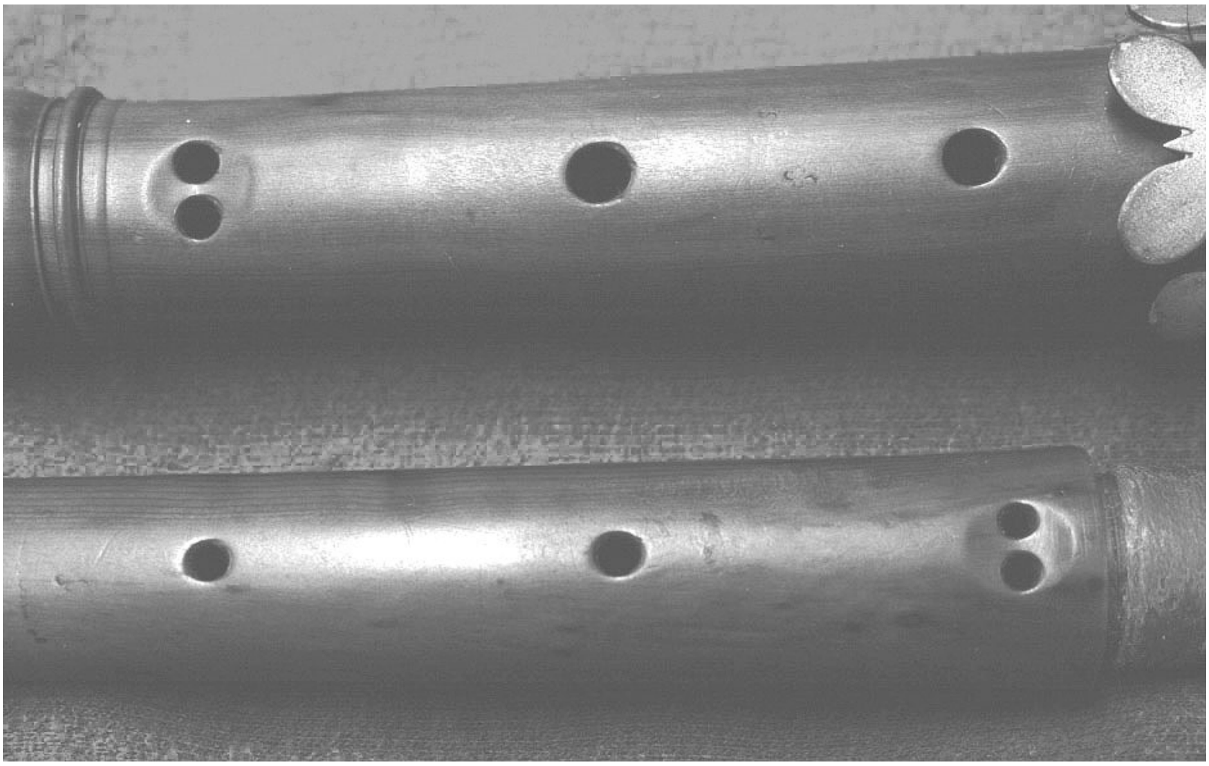


*Fig. 14: The fingerholes of HR9 (this oboe is made from boxwood), a bit rounded around the edges but with hardly any wear on the wood around the holes.*

Makers (and players) of modern woodwinds are very critical and strict about the tuning of their instruments, which must be perfect for all tones, using standard fingerings. But players of baroque woodwinds must have (or ought to have) a certain amount of flexibility: some-

-times a tone needs a bit of correction, for instance to make the sound better (for instance using the small key to improve the sound of the f1), or to make a difference between enharmonic tones such as g-sharp and a-flat. Baroque woodwinds are therefore often not so much good or bad, it is better to say that they are more or less flexible, or suitable for your way of playing, or they are more or less suitable for a specific kind of music.

Sometimes an oboe plays more easily in keys with flat tones (e-flat, f1 and b-flat), while another will more easily play notes such as d- sharp and f-sharp.

In part 5 of this series I mentioned the aspect of resistance, which allows a player to aim for a precise and well-balanced attack, whether he is playing legato or piano, staccato or louder. An instrument's condition may also affect its playing. Two oboes on my research (Van Heerde's no. 13 in The Hague and Terton's no. 10 in Stockholm,) show traces of intensive use in the past (wear at the fingerholes, repaired cracks); perhaps this accounts for their very fine playing qualities. I have not seen traces of such intensive use of the oboes by (or in the style of) Richters and Rijkstijn. Several of these instruments are damaged, but that may be have other causes, such as preservation in bad conditions.

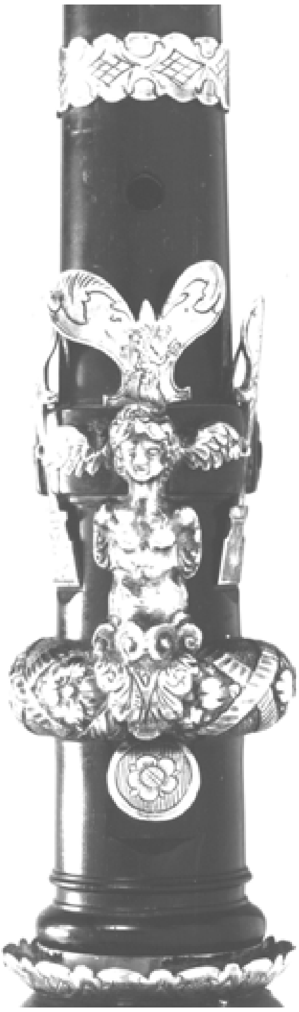


*Fig. 15: c-key of Richters-style No. 5.*

**Some final remarks**

Oboes are musical instruments, made with the purpose to be used for playing music. That includes also the instruments of, or in the style of, Richters and Rijkstijn, with their posh embellishments. Are their oboes ‘instruments beyond compare’, or just cleverly made ‘status symbols’ for rich people, which by chance, were perhaps good players as well? However it might be, we can learn a great deal from these oboes, just because they were carefully designed and finished, and because there are still so many of them. We also have a lot data about these oboes, but grasping their playing qualities is difficult. That is always a matter of comparing with other instruments, copies and original ones. One person playing one original oboe with only one reed and staple gives only very restricted information.

Assessing the qualities of the Richters oboes means also that you have to compare them with oboes by other makers, in the first place from Amsterdam but also from other major European workshops. And there is a problem: it is very difficult to get sufficient and systematical information about those instruments. Each drawing with measurements has its limitations, as I discovered again in the research for this article.

One of the questions I meet in investigating woodwind instruments is how elaborate and accurate specific measurements have to be, especially of the bore profiles and tone-holes. What do I want to know? Too exhaustive information may hamper a good survey of the way of how the oboes were made. For making a copy: do you want to, to make an exact copy, or one ‘in the style of’? Is it perhaps enough to take measurements with the same accuracy (or lack of it) as Richters and Rijkstijn applied in making their instruments. One of their secrets was that they exactly knew where they could afford some liberties, and where to be very precise, or make small changes in the acoustical design necessary to meet the needs or wishes of the players. And that is exactly what we have to learn today, to make better instruments.