

Developing the Altissimo Range of the Oboe¹

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During the 20th century the range of the oboe has been creeping upwards. In the 1930s A6² was first used^{3, 4} while in the 1960s the occasional B⁵ could be found, and in the early 1970s C7 was sometimes used.⁶ By the early 1980s a few composers had written up to D7⁷ and pitches between A6 and C7 were employed more frequently. The range from G6 upwards can usefully be referred to as the *altissimo* range.

Because of the changes which have occurred in the last 50 years, a reconsideration of what is reported as the range of the instrument, for example in orchestration books, is required. When writing for professional performers I suggest the following revision: For use in orchestral music Bb6 should be the top pitch and for soloists C7. These are of course the ideal and should be tempered with advice concerning their use.⁸

In the early days high pitch use tended to be either individual pitches used in isolation or in a situation where there was time to prepare or to move to/from them chromatically.⁹ More recently, the demands have increased and many of these pitches have been written in technically complex passages.¹⁰

The techniques required in order to execute these pitches fall into two categories: first, using standard blowing techniques, (which are sometimes enhanced)¹¹ and second, the use of teeth on the reed. Many lists of fingerings for the upper range are not specific concerning the technique or, where one technique takes over from the other.¹² This can cause problems, as many writers suggest that the use of teeth on the reed pushes the pitch up by as much as a semitone.¹³ Technical problems also exist in that the use of teeth on the reed involves a slight gap in sound production. This makes a real legato impossible and slows down the execution of some passages that require movement from one to the other. In addition, the sound quality of these pitches varies significantly, depending upon which method of production is used. Writers also vary in their understanding of what is possible in terms of dynamic range.¹⁴

From my own experience of performing a considerable body of music that employs the altissimo range I have become convinced that, though a challenge, it is

worth the effort and that the extended range adds considerably to the instrument's potential colour pallet. My arguments in favour of this assertion are of course the excellent works that already employ this range.¹⁵

Developing and using the altissimo range should not, however, be the preserve only of the avant-garde. Any professional performer and many advanced students (university, music college etc.) should be able to play in this range if the fingerings are properly developed, the techniques are understood and the psychology is right.

There are surprisingly many alternative fingerings available for almost all of the *altissimo* range pitches;¹⁶ many of which are minor modifications of similar fingerings.¹⁷ In some cases, when comparing the fingering lists, the same fingerings can be found on different pitch lists, which is not surprising given the use of teeth on the reed by some performers and its potential to raise the pitch by a semitone.

Many oboists faced with one or more unusually high pitches will be familiar with the time it takes to find fingerings, and the sense of floundering around until the required fingering is stumbled upon. This was my experience in the early days when fingering charts were not available for this range.

A central aim in writing this article is to present a method that will take a great deal of the sense of floundering about out of the search for fingerings along with some guidance on the techniques needed for successful performance in the *altissimo* range.

The central themes are:

- Fingering development;
- Understanding of the techniques required in order to play in this range successfully; and
- The place of the reed in developing the range.

In addition to the above I will explore a number of areas of keywork development with which I have been involved and which are specifically concerned with range development.

FINGERING DEVELOPMENT

"Fingering positions in this register only set up the acoustic possibility of producing the desired

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note, but will in no way guarantee it—the actual pitch is attained from a strengthened lip position, which must be slightly altered for each tone.” Larry Teal—*Art of Saxophone*¹⁸

While the technique and performance practice of the saxophone may be quite different from the oboe, the above quotation does raise an important issue that needs to be addressed at the beginning of this section: The study of the fingerings must be undertaken alongside the study of the techniques that help performance. Where Larry Teal talks about ‘a strengthened lip position’ we have a more complex range of issues to address, including the way in which we cause the air to pass through the reed, the possibility of using teeth on the reed and of using the embouchure strategically.

In devising this article I have compiled information and a strategy that can be applied to almost any oboe.¹⁹ When beginning the search for high note fingerings it should be remembered that there are very many variables, and that what works for one oboist in this range may well not work for another.²⁰

The first level of the search for fingerings is usually simply finding something that works, and, at its most basic, the following can be used to do just that. However, there are other issues that are important. Ideally it is advisable to develop fingerings that are as comfortable as possible,²¹ safe in performance, that can be used easily with other high-range fingerings (both in terms of ease of fingering and that speak in legato) and that can be articulated in isolation. Finding fingerings that work well without the use of teeth on the reed is the final goal.²²

A METHOD FOR OBTAINING THE ALTISSIMO RANGE PITCHES USING GENERIC FINGERINGS AND FINGERING MODIFICATIONS

A comparison of all of the available fingerings for each pitch in the *altissimo* range led me to develop a set of generic fingerings and a list of most likely modifications.²³ These two resources enable performers to explore a wide range of options and to develop fingerings that will be practicable on their own setup.

A basic process can be used in exploring the range:

Generic Fingerings²⁴ (details in Appendix Two)

Using the Generic Fingerings as a starting point, test the fingerings both with a normal embouchure and, at the top of the range, with the teeth on the reed. Make a note of the pitches obtained and any obvious problems: too sharp, too flat,

nothing speaks in the required range, only just sounding, etc. You may want to try these tests on two or three reeds for a more accurate evaluation of the fingerings. If you have not tried to play in this range before, take your time and make several attempts if necessary.

Venting

The octave keys are used more than any other keys for venting²⁵ even in this very high range. Occasionally in the fingering lists two octave keys are used together; either 1 and 3 or 2 and 3.²⁶ This situation arises at the very top of the range. Suggested octave-key use in the fingering charts varies greatly on otherwise similar fingerings. In addition to their use as vent keys, the octave keys in this range can also alter the intonation. This is particularly the case with the third octave key. Therefore there can be occasions where an octave key can be added simply in order to lift the pitch a limited amount.

The left-hand index finger is very significant in this register and in addition to the standard ways of using this key (closed, open and half hole) I have found it useful on C7 and C#7 to use a quarter hole (in effect letting out only the smallest amount of air through the hole).

The trill keys play an important role in the *altissimo* range especially for B6, C7 and above. They can work as a speaker key rather like the 3rd octave key in the standard upper range. Trill keys can significantly alter the pitch, usually taking it up, when opened. So if you find that a fingering is not working, is only just there or is not in tune, take a careful look at the trill key use. In some fingering charts the trill keys are used on Bb6, but as there are good fingerings for Bb6 that do not use the trill keys there is no reason to complicate the fingerings even further.²⁷ Additional information about key use can be found in Appendix Three.

Intonation

Each fingering lives in its own limited pitch world. It is rare that a modification takes it up or down far. When seeking to move a pitch to its correct place, remember that the teeth on the reed will lift the pitch and so if you are using teeth this needs to be taken into account.

Fingering options²⁸

If you find more than one fingering that works

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on your setup then note it down. Given the complex nature of many of the fingerings it is useful to have options. This is the case for ease of execution in complex fingering patterns but can also provide fingerings with different responses, some being better at different dynamic ranges or response to articulation.

Most of the Generic Fingerings will produce a pitch in the right general area and if you are lucky they may work perfectly, but for most performers there will be a need to modify them in some way.²⁹ You may also find that even if they do work, they are not quite in tune or are a bit stiff or unstable.

COLOUR FINGERINGS

In the standard range of the oboe there are a several alternative fingerings available for many of the pitches. These fingerings can provide beautiful colour alternatives, as can be seen in Berio's *Sequenza VII*. In the upper and *altissimo* range a similar array of colour options is possible and so any optional fingering you find should be noted for potential use in this context.

In addition to the variety of colour fingerings available there is also the teeth option to consider, not simply as a technique for high note production, but also as an alternative quality of sound. Teeth notes tend to be rather thin and sometimes fragile. Many composers would much prefer the more standard quality; however, in my experience there are times when the very fragility of the teeth notes can be the ideal choice for a composer. In the book *The Techniques of Oboe Playing*³⁰ there is a specific section on teeth notes starting from the G6 fingering and going up to top C7. So it should be possible to perform from G6 upwards using teeth if that particular sound quality is required.

ADDITIONS TO THE STANDARD FINGER TECHNIQUE

The use of the trill keys at the upper end of the *altissimo* range requires a slight rethink of the way in which they are used. The challenge is to depress the required trill key (or keys) while holding down the keys around them. For example the left-hand C# and D trill keys need to be used in conjunction with the standard G and A keys. To achieve this, the hand must be turned slightly in order to depress the required trill key while maintaining a hold on the other keys. This can seem rather uncomfortable at first, but soon becomes

a part of the technique.³¹ If the left hand index finger is not in use over its usual touch piece then it can of course depress the D trill key. Occasionally reference is made to moving the fingers down so that the left-hand index finger covers the second key (A key) while the second finger depresses the C# trill key and the third finger covers the G Key. This can be a useful solution in some cases.³²

The spatula key employed by the left hand index finger (usually used for an A#/B trill) is sometimes used at the top of the range, and the performer needs to become quite adept at sliding on and off it.

EMBOUCHURE AND BREATH TECHNIQUE

The technique required for playing in the *altissimo* range requires careful consideration as there are some very specific technical changes that would be frowned upon in the standard range. At the very top of the *altissimo* range, the B6 and above, the need for change becomes even more evident. Up to Bb6 most professional performers should be able to play with a standard technique once they have sorted out the best fingerings for their setup. However, even in the lower part of the *altissimo* range some performers may want to employ some of the technique modifications recommended below.

USING TEETH ON THE REED

I have already mentioned that in this range the teeth are often employed on the reed in order to obtain the highest pitches. Though this technique is obviously less attractive to oboists than maintaining a standard embouchure, it is worth careful study for a number of reasons:

- Teeth on the reed may well give you an instant pitch.
- If a performer has not played in this register before, psychologically it can be an encouraging way to start.
- Initially it may be the only way of obtaining the highest pitches
- In extended passages in the *altissimo* range it can take the strain off the embouchure.

The teeth are placed at the bottom of the scrape³³ with the lips closed around the reed in order to stop the air leaking out. A light pressure is then exerted upon the reed. Biting too hard will of course close the reed up, while insufficient pressure will not produce the right effect. It is worth experimenting in order to find the best place for the teeth. In the initial stages

try several reeds in order to establish which qualities in the reed encourage the better performance of upper pitches. When learning this technique, I have found it useful to blow without articulating with the tongue.³⁴

Using the teeth on the reed in this way effectively shortens the vibrating length of the reed and thus helps the highest register. Roxburgh describes it thus:

"Consider that the reed, as generator of the sound, maintains a vibratory system independent of, as well as adjacent to, the oboe. Like any vibratory medium it is activated by a mode of attack – in this case, air and embouchure. Played without the instrument the reed will make a croak at the pitch *b'* [B5]. If any part of the medium (the cane) is prevented from responding by being stifled, the wave forms being propagated will be shorter, and the resultant sounds higher."³⁵ [Square brackets mine.]

Some of the suggestions in the next section may also prove helpful when using teeth (very few techniques on the oboe work in isolation!). One of the problems of using teeth on the reed is that it tends to produce a sound with limited control, and is therefore hard to employ in a musical setting. Using the following suggestions alongside the teeth can help to bring a greater level of control to the sound especially where dynamics are concerned.

STANDARD EMOUCHURE TECHNIQUE

In order to perform in the *altissimo* range, and especially when using the standard embouchure, there is a need for significant breath support. This is often a contributing factor in gaining the pitches throughout the *altissimo* range and may be all that is needed, especially for the first few pitches. Other strategies however may be required.

Taking the reed further into the mouth³⁶ or increasing the pressure of the embouchure,³⁷ and sometimes a combination of the two can be helpful throughout the *altissimo* range. At the upper end of the range a careful focusing of the breath³⁸ is very important. The best descriptions I have seen for this are to 'Close the throat as if saying "ee"',³⁹ or 'focus the air stream as if saying "Hee"'.^{40, 41} My own way of describing this is to constrict the aperture at the back of the mouth.

These technical options soon become natural when playing in this range. You may find that one or other suggestion is best for you, but a combination of each is probably ideal.

Performers will differ as to how the two techniques are used. Some will opt for a complete 'no teeth'

option, while others will use teeth. Many performers will find a happy medium between using teeth and using the standard embouchure. Those using the second option will also choose different points in the range to change from one to the other. In the final analysis it is the musical effect that is of paramount importance, and performers will want to choose the options that are most suited to the music in question. My personal preference is to use teeth as little as possible, but having said that, I do frequently use the teeth especially when passages demand continuous playing in this range or where there are very long notes (by this I mean longer than a minute). I also vary to some extent according to the reed I am using, as some reeds respond better to one or other technique.

PRACTISING IN THIS RANGE⁴²

Anyone performing music using this range or interested in developing it will almost certainly already have an advanced technique, and therefore playing up to G6 will be quite normal.⁴³ By placing the teeth on the reed you may have found that all of the pitches up to B6 or C6 have 'popped out' relatively easily (if not, don't give up!). I suggest the following guidelines for developing this range:

- Never practise for too long at any one time in this range – probably no more than five to ten minutes at a time.
- Get used to playing individual pitches so that you become accustomed to the sound
- Try using the teeth for the highest pitches – at least initially.
- Extend the practice of the chromatic scale note by note – this helps to integrate the fingerings.⁴⁴
- Work regularly in this range so that it ceases to be something out of the ordinary.

THE PSYCHOLOGY OF PERFORMING AT THE TOP

There is a psychological side to performing at the top of the instrument. I have for many years now encouraged my students to be able to play pitches higher than they need in performance.⁴⁵ So if a performer is playing G6 in concerts, especially solo or exposed, and the performer can obtain the G#6 or even A6 with any regularity in practice, there is a good chance that the G will not seem quite so intimidating. However, because we consider the *altissimo* range to be out of reach for many of us, it carries with it psycho-

logical challenges. This is where using teeth on the reed can be a great help in the early stages of learning to play at the top, as the pitches can be much easier to attain, especially in isolation. This then can build confidence to explore the more demanding but more musically successful embouchure production.

Verdi writing about the teaching of the Saxophone player Sigurd Rascher⁴⁶ states that in his book *Top-Tones for the Saxophone* he 'places strong emphasis on the development of the "inner ear" and "tone imagination" (Top-Tones), i.e., the ability to mentally "hear" the tone before its production.'⁴⁷ This is a very important part of the psychology of performance at the top of the instrument. Knowing where the pitches are in your 'inner ear' or imagination is a vital step towards actually producing them. My own experience in this range resonates very strongly with this approach. The ability to know what you are aiming for is an essential part of developing the range.

REEDS

The general consensus is that any style of reed can be used when performing contemporary music. There are several very fine performers from every major approach to reed design that do indeed perform successfully on their own style of reeds.

Every writer in this area agrees that a light reed is essential for the performance of contemporary music, and Cleve adds that "... extreme high notes are played more easily with lighter reeds and narrow openings."⁴⁸ To some extent this depends upon what contemporary music is being performed. There can be two reasons for using a light reed. First, if the music demands contemporary techniques such as dyads or other difficult multiphonics, a great deal of flutter tonguing, etc. Second, if the music is technically extremely demanding or very long. A great deal of contemporary music of course fits none of these categories and therefore makes no extra demands upon the reed or performer. Where the music does fit into these categories and, obviously, if the performer is having difficulties, a lighter reed should be considered. The down side of course is that the performer's sound quality can be adversely affected by a lighter reed. Roxburgh suggests the following:

'Less wood in the reed than usual will certainly produce a slightly thinner sound, which many players might consider too much to ask. There is no compromise. Players approaching this part of the repertoire for the first time are well-advised to begin with a very easy reed. Facility and ease of production di-

minish the problems by half, and the conditions of the embouchure for less conventional demands will gradually mature to compensate for any thinness initially experienced.'^{49, 50}

Cleve's suggestion that a 'narrower opening'⁵¹ can be helpful for the high notes is quite true. I have certainly benefitted from the use of a reed with a narrower opening in this register creating, as it does, a similar acoustic environment to that of the use of teeth on the reed. There are two issues raised by this however: First, the response for other techniques can be limited by the narrow reed and, second, the dynamic range in this register can be limited. I suggest, however, that an opening ideally similar to the performer's usual reed is much more useful, especially if the teeth are being used, and that the techniques discussed above can compensate for a more normal opening to the reed.

Daniel McAninch suggests the use of a very thin and short tip⁵² which enables response while at the same time leaving the heart un-thinned. It could therefore be a way of getting around some of the sound loss issues.

Wiring the reed is an issue that requires some thought. I have performed contemporary music, including passages with large numbers of *altissimo* range pitches, with and without wire on the reed and have found, at different times, both equally responsive. A strong case can be made however for not using wire when performing contemporary music. If teeth are being used, or as suggested above, a little more reed is taken into the mouth,⁵³ the wire on the reed could catch on the lip and cut it. This has never actually happened to me, but in theory it could. Some plumber's tape, wrapped around the wire, can help protect the lip. With regard specifically to the upper range, I have noticed that the wire can have a positive influence. I have experimented with moving wire up and down reeds while working in the *altissimo* range. As a generalisation pushing the wire up towards the tip so that it is firmly gripping the reed (often at about the halfway point on the visible cane) can help in producing the pitches. It is worth experimenting with this.

Some reeds respond much more in the *altissimo* range than others. The above suggestions should all be tried. I have yet to find the perfect formula for a good high-range reed that can also do everything else!

KEYWORD DEVELOPMENT

An entirely different and much more radical approach to developing the *altissimo* range is to rethink aspects

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of the design of the keywork which are specifically concerned with range performance, and then to re-design keywork accordingly. With the maker *Howarth of London*, I have been doing just that. The trill keys which, as can be seen from the lists above, play a significant role at the top of the *altissimo* range, are a case in point. These keys, while being well placed for their traditional role of trilling are not easy to use when playing at any speed in the *altissimo* range. Therefore we have re-sited them near the 2nd-octave key so that they can be played with the side of the hand, taking down the 2nd octave key as well when needed. Actually trilling on them in this position is much easier as well. We have also been looking for

other venting options: the equivalent of the 3rd octave key but for use higher up the instrument. This aspect of the research is still a work in process.

GOING OVER THE TOP!

I was hoping to find a pattern or sense of order in the fingerings that could point me to the development of fingerings above C7. I have been unable to find any obvious pattern in my analyses that could offer a structured or logical insight into the development of the extended *altissimo* range. That does not mean that it will not yield to further research, but simply that this research will be more arduous.

APPENDIX ONE: BACKGROUND TO THE FINGERING RESEARCH

I amassed and tested every fingering that I could find from G6 upwards.⁵⁴ Each test was performed on three reeds with a normal embouchure and also with the teeth. Almost every fingering worked to some extent but did not always produce the pitch stated.⁵⁵ Given that not all fingering charts are specific with regard to the use of teeth, I had to make decisions about how to test and classify the fingerings.⁵⁶

The Techniques of Oboe Playing, the most comprehensive work available for fingerings in this register, has a clear line where teeth take over from the embouchure: Bb6 is the last fingering given for standard embouchure while fingerings for B6 and C7 are listed only in the Teeth Notes section.⁵⁷ For many years this was also my own practice, so I used this as a standard for testing the pitches.

I was therefore able to collate clear lists of fingerings for each pitch. These lists then enabled me to compare the given fingerings, seek out the common patterns, and from these to develop the Generic Fingerings of which there are several for each pitch.⁵⁸

When comparing the common patterns I was pleased to note that many of the fingerings that have moved down a semitone did actually fit the Generic Fingering patterns of the lower pitch. In other words these fingerings were simply being pushed up a semitone with the teeth and were in fact a fingering for a semitone lower. This was particularly the case with Bb6 fingerings, many of which are A6 fingerings being pushed up to Bb6 using the teeth. Some pitches however simply did not produce the pitch stated.

In addition to testing all these fingerings I also tested each key in use on each fingering in order to ascertain their function. Having done that, I tested each key that was not in use on the fingering to see how that would affect the fingering. Having been able to develop a set of Generic Fingerings I was eager to see if there it was possible to develop a list of the most useful 'Modification' keys.

Having a list of Generic Fingerings and lists of Modification keys provided a strategy for developing *altissimo* fingerings on any oboe.

The motivation for this area of research was threefold. First, I wanted to find B6 and C7 fingerings that did not require the teeth on the reed, as I was finding this rather limiting in some of the virtuoso passages in the works I perform, and in addition I wanted to see just how feasible it is to play without the 'teeth' limitation at the top.⁵⁹ Second, I needed a strategy that would enable me to explore a wide range of fingerings as part of the continuing development of the keywork of the oboe. I could not be sure that the fingerings I use would work on a redeveloped oboe or, if they did work, that they would be the most useful. It was therefore essential to have a strategy in place such that I could find fingerings that work on the modified instruments. Third, I intend to push the range still higher, so any guiding principles for developing the range beyond C7 that could be developed from the fingerings studied would be a great benefit. I am still searching for these, but I have already found some nice 'teeth' notes beyond C7.

APPENDIX TWO: GENERIC FINGERINGS AND SUGGESTED MODIFICATIONS

For each of these fingerings the thumb plate should be used. They should, with the possible exception of the first B \flat 6 fingering, all work on a conservatoire system instrument. The first B \flat 6 should work with a small modification making sure that the small 'a' key just below the A touch piece is closed.

G6 - 38 fingerings collected and analysed

Generic 1

1 or 3



Key changes worth considering:

- Half holes on LH 1 or LH 2 are used individually—each raises the pitch.
- The E, F and D keys all lower the pitch.
- B and E \flat are sometimes added individually and together but do not make a great difference.



Generic 2 – The basic form is a little sharp

1 or 3



Key changes worth considering:

- Lifting the G key take it up to a possible G \sharp .
- Adding the low D also raises it considerably.
- Adding the G \sharp key lowers the pitch.
- The C \sharp key is sometimes added, but improves neither the pitch nor the sound quality.



Generic 3 – This is very sharp and identical to a G \sharp basic fingering. I have included it because it is the foundation for a considerable number of G fingerings.

1 or 3



Other key changes worth considering:

- Adding G \sharp brings it down.
- Adding E and F together brings the pitch down. Also adding the G \sharp key brings it down further.
- Experiment with adding the F key and the A key.



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G#6 - 27 fingerings collected and analysed

Generic 1

1 or 3 (occasionally a 2 is listed but I found it less convincing than 1 or 3).

- Key changes worth considering:
- • Half hole on LH 1 (there is one use of an open key which raises the pitch).
 - • B \flat and E \flat are often added (individually or together); these additions strengthen the fingerings considerably. It even works with no octave keys sometimes!
 - • Adding the B \flat key can take the pitch down a little.



Generic 2 - note that this is the same basic fingerings as G 3

1 or 3 (occasionally a 2 is listed but I found it less convincing than 1 or 3).

Key changes worth considering:

-
- • A number of fingerings use a Lh1 half open or open these alterations raise the pitch.
 - • Experiment with C, E \flat , G \sharp and B keys for pitch variation.

**A6 - 36 fingerings collected and analysed**

Generic 1

1, 2 or 3 and occasionally in the lists a doubling of 1/3 or 2/3 - The second raises the pitch a little and the 3rd is rather poor.

- Key changes worth considering:
- • LH1 half closed is common but can flatten the pitch.
 - • G \sharp and E \flat are the most commonly added keys - G \sharp raises the pitch.
 - • Adding F \sharp can lower the pitch.



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Generic 2

1 or 2 the 2nd raises the pitch a little.



Key changes worth considering:

- LH1 is often listed as open and raises the pitch – occasionally there is a closed listed.
- B \flat and B are the most common additions.



G \sharp



Generic 3

1, 2 and 3 are all used.



Key changes worth considering:

- LH1 is often listed as a half hole which flattens the pitch
- The A key is sometimes closed which flattens the pitch
- Adding the G \sharp key takes the pitch up a little
- Adding the E \flat key takes the pitch up a little



B \flat 6 - 19 fingerings collected and analysed (many of which in reality A6 fingerings)

Generic 1 - a little sharp

1 or 2 - the 1st is slightly flatter.



Key changes worth considering:

- LH1 is occasionally listed as a half hole
- Taking the G \sharp off flattens the pitch
- Adding the G key flattens the pitch



G \sharp



E \flat

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Generic 2 - a little flat

1 or 2 - the 1st is slightly flatter.



Key changes worth considering:

- LH1 is occasionally listed as a half hole.
- Half holing the G can tune the fingering.



G#



E \flat

B6 - 20 fingerings collected and analysed (teeth used throughout the tests)

Generic 1

All three octave keys are found in the lists but 2nd is by far the best - the 1st flattens the pitch.



Key changes worth considering:

- LH1 half hole is occasionally suggested.
- Experiments with both the C# and the D trill keys can modify the pitch and intonation and sometimes help the pitch to speak.
- Taking the G or E keys off can raise the pitch.



B



Generic 2 - this tends to be flat.

2



Key changes worth considering:

- LH1 half hole is occasionally suggested.
- C# trill key can raise it to pitch.
- D trill sharpens the pitch.
- Half hole on the G raises the pitch.
- Removing the G or E keys can sharpen the pitch.



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C7 - 20 fingerings collected and analysed

Generic 1 - this tends to be flat.

All three are listed but 2nd is by far the best.

Key changes worth considering:

- LH1 half hole is occasionally suggested.
- A number of fingerings use the D trill key rather than the C# trill key.
- D trill sharpens the pitch.
- Experiment with both trill keys.

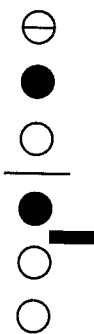


Generic 2 - this is sharp

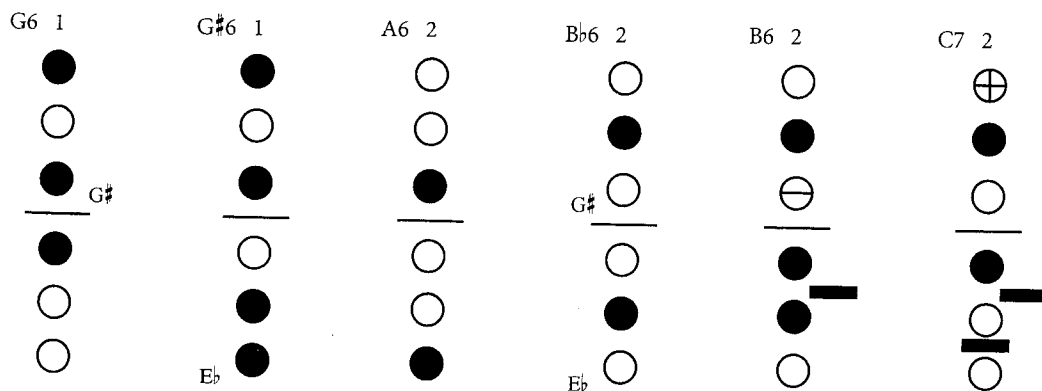
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Key changes worth considering:

- LH1 open and closed are also found in the lists.
- C# trill key often added.
- Some do not have the D trill key.



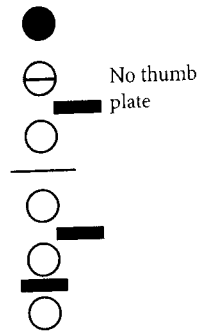
APPENDIX THREE: MY OWN NO-TEETH ALTISSIMO RANGE FINGERINGS⁶⁰



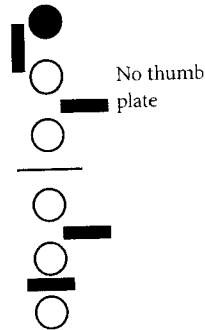
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Altissimo C#7 and D7 - With Teeth!

C#7 2



D7 2 and 3

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