Making woodwind instruments

10.11 Tuning the baroque oboe

Introduction; fingering tables

Simply because my own practical knowledge was too restricted to answer all questions, I have consulted several people on the subject of making and tuning the baroque oboe. I mentioned them at the end of Comm 2097. In this section I refer several times to the article by Marc Ecochard about Karl F. Golde. See his website (www.grandhautbois.com/c_publications/objet .php?reset=1&p_ ftype=3) in French, with a shorter English adaptation of the article 'A perspective on original tuning and modern adaptations' on (http://en.grandhautbois. com/c_ publications/ objet. php?reset= 1&p_ftype=3). Longer quotations from the Golde article are in italics; I made some adaptations in the notation of the tones and names of the tone holes.

Concerning fingerings, I strongly advise reading the article 'Oboe Fingering Charts, 1695-1816' by Bruce Haynes, published in *The Galpin Society Journal*, Vol. 31 (May, 1978), pp. 68-93. I found it also on internet: www.jstor.org/stable/841191. He suggested that most fingering charts were written for amateur players (professionals didn't need them). Modern fingering charts (published in the last 30 years) for the baroque oboe are surprisingly very rare, I found actually only one, on http:// hautboy.org/fingerings with the fingerings for the 'Saxon model baroque oboe'. We will see that several fingerings on that chart are different from those which were used before 1750.

About the notation of the fingerings I use here: I give the numbers of the holes which are closed, and for the keys if they are activated. '7' means also that the hole of the small key is opened, but '8' that the hole of the great key is closed. For instance: 1 2 3 4 + 7 means that holes 1 to 4 are closed, and that hole 7 is open. A dot (.) means that that fingerhole is open. For instance: with the fingering 1 2 3 4 . 6 + 7 is hole 5 open between two closed holes (4 and 6), it is a so-called fork-fingering. To avoid confusion, I put the tone names in italics.

Resonance holes

***c1*: 1 2 3 4 5 6 + 8 and *c#2*: . 2 3 4 5 6 + 8**

These holes are on the bell, and are also called 'vent holes' or 'tuning holes'. On most oboes there are two of them, drilled at each side of the bell. Oboes d'amore don't have these holes, but I have seen a tenor oboe (in *f*) by Robbert Wijne with a bell like an oboe d'amore, but with resonance holes.

The resonance holes on baroque oboes are always open and they are in the first place important for the pitch of the c1, the lowest tone on the descant oboe. With (almost) the same fingering, only hole 1 opened as an octave hole, the *c1* overblows not to the *c2*, but a semitone higher to the *c#2* (such 'false - but useful - harmonics' can also be observed on the lowest tones of baroque recorders).

This *c1* is on many historical oboes rather sharp; Marc Ecochard writes that on the first generation of (French) oboes this tone even comes close to *c#*. And on some bagpipe chanters (*musette de Poitou*) it was indeed intended as a *c#*. Modern players of the baroque oboe do not like the sharp *c1* so much. But by making the resonance holes smaller (resulting in a lower *c1*), other problems may arise. The pitch and sound of the *d1* and *f1* become worse, *c#2* and *d2* becoming too flat, and Piet Dhont told me that *e2* might become just (and surprisingly) too sharp.

Karl F. Golde says that if the bore of the bell after the resonance holes is too narrow, it will result in the *c1* becoming too sharp. And also that the bore in the upper section of the bell (between the socket and the resonance holes) needs to be wide enough. A narrow bore in this section makes the *c1* flatter, but then you can't get the *d1* (which is more important tone than the *c1*) in tune. I suppose that this is the reason that on so many baroque oboes there is a clearly visible leap in the bore from the middle joint to the bell (for instance for the oboe by Haka in the Gemeentemuseum Den Haag: a leap from 17.4 to 20.0 mm). Golde continues: In general, it will be more beneficial for the middle register when the *c1* and *d1*are sharp than when they are flat. In the latter case the *e*, *f*, and *g* in both octaves will also be too flat, and the *d2*, *d3* and *a* [I suppose *a2*] will be too sharp.

Hole 8 (hole of the gret key)
***d1*: 1 2 3 4 5 6 and *d2*: . 2 3 4 5 6**
Hole 8 is the tuning hole for *d1* and *d2*. Whereas *c1* is often a bit (or more than a bit) too sharp, the *d1* is more representative as a reference tone for the whole instrument. In other words: here begins the tuning of the oboe, and all other tones are tuned in relation to the *d1*.

The pitch depends not only on the size of hole 8, but also on the key action. Golde specifies that the pad of the key must have a wide opening angle.

Hole 8 is on most baroque oboes the widest hole, and can be far undercut: Piet Dhont told me that this improves the response of the *c3* (with . 2 3 4 5 or . 2 3 4 5 + 7).

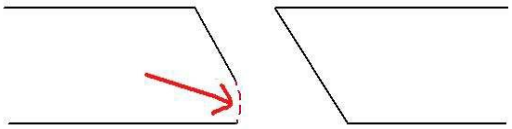
In old fingering charts hole 1 is always open for the *d2*. Bruce Haynes writes: *on the modern oboe, hole 1 is covered by an ingenious plate which makes it easy to 'half-hole', or open this hole only a fraction, so that it can act as an octave speaker for the c#2, d2, and eb2. This technique has often been quite naturally taken over on the early oboe for d2 and eb2. The charts, however, indicate that this fingering is rarely used; the earlier charts prefer an entirely closed first hole for d2 and e-flat2, and after c. 1770 the d2 is usually entirely open. The same is true for the c#3: on all charts, the first hole is left completely open. It is only rarely half-closed for d3. Again, this fact probably has something to say about our present manner of making reeds and blowing them.*

Hole 7 (hole of the small key)
***d#1/e-flat1*: 1 2 3 4 5 6 + 7 and *d#2/e-flat2*: . 2 3 4 5 6 + 7**
Just as with hole 8, the action of the flap of the small key affects the pitch of the *d#/e-flat*. It was for Johann Joachim Quantz in his *Versuch einer Anweisung die Flöte traversière zu spielen* (Berlin, 1752) very important to make a distinction between the pitch of *d#* and *e-flat*. He even designed (or perhaps made himself) traversos with two keys, the *d#* being a bit (a *comma*) sharper than the *e-flat*. But other instrument makers didn't follow him and as far as I know there have not been experiments with oboes with this system of double small keys. One could say that this is not important issue, but it surely matters when we look at some Dutch oboes where we found that hole 7 was remarkably small (less than 4 mm), combined with a low key action. The resulting tone was much more suitable as a meantone *d#* than an *e-flat*. That makes restrictions in the music you can play on these instruments.

It is of course possible to make hole 7 wider, as Mary Kirkpatrick did on her copy after Haka (see Comm. 2055 in FoMRHI Q 135). Golde gives a size of 5.5 to 6 mm for hole 7 on his instruments, and on a 'romantic oboe' in my collection this hole is even 7 mm wide. But on most baroque oboes, hole 7 is clearly smaller (< 5 mm). The same pattern can be seen on traversos: on instruments from the late 18th century, hole 7 is much wider than on the longer instruments from the beginning of that century.

I myself prefer baroque oboes where hole 7 is not very small. On my copy after Wijne (private collection) is the diameter 4.8 mm, on the oboe by Van Heerde in Stockholm, c. 5 mm.
The b-flat2 with 1 2 . 4 5 6 + 7 on the baroque oboe is the third harmonic of the *e-flat1*. The pitch of the *b-flat2* is thus related to the size of hole 7. I think that the pitch of the tones of the upper registers depend more on the bore profile. Golde gives no information about this tone.

Hole 6
***e1* and *e2*: 1 2 3 4 5**
At first sight there are no problems for tuning *e1* and *e2*. It is perhaps more difficult to get the sound perfect (just as on a baroque traverso, where the e1 is often the weakest tone).
Ecochard gives in his article about Golde the advice is to bore hole 6 downwards, which rectifies a natural instability of the note and a natural tendency for the octave to be too wide. That confirms the observation of Steinkopf that on an oboe you must work downwards to avoid wide octave intervals. The downwards angle of the undercutting means that you can only undercut the hole above (see figure left); that immediately raises the fundamental and the octave.



The thickness of the wall plays a role as well in fine tuning. Piet Dhont removed some wood (by sanding) around hole 6 on one of my oboes to improve the *e1* and *e2*.

Hole 5
***f1*: 1 2 3 4 . 6 (7) and *f2*: 1 2 3 4 . 6**
***f#1* and *f#2*: with the fingerings 1 2 3 4 . . (+ 7)**
For *f1* and *f2* there is just this one fork-fingering: 1 2 3 4 . 6. Activating the small key (thus opening hole 7) makes the sound of *f1* - which is often a bit weak - much better.

Piet Dhont told me that he once used to put a piece of paper for narrowing the bore a little bit just above hole 4 when he had to play pieces with many *f*'s. That improved the sound of *f1*, but in later years when he used staples with a narrower bore, he had no problems with this tone. He also told me that he preferred to place hole 5 a bit lower on the middle joint: a bit closer to hole 6 than to hole 5, just as on the oboes by Jacob Denner and that then with the tuning he worked upwards (making the hole wider, undercutting). But he said also: be careful with undercutting at the upside edge of the hole.

This information seems to me different from what I read in Golde/Ecochard: *this tone hole (hole 5) is drilled vertically or with a slight downward angle, which permits undercutting on the upside edge and on the sides in order to reinforce the tone of the fork fingering without making the note too sharp.* Ecochard continues*: a good position and good undercutting of the F tone hole helps the response and intonation of high D (d3), which could have a tendency to be too low if hole 5 hole is lowered in position between hole 4 and 6; this latter position, which permits opening the tone hole more and thus gives a better tone to the cross-fingering, is to be found frequently on some German or Italian hautboys.* And he concludes: *modern players most often find the cross-fingered F on original instruments to be much too high: this is due partly to the original tuning which favours a rather high F, but mostly to an unsuitable reed setup. The frequent use of too thick a scrape and blades that are too long, together with an unadapted taper of the staple, makes the cross-fingering unavoidably stuffy in tone and too high in intonation.*

About the *f#*: the size (position and shape) of hole 5 is also - or even in the first place - important for the *f#* fingered with 1 2 3 4 + 7. This fingering is in all old charts mentioned as the first

and main option for *f#*, but is - just as on the traverso - always a bit flat. That is, for our modern ears. That's why most players of the baroque oboe nowadays use the alternative fingering 1 2 3 4a . 6 + 7 for *f#1*, thus covering one of the small holes of hole 4. As this fingering is too sharp for *f#* (but useful for *g1-flat*), hole 6 must be closed as well, adding the small key for the final correction. *f#2* is seldom a problem with the fork-fingered 1 2 3 . 5 6.

Bruce Haynes mentions the question of both fingerings for *f#1*. He says that: *the unanimity in the charts is startling. Michel Corrette made an interesting distinction between what he called the 'Italian' f#1, fingered 1 2 3 . 5 6 or 1 2 3 4h in both octaves, and the 'French' 1 2 3 + 7 Most oboists of the time evidently preferred the French version. Intriguingly, Francoeur in 1772 complained that the low f# on the oboe is always too low, even when one forces it by blowing, so that it should be used only in passing', and he was not the only one to complain about this note.*

Haynes states that: *the invention of the double-hole with an indentation or 'dimple' must have been a great help to early woodwind players who needed to close certain holes only partially. Yet long after the invention of the double holes, and often even on oboes whose 3rd hole is doubled, the 4th hole was still made single. ... It should be pointed out that in the 18th century leading tones (i.e. sharpened notes) were played low, which helps explain why a flat f# was tolerable or even appreciated. By the 1820s, the leading tone had reversed positions and was played higher than normal, making a low f#1 unendurable, and required the use of a special key. Although the 1 2 3 4 + 7 fingering is awkward in fast combinations with low c1 and d1', most technical passages are noticeably easier with it. Its appropriateness when playing with the flute (traverso), which uses the same fingering, and which also tends to be low, is self-evident. When playing an oboe with a single 4th hole, if one must choose between 1 2 3 5 6 (too high) and 1 2 3 4 + 7 (too low), the latter would seem preferable in most harmonic situations.*
Back to Marc Ecochard; he says that: *if the octaves of d, e-flat, e and f remain flat after tuning (chambering and undercutting tone holes), it is necessary to expand the upper portion of head joint slightly, between hole 1 and the narrowest point; this explains the particular profile that one sometimes finds in the bore of a hautboy in this region: namely a reamer step just after the narrowest point and a widening of the bore. Octaves of e-flat and f are tuned in the same way, the chambering being carried out a little lower in the bore. Chambering the bore just below the socket of the middle joint facilitates the response and tuning of f.*

Is it possible to do something with the bore profile and the fingerholes to optimise the difference in pitch between 1 2 3 4 and 1 2 3 4 . 6? The same question is asked for traversos, where there are indeed instruments where this difference is bigger than on others. My suspicion is that very wide undercutting in combination with a thin wall makes the difference in pitch smaller, but I can't exactly prove or explain that.

Hole 4 (4a and 4b)
***g1* and *g2*: 1 2 3, *f#1* with 1 2 3 4a . 6 + 7 and *d3*: 1h 2 3 + 8**
Piet Dhont told me a long time ago that some problems, such as *g1* too low or the octave *g1-g2* too wide (with the nasty additional effect a bad response of *f2#* with 1 2 3 . 5 6) are hardly to be corrected at hole 4. You have to find a solution in the bore: making the section between holes 2 and 3 a bit wider may result in a better balance between *g1*, *g2* and *f#2*. But he warned: don't go too far with reaming corrections!

Golde says that: *the g in both octaves is usually flat and becomes more so when the low notes are too flat. If g1is too flat its hole can be conically undercut, or the upper end of the lower joint bore can be gently widened from above, or the upper joint can be slightly chambered from its lower end up to just below the hole 3.*

Ecochard adds that hole 4 (single or double) is often drilled upwards, to make the octave interval (which is often a bit small) wider.

When both small holes at 4 are of the same size, the fingering 1 2 3 4a produces a tone which is too sharp for *f#1*. That's why nowadays oboes are made with a different size of the holes. See the photo (from the website of Marc Ecochard). Disadvantage: you can't play so well this oboe with the left hand below. At hole 3, Ecochard left both holes at the same size.

See also the small size of the coves of the fingerholes of this copy (after Naust). Mary Kirkpatrick mentioned similar small coves on the Haka oboe. Piet Dhont recommends for the situation that *f#2* tends to overblow into the next harmonic (which might happen by going from *a2* to *f#2*), that you can make the cove slightly deeper (but be careful, it is easy to go too far), or - what you also can do - undercut the hole at the lower side. Undercutting helps also to make the sound of the *f#1* more clear.

d3 with 1h 2 3 + 8 is the third harmonic of *g1*: you can't tune this tone (and others in the third register) so much by manipulating the finger holes, as they have to be optimized for the tones of the lower registers. Small corrections are sometimes possible, see for instance at the description of hole 5 where the position of that hole has influence on the pitch of the *d3*.

Hole 3 (3a and 3b)

***a1*: 1 2 and *a2*: 1 2, and also *g#1/a-flat1* and *g#2/a-flat2* with 1 2 3a**

At first a remark about *g#1/a-flat1*: in the chart for the Saxon type of oboe there is only this fingering with hole 3 half covered. A fork fingering is not possible in the first register, but does so in the second register voor *g#2/a-flat2*: with 1 2 . 4 or 1 2 . 4 + 7; the Saxon chart gives also 1 2 3a 4 5 6 + 8, which you can you for pp passages. There is the same situation for *a2*: in old fingering tables give the 'short fingering' with 1 2, but the 'long fingering' with 1 2 . 4 5 6 + 8 is more stable and safer. It also depends on the reed and Marc Ecochard says in his article: *the modern use of a bocal-and-tube set give the player a steady sound and good balance throughout the whole register of the hautboy, but poor responsiveness of the high register (above A), which prohibits the regular use of natural fingerings (short fingerings) for high notes; this problem is avoided with a one-piece tube, the taper of which is not disturbed as it is by placing a tube on the bocal.*

Hole 3 is actually almost always double, even on oboes where hole 4 is single. Piet Dhont recommended to drill the holes in a downwards angle, even if that was not the case on the original oboe. By doing so the volume of the holes become slightly bigger and the diameter of the holes can be enlarged a bit. This prevents that the *a1* becomes too soft in relation to the *g1*.

Golde mentions the same but adds some more information: *the double holes for A must be drilled and undercut so that their edges meet at the bore and almost form a single hole. This improves the speech of the A. If these holes are drilled diagonally towards the tenon they must be made larger. This gives the A the same strength as the G. These holes most be significantly smaller if they are drilled perpendicular to the bore as the other holes, since the effectively lower-placed diagonal holes most be wide rather than narrow.*

Golde continues: *it is preferable to leave the A holes somewhat small and to enlarge them*

when tuning, since both the As easily become sharp. If the A remains slightly flat a small chamber must be made between its hole and the B hole. Also, if the middle C and D are too flat the narrowest part in the bore can be enlarged through the reed socket with the long reamer. The clarity of the middle D depends, however, on the lower C and D holes being adequately enlarged.

Hole 2

***b1*: 1 or 1 . . 4 5 6, *b-flat1*: 1 . 3 and *b2*: 1 . 3 4 5 6 + 7 or 1 + 7**

b2 is actually always played with the long fingering (1 . 3 4 5 6 + 7); concerning the short fingering see what is said above for the *a2*. On my Wijne copy I can quite easily play the short fingering when I use the small key (1 + 7), but I don't know if that works on other oboes.

Also in the first register is *b1* with 1 . . 4 5 6 (or with 1 . . . 5 6) more stable and safe than with only hole 1 closed. With 1 . . 4 5 is *b1* a bit sharper.

Hole 2 is on several oboes drilled upwards, or even (as on most bassoons) downwards. This makes the hole longer and that has an effect on the response and relation between tones which are tuned on this hole *b1, b-flat 1* (1 . 3) and *b2*. I discovered that closing more holes down the fork (1 . 3 4 5 6 or 1 . 3 . 5 6 + 8) for *b-flat1* this tone sounds brighter, but also a bit sharper. It is a matter of tuning and voicing: you can't do that separately and sometimes you have to made a compromise, especially for such critical fork fingered tones as *b-flat1* and *f1*.

The table for the Saxon type baroque oboe gives 1 . 3 4a for the *b-flat1*; this fingering makes on my Wijne copy this tone a little sharper than 1 . 3. Ecochard says that hole 2 is generally drilled with a slight upwards angle and that it needs to be rather undercut on its downside edge and well opened to get a good response for the *b-flat1*. This tone is on historical oboes often rather high (giving a mean tone minor third from the *g1*). But making hole 2 smaller makes *b2* with the short fingering too flat.

Hole 1

***c2*: . 2 (only hole 2 closed) and *c#2* with all holes open**

Both notes are more stable when closing some holes in the right hand (4 5 6). For *c#2* there is also the fingering . 2 3 4 5 6 + 8, which is tuned together with the *c1*.

Piet Dhont told me that on hole 1 we have to deal with a difficult compromise: we want to have a stable *e-flat2* (which should be easily playable without half covering hole 1 - despite the fact that most players do just that) and also a good response for the *c3* (with . 2 3 4 5 + 7). A difficult *c3* is often caused by the *e-flat2* being too stable. It might help in that case to undercut hole 1 a bit at the lower edge.

Golde says: *the holes on the upper joint must be rather undercut. Care must be taken, however, to avoid undercutting hole1 too much as this will cause the c2 to be too sharp and sound poorly. Hole 2 can, in contrast, be more undercut.*

Hole 1 and hole 2 are positioned high on the instrument and I think that for the tones which are tuned at these holes, it matters more than for the lower tones how far the staple with the reed is sticking out the bore. You can't tune the tones on an oboe individually (as on a piano), each on its own and by looking on the display of your tuner. It is always about playing runs and intervals and finding the ideal position of the staple, how far to push it into the bore.

Other tones

Some more high tones can be played on the baroque oboe (depending on your reed and so on), but tuning at the fingerholes is not easy or possible. But it is good to know about the relations between the tones. I give here some tones and their fingerings, with comments which Piet Dhont has given me.

- *c3*: . 2 3 4 5 (recommended, and useful in connection with *b2* with 1 . 3 4 5 6 + 7 or with the short fingering for *b2* (only hole 1 closed); *c3* has with . 2 3 4 5 + 7 a bit stronger or piercing sound. With 1h 2 3h 4 5 + 7 you can play it in a more subtle way (for pp attack). With . 2 . 4 5 might the *c3* a bit risky, but with a clear sound, just as with the aforementioned . 2 3 4 5.
- *c#3*: 1h 2 3 4 is the third harmonic of *f#1*. You can't do so much with this tone, it is no problem when it is a bit flat as leading tone to *d3*.
- *d3*: 1h 2 3 + 8; see the remarks given at hole 4. Other fingerings for *d3*: 1h 2 3 . . 6 or 1h 2 3 + 7 (for combinations with *c3* played with . 2 3 4 5 + 7 where *c3* is the more important tone, or in combination with other tones which are played using the small key.
Finally the fingerings for *e-flat3*: 1h 2 3h + 7 (hole 1 only a fraction to be opened), *e3*: 1h 2 3h 4h 5 6 + 7 and *f3*: 1 2h . 3 5h 6 + 7.

Mary Kirkpatrick discovered that making the bore wider in the narrowest section in the top joint of her Haka copy improved the response of some of the top notes very much (see her Comm. 2055 in Q 135). To me that sounds remarkable, for I had expected - coming from my experience with recorders - just the opposite effect. And that proves again that on oboes many things are just different from what we know about other woodwind instruments. The baroque oboe is a flexible instrument, which means that you have to be flexible as a player as well: there are for several tones more than one fingerings possible, and for intonation problems you must look for more than one cause and solution. But I must add a warning: be careful and even reluctant in applying the suggestions collected in this chapter: it is easier to make things worse than to solve a problem.

Some tips and warnings
- A tone on a musical instrument is never tuned on its own, but always in relation and combination with others. There is also - especially on oboes - a strong relation between pitch and sound: by manipulating a tone hole, you are combining tuning and voicing to get both aspects right. Tuning an oboe means that you have to play intervals and runs: you are always coming from one note and going to another, and you must be sure to apply the right amount of pressure: with your breath, and with your lips on the reed (it is, however, interesting to play the oboe with the reed completely in your mouth, thus not pressed between your lips, and then check the pitch).
- Modern tuning devices are very helpful, as they automatically select the tone for you. Lucas van Helsdingen prefers another approach: he uses what is known as an *Orgelpunkt* (pedal point, a long sounding tone) as a reference to compare the intervals (for some tones he switches to another pedal point tone).
- If the instrument does not work properly it is well worth trying different reeds and staples before doing permanent damage to the instrument itself. Some reed-makers make staples and reeds for specific old maker's instruments, so it is sensible to start with a reed that someone knows works on a Denner oboe before modifying a new Denner oboe copy. Squawks, burbles, unstable notes, excessively veiled notes and problems with octaves can all sometimes be corrected by a different reed. It is also worth measuring the instrument to be sure that it has come out as intended!
- It is important that every action in the bore profile will affect more than one tone: don't think that e.g. a quick scrape of the bore below hole 2 will affect the tone *A* and nothing else! 'Everything affects everything' to some degree. Try everything with a piece of card or something similar (thin brass sheet, a bit of plasticine, it is not necessary to put it evenly around the wall of the bore) to get the reverse effect before reaching for the reamer.
- The usual way in tuning a new oboe is drilling all tone holes a bit too small, followed by

enlarging and undercutting, beginning with the lowest holes on the instrument. But with these actions you are affecting the bore profile as well. Which means that eg. enlarging hole 2 may have an effect on a tone (pitch or sound) of a tone which was tuned on a lower hole: just because one of the nodes or antinodes of this tone (including its harmonics) are just at that position in the bore. It is very difficult to predict these effects; it is best to pre-drill the holes not too small, and to ream or at least to clean them carefully before you start down on the instrument.

Some final remarks

How were the oboes played in the past, by professionals and amateurs? I mentioned in chapter 10.9 the old and new types of scraping reeds, which has a direct effect on the sound of the instrument. In my dissertation (Par. 9.6.3, p. 454), I wrote about the difficult aspect of the resistance of the oboe: *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. Finally, an instrument's condition may also affect its playing. Two instruments (Van Heerde's oboe in Stockholm and Terton's one in Den Haag) show traces [glued cracks, wear of wood] of intensive use in the past; perhaps this accounts for their excellent technical playing qualities.*

Back to the fingerings and fingering charts: Bruce Haynes suggested in his article that virtually all of these charts were written for beginners and amateurs and that a study of them therefore gives a rather superficial picture of the real fingerings used on the oboe in the 18th century. I see myself in relation to the *hautboy* also still also as a relative beginner and amateur, without a very thorough experience in making and tuning this beautiful instrument. I had the privilege to see and measure many fine historical oboes: over 90, by around 20 Dutch makers, which was then a reason for me to make some copies. About those old instruments: I was surprised by their variety and also the quality. Apparently, their makers all seem to have conquered the problems in producing (voicing and tuning) the oboes, without slavishly copying each other bore profiles and other technical aspects. There are so many secrets yet undiscovered. One example: how to interpret the variation in fingerholes sizes (and wall thicknesses) on the oboes (there are over 30 made by them) by Hendrik and Fredrik Richters (see Table 9.9. in my disssertation: Dutch woodwind instruments and their makers, 1660-1760, Utrecht 2005).

At the moment I don't have plans to go on with the oboe and make new copies; this article about tuning the oboe can be seen more or less as a conclusion of a long and fascinating period. Which means: do not come to me with your questions if you have a problem with your oboe, but you are welcome to ask them and share your experiences on the pages of the FoMRHI Quarterly! And I am always interested to receive information about historical oboes, especially when they are made by Dutch makers.