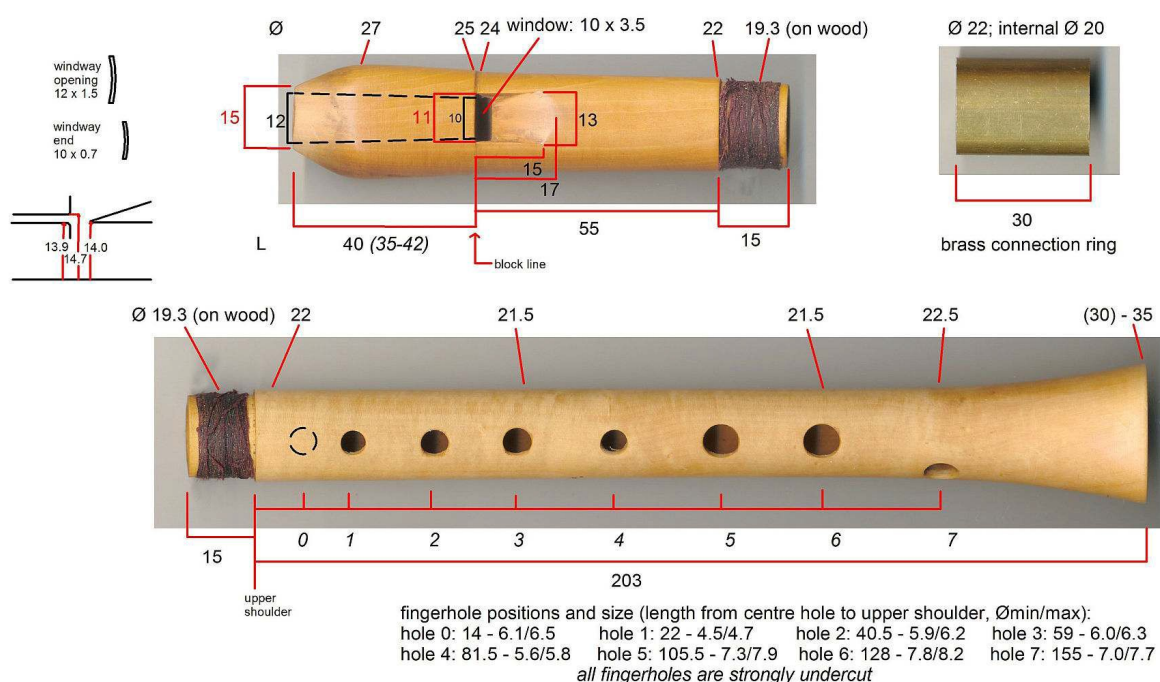


Two recorders in g

Last year I was asked to participate in a Christmas celebration with older people from our church congregation. Because there was no opportunity to practice with other people, I chose a solo piece from *Der Fluyten Lusthof* by Jacob van Eyck: 'O Heyligh zaligh Bethlehem'. That piece is in the key of g, but the song with the same melody can also be found in one of our hymnals, and then a fourth lower in the key of g. That led me to build a recorder in the style of the 'handfluit' (a soprano in c) of Van Eyck, but pitched a fourth lower, with a g as the lowest note, so the people could also sing the hymn with recorder accompaniment.

I had once made a recorder in g, long ago on a course with Alec Loretto, but that was a so-called Ganassi recorder that has different fingerings than the recorder I am used to for playing Van Eyck's music. That is why I have now designed a new model, based on my soprano recorder with a cylindrical bore (Ø 14 mm), which instrument in turn was based on a model by Alec Loretto. The reason for changing my soprano version slightly was that I had a different size brass tube available; it was narrower, so I had to reduce the wall thickness of my soprano (from about 5.5 to 4 mm). That has some consequences for the size and sometimes also the position of the finger holes, but these things are difficult to calculate and can only be determined experimentally. But the result was a fine instrument, playable with modern baroque ('Dolmetsch') fingerings.

Soprano recorder in c2 (a1 = 440 Hz) with cylindrical bore and baroque (English) fingerings



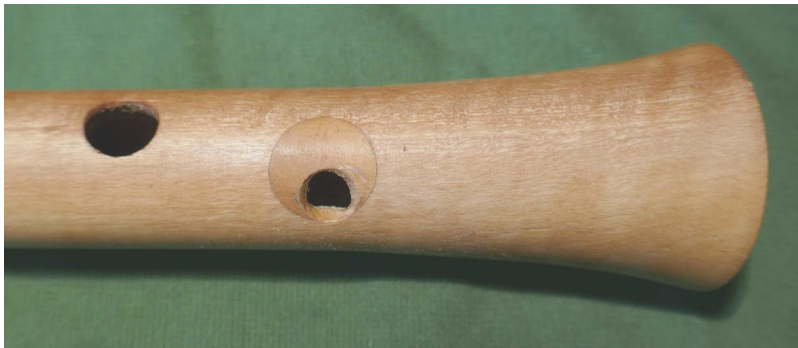
Bore of head joint: from Ø 15 at upper end to Ø 14 at block line; Ø 14 from block line to lower end; bore of the lower joint 14 over the whole length. All measurements in millimeters.

For a recorder in g I first scaled up all length measurements of the soprano by 4:3 (= 1.33 or 33%), the factor for the interval of a fourth. However, a different magnification factor applies to the bore and associated width dimensions. Organ builders are well acquainted with this: within a register an organ pipe that sounds an octave lower than another will be about twice as

long, but to get a comparable sound it should not be twice as wide, but about 1.68x (Töpfersche Normalmensur). I have therefore calculated the bore of the G recorder as follows: 68% of 33% = 22%, 14.0 mm + 22% of 14 = 17.08 mm. That is quite a lot narrower than the average 19.0 mm of my Ganassi in g!

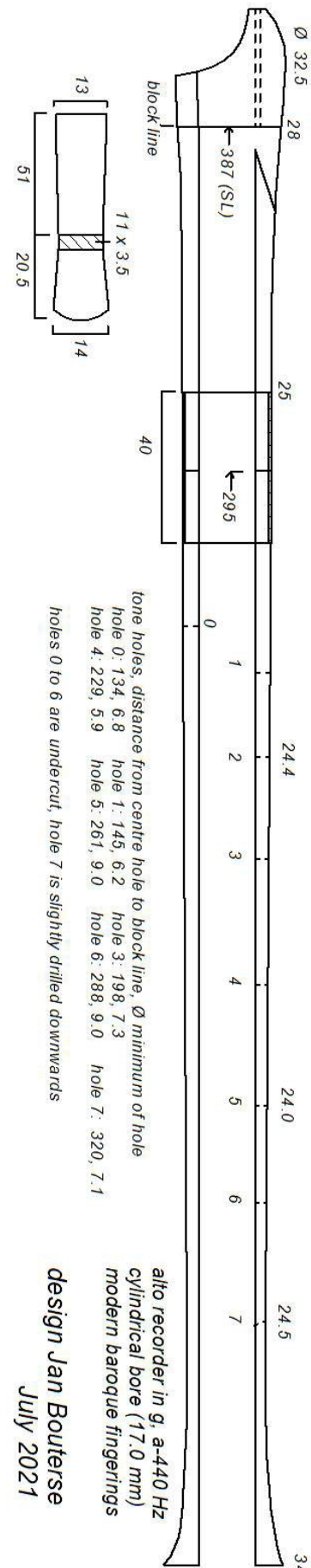
I initially drilled my first prototype a bit narrower, 16.7 mm. The recorder sounded clearly too high, so I reamed the bore further to 17.0 mm. That gave a clear improvement, but just not enough. That's why I made prototype no. 2 a little (about 5 mm) longer. Don't forget: only after drilling (and under-cutting) all holes, can you establish the pitch of the lowest tone of the instrument. A recorder or flute without holes sounds always sharper (up to 50 cents) than with its holes (of course covered by your fingers). That's because the volume of the holes adds up to the volume of the bore.

There were some other problems. The first prototype was made of olive wood, which with a rather pale appearance was lacking the interesting colour which this wood normally has. I had problems with covering hole 7, I had drilled so close to the centre line. So I decided to move the hole a bit more to the side, plugging the old hole with a piece of wood (much larger than the original hole, and drilling a new hole in it (see photo below).



I made prototype 2 of Rio palissander (Brazilian rosewood), a wood that is nowadays on the red Cites list of protected species. So I can't sell the instrument, but for my own use I can still make instruments of it. The wood is hard, has a medium-to-coarse texture with medium-sized open pores. I usually work in European boxwood which has a much finer texture. Working in a different type of wood means that I have to adjust and pay close attention to how the wood reacts to my tools. Something went wrong when cutting out the labium: a small piece at the rim broke out. I wasn't able to fix it, and the rim has now a slightly irregular shape, but that doesn't harm the sound at all.

The drawing of the g-recorder only contains basic information; total length of the instrument: 438 mm.





From left to right: third flute in a after Robbert Wijne; Ganassi recorder in g; recorder in g in olive wood (prototype 1); recorder in g in Rio palissander (prototype 2); soprano in c (boxwood).



Prototype 2: the problem with the labium rim is clearly visible. Also that this wood (Rio palissander or Brazilian rosewood) has not such a fine grain as for instance boxwood. It is very hard, but also more brittle.

About the sound of both G-recorders: prototype 1 in olive wood has a full sound in the lower register, but some of the higher notes do not speak easily. Prototype 2 has a better balance, easy top notes, the lower register perhaps not as full as the other recorder, it comes in its character close to a baroque recorder. Is that what I wanted to achieve?

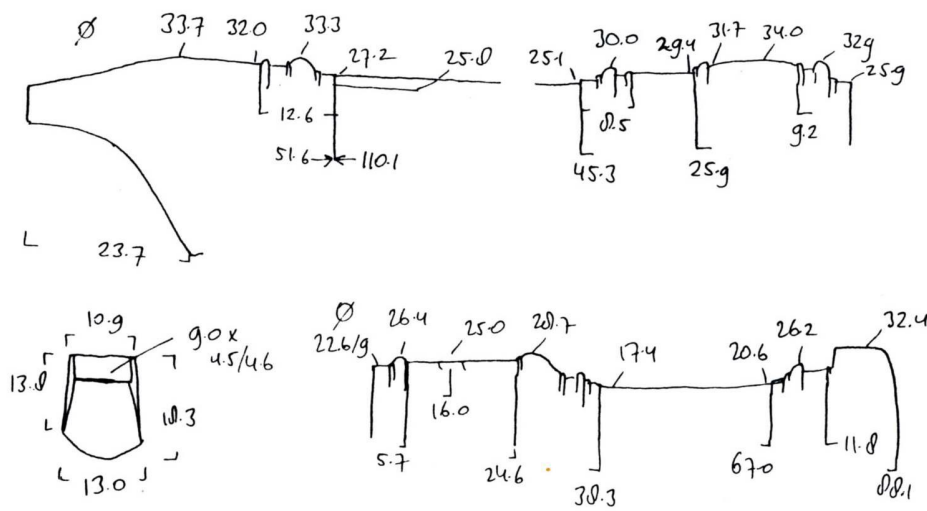
There are two problems I couldn't solve. On baroque recorders there is always one note which is always left out when tuning the instrument: that is (on an alto in f) the g# in the second register, with the fingering . . 2 3 4 5 6 . This tone has no tuning hole on its own; tuning can be done on hole 7, but the first and more important note that it tuned from hole 7 is the low g (again: related to an alto recorder in f). What is happening is that the g# is from an acoustical point of view a false (too sharp) overblown g. By opening hole 0 and 1 it is on most baroque recorders pushed up to a perfect g#. But that didn't work for my cylindrical recorder in g: the corresponding tone, the a#, is staying too low, only one alternative fingering (. . 2 . 4 5 6 .) seems to work. But as this note occurs in Van Eyck's piece, I have to practise it all over again.

There is perhaps a solution to solve the problem: moving hole 7 a few millimeters further downwards. That could make the overblown tone a bit sharper. But then another problem arises: I had some problems on both prototypes with the lowest note, the fundamental g. It didn't speak fast enough, so I tried everything on the instrument to solve that (changing small things at the block and so on). But the cause of the problem turned out to be my fingers: they had trouble covering the large and widely spaced holes properly. Positioning hole 7 further (which also means that it becomes bigger) would only add to this finger problem. In the past, I used not to have such a problem with it, but as I am getting older now I have to deal with oncoming osteoarthritis, in my knees and unfortunately also in my fingers, some of them becoming stiffer and more crooked. That's why I am not continuing in making this type of recorders. There is one positive thing: the lowest note doesn't turn up in this piece by Van Eyck. And I had some time to practise a bit longer: because of the corona restrictions, the Christmas service in December 2020 was cancelled. But I have been asked again this year, and I will play Van Eyck on recorder No. 2: an instrument made of a noble wood, with a noble sound.

The other recorder in g

My most recently made instrument was again a recorder in g, a copy after an instrument of Robbert (or Robert) Wijne (or Wyne). However, the original instrument was probably not made as such, it is supposedly a *third flute* in a, but in the low French baroque pitch (a- 392 Hz). Which means that it can also be used as a recorder in g, in the modern pitch standard of a-440 Hz.

The recorder is in the collection of the former Gemeentemuseum (now 'Kunstmuseum') in The Hague and is described and measured in 'Dutch recorders of the 18th century', the catalogue from 1991 (Moeck, Celle) .



To the pictures: photo of the whole instrument is from the catalogue, the other photos (taken under different light conditions) and the drawing are by the author.

Measurements, summarised from the catalogue (1991) and published in my dissertation 'Dutch woodwind instruments and their makers, 1660-1760', Appendix C (2005):

head (I): L 161.7; SL 110.1; socket: L max 21.5, \varnothing max 20.9; window (WxL): 9.0/9.15 x 4.55/4.65; \varnothing ext-max at window: 27.2; labium L 18.5, Wmax 13.0; block surface: L 50.6, W 10.5 - 9.0;

bore (\varnothing - Lmax, from upper end):

| | | | |
|----------|-----------|-----------|----------|
| 17.1- 22 | 16.8- 35 | 16.3- 51 | 16.2- 58 |
| 16.1- 63 | 16.0- 131 | 15.8- 136 | 15.6- -> |

middle joint (II): L 204.0; SL 171.5; upper tenon: L 21.0; lower tenon: L 11.5; \varnothing ext of shoulders: 24.2 and 20.6;

finger-holes (L from upper shoulder to centre of hole; \varnothing WxL; \varnothing ext):

| | | | |
|---------|--------|------------|------|
| hole 0- | 11.9; | 5.0 x 5.3; | 23.8 |
| hole 1- | 26.6; | 4.8 x 5.0; | 23.3 |
| hole 2- | 53.1; | 5.2 x 5.3; | 22.6 |
| hole 3- | 81.0; | 5.2 x 5.4; | 22.1 |
| hole 4- | 112.3; | 5.1 x 5.3; | 21.5 |
| hole 5- | 138.8; | 5.0 x 5.2; | 20.4 |
| hole 6- | 163.8; | 4.6 x 4.7; | 20.5 |

bore (\varnothing , Lmax, from upper end):

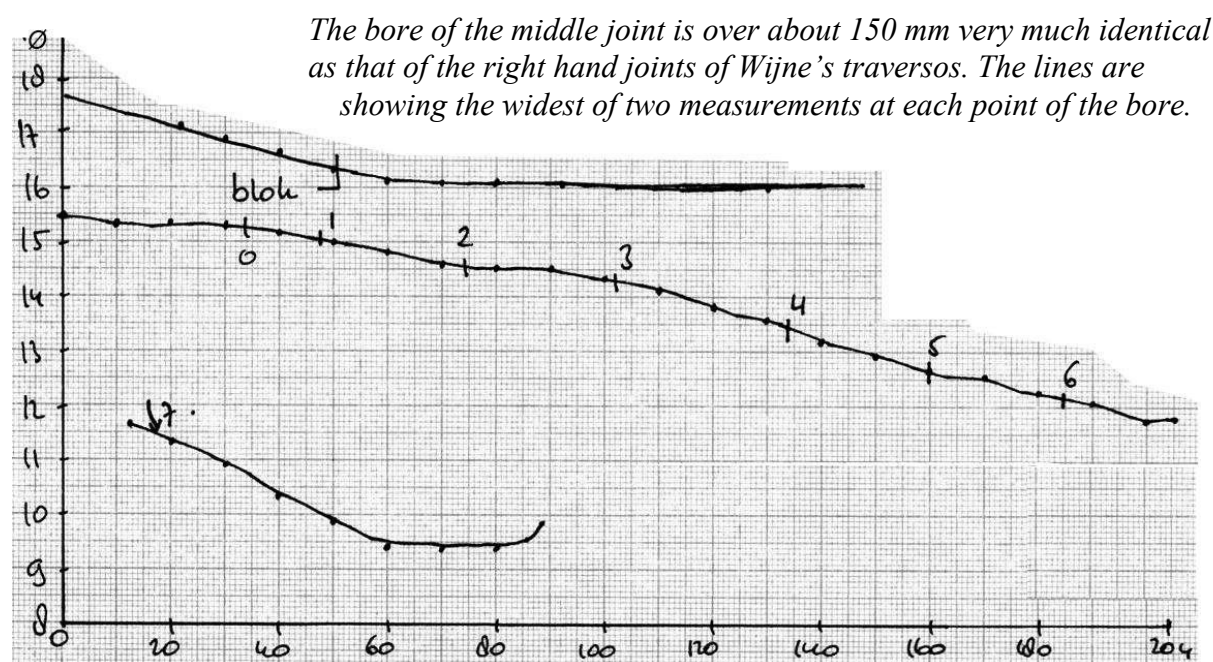
| | | | | |
|-----------|-----------|-----------|-----------|-----------|
| 15.5- 0 | 15.3- 29 | 15.0- 52 | 14.6- 72 | 14.5- 89 |
| 14.4- 98 | 14.2- 108 | 13.8- 122 | 13.2- 140 | 13.0- 148 |
| 12.6- 168 | 12.2- 180 | 12.0- 192 | 11.7- 202 | 11.8- end |

foot (III): L 88.1; socket: Lmax 11.8; \varnothing max 17.1; hole 7 at L 16, \varnothing 4.5 x 4.6;

bore (\varnothing , Lmax, from upper end):

| | | | | |
|----------|----------|----------|---------|----------|
| 11.6- 12 | 11.3- 20 | 10.4- 39 | 9.8- 50 | 9.4- 60 |
| 9.3- 66 | 9.4- 70 | 9.5- 74 | 9.7- 82 | 9.8- end |

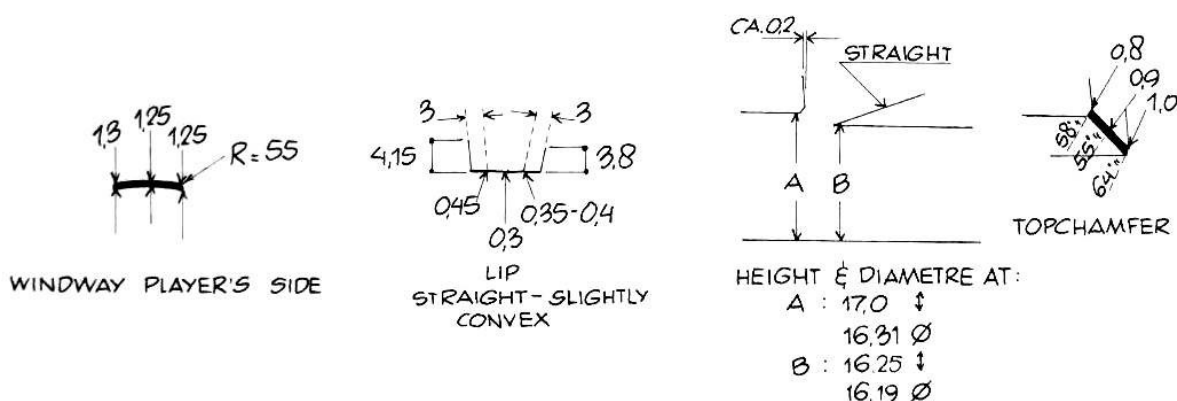
Bore profiles of the three parts of the Wijne recorder, with positions of the block ('blok') and the tone holes, based on the measurements above:



Wijne's recorder is preserved very well. The bore of all other parts is on cross section hardly warped (apart from the upper 30 mm of the middle joint), the windway is in nice condition. Remarkable is the very long window: with in average 4.6 mm longer than on most baroque alto recorders in f. A bit strange: the lower footring is rather thick (length) and small (diameter). It looks original, but is different from the only other surviving foot, that of the soprano recorder by Wijne in the Brüggen collection (it is actually the foot section of the combined lower part of the instrument: middle joint + foot, see photo right).



About the windway of the third flute: in cross section slightly curved, whereas the lip (labium rim) is almost flat. But there might have been some warpage there.



Both the block surface and the roof of the window are longitudinally almost straight, no vaulting or curves to be seen. That makes copying of the windway relatively easy. From the measurements (by Hans Schimmel) I have calculated the angle of the windway: in the roof slightly going down, on the block slightly upwards. But there are some questions. In the drawing above, the height at point A from bottom to roof of the windway is 17.0 mm. The height of the block is 16.65 mm, which is rather more than the height under the labium (B on the drawing, 16.25 mm) and what means that there is only 0.35 mm left for the wind going through. That is very narrow and is maybe the cause that the high notes on the recorder do not speak very well. I have described that in the catalogue as follows: 'Both windway and block are in good condition, although the centre and left side of the block are too high at the window end. Only the right side of the window edge is visible.' And about the sound: 'The recorder has a very individual tone, accompanied by a slight noise. It is stable at the bottom and has an initial speech characteristic (comparable to the 'chiff' of organ pipes) in the higher registers. The third register, however, speaks only with difficulty.'

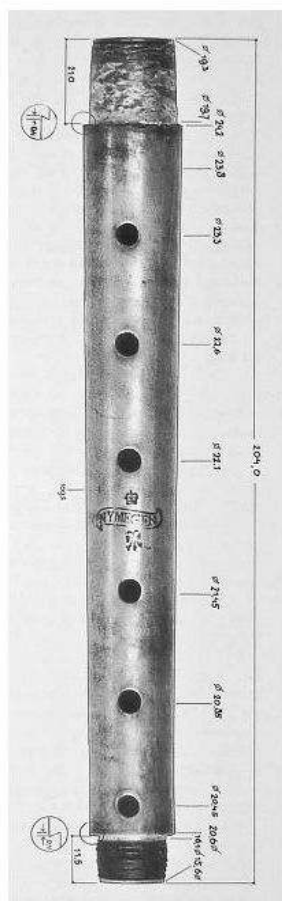
On my copy, I have given more room for the wind, not by lowering the block, but by making the roof higher. The third register speaks fine, with some (but very light) chiff, and there is a slight noise, especially in the lower tones. My overall impression of the copy: a gentle, elegant (my wife says: warm) sounding instrument, not so loud. It doesn't like to be forced.

So far, so good. But I have not discovered all secrets of this recorder. What happened was what I always do: drilling the tone holes initially too small, and making them larger in the process of tuning. I had few problems with that tuning process, the only thing was that I had to ream the bore in the upper section of the middle joint a bit wider to get better octave intervals.



I tuned the notes according to historic fingerings, but made a second middle joint to play the recorder with modern baroque ('Dolmetsch') fingerings: making hole 4 a bit smaller, and hole 5 a bit wider. That worked very well, giving better ('easier') fork-fingered notes in the second register. But then the discovery: I checked the size of the tone holes on both parts with the original instrument and was surprised to discover that my holes were clearly smaller. But why? The bore was exactly enough copied (rather a bit too wide than too narrow).

Also different is the turned profile of the foot. As I didn't like that of the original recorder, I made a new one, more elegant and in my opinion more in line with the sound of the instrument. But did I capture the original sound when I played the instrument (over) 30 years ago? With the large window and tone holes, you might expect a bigger sound.



Why have I made this instrument?

There was a question from Jem Berry, he is planning to make a copy and he knew that I have a lot of information about this maker and his instruments. So I became inspired to make a copy as well, from a recorder which I have seen for the last time over 30 years ago. Robbert Wijne, who lived in Nijmegen, from 1698 to 1774, was the first Dutch woodwind maker whose instruments I discovered (the other one was F.G.A. Kirst from Potsdam, Germany). Further research about Wijne's relation with other makers resulted in writing a dissertation about all (perhaps too many...) aspects of Dutch woodwind making. But in the end I have not found answers to the question where Robbert Wijne received his education as maker of musical instruments, nor how his third flute. is related to recorders of other makers. Was it a one-off instrument, was it completely his own design?

Conclusion: I am not disappointed with my copy of the Wijne recorder. It is a nice instrument, plays well and it proves that it is not too difficult to achieve a satisfying result with the measurements from the catalogue as a starting point and with some basic knowledge of the rules of woodwind making. It is not an exact copy and therefore not perfect; as a musical instrument it is a piece to cherish.