

Making woodwind instruments: 10 Double reed instruments

10.1 Introduction

These double reed paragraphs deal with instruments of which I have made copies with some success: the baroque oboe, with a side trip to the Deutsche schalmei: both instruments with a conical expanding bore. I have no experience with renaissance types of double reeds such as shawms (pommers), crumhorns, dulcians or with baroque bassoons and rackets. If you want to make copies of those instruments, it might be interesting for you to read chapter 6, which is about oboes and shawms in Trevor Robinson's book *The Amateur Wind Instrument Maker* (I have the revised edition of 1980, by The University of Massachusetts Press). The text of this chapter is very much to the point about the history of double reed instruments in Europe. His drawing plans are, however, very concise and you need much experience and imagination to make the instruments from those plans.

Unlike recorders and - to a lesser extent - traversos, it is not possible to make useful simplified versions (for instance from stuff you can buy in a DIY shop) of a baroque oboe or Deutsche schalmei. A chanter with a cylindrical bore for a bagpipe comes close to the simplest double reed instrument you can make. The dulzaina, a short shawm, found in some regions in Spain, is at first sight also not too difficult. But you have to conquer the same problems as with the oboe: making a reed (and staple, on which the reed is attached) and a conical bore.

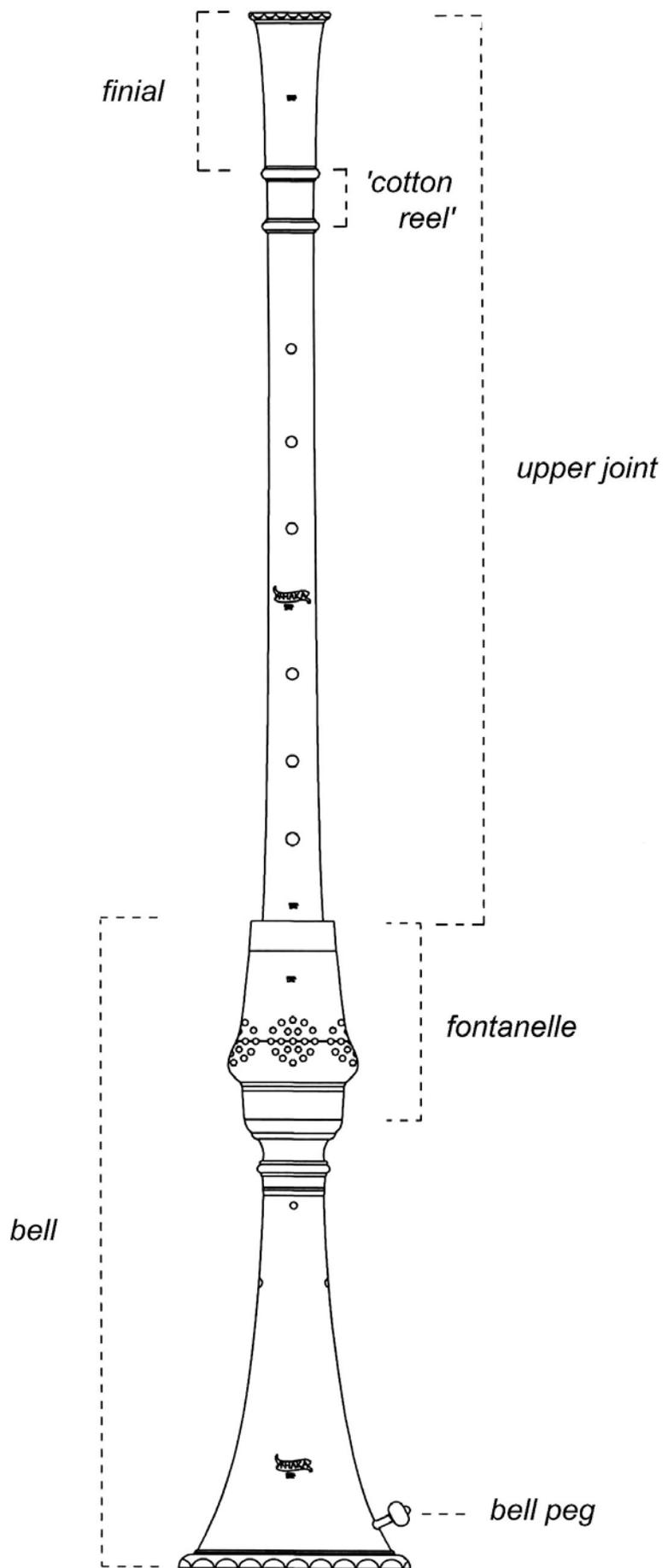
Maybe tuning it is simpler, but playing might be not a pleasure. The dulzaina has, despite its sweet name, a penetrating sound.

Back to my copies of the baroque oboe: when are they successful? That means that I am - or then was - satisfied with the result, but also that other people were positive about them as well. To get such a result is a matter of experience and sometimes a bit - or even quite a big chunk - of luck. That was surely the case with my first copy of a baroque oboe. I made that copy with some routine in making recorders and traversos, but with very little knowledge of that type of instrument, which I had never played before. I had no idea about the acoustics of the oboe (for instance the implications of an expanding conical bore profile), specific technical issues (how to make reamers for the upper part with a bore which at its narrowest point is only 6 mm) nor about making reeds and staples.

That first copy was after an oboe by Robbert Wijne (Nijmegen, 1698-1774). I collected a few measurements myself and was able to use some far-from-complete data from oboe player Piet Dhont. How I managed to find a reed and staple, I can't remember. But that first result was surprisingly good, the oboe could easily be played at a pitch of a-415 Hz, with a not very loud sound, very suitable for playing chamber music.

Maybe that for a first exercise in unknown territories you need a portion of innocence to come to a good result. Just trusting the original instrument, not experimenting, being precise even when you, like a sleepwalker, don't exactly know what you are doing. But there is then also a big possibility that the result may be disappointing. It is therefore wise to collect and try to understand all available information about the instrument you are making. And for the baroque oboe, that is quite a task.

First an introduction into the Deutsche schalmei ('German shawm'). It is not that it is easier to build than a baroque oboe, maybe that only the tuning is a bit easier. I focus on the instruments of Richard Haka (c.1646-1705), the famous English-born woodwind maker who moved at a young age with his parents to Amsterdam.



10.2 The Deutsche schalmei

There has been a lot of discussion about the name Deutsche schalmei, but I discovered that it was surely used, for instance in an invoice for delivery of wind instruments by Richard Haka sent by him in 1685 to Sweden. We think now that the Deutsche schalmeien were not precursors of the baroque oboe. They were made about the same time, in Germany and also in the Netherlands. The most important differences: the Deutsche schalmei was made in two parts and has no double holes and no keys (see drawings and photos on the previous and next page). That means that playing music with more than two accidentals is not easy on the instrument. The bore profile of the upper joints of the Deutsche schalmeien by Haka is narrower (minimum diameter 5 mm or less) than those on the upper and middle joints of his oboes, but the bells are much more widely flaring and have no bell lip at their lower end.

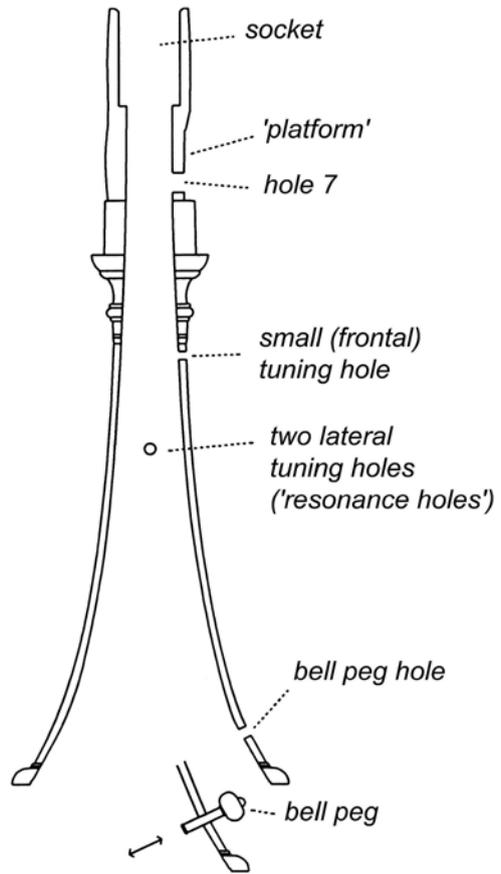
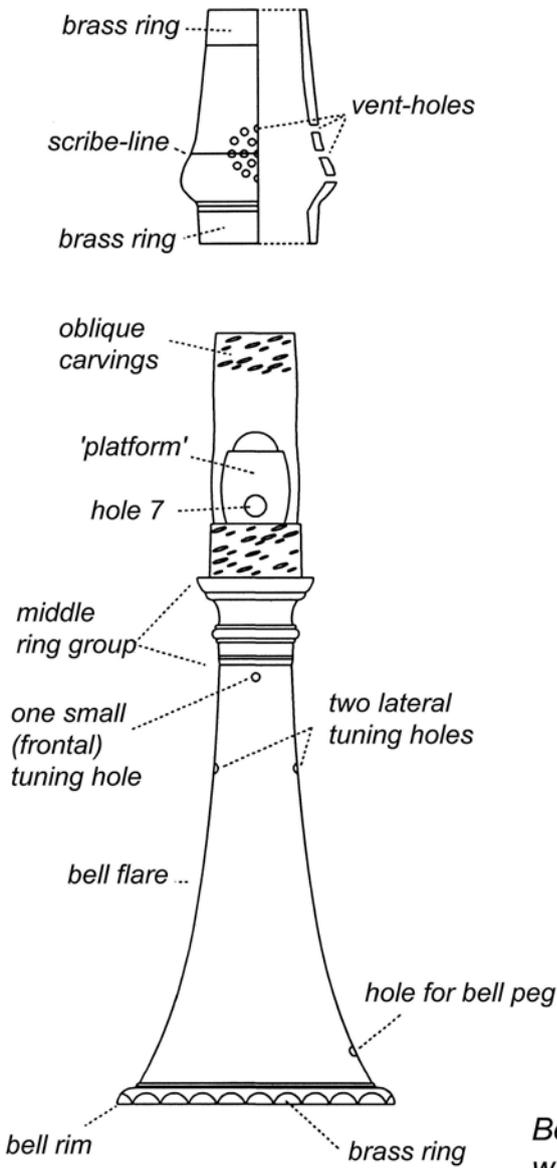


All Deutsche schalmeien by Haka are made of boxwood, and for the bell he drilled the bore through or just next to the heart of the piece of wood he was using. On almost all other wind instruments made from boxwood you stay away from the heart, where the wood is often irregular and prone to distortion or cracks.

I have only once made a copy of a Deutsche schalmei, it was a challenge to drill a hole through the upper joint (just short of 400 mm in length) with a minimum of 4.5 mm. The best way is to make a pilot hole in sections with different diameters: for instance beginning with $\text{\O} 10$ over a length of 130 mm, then $\text{\O} 8$ mm up to 200 mm, $\text{\O} 6$ mm to 300, the rest with $\text{\O} 4.5$ mm. The other challenge was turning the bore of the bell (maximum $\text{\O} 70$ mm), for which I had to make an adaptor to fit the bell in the lunette (as the opening of the lunette on my lathe is only about 60 mm). The fontanelle, on older shawms used for protecting a key construction, on most Deutsche schalmeien covers only a tuning hole (photo left, instrument in the Rijksmuseum Amsterdam, Haka-No. 29 in my list of Dutch woodwind instruments). There are two Deutsche schalmeien by Haka where a key is added. The photo below shows the instrument at Yale University New Haven, USA (Haka-No. 31). The lower part of the key is rather crudely made but that happens often, as it is covered by the fontanelle. I was more surprised that the wood under the key wing is cut away completely from close to the key axle up to the rim.



Fontanelle (right half in cross-section)



Bell (cross-section)

Bell (frontal view, without fontanelle)

Why three tuning holes in the bell, since hole 7 should be enough to tune the lowest note? Maybe that these holes are a relic from the time that the schalmei still had a key on hole 7 - or they are necessary for the response of some tones in the upper registers.

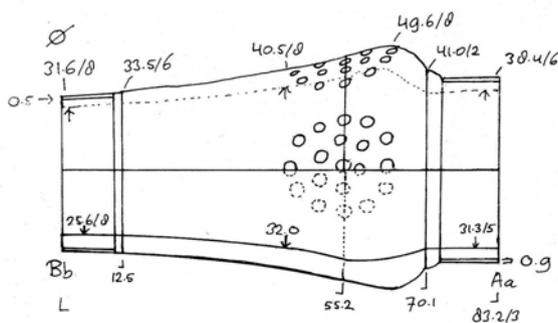
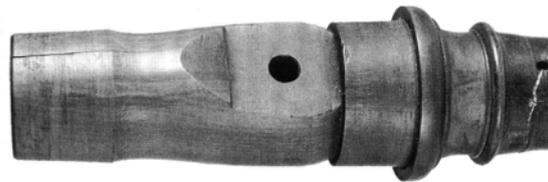
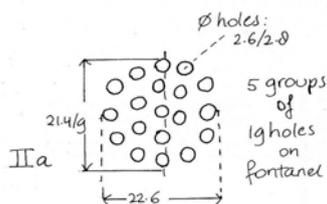
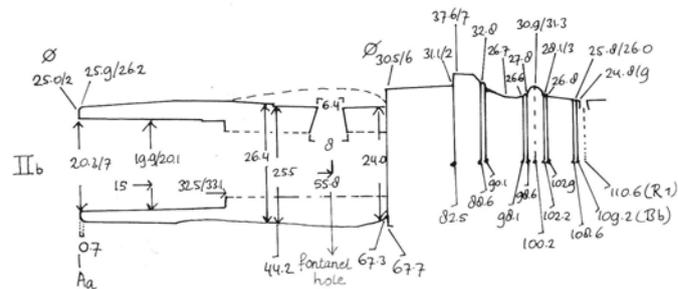
The bore of the fontanelle must be turned with a special chisel. Haka used for the mounts strips of brass, which he welded to rings. He did that very nicely, the seams in the rings are almost invisible. With no experience at all with this technique, I choose another option: making solid rings from brass tubes (not so easy to find in the requested diameters); finally, drilling the vent holes in the fontanelle, it's quite difficult to do that nicely. Freehand drilling does not give a nice result, as I can tell you. It is advisable to make a template to drill these holes, but how to apply such a tool on a curved surface - that is another problem.

Only a few Deutsche schalmeien by Haka did survive with a bell peg (photo left below). That peg was probably meant to keep a pirouette from falling out of the bell (where it was put when the instrument was not played). It was Cary Karp, former curator at the Musik Museet in Stockholm, who advanced this theory, which is confirmed by traces of clamps exactly above the peg or hole in the bell bores of some of Haka's schalmeien. Only one pirouette did survive, which indeed fits perfectly in the bore of the bell (photo right).

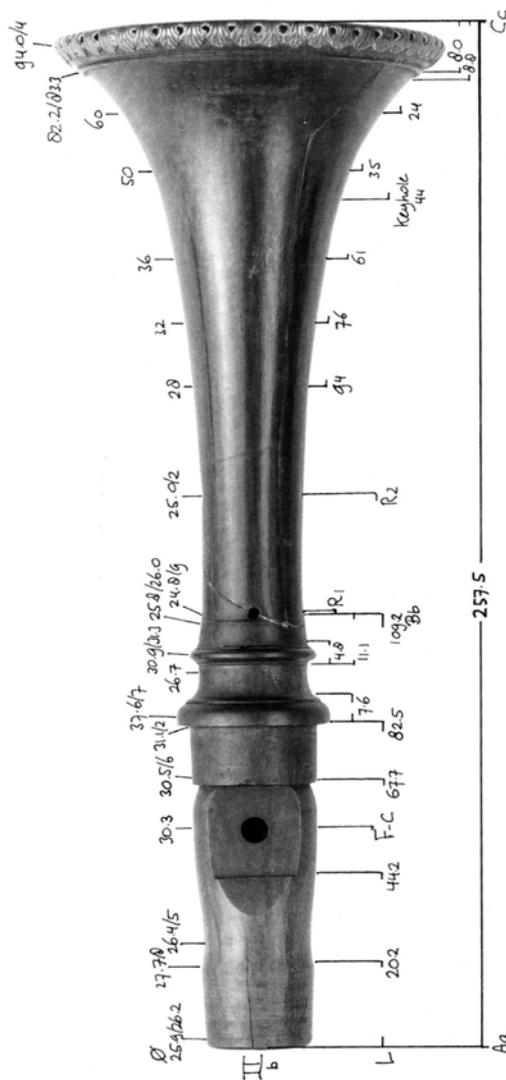
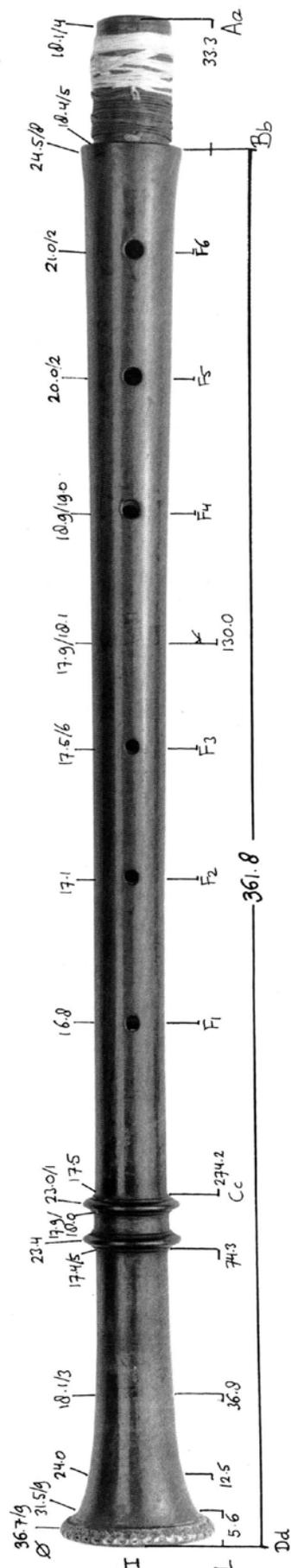


Photo left: National Music Museum in Vermillion SD, USA (Haka No. 30): photo right: Yale University Collection of Musical Instruments, New Haven CT, USA (Haka No. 31). Photos by the author.

See the list on my website (www.mcjbouterse.nl) for the current list of Dutch woodwind instruments with all old and new inventory numbers and list of collections.



These drawings are of the fontanelle and the bell section under the fontanelle of Haka's Deutsche schalmei No. 28 (Boers Collection, Rijksmuseum Amsterdam). When the instrument was still in the exhibition of the Gemeentemuseum in The Hague I made these drawings for the catalogue *Niederländische Doppelrohrblattinstrumente des 17. und 18. Jahrhunderts - Dutch double reed instruments of the 17th and 18th centuries* by Rob van Acht, Jan Bouterse and Piet Dhont (Laaber 1997).



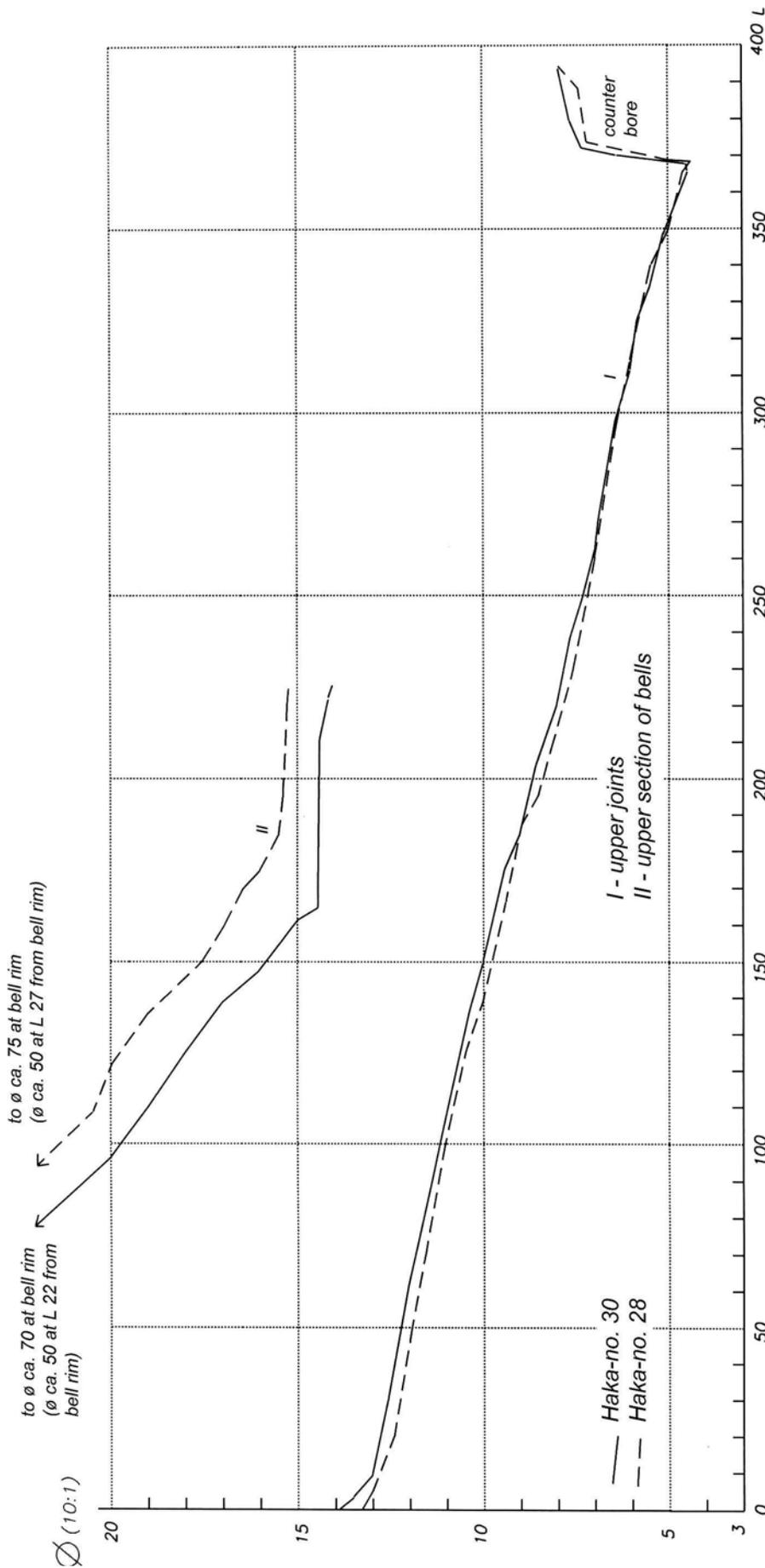
Deutsche Schalmei No. 28, Boers Collection.

Fingerholes upper joint: (L from lower shoulder to centre of hole; ØWxL; Ø of wood, angle):

- hole 1- 229.0; 2.8 x 3.1; 16.8 up /
- hole 2- 191.0; 3.1 x 3.3; 17.1 down \
- hole 3- 156.5; 3.1 x 3.3; 17.6 down \
- hole 4- 94.7; 4.0 x 4.0; 19.0 up /
- hole 5- 60.1; 4.2 x 4.3; 20.2 |
- hole 6- 27.2; 4.2 x 4.3; 21.2 |

Holes on bell: (L from upper end, ØWxL, Ø of wood):

- hole 7- 55.8; 6.4 x 6.4; 29.7
- frontal tuning hole- 110.6; 2.8 x 3.1; 23.6
- lateral tuning hole left- 141.1; 5.7 x 5.8; 25.1
- lateral tuning hole right- 142.0; 5.4 x 5.5; 25.1
- the hole for the bell peg at L 44 from lower end of the bell rim, Ø 3.3 x 3.6.



Graphs of the bores of two Deutsche schalmeien by Haka. Nos. 28 and 30.

For No. 28:

bore upper joint (Ø, Lmax, from lower end):
 13.0/13.2- 0
 12.6-13; 12.4- 19
 12.2-16; 12.0-49;
 11.6-69; 11.4-83;
 11.0- 99 10.4-126
 10.0-138
 9.4-167; 9.0-187
 8.6-197; 8.4-204
 8.0-219; 7.6-231
 7.2-246; 6.8-274
 6.4-296; 6.0-313
 5.6-331; 5.2-343
 4.7-359; 4.6-364
 4.3- 368 and ->

counter bore, from upper end: (L of counter bore: 28 mm):
 8.0-1; 7.5- 3;
 7.0-22; 6.0-27
 5.0-28

bore of the bell (Ø, L, from lower end):
 76.2-2; 60-12
 40-40; 26-74
 22-95; 20.0-121
 18.0-144
 16.0-173
 15.3-195
 15.2- ->

One of the points of discussion I encountered is whether the common or 'soprano' Deutsche schalmei is an instrument in c or in d. My copy is not so different (in pitch and sound) from a baroque oboe: it gives a d' (d4 in modern notation) with the six fingerholes closed, at a low pitch (between a=400 and 415 Hz). That is of course a c' (c4) when you tune the instrument at a pitch of a=465 Hz or thereabouts. There is also one 'alto Deutsche schalmei' by Haka (Haka No. 37, Boers Collection), with a probably original key. With all tone holes and the key hole closed, the lowest tone is a g3 in modern notation. With the six finger holes closed, it is a a3, a fourth below the soprano in d'/d4. This instrument has a beautiful mellow sound.

We have assessed the pitch of Haka No. 28 for the big book (*Dutch double reed instruments of the 17th and 18th centuries*).

Pitch measurements (by Piet Dhont and Jan Bouterse, tuner set at a=415 Hz and equal temperament, deviations in cents; modern tone indications)

tone	fingerings	pitch	
d4	1 2 3 4 5 6	-30/-35	
d5	. 2 3 4 5 6	-45/-50	
e4; e5	1 2 3 4 5 .	-30/-35;	-20/-25
f4; f5	1 2 3 4 . 6	-25/-30;	-10/-20
f#4; f#5	1 2 3 4 . .	-55/-60;	-50/-60 (f#5 was not playable with 1 2 3 . 5 6)
g4; g5	1 2 3 . . .	-45 ;	-25/-35
g#1	1 2 . 4 5 .	-35/-45	(g#5 was not playable with 1 2 . 4)
a4; a5	1 2	-30/-40;	-15/-25
b-flat4	1 . 3 . . .	-60	(a#2 was not playable with 1 . 3)
b4	1	-65	
b5	1 . 3 4 5 6	-45/-50	
c5	. 2	-40	
c6	1h 2 3 4 5 .	-15/-25, but difficult (1h means: hole 1 partly closed)	
c#5	. . 3 4	-65	

With a smaller (narrower) reed, the pitches appeared to be higher, 5 to 20 cents below a=415 Hz.

Richard Haka is today the best-known historical maker of the Deutsche schalmei. But that was partly because he stamped the instruments with his name. I have seen many more Deutsche schalmeien in collections in Germany (Nuremberg), Austria (Salzburg) and Switzerland (Basel). Most of these instruments - often made from plum wood - have no makers' names.

Bibliography for the Deutsche schalmei:

- Kurt Birsak: *Die Holzblasinstrumente im Salzburger Museum Carolino Augusteum*, Salzburg 1973 (Jahresschrift 192, Band 18.)
- Susan Thompson: 'Deutsche Schalmei, a question of terminology', *Journal of the American Musical Instrument Society* 25 (1999), p. 31-60.
- Jan Bouterse: 'The Deutsche Schalmeien of Richard Haka', *Journal of the American Musical Instrument Society* 25 (1999), p. 61-94.
- Jan Bouterse: 'Communication' [about Richard Haka's specification of the delivery of 40 woodwind instruments to Sweden in 1685], *Journal of the American Musical Instrument Society* 30 (2000), p. 243-250.
- See also chapter 9 of my dissertation: *Dutch woodwind instruments and their makers 1660 - 1760* (Utrecht 2005).