PHILIPPE BOLTON,  RECORDER MAKER

# Recorder tuning adjustments

This page explains techniques that can be used for simple tuning adjustments.

However this kind of work should only be undertaken by someone who knows what he is doing, otherwise it should be given to a specialist repairer.

## Work on the recorder's holes

To modify the pitch of a note either the position of the appropriate hole or its diameter needs changing.

- A note that is too low can be tuned by moving the hole up the instrument (towards the windway) or by enlarging it.
- Inversely a note that is too high can be tuned by moving the hole down the instrument or by reducing its diameter.

The choice of one or other method depends on the note to be corrected, and on the other ones that depend on the same hole. Most of the holes of the recorder can influence the tuning of several notes, since there are only eight holes for a range of over two octaves.

- When a hole influences a note and its octave the position will have more influence on the lower note, while the diameter will have more influence on the upper note.
- When a hole influences both a simple fingering note and a fork fingering note the influence on the fork fingering will be quicker.

**When retuning one particular note it is very important to watch the possible changes on all other notes depending on the same hole as shown in the table below.**

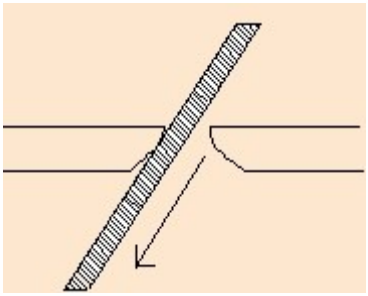
# How to modify a hole

## *Using a file*

To move a hole up or down the instrument, it is often sufficient to enlarge it on one side, and fill it in on the other side if necessary with a little beeswax. To increase its diameter without moving it just enlarge it all around.

The safest tool for enlarging holes is a coarse round file.A fine file is inefficient on wood.

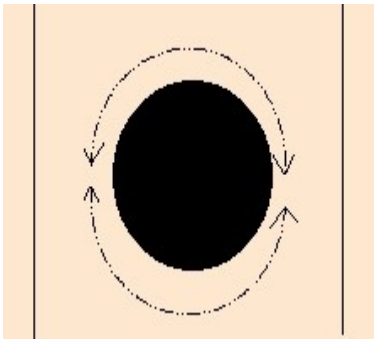
Work at an angle in order to undercut the hole rather than cut it vertically. Work calmly in a downward direction. Be careful to avoid the file "jumping" out and marking the instrument.



## *Using a knife*

*the tuning knife*

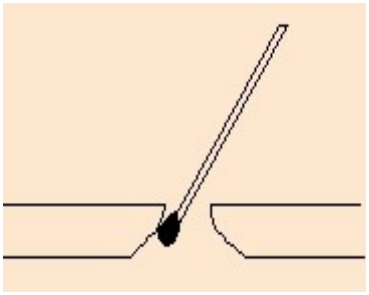
Recorder makers usually use a narrow tuning knife, but this needs learning. The upper and lower parts of the hole must be cut separately, beginning on one side and working around to the other, stopping before the blade gets parallel to the fibres, since it will then start splitting the wood instead of cutting it.



Finish the job by cleaning the hole with small rolls of progressively finer grained abrasive paper (240, 320, 400).

---

To put wax in a hole, just use a small metal point like the handle of a needle file. heat this on a flame, then touch the wax to melt it and pick up a drop which should quickly be placed it the right position inside the hole. It will harden on contacting the wood.



---

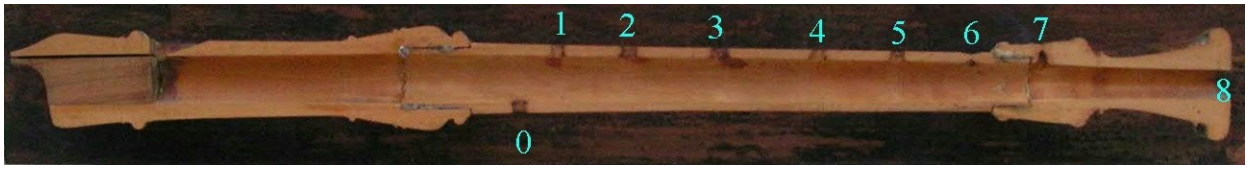
*Some practical examples :*

- *To raise a low note without changing its upper octave too much, open the top (windway) side of the hole. It may also be necessary to put some wax in the opposite (bell) side) to reduce its diameter.*
- *To lower a low note without changing its upper octave too much, put some wax in the top (windway) side of the hole. It may be also be necessary to open the opposite (bell) side).*
- *To raise a high note without changing its lower octave too much, open the bottom (bell) side of the hole. It may also be necessary to put some wax in the opposite (windway) side to reduce its diameter.*
- *To lower a high note without changing its upper octave too much, put some wax in the bottom (bell) side of the hole. It may also be necessary to open the opposite (windway) side).*

---

# Which hole ?

The holes are numbered from 0 (the thumbhole) to 8 (the bell).




The following instructions are for a baroque type alto or treble recorder in f. They must be interpreted for working on other recorders. The note names carry a number corresponding to the octave they are situated in. F1 is the lowest F, F2 is the middle F, F 3 is the highest F, and so on.

| **Note** | **Hole to work on** | **Other notes influenced by the same hole (which must be watched)** |
|---|---|---|
| F1 | 8 (bell) | Eb2, E2, F3 |
| F#1 | 7 (far side double hole) | Eb 2, E2, F3 |
| G1 | 7 | Eb2, E2, F3 |
| G#1 | 6 (far side double hole) | A1, A2, E2, F3 |
| A1 | 6 | A2, E2, F3 |
| Bb1 | 5 | Bb2 |
| B1 | 4 | C1, B2, C2 |
| C1 | 4 | B1, C2, B2 |
| C#1 | 3 | C#2, D1, D2 |
| D1 | 3 | D2, C#1, C#2 |
| Eb1 | 2 | E1, F3 |
| E1 | 2 | Eb1,F3 |
| F2 | 1 | G2 |
| F#2 | 0 (bell side) | G2 |
| G2 | 0 (windway side) | F#2 |
| G#2 | 0, 7 | F#2, G2 (0)<br>G1, Eb2, E2, F3 (7) |
| A2 | 6 | A1, E2, F3 |
| Bb2 | 5 | Bb1 |
| B2 | 4 | C1, B1, C2 |
| C2 | 4 | B1, C1, B2, |
| C# 2 | 3 | C#1, D1, D2 |
| D2 | 3 | D1, C#1, C#2 |

| Note | Hole to work on | Other notes influenced by the same hole (which must be watched |
|---|---|---|
| E2 | 6, 7, 8 | A1, A2, F3 (6)<br>G1, Eb2, F3 (7)<br>F1, Eb2, F3 (8) |
| F3 | 2, 6, 7, 8 | E1 (2)<br>A1, A2, E2, (6)<br>G1, Eb2, E2, (7)<br>F1, Eb2, E2, (8) |

Notes above F3 cannot be tuned easily.

---

# Work on the recorder's bore

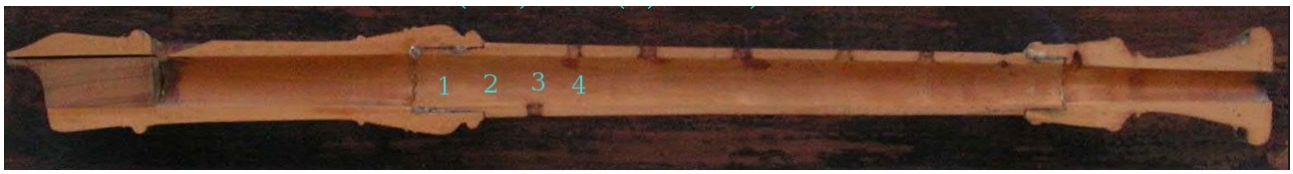
It is possible to adjust octaves by putting wax inside the bore. A piece of wax positioned half way between the labium and the note's hole will reduce its octave relationship, while placing it close to the hole itself should enlarge it.
This does not work for Eb2, E2, F3 and G3, nor does it apply to F2, F#2 and G2, which are first register (fundamental) notes.

Place the wax in the right position, then apply a warm piece of metal to make it melt and adhere to the bore.

Octaves can be **widened** by placing wax in the bore where shown here:


**1 = D  2=C  3=B*b*  4=A**

Octaves can be **made smaller** by placing wax in the bore where shown here:




**1 = D  2=C  3=B*b*  4=A**

E*b*2, E2, and F3 can sometimes be tuned up with wax at the top of the foot bore, but possible adverse effects on other notes should be checked.

* = the places where some wax can be placed to **raise high E*b*, E and F**

Wax can be removed fairly easily, so mistakes can be rectified without too much difficulty. It is wise, however, to experiment beforehand with pieces of plasticine as there can be adverse effects on the tuning, speech or stability of other notes.

**Philippe BOLTON,**
**22 Le Grand Portail, F-84570 VILLES SUR AUZON, France**
**TEL +33 4 90 61 86 11  FAX +33 4 90 61 97 82**
**philippe.bolton@flute-a-bec.com**  **http://www.flute-a-bec.com**