A Discussion of Contemporary Flute Design and the Issues Surrounding these Developments.

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Abstract

This study discusses the increasingly vast subject of flute design, demonstrating the vital role it plays in influencing both flautists and composers. This study investigates the inspiration behind the creation of contemporary designs, as well as the impact caused and the diversity of responses and uses.

Chapter one outlines the construction and design of the Boehm flute in order to understand the contemporary designs discussed later in the chapter, which are all variations on this now standard model. The designs and basic aims of each will then be discussed. Although there are many flutes relevant to the progression of flute design, researched for this project concentrated on headjoints or instruments which seemed to be most important or which represent a particular design idea. These are the Goosman Butterfly headjoint, the new Glissando headjoint by Robert Dick, the Kingma quartertone system flute, and the Drelinger 'UpRite' headjoint.

Chapter two looks at the discussions with flautists, composers and flute-makers in order to establish an understanding of the relationship each has with the instrument. Investigating why the owners of the flutes have chosen a particular model as well as when and why they use the flute. The chapter aims to uncover the range of demands from different individuals and why these flutes are still relatively unknown.

Chapter three examines the impact on the flute world of issues discussed in chapter two, concluding that the Boehm flute is unrivalled and will not be replaced within the foreseeable future. This chapter establishes an understanding of the growing individualism which is increasingly apparent in flute design, going further to question the need for these new designs and consider the extent to which theses designs meet the demand. From these discussions an insight is gained into the inherent relationship between flautists and the transverse flute, in particular that of the Boehm, realising the associations that are as equally linked to the tone and timbre as they are to the visual and physical perceptions of the instrument.

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DEBORAH FETHER

Introduction

The flute has been my principle study for fifteen years, and I have enjoyed exploring every nuance of sound that it can produce. When I was given a new flute at the start of my first year at City University I became increasingly curious about the intriguing aspects of flute design. I began having lessons with Ian Clarke, at the Guildhall School of Music and Drama. A huge variety of contemporary pieces and extended techniques was introduced, exposing me to the knowledge of specially made instruments built to achieve and enhance such possibilities. This study aims to look more closely at these seemingly specialist instruments, discovering how they are used within the contemporary world of performing and composing. Also observing the significant influences that are brought to the designs by flautists, and indeed the relevance of these instruments on performance.

The world of flute design is as vast as is it is interesting. Although a number of flutes relevant to the progress of flute design today are discussed, research for this project has concentrated on headjoints or instruments which seemed to be most important or which represent a particular design idea. These are the Goosman Butterfly headjoint, the new Glissando headjoint by Robert Dick, the Kingma quartertone system flute, and the Drelinger ‘UpRite’ headjoint.

The work involves several stages, starting with an explanation of the basic design features of the Boehm flute. It is important to outline this design in order to observe the variations made by the new designs. This chapter moves on to look at each of the four main designs in detail. The next chapter will form the main discussion of the use and relevance of these and other new flutes, raising the issues encountered when purchasing, designing and composing for these flutes. These discussions will be based on the opinions collected from various sources, including professional flautists from around the world, as well as flute makers, teachers, composers and my own personal experiences. The third chapter then aims to draw conclusions from these discussions and to consider the future impact of these designs.

Chapter One:

The Design Features

1. The Basics of the Boehm flute

A note is produced on the flute by the flautist blowing over the lip plate, producing a vibrating column of air inside the flute. It is when this air stream strikes the edge of the hole that the stream is split into two, the smaller amount of air going further and passing over the hole, whilst the larger amount of air goes into the flute, setting the column of air in motion, illustrated in Figure 1. This vibrating motion of the air excites the molecules of the flute tube itself, causing a note to sound.[1]

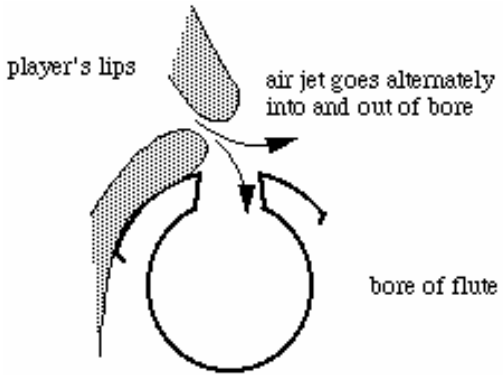

Figure 1. The air stream flow produced at the embouchure.[2]

Although both Christopher Denner (1655-1707)[3] and Johann Joachim Quantz (1697-1773)[4] developed the construction and design of the flute, in particular that of the bore of the flute tube, it is Theobald Boehm[5] (1794-1881)[6] who designed the flute as it is principally used today. The Boehm design, introduced in 1847[7], consists of a cylindrical body and a tapered headjoint. The placement of the embouchure hole along the tapering bore is crucial and it is usually between and 17.3mm and 17.4mm,

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[1]James Phelan, *The Complete Guide To The Flute* (Boston: Conservatory Publication, 1980), p.116.

[2]Joe Wolfe. 'Introduction To The Flute'. *University Of New South Wales.* http://www.phys.unsw.edu.au/~jw/fluteacoustics.html. 8 December, 2004.

[3]Theobald Boehm, *The Flute And Flute-Playing In Acoustical, Technical And Artistic Aspects* (New York: Dover Publications Inc., 1946), p.10.

[4]ibid., p.10.

[5]Theobald Boehm was a German goldsmith, flute-maker and professional flautist.

[6]ibid., preface p.XXIII.

[7]ibid., p.10.

but the exact placement is found by experimentation when the headjoint is hand crafted. Figure 2. shows both a graphical representation of the parabolic curve on which the taper of the flute headjoint is modelled, and a representation of the tapering headjoint. Line *ab* represents a cylindrical bore, line *acd* a straight taper, and the curved line *aed* is the parabolic curve actually used.

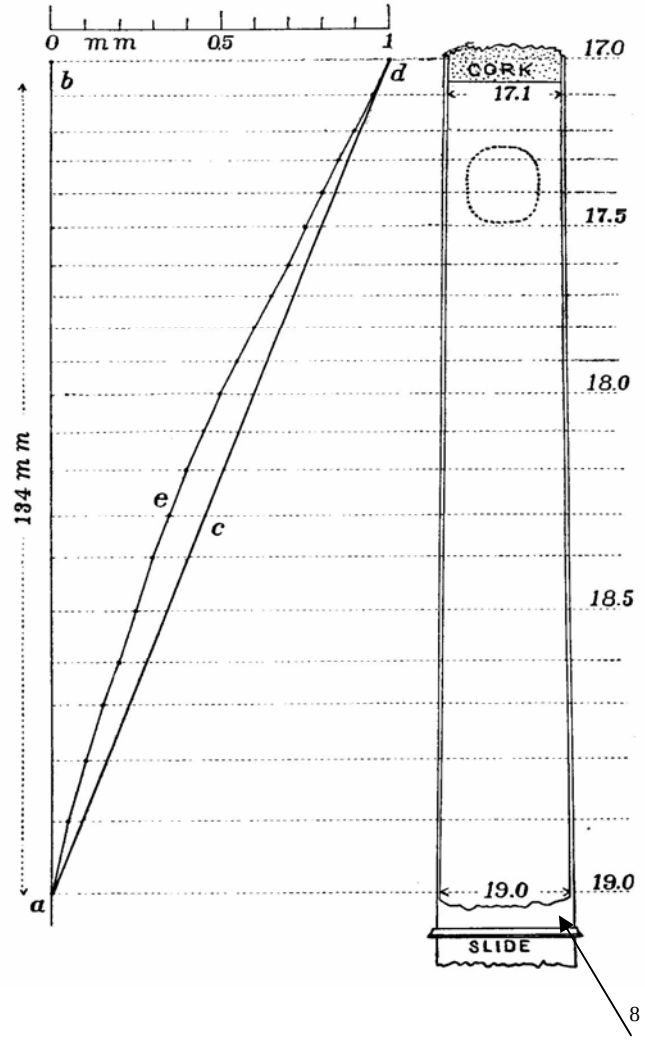


Figure 2. The parabolic taper of the headjoint.[9]

[8]The bore of the flute was originally 20mm, but was reduced to 19mm, which made it easier to blow in the upper register. Boehm had realised that 'the strength of resonance depends on the amount of reflection at the ends, which is determined by the ratio of the wavelength to the tube diameter'. Clive Greated and Murray Campbell, *The Musician's Guide To Acoustics* (New York: Schirmer Books, 1987), p.281.

[9]ibid., p.18.

Although in reality this headjoint design is not in fact a parabola, the tapering of the previously cylindrical tube towards the crown[10] does follow a curvilinear reduction in diameter similar to the geometric proportions approached by the curve of a parabola. Boehm had arrived at this design having discovered that such a taper was required in order to adequately control intonation, and generally speaking, the steeper the taper of this bore within the flute, the richer the harmonics generated[11].

To my experience the headjoint is paramount to the sound production of the entire flute. Indeed, the headjoint determines many aspects of the flute's sound, from the response of the flute and the attack produced, to the mix of harmonics, the flexibility that it allows in dynamics and ease of intervallic movement, and the quality of the intonation over all three octaves of its register.[12] The headjoint is constructed of four parts, the tube, the lip plate assembly, the stopper, and the crown[13]. Figure 3. shows the contrast between the different shaped embouchure holes, some are elliptical and some rather rectangular, the typical measurements being approximately 10mm by 12mm. Boehm, discussing the size of the embouchure and the relation between that and tone production, states that the tone will be stronger when there are more air particles set in motion, and an elongated rectangle with rounded corners, which provides a long edge for the air stream, will be more effective for this than a rounded or oval hole, even if the size is equivalent.[14]

[10]The crown is the cap at the top of the headjoint, covering the cork end of the tube.

[11]Nancy Toff, *The Development Of The Modern Flute* (Urbana and Chicago: University of Illinois Press, 1986), p.183.

[12]Phelan, op.cit., p.105.

[13]The composite parts of the headjoint construction can be seen in appendix 4.

[14]Boehm, op.cit., p.21.

The size of the embouchure hole also influences tone production, and the shape can vary between different flutes. However, many factors need to be considered, since although a larger embouchure hole produces a louder tone it also requires much more from the flautist, in that greater strength is required in the muscles of the lips. The thickness of the wall of the embouchure hole also has an influence on tone production, since the thicker the wall the richer the harmonics of the lower register. The placement of the embouchure hole upon the headjoint is important, since placement too far along the taper, in the direction of the cork, produces a weakness in the lower register, whilst subsequent movement in the opposite direction creates more resistance in the upper register.[15]

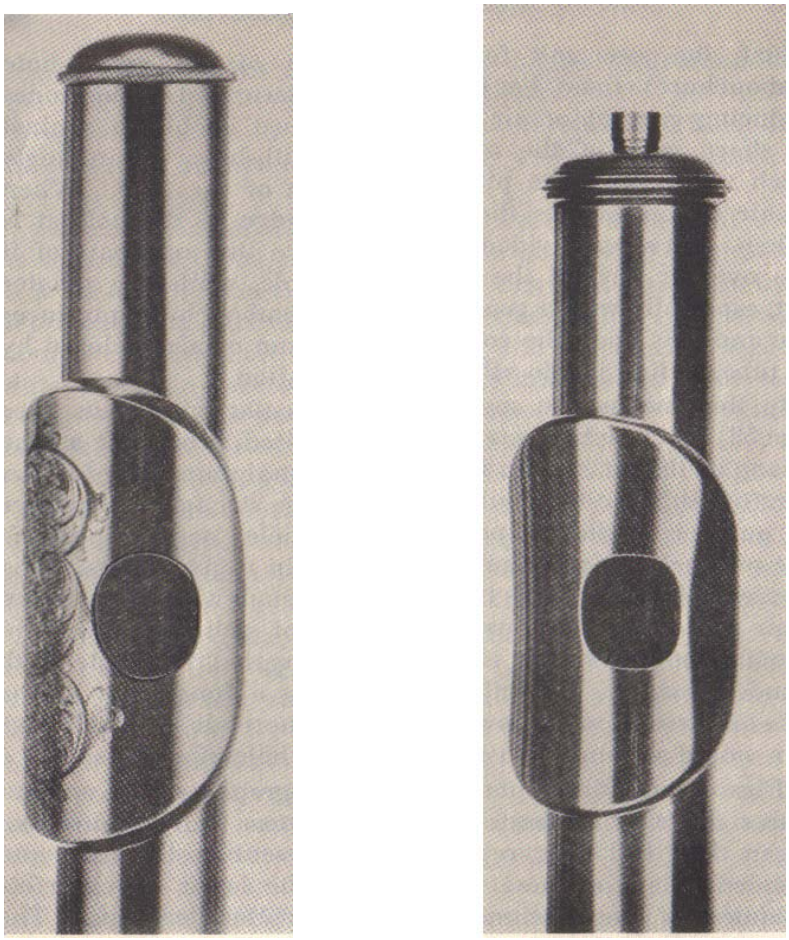


Figure 3. Different embouchure shapes.[16]

[15]Phelan, op.cit., p.108.

[16]Boehm, op.cit., p.22.

The construction of the flute body is similarly modelled on mathematical calculations. Boehm's schema, shown in Figure 4, refers to the calculations that enable the correct positioning of the tone holes upon the length of the flute body, shown in Figure 5.

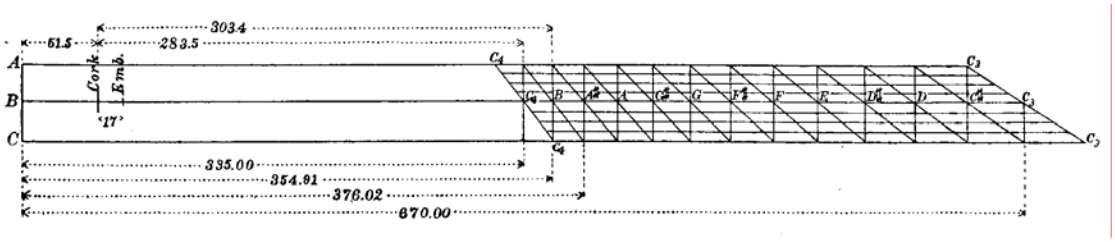


Figure 4a. The full size Boehm Schema.[17]

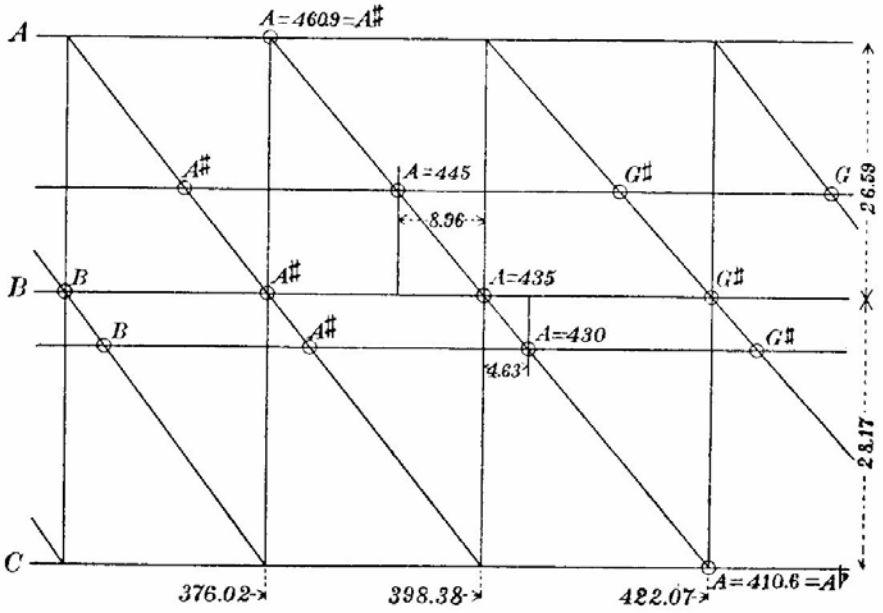
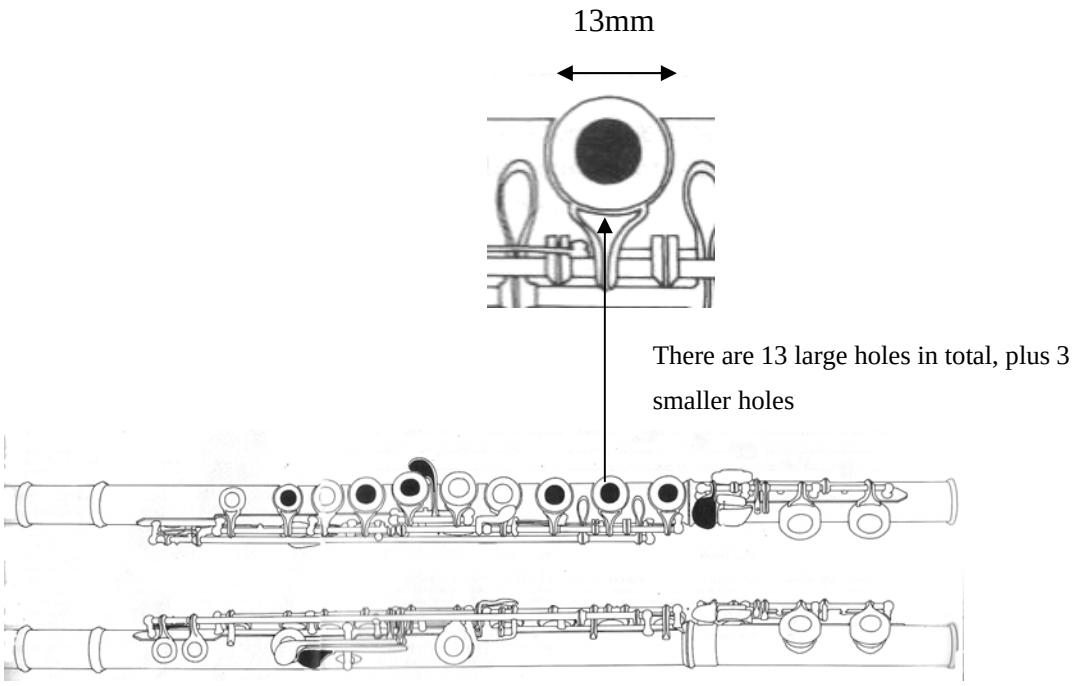


Figure 4b. An enlargement of a section of the schema.[18]

[17]Boehm, op.cit., p.41.

[18]ibid., p.45.



The lowest note, C4, is produced when all of the keys are down. This note has a wavelength of 346/262, or 1.32 metre. Given this and correction due to the riser, the length from the embouchure hole to the open hole is 62cm.[19]

Figure 5. The body and C foot joint of the flute.[20]

Boehm incorporated large tone holes covered by pads, since he had decided that it was the large tone holes on a flute which were responsible for a greater power of tone production. He added pads to the holes since he realised that a flute with large tone holes was handled poorly by less expert flautists, resulting in intonation problems.

2. After Boehm

The next prominent figure in the development of the flute was Albert Cooper, who, in the 1970s, created the Cooper scale.[21] Since Boehm's schema was designed

[19]Clive Greated and Murray Campbell, *The Musician's Guide To Acoustics* (New York: Schirmer Books, 1987), p.283.

[20]Peter Wastall, *Learn As You Play Flute* (London: Boosey and Hawkes, 1989), pp.2-3.

for a flute pitched at A=445, as pitch rose towards today's, at A = 440, the flute became out-of-tune. Flautists have learned to adjust, by shortening the distance between the embouchure hole and the tone hole, pushing the headjoint further into the body, in order to produce an A which is in tune. However, this serves to make the notes above the A sharper and the notes below flatter, so achieving an acceptable level of intonation requires the flautist to alter the position of the embouchure for the production of each note.[22] Cooper introduced the development of a new scale, altering the distances between the placements of tone holes upon the flute body.[23] Copper aimed for the same ideals as Boehm, such as to make the perfect vent hole, placing the C-sharp key further up the flute body, toward the lip plate, and making it smaller, but Cooper makes further considerations in order to maintain good intonation.[24] Cooper is best known for his scale, although he also developed different dimensions for the embouchure hole.

Another innovator of flute design is Oleg Garbuzov,[25] who developed a new scale by manipulating the bore parameters to re-arrange the placements of each resonance to minimise friction and energy loss.[26] This creates an efficient resonator which stimulates all aspects of sound production without excessive need for 'embouchure gymnastics'[27], and creating no need to search for a 'sweet spot'. Garbuzov observed that many flautists experienced similar technical problems, stemming from the centrifugal pitch tendencies, such as playing sharp at the top of the flutes range, flat at the bottom, out-of-tune on C sharp and high E, and difficulty

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[21]The use of the word scale here, and throughout this work, refers to the placement of the tone holes and keys upon the flute body.

[22]Many people still perform using a Boehm scale.

[23]Robert Dick. 'Why I Love the Cooper Scale'. *The Larry Krantz Flute Pages.* http:// www.larrykrantz.com. 5th January, 2005.

[24] British performer William Bennett OBE also created a new scale with similar aims, but he achieved them by incorporating slightly different alterations, mainly in the placement and size of the C-sharp key.

[25]Oleg Garbuzov founded Oleg products, Inc in 1980 after moving to Los Angeles from Kiev in Russia in 1974. His innovative designs stretch across many woodwind instruments.

[26]'Oleg Garbuzov flute innovator, his new scale headjoints.' Volume 1 Issue 2. January 2003.' *Flutesmith.* http://www.flutesmith.com. December 2004.

[27]ibid.

in articulating the lower register. The 'Oleg Scale' headjoints restrain these centrifugal tendencies.

There are many variations to the original Boehm flute which can be adopted for various reasons. These range from small changes to radical redesigns. Many choose to have open holed tone holes to allow half venting of notes, and there are other mechanisms to ease the production of notes or the physical stretch to some keys, including the E mechanism, and an offset G key. The calculations detailed by Boehm are guidelines upon which to base the craft of flute making. The flute designs investigated have, however, gone much further than these small alterations and demonstrate the equal importance of creative input into the art form of flute making.

3. The Butterfly Headjoint

The Butterfly headjoint was created by Jack Goosman, and was developed together with his wife Mara, who now continues the production following his death in January 2002. After training to make flutes at Verne Q. Powell[28] flutes, Goosman set up his own business in 1971[29]. The design for the headjoint was inspired by a snowstorm.[30] Goosman watched the snow being divided in two by the shape of the window, as it blew against the front of the house, and was inspired to question what such a split would do to the air stream used to produce a note on the flute.[31] He thought that perhaps if a channel were cut into the front of the lip plate, creating the shape of the wings of a Butterfly, as shown in Figure 6, the air stream would subsequently be further channelled by the design, directing the air down and into the sides of the lip plate.

[28]Verne Q. Powell established his company in 1927, in Boston

[29]Alan Markowitz. 'Meet the Maker – Mara Goosman. An interview with Mara Goosman, headjoint maker, flute repairman and player. Volume 1 Issue 1. December, 2002.' *Flutesmith.* http://www.flutesmith.com. December 2004. p.2.

[30]ibid., p.2.

[31]ibid., p.2.

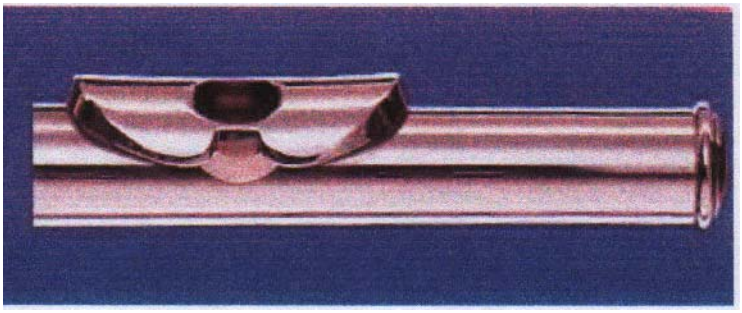

Figure 6. The Butterfly headjoint[32]

Since the air stream is split, some of the air stream enters the blow hole, while some travels beyond. The air travelling beyond creates an outside resistance which acts to inhibit the speed and amount of air entering the blow hole. The design of the Butterfly headjoint works to reduce this action by creating interaction between the air that goes down the groove, past the blow hole and that which continues down the radius of the lip plate. The design therefore enables the air to enter the blow hole at a faster rate. It is this fact that makes the headjoint 'dramatically'[33] more responsive, especially in the low register, and enhances the attack of the note. The headjoint was first introduced at the National Flute Convention in New Orleans in 1989,[34] and in 1994 the Goosmans then specifically focused their attention on the production of Butterfly headjoints.

There are other particular techniques incorporated into the production of the Butterfly headjoint to improve the quality of sound. The tube of the headjoint is hand-burnished, resulting in making it a more vibrant headjoint, and the embouchure wall[35] and lip plate are cast from one piece, making a heavier lip plate, which is beneficial to the way the tube vibrates .[36]

Another significant headjoint made by the Goosmans is the Bravo headjoint,

[32]'Butterfly™ Headjoint Company, Inc.' *Netcoms.* http://butterflyheadjoints.netfirms.com. 23 January, 2005.

[33]ibid.

[34]ibid.

[35]This is the section that joins the lip plate to the tube of the headjoint, sometimes called the chimney.

[36]ibid.

intended as an alternative to the Butterfly. Unlike most other headjoints with a rounded top lip plate, it is rounded in the front, creating a 'warmer, darker' sound.[37]

There are other headjoint designs that incorporate similar aims to direct the flow of the air stream produced by the flautist. An example is the Lafin headjoint[38], which finds a means of directing the air by adding two wing-shaped pieces of metal to the lip plate, horizontally either side of the embouchure hole.

Although this headjoint may not seem particularly radical it is a relevant contemporary design, and exemplifies part of the progression of flute design.

4. The Glissando Headjoint

The Glissando headjoint is made by Brannen Brothers and marketed by Robert Dick. I became extremely interested in this headjoint, and its development, in particular since this concept, more than any other, seemed so incomprehensible to me when I first learned about it, since I could not envisage how the principle could be implemented. In interviewing Robert Dick,[39] I learned more about how the headjoint works, and the inspiration behind its creation.

The design is basically a telescoping headjoint, inside a modern Brannen-style headjoint, which slides in to a carrier tube. The lip plate has two wings which embrace the cheeks of the flautist, creating the means by which the headjoint is slid back and forth, shown in Figure 7.

Whilst the headjoint can be used to perform as an ordinary Boehm flute, the headjoint enables a glissando slide of a major third when fingering a first finger C, and a major second when fingering a low B. Robert Dick likens the slide to that of the trombone, but points out that it is indeed such comparisons that highlight one of the predominant difficulties encountered during the design of the headjoint. Unlike other instruments which incorporate a slide, the flute headjoint is parabolic, not cylindrical, creating the problem of sliding a conical tube into a cylindrical tube, without any leakage of air. Through the investigation of several prototypes this has now been solved.

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[37]Markowitz. op.cit., p.3.

[38]This headjoint if made by J. R. Lafin, see appendix 1 for picture the Lafin headjoint.

[39]Robert Dick lives in New York and is renowned in many parts of the world as leading the frontier in the flute word, in all areas, including composition, performing and the design and construction of the flute. I interviewed him on 14th September, 2004, in London.

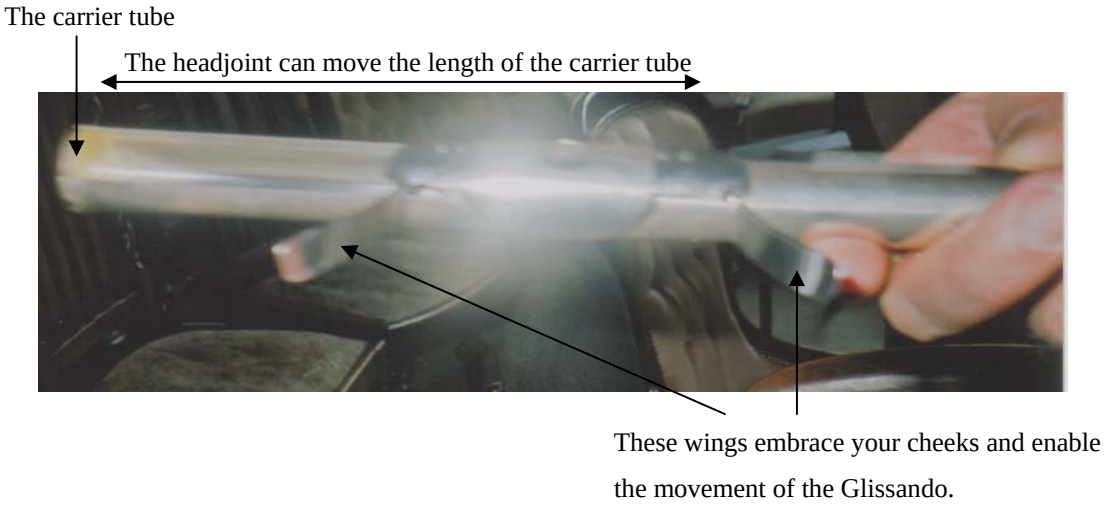

Figure 7a. The Glissando headjoint.[40]

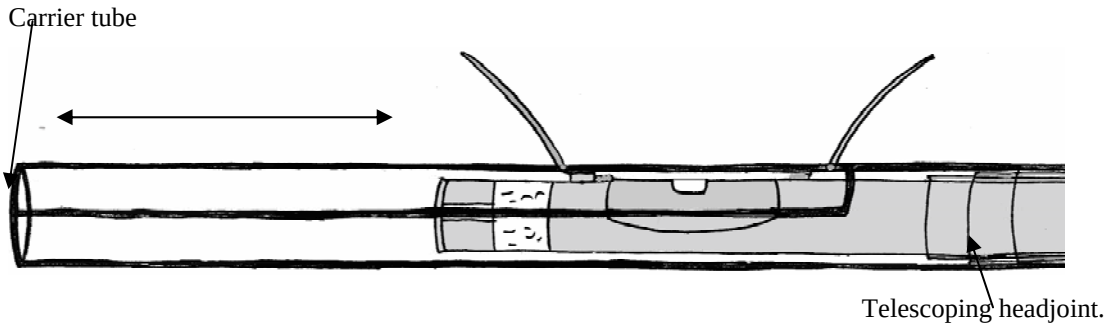

Figure 7b. The Glissando headjoint.

Another problematic issue encountered during the development was met by the first prototype, made by Eva Kingma in 1992.[41] Robert Dick describes that this design created certain difficulties since the headjoint started at the normal position and slid inwards, thus the headjoint would travel further into the flute body and obstruct the tone holes. The discovery was therefore made, that the normal length of the flute was where to begin, and from there the headjoint would be pulled out.

With the second and third prototypes, made by Kasper Baechi in Zurich[42], came some major advances as well as the realisation of more problems. It was at this stage that the wings were attached to the lip plate. However, the carrier tube was lined with a thick layer of Teflon, and was heavy, whilst the key and slot system used

[40]A photograph of Robert's Dick Glissando headjoint taken during the interview, 14th September, 2004, in London

[41]Robert Dick detailed this during the interview. Eva Kingma is a Dutch Flute maker.

[42]Robert Dick detailed this during the interview.

was a source of air leakage. The next steps involved the performance and compositional expertise of Robert Dick. A decision was made to make the headjoint shorter so that it went into the flute body easily, but this meant losing the parabolic shape, which is the essence of the headjoint acoustic. Robert Dick describes how at this stage he felt the design was a disaster, there was one place on the slide for each note to play in tune, but it was a different place for every note.

Robert Dick explained how the realisation of the headjoint design was made when he experimented with a 'wedge-head' headjoint designed by Raoul Fajardo,[43]shown in Figure 8. Since Fajardo had experimented with the fact that perhaps it is not the parabolic shape but the volume of air it encompasses that is essential to the acoustical features of the flute headjoint, he used a cylindrical tube and fastened a wedge, or blade-like piece of apparatus, to the inside of the stopper. Thus this wedge changed the volume of air within the cylindrical tube to the same as that created by the parabolic design. Since this is now cylindrical instead of tapering it meant Robert Dick could place the headjoint into the body either way round, and experiment with the two different positions of the lip plate. This led him to develop a mechanism which would move between these two positions.

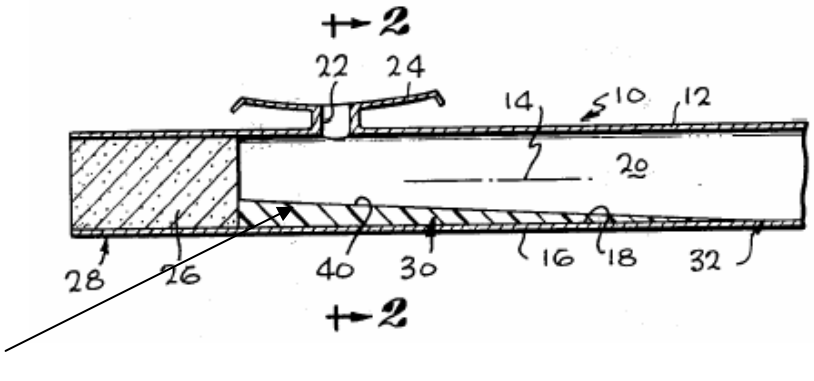

Figure 8. The wedgehead headjoint by Fajardo[44]

[43]A Professor of physics and electronics, Fajardo conducted research on the wave from analysis of the flute.

[44]Raoul Fajardo. 'United States Patent: Cylindrical Head Joint With Acoustic Wedging For Concert Flutes, 1977.' 31 March, 2005, p.1.

A similar creation has been made in the 1800s, called the Card's mellodium[45] producing a similar effect, by turning a bolt which extended the length of the headjoint[46]. I have also researched a similar design created by Swedish flautist Magnus Båge. Båge has developed a design called the 'Intonation slide' which has a slide controlled by the right hand thumb.

The Kingma Quartertone System Flute

The Kingma quartertone system flute is produced through the creative collaboration of Dutch flute maker Eva Kingma and Bickford W. Brannen, the President of the American flute manufacturers, Brannen Brothers. Dirk Kuiper founded the Kingma Company in Holland in the 1950s[47], and Nederhorst den Berg and Eva Kingma joined him in 1975, Eva Kingma taking over from Dirk Kuiper following his retirement in 1980. Bickford Bob Brannen established Brannen Brothers Inc in 1978 after working for Powell. The Brannen Brothers' company adapts Albert Cooper scales and headjoint designs as well as incorporating the advances in design made by Danish flute maker Johan Brögger, and Dutch flute maker Eva Kingma.[48]

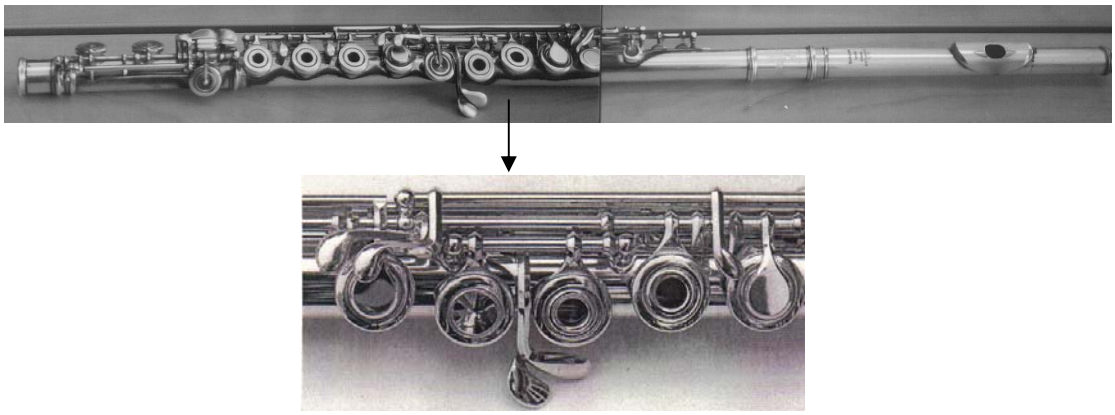

Figure 9. The front of the Kingma quartertone system C flute[49]

[45]See appendix 3 for a picture of Card's Mellodium.

[46]This was discussed during an in depth discussion with Robert Bigio.

[47]*Eva Kingma Flutes Brochure.* Fluitbouwatelier. Grollo, the Netherlands. September, 2004.

[48]Eva Kingma specialises in lower flutes, and in fact the first quartertone flute to be made was a bass flute in 1987.

[49]The large photographs of the Kingma system flute owned by Wissam Boustany, photographed during interview, 7th January, 2005. The Close up sections are from *Eva Kingma Flutes brochure.* Fluitbouwatelier. op.cit.

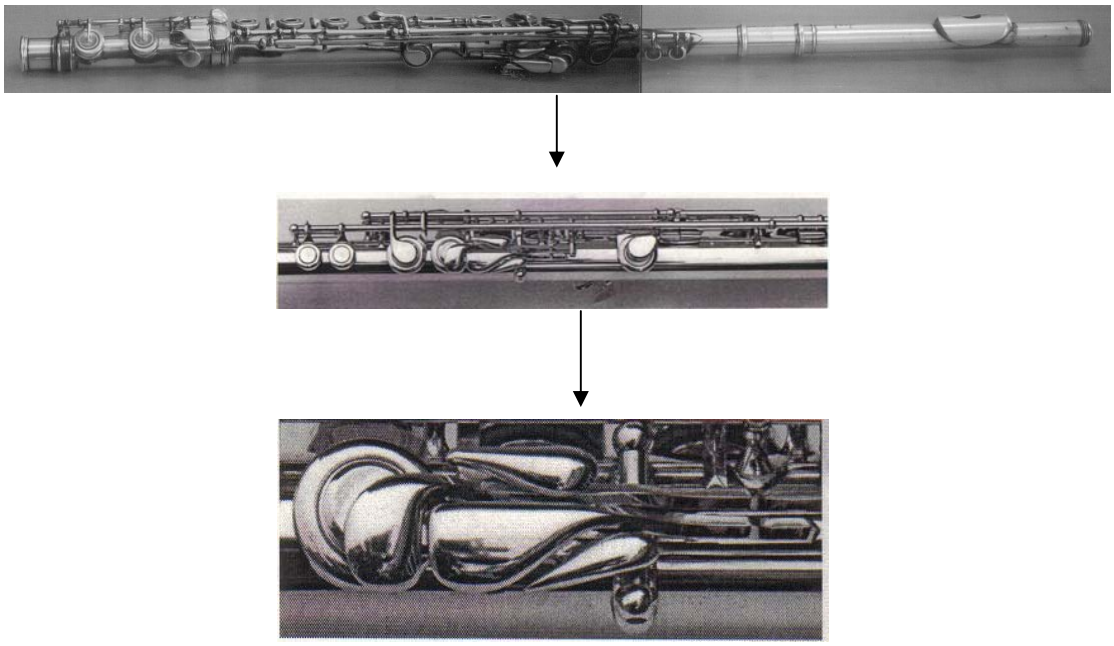

Figure 9b. The back of the Kingma quartertone system C flute.[50]

Whilst this Kingma[51] flute has all the standard keys and levers of a traditional Boehm flute, it has extra systems which enable the complete quartertone scale and multiphonic venting. The flute enables quartertones by using the first 'key on key' system, shown in Figure 10. It is this 'key on key' system, unique to Eva Kingma, that adds the six extra keys to the flute enabling the exploration of such contemporary techniques. Since the first Kingma quartertone system on a bass flute the design has developed, and is now available on the C flute, alto, bass, contrabass in C and contrabass in G (contr'alto).

Eva Kingma explained that she sees the 'key on key' system as the only practical approach to quartertone scale. Without this there would nned to be many more keys, adding weight to the flute and effecting the sound due to the exntensive perforation of the flute body.

[50]ibid.

[51]After the first statement of the full title of the Kingma quartertone system flute I may referred to only as the Kingma system or Kingma flute, although the Kingma does make flutes that do not have a quartertone scale.

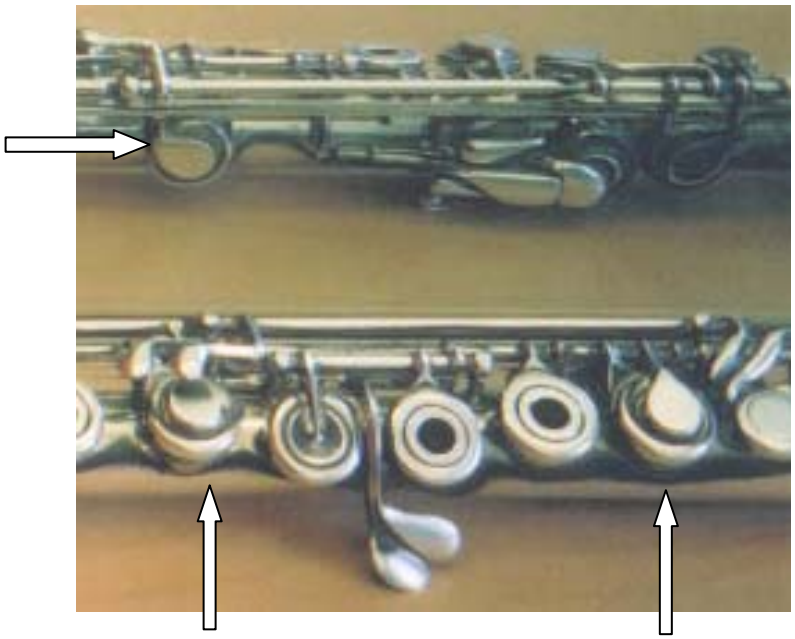

Figure 10. The key on key system used on the Kingma system flute.[52]

It is possible to produce five quartertones on the Boehm flute. However, since they are produced through half opening keys, a progression through quartertones on a Boehm flute results in a glide or glissando through the tones. The Kingma system enables the production of all quartertones through the use of the 'key on key' system and the C-sharp trill key. It is this system which ensures a progression through these tones can be a clear, step-by-step movement through the entire scale. This key design also allows every key to be half vented, not just the open-hole keys, and it is this which allows the production of many more multiphonics than are possible on a Boehm flute.[53] Before the Kingma system was developed both Michael Allen[54] and Alexander Murray[55] each made a single quartertone flute.

The Drelinger 'UpRite' Headjoint

The 'UpRite' headjoint is produced by the Drelinger Company, founded by Sandford Drelinger, in New York in 1980. This flute company works particularly to

[52]A Kingma system flute owned by Wissam Boustany, photographed during interview.

[53]*Eva Kingma Flutes Brochure.* op.cit.

[54]Michael Allen is a London based flute maker, trained as a jeweller in Hatton garden. This flute was specifically made for the use of and under the guidance of Robert Dick. I learned of this quartertone flute through a discussion with London based wooden flute specialist and maker, Robert Bigio.

[55]Alexander Murray, American flautist and flute maker and made a single quartertone flute which is now owned by his student Leslie Timmons.

eliminate physical discomfort in headjoint design, rather than enabling specific techniques. For example, they produce a 'no slip lip plate' to prevent slipping, a 'free-flo' headjoint, in which the lip plate and riser area are in front of the blow edge, shaped to reduce noise, a 'modern wing' which provides an increased lip rest area for increased comfort and ease of blowing, and indeed all of these features can be combined into one headjoint[56]. The Drelinger 'UpRite' vertical headjoint transforms the transverse flute into a vertical flute, aiming to eliminate the physical stress which can be associated with the transverse position. The headjoint can be adapted back and forth from transverse to vertical position with ease.[57]

When creating the design for such a headjoint consideration had to be given in order to recreate the acoustical properties of a transverse flute. A transverse flute has an edge which is blown against and has both ends open. A flute tone could not be created by blowing directly down the vertical length of the flute, so there needs to be a connection from horizontal embouchure to the vertical body. However the join from the horizontal lip plate construction to the vertical flute body could not be curved since this would compromise tuning and octave uniformity. Drelinger took five years to solve these problems developing the 'UpRite' headjoint design. A mitred step-flow technology was used to create the correct shape and the design was named the parabolic wave guide, shown in Figure 11.[58] The aim of the design is not to alter the quality of the production of the flute, although flautists themselves receive a different perception of the sound produced by the flute, this is due to the fact that the sound which leaves the flute is centrally placed between both ears, not to one side of the flautist's head, as with a transverse flute.[59]

[56]Drelinger Headjoint Company. The Headjoint Specialist. New York. September, 2004.

[57]The 'UpRite' Headjoint, The Drelinger Company. New York. September, 2004. p.12.

[58]ibid., p.7.

[59]ibid., p.19.

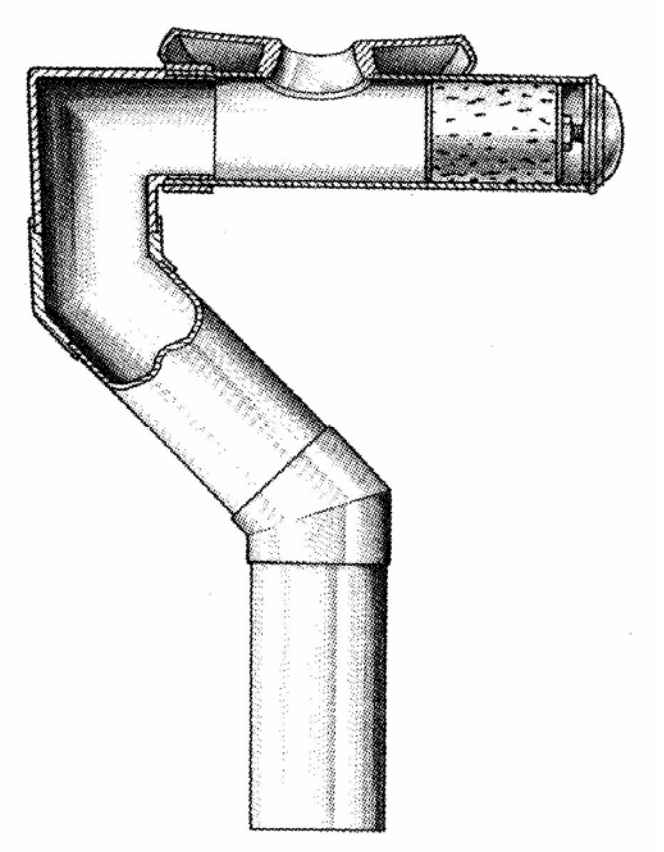

Figure 11a. The parabolic wave guide of the 'UpRite' headjoint.[60]

Figure 11b. The use of an 'UpRite' headjoint. [61]

[60]The 'UpRite' Headjoint, The Drelinger Company. op,cit., p.8.

[61]ibid., p.9.

There are other designs which adapt the transverse flute to a vertical design, such as those by Dutch flautist and flute maker Maarten Visser. As well as developing a vertical headjoint, Visser also makes a 'Swan-neck' flute which incorporates a slight angle[62].

Other Contemporary Design Features

Other flautists have investigated designs that enhance the style in which they play, and indeed there are many aspects of design that can be developed and discussed. Here it is important to mention the issue of the acoustical results given when different materials are used in flute making. It is an issue that is still a subject of fierce debate as to whether there is a physical difference or whether it is perceived due to psychological associations. I have personally encountered this issue during a change from a silver-plated to a solid silver headjoint. Only after hours of trying one headjoint after another did I strike the right sound quality to satisfy me. It was only after I had chosen this headjoint that I learned it had a gold riser.[63] Could this have been what made the striking difference in sound which made this headjoint stand apart from the rest? Whilst the discussion still lacks scientific evidence to prove the case either way, there are many flautists and flute makers who have experimented with this issue, from offering designs made with different metals such as gold, silver and platinum, to more radical experimentation. Stephen Wessel[64] makes silver flute bodies which have keywork made from stainless steel. He uses this material because he believes it to be reliable and produce an 'expressive power second to none'[65] with the added benefit of giving the flute a 'stylish modern look'. Years of research by Jonathon Landell[66] led him to make his flutes from titanium since he concluded that

[62]See appendix 2 for a photograph of the Swan-neck design.

[63]The riser, also known as the chimney or embouchure wall, and is the part of the headjoint that joins the lip plate and the flute body. The riser and the lip plate can be cast as one, or separately. For further detail see the Appendix 4 for a picture of the composite parts of the lip plate construction.

[64]London based flute maker, formerly the company Webb & Wessel until 1990, and now Wessel works alone, focusing on the production of flute bodies

[65]*Stephen Wessel.* http://www.wessel-flutes.co.uk. 23 January, 2005.

[66]The founder of Landell flutes.

the use of titanium produces the 'brightest, loudest, most responsive and flexible instrument' he has ever heard.[67]

Matti Kahonen[68] goes further than investigating with metals, to use carbon fibre. Kahonen found that both the light weight of the flute body as well as the rigidity of the tube led to improvements in sound, similar to conclusions found by Boehm himself. Kahonen's enthusiam led him to develop a flute which enables the production of different timbral acoustics, such as that of the bamboo flute. He also found there to be certain acoustical advantages of the properties of carbon, including a relatively light weight and a high tensile strength, both of which produce a fast acoustical response from the material. The natural response of this material is higher than others, making it ideal for the high frequencies produced by the flute, and especially that of the piccolo. Matti Kahonen also developed the keywork of the flute, enabling the key return on the body to be produced by the use of magnets rather than the traditional use of springs, enabling a friction free, therefore wear free, mechanism which provides a quicker more balanced movement[69].

Western flautists often look toward the timbre created by non-western flutes, yet feel they cannot adopt such a flute due to vast difference in tuning. The answer can sometimes be found in the alteration of a Western flute. Similarly to Kahonen, Mathias Ziegler[70] aimed to create the timbre associated with the Chinese flute, through experimentation with the use of different materials. Ziegler makes use of a built-in paper membrane, used in the traditional Chinese flute, to adapt his Louis Lot (1880)[71] flute headjoint. The system which he calls the 'Matusi-Flute' makes use of a hole drilled into the headjoint, covered by a membrane which is stopped from vibrating by operating a mute with the right hand thumb.[72]

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[67]*Landell Flutes.* http://www.landellflutes.com. 23 January, 2005. The use of titanium was introduced at the National Flute Association in New York, in 2003

[68]Based in Helsinki, Finland, Matti Kahonen's Acrobat company, established in 1986, makes both flute bodies and headjoints.

[69]*Matti Kahonen.* http://www.matitflutes.com. 23 January, 2005.

[70]A contemporary flautist from Switzerland.

[71]Louis Lot was a French flute maker, 1807-1896.

[72]This personal system was then developed, and resulted in a more sophisticated structure, added to his alto and bass flute. The membrane-covered hole is located on the headjoint between the mouth-hole and the C sharp key.

Robert Bigio also experiments with the use of different materials, from metals such as zirconium to plastics such as Delrin[73]. I was very interested to get hands-on experience about everything I could, so I visited Robert Bigio at his home and workshop in London. Some of his views will be included in later discussions.

In comparison Michael Pestel[74] makes use of unusual materials not through their use in the production of the flute but instead rather uniquely to 'prepare' the flute. Pestel closes off the end of the flute tube with a screen, whilst placing small cylindrical objects or rods into the flute, which are free to move the length of the tube, or blows small bullet-shaped pieces of paper out of the flute.[75] The concept of 'preparing' an instrument is most associated with the use of a piano and its origins in the work of John Cage, and to my knowledge the only use of such 'preparation' of a flute is by Pestel.

The demands for such innovations and their influences upon contemporary performance and composition will be investigated and discussed in the next chapter.

[73]Specifically used in his creation of stoppers and crowns. The stoppers are held in place by an O-ring and replace the cork. Users of the new idea are quoted to say that they enable their flute to play 'louder, smoother and with better resonance'. One of the possible reasons for such improvements in sound is that the space created between the stopper and the crown when the cork is removed creates a chamber that can resonate. Delrin is a hard plastic and Zirconium is a greyish white lustrous metal.

[74]A contemporary performer, working in the field of visual arts in the USA.

[75]Michael Pestel has discovered that by placing these objects within the flute tube their free movement, which is particularly difficult to control, creates different overtones, timbres, and glissandos and multiphonics. For a full description of the flute prepared by Pestel see the appendix 12B.

Chapter Two:

The Use and Responses to these New Flute Designs.

1. Sources: Flautists, Composers and Makers.

The information given by the flute makers only forms part of the discussion. In order to gain a broader perspective it is important to consider and include the views of flautists and composers. Since the designs are mainly aimed at aiding contemporary performances, the views primarily consist of those from contemporary performers and composers. The investigation seeks to establish the popularity of these flutes and the reasons why flautists choose them, as well as why many choose not to, the flautists involved therefore have varying experiences with these flutes.

The research consists of personal communications with[76]:

Robert Bigio[77] — We met to discuss his experiences and views as a flute maker, specialising in wooden flute, and view his workshop, where he explained the workings and construction of the flute.

Wissam Boustany[78] — Lebanese flautist and teacher at Trinity College of Music. Interviewed regarding his Kingma quartertone system flute, and Lafin lip plate, as well as his contemporary performing.

Robert Dick[79] — American, New York based, flautist, composer, teacher, and renowned innovator. Interviewed regarding his design of the Glissando headjoint, and experiences with his Kingma quartertone system flute.

Eva Kingma[80] — Interviewed via telephone to the Netherlands to discuss her design and production of Kingma quartertone system flutes.

[76]These communications involve formal interviews that are transcribed in the appendixes as well as meetings in order to discuss ideas and look at work.

[77]This meeting took place in his London workshop on 14th January, 2005.

[78]This interview took place at Trinity College of music, on 7th January, 2005. See appendix 9 for the edited transcripts of the interview.

[79]This interview took place at Ann Cherry's House, on 14th September, 2004. See appendix 8 for the edited transcripts of the interview.

[80] Interviewed on 11th April, 2005. For edited transcriptions of this interview see appendix 10.

Helen Murray[81]	We met to discuss her research into physical discomfort as well as her views of new flutes, as both a flautist and flute maker/repairer.
Carla Rees[82]	We met to discuss her experiences as a Kingma system alto flute specialist.

However, there are users of these flutes all over the world, so many of these flautists were contacted via email[83].

Flautists who own one or more of the four flutes under discussion;[84]

Damian Bursill-Hill	Butterfly	American (Pittsburgh) flautist.
Janice Coleman	Butterfly	American (St Loius) flautist.
Nancy Ruffer	Butterfly	American Flautist, based in England.
Stefan Keller	Glissando	Swiss flautist, composer, and recording engineer.
Michael Pestel	Glissando	American (Pittsburgh) visual art teacher and flautist
Anne La Berge	Kingma (alto)	American Flautist and composer, based in Amsterdam

[81]The meeting took place in London, on 4th February, 2005.

[82]The discussion was held after her recital on 18th February, 2005.

[83]Receiving various responses between the period of September 2004, and April 2005. For details of the responses given see appendixes.

[84]Flautists who own more than one of the flutes will appear in both listings, as with other categories

Continued.

Wissam Boustany	Kingma	Lebanese flautist and teacher, based in Britain.
Robert Dick	Kingma	American performer, flute designer, composer, and teacher.
John Fonville	Kingma (alto)	American (California, San Diego) flautist, composer and teacher.
Marion Garver	Kingma {alto, bass, contrabass}	American (California) owner of concert, only contrabass to be made soon to own a contr'alto
Jennifer Higdon	Kingma (alto)	American (Brooklyn) flautist and composer.
Stefan Keller	Kingma	Swiss flautist, composer, and recording engineer.
Myrto Korkokiou	Kingma	Greek (Athens) Flautist and composer.
Kate Lukas	Kingma (bass)	American (Indiana) Flautist
Michael Pestel	Kingma	American (Pittsburgh) visual art teacher and flautist.
Carla Rees	Kingma (alto)	British flautist, owns an alto Kingma.
Moshe Aron Epstein	'UpRite'	German (Hamburg) flautist and teacher.
Alexa Still	'UpRite'	American (Indiana) flautist.

Composers;

(Those who have composed specifically for a contemporary designs.)

Daniel Giorgetti	British composer. *Panic and Echoes* - Kingma system alto flute and piano.
Andrew March	British composer. Alto Flute and Harp Book: 2001 ***XXIX*** *– in Perpetuum* for solo Kingma System Alto Flute. pp. 17-26. *Water Lilies* - for solo alto flute and harp, with Kingma system alto flute ossia. pp. 1-16. *Aeolian Rustling* - for solo alto flute and harp, with Kingma system alto flute ossia. pp. 38-62. *Memoriam* - Kingma system alto flute, vibraphone, marimba, harp and strings.2002
Patrick Nunn	British composer. *Maqamat* - solo Kingma system alto flute. 2002 *Into My Burning Veins A Person* – for quartertone flute alto flute, piano and electronics.
Rolf Martinsson	Swedish composer Currently working on a flute concerto for the 'Intonation Slide' by Magnus Båge

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(Flautists who have composed for one of the contemporary designs mentioned)

John Thow	American flautist and composer. *Puva, Puva* - for solo Kingma system alto flute. 2001

(Composer/flautists who own one of the designs)

Anne La Berge	American flautist, owns a Kingma system flute.
Robert Dick	Designer of Glissando and owns Kingma system flute.
John Fonville	American Flautist, owns a Kingma system flute.
Jennifer Higdon	American flautist, owns a Kingma system flute.
Myrto Korkokiou	Greek flautist, owns a Kingma system flute.

Contemporary flautists who do not own one of these flutes;

Robert Aitken	Canadian flautist and composer.
Sebastian Bell	British flautist.
Ian Clarke	British flautist, composer, teacher.
Richard Craig	British flautist.
Detta Danford	British flautist.
Phillipa Davies	British Flautist.
Joanne G'froerer	American (Vancouver) flautist.
Guy Harries	Israeli flautist studying in Britain.
Dave Heath	British flautist and composer.

Larry Krantz	Canadian flautist.
Ruth Morley	Scottish flautist.
Alexander Murray	American flautist and maker.
Helen Murray	British flautist and repairer/maker.
Rachael Rudich	American (California) flautist.
Suzanne Shulman	Canada (Toronto) flautist.

Although equally important, there are also flautists who have made a smaller contribution, stating that they do not own the flutes, with no further reason:

Emily Beynon	Welsh flautist, based in Amsterdam.
Heledd Francis	British performer.
Camilla Hoitenga	American flautist, based in Germany.
Mike Mower	British flautist and composer.
Anna Noakes	British flautist.
Ingela Øien	Norwegian flautist.
Rowland Sutherland	British flautist.

Although the performers demonstrated various musical features of the flutes in the meetings, it was also important for me to hear performances made on these flutes, including recordings and live recitals.

Robert Dick – private recital[85] given on Glissando headjoint and Kingma system. The performance included a mixture of his compositions, such as *Fish are Jumpin*g, well as other pieces including an adaptation of Paganini violin works and Telemann *Fantasies*. Robert Dick incorporated the use of the headjoint in all the pieces, as well as playing a piece he has specifically composed for the headjoint, *Sliding Life Blues.*

Carla Rees – A recital given by the *Rarescale* ensemble and Carla Rees, performing on a Kingma system alto flute.[86] The concert included a variety of contemporary pieces performed using the quartertone alto flute as well as two pieces written for the Kingma quartertone alto flute commissioned by Carla Rees; the London premiere of *have heard a dialogue of one* for solo Kingma system alto flute by Marc Yeats, and the World premiere of *Quasi Csango* for Kingma system alto flute, concert flute, and piccolo by Maria Antal.

Guy Harries and Nancy Ruffer performed contemporary solo flute pieces in an electroacoustic concert at City University.[87]

I have also received recordings from performers who use these flutes.

Anne La Berge - Performs the Kingma quartertone system flute on the recording by *De Ereprijs* [88]

[85]The private recital took place at Ann Cherry's house, on 14th September, 2004.

[86]The recital was given by *Rarescale* at Marylebone Church, London, on 18th February, 2005.

[87]The concert took place on 3rd February. Nancy Ruffer performed '*Spirit of '76'*for flute and delay by Simon Emmerson, and Guy Harries performed his composition, *Flutter* for flute, tape and live processing.

[88]A compact disc of music performed by the ensemble *De Ereprijs*, received February 2005.

Wissam Boustany- Performs the Kingma quartertone system C flute on the compact disc '*Mirror of Eternity'*.[89]

Patrick Nunn- A demonstration recording of his compositions, including *Maqamat* for solo Kingma system alto flute.

Michael Pestel- A demonstration compact disc recorded specifically for this research using of the Glissando headjoint, and a variety of flutes, including his 'preparation' of the flute and his installation work with birds, *Ornithology Series*.[90]

Carla Rees - Performs the Kingma system alto flute on her CD-ROM about composing for this flute.[91]

Nancy Ruffer - Performs *'Elegy'* by Mike Parkin and *Maïastra* by Simon Holt on a Butterfly headjoint, on the recording *Multiplicities.* [92]

Alexa Still - Performs the Drelinger 'UpRite' headjoint on the demonstration recording for the flute.[93]

There is also a video recording of Robert Dick performing his Glissando headjoint on his website.[94]

The work now looks to bring all of these sources together and discuss their relevance to the investigation.

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[89]*Mirror of Eternity,* Wissam Boustany and the National Symphony Orchestra of Ukraine, conducted by Volodymyr Sirenko. QTZ 2015. England: Quartz Music, 2005.

[90]A demonstration compact disc, recorded in April 2005, for the purpose of this research, received in April, 2005.

[91]*Composing for Quartertone Alto Flute,* CD-ROM. Carla Rees and David Burnard. London: Royal College of Music. Received in January, 2005.

[92]*Multiplicities, Music For The Flute.* Nancy Ruffer. MSV CD9063. England: Metier, 2003.

[93]'*UpRite' Demo*. Volume 2. Alexa Still and David Korevaar. DDD 9/1 & 13. Boulder Colorado: Chautauqua Community House, Kevin Harbison, 2002.

[94]Robert Dick. *http://www.robertdick.net. 23rd January, 2005.*

2. The Butterfly Headjoint.

The design of the Butterfly headjoint is based on the specific feature of the butterfly-shaped lip plate. Whilst explanations about the effect this design can have on directing the air stream can be proven, it seems apparent that any statements made by the makers thereafter about specific timbral qualities or technical advantages brought to the flute by the design are subjectively based. Such statements include an improved ease of movement between interval and octave leaps[95] because the design creates less need for travel by the bottom lip and jaw. An improved ease of playing longer phrases, as well as producing a 'more immediate and well-defined articulation'[96] is also stated as an advantage. The design is stated to stabilise intonation and improve the control and range of dynamics produced[97]. All of these statements generally describe a 'more responsive flute'[98].

The users of the Butterfly headjoint who have contributed to this work discussed their experiences with the design. Damian Bursill-Hill does indeed experience the immediacy of response which is stated by the company, and he explained that it is especially prominent in the third octave, as well as producing more accurate attacks. He also makes use of the ease of management of the dynamic range that the design brings, when he is performing within an ensemble. Janice Coleman observes some of the other qualities stated by the company, including a control of intonation and a smoothness of response, whilst adding the design brings an equality of tone throughout registers, and allows her to blend well within an ensemble. Both agree that the headjoint creates a beautiful and rich tone. Nancy Ruffer feels the Butterfly headjoint directs the air better, and brings the full and focused sound which her flute was previously lacking.

[95] Markowitz. op.cit.

[96] 'Butterfly™ Headjoint Co., Inc.' *Netcoms.* op.cit.

[97] ibid.

[98] Markowitz, op.cit.

3. The Glissando Headjoint

This headjoint provides the flautist with a means of creating a glissando, and the designers states that it changes the quality of the glissando produced compared to the use of open holes[99]. The sound produced by the headjoint is compared to the whammy bar used on an electric guitar[100], and Robert Dick states that the design will make the flute more vocal and 'widen the flute's expressive possibilities enormously, creating, virtually, a new instrument'[101]. The main aims of this headjoint are clearly not focused purely on the technical advantages but also helping the flute to become a part of a larger range of genres. The users of the Glissando headjoint who have contributed to this work discussed their experiences with the design. Both Michael Pestel and Stefan Keller agree the flute helps to cross between genres such as jazz, rock and pop, and ethnic music. Pestel adds that the flute helps to create 'new genres of its own', and Keller has experienced that the flute offers a 'new approach in flute playing'. Other than Ian Anderson, of 70's pop band Jethro Tull, there are no prominent flautists performing in such a genre, perhaps the Glissando headjoint can help the flute to make such a transition.

There are flautists who raise the issue that a glissando is possible on an ordinary open hole model. Indeed there are players who have learned to play smooth glissandi of an octave or more, although generally a player can rely on achieving a more conventional major to minor second glissando by using open holes. Pestel describes that such techniques could not achieve the smoothness obtained with the Glissando headjoint and the ability it gives the player to glissando downwards from 'any note and at any speed' with a consistent tone colour.

There are certain drawbacks of this design. Firstly the headjoint may not prove to be as versatile as it aims, since both flautists do not use the Glissando to perform their entire repertoire. Secondly due to the fact there is part of the headjoint cut away to allow the use of a slide mechanism, Michael Pestel describes that the result is a less resonant sound quality. This second reason may be why they choose not to use it for all repertoire.

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[99] *Robert Dick: Programme Notes.* 14th September 2004.

[100] ibid.

[101] ibid.

However, I question whether in reality rather than take the flautist and his music into the new genres, the work of the Glissando headjoint is to create a new market for the flute, through this regeneration of image. Performers such as Wissam Boustany rather ambiguosly feels that the flute as a performance instrument 'has never been taken seriously', I wonder if this is perhaps due to such limitations as those which are now being addressed.

4. The Kingma Quartertone System Flute.

The Kingma system flute is a Boehm flute plus six extra keys, using the unique 'key on key system', patented by Eva Kingma. This design enables the production of the full quartertone scale as well as multiphonics, and the ability to half vent all notes, not just the open holes. Other than these most obvious design features which might attract one to purchase the instrument, the manufacturers state there are other benefits, such as the fact that the system can be employed on alto and bass flutes as well as the C flute. These also include a 'superb pitch control'[102], the comparative ease of slides and glissandi, and flexibility in matching timbres and intonation within ensemble playing[103].

A considerable number of flautists who own a Kingma system have contributed their opinion toward this work. All of these flautists agree with these statements about the added advantages of the flute. However, many flautists considered these qualities subsidiary to their main reasons for buying the flute, such as Myrto Korkokiou who explained she would not buy the flute for these reasons alone, rather than the ability of quartertones. Many flautists are led primarily by the attraction of using quartertones and yet once using the flute, many do enjoy the extra freedom and possibilities it offers. Anne La Berge described how this flute provides more options for sonority, tuning, pitch, and multiphonics and John Fonville adds that it also provides many different alternative fingerings. Myrto Korkokiou enjoys the variety of genres now available to her, ranging from baroque to modern, jazz to non-western, and Marion Garver describes the timbre created as more interesting. Anne Le Berge explained that she had been using microtones for many years before this flute, so she leapt at the chance to have the many more possibilities offered by

[102]Brannen Brothers Flutemakers, Inc. brochure. Woburn MA. September, 2004.

[103]Eva Kingma Flutes brochure. op cit.

this flute. John Fonville experienced a wider palette of timbral possibilities when using the Kingma, after the frustration he had found in the inconsistent microtones available on an ordinary flute.

However a few users of this innovative design have expressed a drawback. The extra mechanisms involved in the design of the key work add weight to the flute body, this is particularly apparent for performers of the lower flutes. Carla Rees is an alto flute specialist and she explained that when she began using the quartertone alto she had to begin weight training to strengthen her shoulders, in order to support the extra weight. Even now, she finds long performances are physically tiring. Flautists who use the C-flute, such as Michael Pestel, have also noticed that 'certain kinds of movements are blocked by the mechanisms' and the extra keywork creates a slowness of movement. Yet these drawbacks have yet to lead these flautists to feel they out way the many benefits.

5. The Drelinger 'UpRite' Headjoint.

It seems the statements about the 'UpRite' headjoint are all relatively subjective. It is difficult to establish the presence or lack of physical discomfort whilst playing, other than through subjective personal descriptive accounts. So to ascertain the degree to which the design relieves, would be equally difficult. The playing position of the transverse flute can incorporate several potentially discomforting factors. Firstly the upper body is slightly twisted, and the flute must be held at a sufficient angle to create the correct embouchure. Then both wrists must be held at a near perpendicular angle to the length of the arm in order to support the weight of the flute on the right hand thumb and left hand forefinger, and the third and fourth finger of the left hand are often required to stretch. I have experienced a small degree of pain in these areas when practising for long periods of time, and have become aware just how distracting and technically hindering such a circumstance can become. Although it is, of course, true that not all the discomfort of flute playing can be removed by the Drelinger, even an element of elimination may be sufficiently beneficial. Drelinger state an improvement in technique due to the relieving discomfort[104]. Indeed a challenging phrase challenging can seem easier when it is revisited after physical rest, for instance. It is also stated that the tone quality of the

[104]The 'UpRite' Headjoint, The Drelinger Company. op.cit.

flute may be improved and the flautist will perceive the sound differently due to the production being centrally placed between the ears[105].

Performer Alexa Still is prominent user of this headjoint. She discussed her experiences of the 'UpRite', explaining that she found it gave her 'a heightened awareness of how the upper body posture and hands are used'. This has then led her to develop a better technique. She explained how students who may otherwise have given up the pursuit of playing the flute, due to physical discomfort, have found a solution in the 'UpRite'. Although the headjoint does not aim to alter timbre, Moshe Aron Epstein observes that this headjoint creates a 'jazzy sound'. Alexa Still explained that adapting to holding the flute vertically is relatively easy, and Moshe Epstein adds that it is the different lip control and coverage takes a time to adjust to.

Flute maker Helen Murray has researched issues concerning physical discomfort. She explained her expectation of the flute's tone production to be effected by the added mechanisms and metal, therefore weight. She questioned whether sound quality would be altered by the bend in the headjoint. Given the example that one can distinguish an apparent difference in timbre between that of a curved alto flute and that of a straight alto flute.

The 'UpRite' can be altered to and from a transverse flute whilst the scale remains the same. Wissam Boustany questioned that perhaps the scale should also be redesigned for use with a vertical headjoint. Epstein agreed that it may have been better to re-think the entire flute, rather than just the headjoint. Similar issues concerned Helen Murray, regarding possible new physical discomforts arising from the placement of the flute body's weight on certain parts of the flautist's hands.

6. The Demand for these New Flute Designs

With so many positive statements about each flute, I was curious to find out possible reasons why many of the contemporary flautists I contacted have decided, sometimes with little investigation, not to purchase one of these flutes.

The decisions a performer makes about their instrument are very important. Whilst some flautists choose to have many flutes between which they can pick and choose for each performance, many choose one. Performer Wissam Boustany states that he chooses one flute, to love for years. Parting with, or changing one's flute, can

[105]ibid.

be difficult and could explain why relatively new flutes can take a time to establish. Flautists may simply not continually look around for a new flute, because they may feel happy with the one they own, like the example of Suzanne Shulman, who explained she is still exploring repertoire that is achievable on the she has. Furthermore many may simply be unaware of the advances. When flautists do investigate they may stick to the designs closest to the Boehm. Perhaps this is due to the fact that they are likely to have been taught on, and by a teacher who owned, a Boehm. When choosing a new few many flautists only extend their experimentation as far as using different metals, such as silver, gold or platinum. However once the flautist has come to further investigate the possibility of other flutes, what is stopping the further growth in popularity of these flutes?

Performers have various reasons to search for something new. Wissam Boustany commented that since he is originally from Lebanon, he wanted to recreate the ethnic sounds he heard there, through using the Kingma system. Many others seem to want to develop further with ambiguous expressions such as Myrto Korkokiou who was ‘looking for more from a flute’ and Marion Garver who wanted to ‘take her performance further’. There are many other reasons such as those explained by Anne La Berge and John Fonville who already used microtones before the Kingma so leapt at the option to adopt a more reliable microtonal system and explore other possibilities further with the Kingma. Michael Pestel explained that he did not want to feel he had become complacent with the flute, and Stefan Keller was simply curious about the possibilities.

I had fully expected only the partial absorption of these contemporary designs into the flute world. However, I was surprised by the number of contemporary performers who, for many reasons, do not have one. When deciding on a flute, consideration is given as to whether it is appropriate for the repertoire which one performs. Many flautists feel that flutes such as the Kingma system are purely for the performance of contemporary repertoire. Flautists such as Larry Krantz and Joanne G’Froerer explained that they are not often called upon to perform quartertones, and they do not specialise in contemporary repertoire. Flautists who perform a range of repertoire feel they do not want to limit themselves with such a flute. Robert Aitken, for example, felt that such flutes are not worth the financial investment for the limited repertoire which one can play on them. Other flautists feel that some of the advances in technical abilities brought about by these flutes are in fact possible on

the Boehm flute, and it is, as Detta Danford described, such challenges which add to the calibre of a player. Other contemporary performers and composers such as Dave Heath are happy with the production of extended techniques that he can perform on his Boehm flute. The general impression from flautists who are not owners of the flutes is most definitely that these contemporary designs are purely for playing contemporary pieces.

In answer to those flautists who think these flutes are purely for contemporary music, the Kingma system, for instance, can be used for all repertoire to enhance all styles, and Myrto Korkokiou agrees, since she uses her flute for everything from baroque to modern music. Michael Pestel feels the Kingma flute in particular offers a 'smooth connection between the diatonic, equally tempered Boehm system and the universe of quartertones'. So these flutes need not be limited to the contemporary flautist, and could be used more widely. Users of the Glissando headjoint also appreciate the possibilities which it enables to cross between genres, although they explained that it is not for all styles, perhaps due to the less adequate sound quality.

Players who do not own one of the flutes feel they do not need a gismo or gadget to overcome each difficulty in playing, and that they should strive to achieve the desired technique on the flute they have. Indeed, owners of the contemporary flutes also feel parameters against which to work are good things. Wissam Boustany thinks unless one is working on the edge, the real limits are not found. Many also realise that these flutes are not the be all and end all, and do not define or make a good player, and agree that many of these qualities can be achieved, with training and time on a standard open hole model flute. Indeed, Wissam Boustany discusses that although the Kingma system, for example, could definitely be for anyone, it is not for everyone. However it is felt these flutes can take care of certain fundamental issues, allowing the flautist to concentrate on and refine a more sophisticated level of concerns. The Kingma system, for example, can help to develop a more acute aural awareness, through the use of smaller tones.

Some flautists believe they can produce an adequate replication of the effects the new flutes are designed for with the Boehm flute. However it is only on a Glissando flute that downwards glissandi from any note at any speed can be performed. Indeed Wissam Boustany views the glissando as one of the most difficult

extended technique. Similarly John Fonville explained only the Kingma system produces acutely accurate quartertones.

The fundamental reason why performers choose not to have a Drelinger headjoint may be that although the design may initially seem radical, challenging the basis of our perception, the main aims of the design are to eliminate physical discomfort. There are many flautists who express they feel no discomfort, such as Larry Krantz and therefore do not look for the solutions which may be found in the Drelinger design. There are also other solutions to physical discomfort which may seem more apparent due to a wider public knowledge, such as the Alexander technique. Flautist and repairer Helen Murray experienced repetitive strain injury in her left wrist. She began experimentation into designs which would alleviate this strain, resulting in an extension of the left hand keys. However, she did look into the design of the 'UpRite' headjoint, and felt that perhaps a position which incorporates an incline of the flute, rather than a complete vertical design, might be more appropriate. I have since researched such a design, made by Maarten Visser.

A number of flautists view the addition of complications to the flute as a removal of the simple tone and timbre of the flute. Alexander Murray explains he is simply 'not a fan of contemporary sounds' and Phillipa Davies prefers a 'rounded flute sound'. Perhaps such views particularly apply to the Glissando and Drelinger headjoint, which seem to focus more on enhancing technique than tone quality. Others believe every technical advance to the flute compromises the purity of tone quality. This view is not exclusive to those who do not own these designs. Wissam Boustany commented that the complications added to flutes exemplify the tendency of technology to have both good and bad aspects. Pestel feels when something is added to the flute something is also taken away. Perhaps it is important to realise that the matter of flute design will always be a compromise of advantages and disadvantages, and striking a realistic balance.

All of these new designs include compromises. For example, the Glissando headjoint compromises a resonant tone quality for technical advances and the Kingma compromises lighter mechanisms for further quartertone and multiphonic possibilities. However it is apparent that even the Boehm design has various

limitations. Indeed Boehm himself realised his design incorporated compromise[106]. These include the size and placement of tone holes. Ideally they should be graduated in size, but due to difficulties in manufacturing there are in reality only two or three different sizes. The theoretical position for the C-sharp key therefore has to be abandoned and the placement and size found by experimentation.

Other flautists feel such designs are too specific and unique to meet the demands of many. Indeed several players, such as Sebastian Bell, felt that if he needed such technical adjustments he would personally add it to his flute, rather than looking to others. Michael Pestel has done just that, by 'preparing' his flutes in a variety of ways,[107] but he also owns several of these news designs. Indeed, one can pick and choose parts of some of designs to add to the parts of the flute you may already own and love dearly. Such as your own headjoint can be used to put into the Kingma system and the headjoints can of course be added to any body.

7. Who Inspires the Creation of these Designs?

Flute design can be inspired by performers, composers or flute-makers, but where should the source of such ideas stem from, and is this reflected in reality? Flautists with whom I have personally spoken, including Robert Dick and Wissam Boustany, have discussed this issue in depth. They, like many others, believe the inspiration of performers, composers, and flute-makers should be combined, each making an important contribution. They feel it is not appropriate to single out one element of such an integrated collaboration. Some, like Ruth Morley, debate which came first. Sometimes both these inputs can come from one person, but surprisingly flute-makers are not always flautists. Others think the inspiration should come from the composers directly, for the ideas they want to express and that development from the flautists would be futile, without repertoire to perform.[108]

Surely it is also largely the responsibility of performers to establish the developments which need to be made, since it is they who perform the new compositions with the new flutes. Also as part of the ensemble '*Rarescale*' Carla

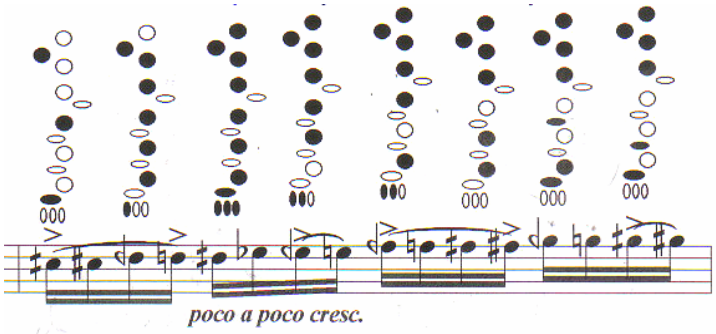
[106] Boehm fully describes these compromises in *The Flute And Flute-Playing In Acoustical, Technical And Artistic Aspects* by, Theobald Boehm (*1946*). New York: Dover Publications Inc.

[107]Michael Pestel uses a variety of paper 'bullets', small cylindrical objects which move freely within the flute body, for details see appendix 12B.

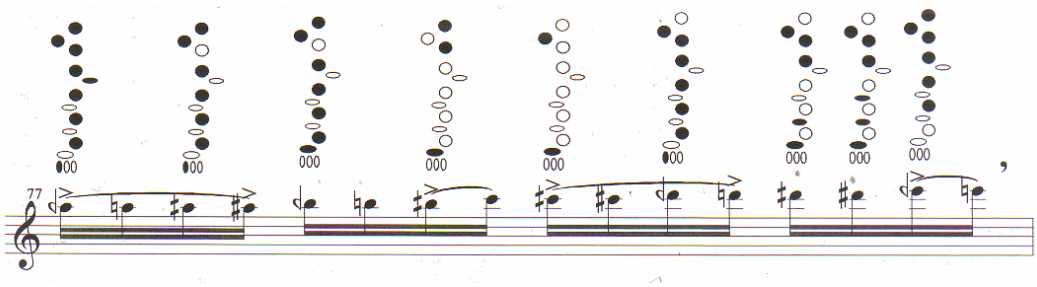
[108]Sebastian Bell has expressed such a view.

Rees commissions many works. Through these commissions she greatly extends the repertoire for the Kingma system alto flute, in which she specialises.[109]The performer-composer can particularly lead in this area, clearly exemplified by Robert Dick, who for many years would only perform his own music. Dick views the influence of a performer as a great potential in publicising a new flute.

If music for these flutes is to be led by composers certain issues arise. Flautist and composer Jennifer Higdon owns a Kingma system flute, but composes for the Boehm flute rather than specifically for the Kingma. This is because the creative output which she generates comes from her commissions, for which the demand is for the Boehm. Ian Clarke explained that composers may also feel constrained to write for the Boehm flute in order to ensure the accessibility of their music. This need not necessarily restrict creative freedom. Since his compositions, in particular, do not at all shy away from contemporary or extended techniques. Indeed some include fast quartertone movement for the Boehm flute, as shown in Example 1.



Example 1A. Fast quartertone movement used in *Zoom Tube* by Ian Clarke.[110]



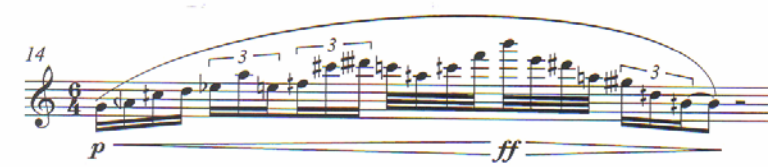
Example 1B.[111]

[109]Works commissioned for Carla Rees include the quartertone alto pieces already mentioned, as well as *The Moon By Night* for quartertone alto flute and piano by Andrew McBirnie.

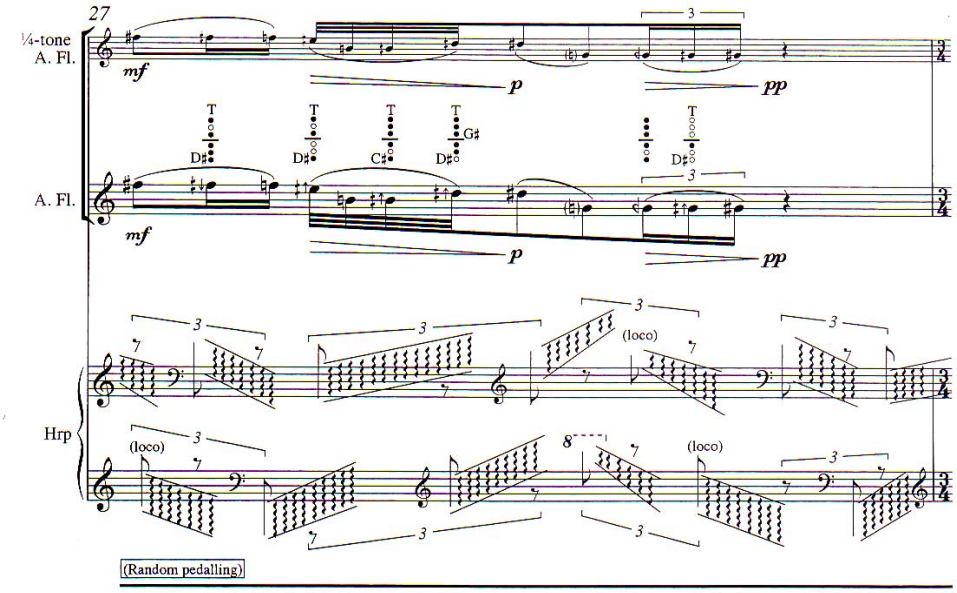
[110]Clarke, Ian. *Zoom Tube for solo flute.* Ed.1.3. Croydon: Just Flutes, 1999. p.7.

[111]ibid., p.7.

In comparison composer Andrew March has written several pieces for the Kingma system alto flute. March has found the 'extraordinary instrument' has captured his 'interest and conceptual freedom' leading him to explore techniques which he would not have dared to on an ordinary flute. This exploration has gone on to broaden the repertoire he produces, since he has applied the ideas to compositions for the Boehm alto flute, such as those shown in Example 2, which also shows fast quartertone movement.



Example 2A. *XXIX – in Perpetuum* for solo Kingma System Alto Flute by Andrew March. [112]



Example 2B. Andrew March *Aeolian Rustling* for alto flute and harp, with Kingma system alto flute ossia.[113]

[112] Andrew March: Alto Flute and Harp Book: 2001, ***XXIX*** – *In Perpetuum* for solo Kingma System Alto Flute. p.18.

[113] Andrew March: Alto Flute Harp Book: 2001, *Aeolian Rustling* for alto flute and harp, with Kingma system alto flute ossia. p.50.

Some composers feel these new flutes provide a welcome outlet for creative expression. Patrick Nunn found the solo Kingma system alto flute the perfect tool for Arabic music, which he uses in his *Maqamat*[114]. There are extra considerations to take when composing for a flute such as the Kingma. John Thow explained the importance of understanding the instrument, and Daniel Giorgetti details the concern of the additional weight of the Kingma system alto flute, describing that extra rests need to be incorporated for the performer.

Performer Richard Craig is concerned by the use of specialist compositions, since very few flautists can perform them. Adapting them for the Boehm flute, can cause unsatisfactory results. However, although there are compositions written especially for the Kingma system and the Glissando headjoint[115] as well as for the 'intonation slide' by Magnus Båge[116] the integration of these new designs need not necessarily be through specialist compositions. The features of the instrument can be effectively used in most repertoire. However these new works may bring vital interest and awareness to the designs and, as the examples show, the contemporary designs can not only push the flute world forward, but also change the parameters within which everyone works.

8. The Image of these Flutes

These flutes are not just perceived as being too contemporary for a certain player, some have a particular image of the flute. For example some flautists have expressed a certain attitude toward the Drelinger 'UpRite' headjoint, that since the physical problems in one's posture should be overcome and that playing 'properly' would counteract such problems, performers who use an 'UpRite' are perhaps somewhat lesser players. Other designs have not yet established a firm position within the market, and as such are perceived as less genuine or worthwhile than other longer standing designs. The new Glissando headjoint in particular is viewed as a novelty, a gimmick, by flute traders. Some, such as Richard Craig view the Glissando headjoint as more of a mechanical achievement than a musical one.

[114]This word means scales in Arabic.

[115] *Felix for Helix* for flute with Glissando headjoint, 1998, by Robert Dick, *Sliding Life Blues* for flute with Glissando headjoint, 2001, by Robert Dick, and electroacoustic piece *Our Other Man* using sound sources of Robert Dick performing the Glissando headjoint, by Alan Lomax.

[116]These include: Concerto for flute by Rolf Martinsson, Jan Sandström and Mat Larsson Gorthe.

The consumer interest in these innovations is market led, much like many aspects of flute design. Ian Clarke makes a comparison to the use of different foot joints in different countries,[117] led by production, cost, and ultimately, availability. Wissam Boustany is surprised that there are still only a handful of British flautists who own a Kingma system. However, all of these designs are expensive, even contemporary performer Rachel Rudich questioned the investment. They are bought by flautists and performers who spend their life and career dedicated to the sound their flute produces, so they are very much a specialist purchase. Can one, therefore, really ever expect a wide spread market demand for them?

However, the fact that these designs are cutting edge and often one of a kind can be an equally attractive prospect to those who feel their performance or composition is similarly avant-garde. Marion Garver explained she wants to 'be different, unique', and as the owner of the only existing Kingma system contrabass flute, she certainly is.

Since many contemporary performers are still not using these flutes I was led to question whether these flutes are perhaps ahead of their time slightly, in that they are pre-empting future demands. Indeed Robert Dick recognises that it takes time for a new design to establish itself. Although he sees the Glissando headjoint as the biggest change in the sound of the flute since the Boehm flute, he feels confident that in twenty years from now it will be a fairly normal headjoint.

9. The Evolution of the Flute.

Is development and evolution of the flute necessary in order to preserve an essential vitality of the flute? Prior to my investigations I expected a mixed response to this concept. Anticipating that a certain number of musicians would feel the compositions, the works of music themselves, should preserve this vitality, I was surprised. In fact many agree the development of the instrument is also necessary.

Clearly it is not until groundbreaking work is revealed that the necessity for such ideas is experienced. Just as parameters are required in performance to push against, the breaking of barriers in design can be equally progressive and important.

[117]B foot joints are more expensive when purchased from a Japanese maker who usually make flutes with C foots, and the reverse is true of American makers.

Michael Pestel, for instance, thinks change is necessary, inevitable and ultimately good.

However some feel radical developments change our perception of the flute and what it represents. Sebastian Bell, for instance, questions 'whether or not a radically altered instrument (e.g. A quarter tone Kingma flute) is properly described as a flute within the normal meaning of the word.' The Kingma system does not change our instant recognition of the flute, but does change the fundamental possibilities of the flute. In comparison the Drelinger 'UpRite' headjoint does not change the timbre or tone significantly, but instead changes our usual associations.

Further still the composer Berio addresses the general issue of new instruments design. He views a musical instrument as a piece of musical language, believing a musical instrument cannot really be changed, destroyed or invented and 'trying to invent a new one is as futile and pathetic as might be an attempt to invent a new grammatical rule in our language.'[118] Although this comparison exemplifies our use of language, I suggest that one can use this very comparison to prove the need for development. Many continually search for other mediums of communications through different art forms. This demonstrates that although language cannot be developed, skills and modes of communication can. Reflecting that although perhaps our understanding of the flute cannot be developed, the new designs expand the instrument into a new, wider concept.

Either way, these changes are important to enable work and growth of the flute world. By further developing the flute there is no negation of designs, or implications that predecessors are any lesser and instrument. These innovations can only work to improve the image and use of the flute. The future of flute design brings with it many more possibilities.

[118] *Luciano Berio: Sequenzas.* Germany: Deutsche Grammophon GmbH, 1998, p.9.

Chapter Three:

Conclusions

1. Replacing the Boehm Flute

The Boehm flute was introduced in 1847 and soon became firmly established as the basis for the design of the flute. This design has since been used by the majority of flautists for nearly one hundred and fifty years. Other flutes in existence, such as those in this discussion, have proved only to be variants, with no other design posing any real threat to the Boehm, or achieving such widespread acknowledgement in the Western world.

Although the Boehm flute is as yet unrivalled, is its position already under threat due to the very fact that it is being challenged, that by questioning the design, it is losing a degree of status? Undoubtedly the Boehm flute will remain a significant part of the flute's history regardless of any subsequent improvement, but it seems unavoidable that the Boehm may not meet new needs demanded of the flute. This proves unimportant to the stability of the Boehm's position. When investigations are made to move forward, the ingenuity of the Boehm design is discovered, revealing his careful considerations and calculations. Indeed, all the designs discussed still make use of, and build upon, the basic Boehm design. It is possible that the Boehm flute may, therefore, never be replaced, but instead incorporate multiple additions.

Perhaps the basis for each of these designs cannot be strong enough individually to unseat the position currently held by the Boehm. Each of the flutes discussed exemplifies a particular design idea: the embouchure, the headjoint length, the scale of the flute and the playing position. These ideas are addressed by the lip plate design of the Butterfly headjoint, the alteration of the headjoint length given by the Glissando headjoint, quartertone scale of the Kingma system and the adaptation to a vertical flute by the Drelinger 'UpRite'. Indeed, the range in aims of each of these flutes demonstrates the diversity encompassed by flute design. This diversity may present the flute world with too many issues and perhaps it would be advantageous to consolidate certain aims, establishing the ultimate needs demanded from the flute. Before development can make a larger step forward, perhaps a common ground needs to be found, in order to ascertain specific problems which need to be solved. At present this target may seem to lie beyond the foreseeable future, since as yet many makers have their own goals, and relatively few take the same route as another.

However, if we look further at the inspiration behind these flutes, fundamental similarities are found. Issues regarding the tone quality produced have

always been a concern when making a flute, and these new designs are no exception, addressing the issues in a variety of ways. This is apparent in the Butterfly headjoint which redesigns a relatively small aspect, the lip plate, in order to enhance the tone produced. Similarly the aim of the Glissando headjoint, to aid a more lyrical expression, creates the ability to refine tone quality by minute adjustments of position. Others make less obvious, yet equally important, considerations. The design of the 'UpRite' headjoint was established after careful investigation, resulting in the parabolic wave guide[119] design which ensures the bend in the headjoint does not loose the acoustic quality of the transverse flute, and some say enhances it. The creation of quartertone mechanisms for the Kingma design applies the principles regarding placement and size of tone holes in relation to tone quality developed by Boehm, to this more complex design.

Careful examination also shows evidence of a crossover between some of the subsidiary aims. The smaller increments in tones provided by the Kingma present an easier method of producing glissandi and slides, which links it to the Glissando headjoint. There are further similarities between the Glissando and Kingma, since they both aim to take the flute into new genres, moving the repertoire into the world of jazz and ethnic music, through the use of pitches which lie between those of western scales. The physical implementation of these smaller increments, and the more acute aural awareness which may be gained from their use, is also beneficial in the stabilisation of intonation, similar to that which is gained through a finer control of the embouchure given by the Butterfly headjoint. Given this crossover of aims it may seem surprising that many flautists do not own several of the designs. In fact, only two flautists contributing to this work, Stefan Keller and Michael Pestel, own more than one. Both own a Glissando headjoint and a Kingma flute. Perhaps a reason for owning theses two designs is the similar subsidiary aims, and a reason for the majority of flautists choosing just one of the designs is due to the diversity of the primary aims.

Even given these crossovers it is still clear that these designs do not compete with one another. So it cannot be a case of trial and error to see which of them stands the test of time, but rather a waiting game to see which aspect of improvement

[119]The 'UpRite' Headjoint, The Drelinger Company. op.cit., p.7.

will be most in demand. Perhaps only after this the next step forward could be to combine the successful parts.

2. Future Impacts

Can there be one flute which answers the needs of every flautist? It may be true that this was once possible, evident in the widespread popularity of Boehm's flute. Perhaps the idea that the flute is being refined, evolving to an ultimate stage of development, views the situation in reverse. Perhaps Boehm's flute began the progression as the ultimate flute, and subsequent work is an outward expansion. Recent innovations could be viewed as beginning the establishment of a more personalised, individual nature of flute design. This is particularly exemplified in the production of a Kingma system flute which is made specifically for the hands of the owner.[120] This reflects the nature by which each performer develops repertoire which is increasingly varied and representative of a certain taste. Perhaps we shall see a move toward each flute being tailor made, not in the sense of the basic design slightly adjusted for personal use, but many different, more personalised designs, to satisfy different groups of individuals. In an ever increasing world of individualism, of multiple and diverse demands, is this an answer to our modern needs? There are many different groups including students, teachers, ensemble members, and soloists with various specialist styles from classical, to jazz, blues, ethnic, contemporary, and rock and pop. The demands of each group are varied. An ensemble member may need to blend tone and timbre with the rest of the group, contrasting with a soloist's demand for a strong and striking tone. Although all of the flutes can be used for solo performance only the Butterfly and the Kingma show specific features to blend with other ensemble members. All the flutes can be used to perform a varied repertoire. The Kingma and Glissando aim at enabling different genres including jazz, blues, classical, contemporary, ethnic, and, in the case of the Glissando, possibly rock and pop. Students may want a basic design to provide a sufficient tone quality, compared with teachers who must meet their professional needs but not alienate their pupils. An example of this is given by Ian Clarke, who feels it would be difficult to teach

[120]Carla Rees explained that Eva Kingma measured around her fingers in order to create the scale of the alto flute that Carla Rees had commissioned, to insure that she would be able reach the keys comfortably.

pupils the quartertones possible on a Boehm flute when teaching with a Kingma system.

There are many issues surrounding the subject of a student flute, some of which extend to these designs. It is debateable as to the necessity and appropriateness of such a concept, whether a student should start on a different style flute to that which they will eventually perform on or to that of their teacher. None of these flutes seems specifically aimed at students, other than perhaps the 'UpRite', which may enable a student, struggling with physical discomfort, to continue when they may otherwise have felt they could not, as Alexa Still observed. Although Robert Dick has been offered to make a student Glissando, at present the other designs may in fact prove unsuitable for students, perhaps difficult, both technically and conceptually, possibly hindering the student from gaining a basic understanding of the flute. It seems the complexity of these flutes demonstrates the role of a student flute, that a student must learn to overcome difficulties themselves. However these designs go beyond this idea, to demonstrate that as a flautist develops their needs become greater and more refined, through a more critical and musical practise. This is why these flutes are not for students, because a student needs to fully explore every aspect of the Boehm before moving on.

Will this personalised aspect of design take the flute too far? Just how far can the design be stretched before our perception of what a flute is, becomes questionable? Although the transverse flute evolved from its vertical ancestor, the horizontal playing position of the flute has now become intrinsic to an understanding of the instrument. This is clearly exemplified in the views expressed about the Drelinger 'UpRite' headjoint. Responses from flautists who do not own one question whether it will 'feel right', still 'feel like a flute'. All of these revolutions in design address issues of our perception of the instrument and a few flautists question where exactly the boundaries lie in terms of identifying a flute. Although, the defining line of what a flute is, or should be, seems only to be crossed by the 'UpRite' design.

Beyond the audiovisual experience our perception and understanding of the flute may also be based on an appreciation of the tradition and heritage of design. A part of this appreciation is an understanding of its evolution, and acknowledgment that forward development is not dismissive of the past. In my view development is at the heart of the musical world, from the music to the musician. Yet if design could

not develop further, surely it would not stop the progression of a musician who wishes to find opportunities to widen boundaries.

These designs have the potential to alter the future of the flute, in many ways, beyond just the design. Those such as the 'UpRite' and the Glissando may change our physical perceptions of the flute. The cultural image of the flute may be changed by design taking the flute into many different genres, where it may previously only have a small part, such as jazz and pop. The flute repertoire is currently expanding into electronics, and these new designs may help to create acoustic recreations of the electronic effects. Indeed the effects Michael Pestel creates with his 'prepared' flute bear resemblance to electronic effects. Similarly electroacoustic composer Guy Harries finds the flute a useful tool for his aim of moving between pitch and noise.

For there to be a serious rival to the Boehm there needs to be both a willingness and a need for change. Both of these vital factors are present today, in varying degrees and situations, indeed many of the designs are both desirable and necessary. It may seem flute-makers remain divided in their approach, since at the same time the innovative designs mentioned are being produced, there are many flute-makers who continue to apply the successful rules set down by Boehm.

All refinements, however small, help flute design to progress. However progressive as these changes may be, there needs to be bold gestures made in design, like those under discussion. A design which seems futuristic can highlight changes which need to be made, and encourage others to provide more practical solutions, making many smaller steps forward over time.

3. Personal observations

From my research I have seen the design used by the largest number of flautists is the Kingma system. Is this flute the most popular because it offers the most, and meets the demands of the market, or because of achievements it has made in development and the following it has received from many professional flautists? It has a particular high profile and association with contemporary musics. It has been available longer than the others and seems well established in the market, since almost all the flautists contacted have knowledge, and often experience, of this flute.

There are flautists who have experimented to make a quartertone flute,[121] yet none has gone as far as Eva Kingma to establish the design and collaborate with a large flute manufacturer, such as Brannen Brothers. As such, the Kingma stands as the only flute of its kind, unlike the others[122]. Flautists who have tried many of these designs, choose the Kingma, such as Kate Lukas who has tried most contemporary designs, but chooses the Kingma. The Kingma also addresses the growing interest in pitch freedom and the increasing use of quartertones in music today. Comparatively the other flutes seem rather specific in their aims, and perhaps focus on meeting the needs of the flautist, rather than helping the flautist to meet the demands of the music. I have observed there to be more performers who own these flutes than composers who write for them. This may seem to suggest that progression is driven by performers, yet I am reluctant to conclude this. Performers may be led, by the new repertoire, to feel they need these flutes.

Eva Kingma explained that lower flutes, such as the alto and bass flutes, have often been taken up as a second, or even third, performance study, with the exception of those such as Carla Rees. She observed that with an increased interest in flute choirs the demand for these flutes, and the addition of her system to them, has risen in recent years.

It is clear any change will take a while to emerge and establish within the market and so it seems impossible to predict what the future holds for these designs. It would be difficult to predict how each of the individual designs will evolve. These flutes are still a specialist item, and many flautists are unaware of their existence and development. Certainly many other musicians, and non-musicians alike, accept the flute design as the Boehm with no question as to its origin or appropriateness of

[121]Alexander Murray made one quartertone flute, which he then later sold to his student, Leslie Timmons. Michael Allen made a quartertone flute, specifically made for the use of and under the guidance of Robert Dick. Indeed considerable number of makers have experimented in making a single quartertone flute, but have not reached the level of production or recognition achieved by Eva Kingma.

[122]The Lafin lip plate design has a similar aim as the Butterfly headjoint, to direct the air. The intonation slide developed by Magnus Båge also bears similarities to the aims of the Glissando headjoint, and the. Whilst the vertical headjoint and Swan-neck designs by Maarten Visser have similar aims to the Drelinger ‘UpRite’ headjoint.

design. Relatively conventional, yet groundbreaking, modifications such as the new Cooper scale, created in 1970s, are still only finding their feet.

If the numerous and diverse demands are met, I am interested where they will lead. It is possible flautists may become ever more demanding, for instance if design develops to reduce certain physical discomfort, flautists may want more, the total elimination of discomfort. Helen Murray questioned how such discomforts will come to be treated in a world in which there is always someone held liable, 'will a flute teacher or maker be responsible for pain caused when playing?' for example[123]. Perhaps it is also possible as the flute enables more techniques and possibilities, the music will demand more of the flautist and their flute.

As a young musician hoping to develop my skills and further my knowledge at a professional level, I find it relevant to contemplate the effects these issues will have on the future. I hope to develop aspects of the musical world in which I work, and therefore would view a situation in which development had become stagnant with a sense of disappointment. If many others also feel the need to develop, it is inevitable such progression will continue. Before this study I was unaware as to the extent of such development, which is clearly the driving force behind the groundbreaking compositions and techniques of which I had only previously seen the end result. The research for this project goes beyond the culmination of this writing, to extend into a life experience for me, by opening my eyes to the exciting and ever-expanding world of innovation present in the flute world today, and enticing me to explore further in the future.

[123]A personal interview in London, on 4th February, 2005.

Appendixes

Appendix 1:

The Lafin Lip plate[124]

Appendix 2:

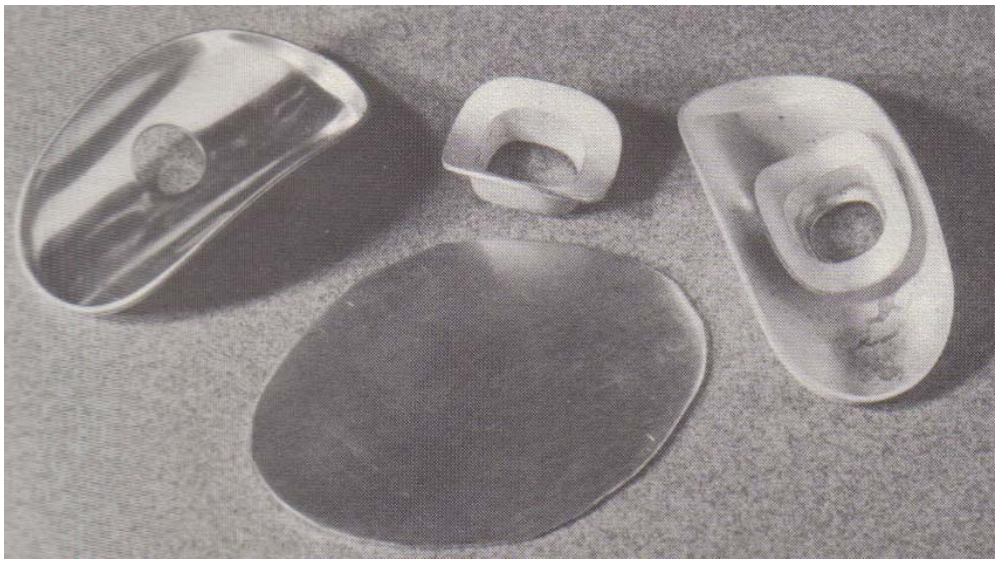
Swan Neck by Maarten Visser[125]

[124] *J. R. Lafin Flutes.* http://www.lafinheadjoints.com/fs.html. 23 January, 2005.

[125] Maarten Visser. 'The Swan-neck Ergonomic flute Head Joint'. *Flutelab Website of De Fluitstudio.* http://www.flutelab.com/swan/swan.htm. 10 February, 2005.

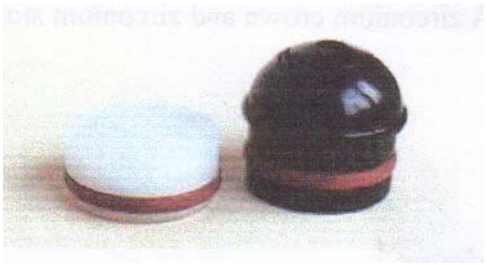
Appendix 3:
The Card's Melodium made by William Card (1863-1876).[126]

[126]Dayton C. Miller, 'Card: Flute in C'. *Dayton C. Miller Flute Collection.* http://memory.loc.gov/cgi-bin/query/D?dcm:4:./temp/~ammem_AoWj::. 30 March, 2005.



Appendix 4:

Composite parts of a flute headjoint[127]



Appendix 5:

Robert Bigio's Crown and stopper[128]

Appendix 6:

Alteration made by Helen Murray to eliminate discomfort. [129]

[127]Albert Cooper, *The Flute* (Great Britain: E. B. Reproductions, 1980), p. 30

[128]*Robert Bigio- Flute Maker.* http://www.bigio.com. 23 January.

[129]Photographed during a meeting with Helen Murray

Appendix 7:

Matit Kahonen carbon headjoint[130]

[130] *Matti Kahonen.* http://www.matitflutes.com. op.cit.

Appendix 8A:
Edited transcriptions from the interview with Robert Dick[131]

Q. Could you explain the construction of the Glissando headjoint?
A. *The Glissando headjoint is simply a telescoping headjoint, inside a carrier tube and as you can see its really in essence quite simple. The slide concept in technology has been around in musical instruments for quite some time. We call the trombone to the stand, to witness that and the difference, of course, is that the other instruments that have slides both the inner and outer tubes are cylindrical, and the headjoint is not cylindrical, it's a section of a cone with this little tiny parabola bit going in to it.*

The headjoint, the part towards the flute body, is bigger in diameter, than the top, and so the engineering challenge in this was to have a conical tube travelling inside a cylindrical tube and not leaking. There are some seals that do that, and that's the part we're trying to keep sort of proprietary, exactly how that got done. We're using this del ring, which is referred to as a self-lubricating plastic, so you don't have to use any oil.
Q. Do you still use the 'parabolic' design? Did you have to make changes along the way and how much has it changed since the original one?
A. *Oh, you mean the history of the Glissando headjoint. It has gone through a prototype process, and the first Glissando headjoint was made in 1992, by Eva Kingma and that headjoint travelled in, making the sound sharp, instead of turning out, making it flat. They quickly realised that, 'oh, wrong way'.*
Q. So why does that make such a difference?
A. *Well there are two reasons. One is that you have a tube that is travelling down, into the body of the flute. It's got to be long enough to be a regular headjoint, and as we travel down, we start shutting off keys. The other thing is that one had a system of a rubber band, a very strong rubber band, to pull the headjoint back to the normal position. And that also clearly was a disaster.*

But, you know first attempts can be wildly off the mark, but they are tremendously valuable to learn from, considering, almost nobody ever has an invention which on the first prototype was perfect. So then the second and third prototypes were made by Kasper Baechi in Zurich. With this next prototype it was a normal headjoint with these kind of wings attached to the lip plate, which travelled inside a large and heavy carrier tube, it was lined with a fairly thick layer of Teflon, and it was what is called the key and slot system and the bottom of the headjoint there was these two pin that stayed in a groove so that it wouldn't roll around. This was a source of tremendous air leakage, but again it was a big step forward, and I thought from there, the next step was to try to make one that would go both above pitch and below pitch.

So what we did was we took a headjoint from prototype number two and cut the last couple of inches off of it, and put a smaller, straight piece of stainless steel tube on, so that it would fit into the receiver and then it would fit down into the body of the tube, so it was much smaller in diameter. This was a disaster, because the

[131]Interview took place on 14th September, 2004. The photograph of Robert Dick holding his Glissando headjoint was taken during interview.

acoustics of the headjoint depend on this parabola and we've got half way, and made it cylindrical.

The result was that there was no position where the flute played in tune. There was a position to play every note in tune, but if you wanted to play a C major scale you find yourself having to make all of these massive adjustments note to note, it was nuts, and I thought 'nobody's going to play that, including me'.

It left us with no like 'home' position that where without thinking about it you have an in tune flute, it didn't exist in that version, every note had its own home position for times when you just want to play a regular flute, you couldn't simply just play it.

So we both looked at each other and thought well, we sure learnt something, and unsoldered that tube and put the piece back on. So that's when the decision was made to go with the regular acoustics of the headjoint and only sliding downwards, from the normal in tune position, you can always slide up, you can make the slidings up above pitch, very easily. So then I showed this to Bickford Brannen.

Years ago, decades ago, I guess, in the world of flute-making, we have a period called 'BC', which is 'before Cooper', and in the BC period, which I am old enough to have lived in, flute-makers tended to be the number one conservative, if not reactionary, force.

...

So one did tend to develop a hopeless, or quasi-desperate, approach to flute makers because all you ever heard was 'no' and in my twenties I got this concept to really re-design the flute, a new fingering system, I got the support of Eurcom in Paris to develop this and I thought how on earth am I going to get somebody to make it, and that's when I met people who knew Albert Cooper. Actually the person who introduced me to Albert Cooper was Alexander Murray. The Murray flute had a lot of really, really good ideas. I think that if Murray had been as good a flute player as Galway, and had been the kind of guy who was out there on the road playing, two hundred concerts a year as Galway was, then by now thirty percent of the flute-players in the world would be playing on a Murray flute. The biggest problem with the Murray flute is that it didn't have a major star to advocate it. There are some mechanical issues, they would have been worked out, if a maker like Brannen had actually tackled them on the flute. Brannen has told me *what he thinks the mechanical rethinks are. Well, they would've been solved, had the demand been there.*

So Murray was working with the American flute maker Jack Moore, and Jack was the first maker actually behind it and was the one who was trying different things. Since Jack doesn't play the flute the things he could produce could be very interesting, but were not very ergonomic. In the mid seventies I guess it was a period where things started to change, Murray had also been working with Cooper and so that's when I first met Cooper and because of the duality of Cooper, on one hand was working with the technology straight out of the early 1800s and on the other hand with the imagination that was totally modern. But the fact that he wasn't using power tools and he wasn't using things that were designed for mass production so the set up of those things is long and costly and then, you get the benefit when you make lots of big orders, but with Cooper system everything is made one at a time, so they didn't have to be made the same and my experiences with Albert Cooper were an absolute revelation. That's when I began to understand what a flute was in terms of something that actually got made by human hands not just a blade and that's when

I really came to believe that sure, you could change it all, it could be done, and it wasn't just tilting at windmills.

So, we are now in the AC period, after Cooper, and people like Brannen, who really is one of the best flute makers ever, and the fact that somebody like that, at such a high level is not conservative but instead, really wants to explore.

So Bickford re-designed this completely, it was Bickford's concept to eliminate the key and slot system. We both knew that was the biggest source of tone problems, of the low notes getting weak, because we're just losing too much air. So he figured out this system, where the guides that hold the headjoint steady are really sealed, and serve to keep it from rotating, there is a little rotational play, which if fine, because its an instrument in your hands, you don't want it to feel rigid. And it is Brannen who really took it through this design, so that what we are offering on the market now is the Brannen version, which I am totally happy with, and I feel that in terms of design, now we're in the really interesting period which is the music.

Q. So, is it as you envisaged, or better?

A. *Well, it's better than I envisioned, the original flash, where the idea happened, is where most inventions happen, where there's the flash and its there, then to realise it, can take you years. The original flash, you might have heard of something called the Fajardo double wedge headjoint. The Fajardo headjoint was invented by a guy named Raoul Fajardo, this is again a mid 1970s thing, and what did, if you take a regular headjoint and you took just a cylinder of this diameter and put a cork in the same place, and the headjoint is a regular headjoint tube, no hole in it yet, no lip plate, but with the cork in it. Now if you filled each one of those with water there would be less water in the headjoint than in the cylinder, because of the end, with the taper, and you could measure the amount of difference. Now Fajardo's positive is that the important thing is not necessarily the shape that achieved that difference, but the difference itself. So what would happen if you took another approach to removing that much space from the cylinder? So he made a cylindrical headjoint and into the end stuck what looked like this blade and it was this tapering thing. It was calculated to be the volume of that difference. Now his idea was that you could then adjust its position, just like the old time wooden flute players that adjust the cork when they played it, and you could also rotate it inside and get it to function as a kind of tone control. And it must be said that it worked really well. Now Armstrong flutes are made in that period, and Fajardo convinced Armstrong to make this thing and they really weren't thinking very wisely, what they did was they put this really kind of hi-tech, blade into a wooden headjoint, thinking that they could sell it to a baroque flutists*[132] *because you could turn it where it kind of suppressed the harmonics of the sound, and so it would make a quasi lute. You don't sell the most conservative part of the market a radical headjoint.*

Now what the connection between that and the Glissando headjoint is: Well Alex Murray got me a metal one of those headjoints. I was sitting one day with a cup of coffee and looking at this headjoint, and looking at my flute and the unconscious sent up a flag, so I thought I'm looking at something but I am not seeing it yet, so I thought, I'm going to sit here, and I'm going to drink coffee and stare at this damn thing until I see what it is that I'm looking at. And then I saw it, I took the wedge assembly out of the top, turned the head around and out this end into the flute because it was cylindrical it fit, and then I stuck the wedge in that end so something could close it up. So how was playing the flute with the lip plate here, and of course

[132] This is the American spelling and usage of the word.

everything was totally different. And I thought wow, imagine if you could get from here to there freely and go back and forth, wouldn't that be amazing. So the original conception was that the lip plate was going to the slide on the headjoint, that there was going to be some kind of slot, and some way that it would seal as it moved down, and in the end of course the engineering that was completely impractical and it was leaking and things. It was really complicated; tracks to hold the middle spring. By the time it became possible to actually attempt to build the first prototype, that original idea was already dismissed, as yeah, some great inspiration but we'll get it, but not that way. But that's where the idea came from and the flash.

So getting to this was some deliberating, its been quite an evolution and I certainly could never have done it alone, I'm not the kind of person who can go into a machine shop and operate equipment, I spent enough time with the people who were good at that to realise that I don't have the right kind of personality for that work, and this is really important, there's a form of concentration that you really have to develop, with metal spinning at hundreds of times a minute, is not forgiving of mistakes, metal heated up to a thousand degrees Fahrenheit is not forgiving of mistakes, you can really get hurt, in a flash, parts of your body can be flying across the room, and at least I have to wisdom to feel like, other people should drive this car, people who can, I knew that I was too spacey.

...

Brannen in the end is definitely, the grand master in that zone, a way of thinking, of understanding something musically, and translating it into mechanism, being able to think in both attitudes, when you make a flute, you have to think about leverages, and angles, and key travel, there's a zillion things that when you play the flute you really just don't, you're just assuming, its been done, but when you make them, you really need to think in these terms and I kind of though that my head was pretty full trying to create music, create sounds, recreate the flute from a musicians point of view and partner with a maker.

Q. What performer would you say that it is aimed at, any standard, or are there certain things that you have to learn to use it?

A. *Well like anything else there's going to be a bit of an adaptation period, one is not just using the slide all the way from one end to the other. So you need to know where the notes are, and that takes time, when you want to slide down those, you start on the fingering of the beginning note, so that's easy enough, lets say you wanted to go from A to F, so you start you start on A, and slide to the F. Now if you wanted to start the slide from F to A, you're going to use the fingering of the arrival note with the slide slid from to the departure note, so you need to know where that is, it's not all the same, this is a fixed distance and it's proportional to the length of air you use, so this first finger C can be slid a major third, the low B, a major second. It's a self-teaching system, because hopefully we are musicians, when it sounds wrong you fix it, that takes a little practise, but it's something new and interesting and fun, its not just going to get old and boring.*

Q. Do you think it will change performing and composing in general?

A. Oh yeah, this is going to be the biggest change in the sound of the flute really since the Boehm flute.

Q. I know it's very radical now, but do you think its something that we've been striving towards for many decades?

A. *Twenty years from now it's going to be pretty normal, I think, I mean anyone and everyone who plays any form of jazz or improvised music will have one, further down the line, there will not just be these very high end, custom ones, but there're going to*

be some student versions. I already had people offer to make them for me, and my feeling is, well one step at a time, lets let the Brannen one sink in a bit, and then see what will happen. Anyone who wants the flute to sound more vocal, then this is a huge, huge help, and to me what I'm really excited about now is the practicalities arrived at this place, is entering the world, what are other people going to do with it, I know where my musicianship has lead me to play it, on one hand I'm the inventor, but I'm not the musical definer of anybody's music but mine, sure a lot of people are going to copy me, because its there and they can hear it, but lots of other people have imagination of their own, and it will be very interesting to see what they come up with, and there's going to be all kinds of wild rock and roll, there's going to be some jazz, there's going to be real syrupy new age music.

Q. What reactions have you had so far, I mean have you had any kind of critical reactions, because I know when I was reading about a Berio's Sequenzas, he comments about how instruments shouldn't, at this stage they can't be changed, because it's like trying to change grammar at this stage in our language, and things like that?

A. *Berio said that*?

Q. Yeah

A. *Ah, God, I suppose being Italian it was natural to pontificate. The thing about anybody that makes an absolute statement is that the truth of the matter is that all they're trying to do is justify their own limitations. Maybe its true, Berio was not the person to change the flute. I mean it would make much more sense for a flutist to involve himself in changing the flute and why should Berio involve himself in changing electronic instruments if he wasn't in that part of the musical world. So, its much easier to say, 'oh you cannot change these things, they are fixed, blah, blah, blah', and being Berio some people might even be silly enough to listen to that. Its always helpful to consider the source, if Berio was talking about techniques of serial composition, I would listen very closely, because he really knew what he was talking about, but if he's talking about my instrument, well I'm just going to burst out laughing, I mean it's a cartoon, how would Berio feel if I started pontificating about his music, to come up with some kind of elaborate justification for some musician, I mean if I didn't like his music I would find some way of saying it should never be played. As it happens I do like his music, and I do think it should be played, but if I didn't, , and I was too lazy to learn it, because as I teacher for example, it is your job to learn the music that your students need to know, whether its too your taste or not, which is something that is rarely said or done, and those teachers can make the limits of their taste music values, when there're simply limits of their taste and so, that would just be absurd, silly pontification, sorry Luciana.*

Q. What other reactions have you had to them, have you had a lot of people come forward for it?

A. *Well, the first person who ordered a Glissando headjoint is not actually a full time flutist, but a sound artist who does a lot of things improvising with the flute, and he saw this thing and said, 'well, I mean there're no way I can live without it'. The second person who wanted a Glissando headjoint is a jazz musician, the third person who ordered a Glissando headjoint is kind of a contemporary music flutist and jazz player in Switzerland, and the fourth person who ordered one is someone who is just fascinated by the whole thing and wants to, she's a classical flute player, and she wants to propel herself into the twenty-first century, and she saw Kingma system flute in the version that it's been re-imagined for me, that I did with Brannen, she saw that, and she asked them to build a duplicate of this flute for her, with the*

Glissando headjoint. So those have been the reactions so far, when I played it at the flute convention, a lot of jaws dropped, I mean lots of people, many mouths were open, kids immediately got it, I mean, the word cool, 'it's so cool', and you know there hasn't been anybody who's said, 'oh, that's stupid' or whatever, I mean maybe if they thought that they just walked away, I'm sure there's some people who thought, 'well, what will those guys think of next? But it's not for me'. Of that group, some of them will come round and maybe some of them will not.

Q. Are there any other possibilities that it aids that you didn't realise it was going to, does it help with general legato passages?

A. *Well, if you were going to do play transcriptions of violin passages, where sometimes they would use this portamento technique, you've got that. Now the flute has always been capable of a fair amount of glissando stuff using the open hole keys, but the glissando that uses this system, theirs is a real change in sound quality, as you move from the regular fingerings, which have the air vented through large holes, to fingerings that have the air vented through small holes. There is a big colour change, which for much music is really attractive, but if you didn't want that colour change, then you were stuck. See with this system, the colour really doesn't change until you've really got the slide pulled out pretty far, and then you will find that some of the proportions of the overtones will be shifting around a little bit, but in the opposite direction, you will have more of them instead of less of them. With some practise they could be really nailed, I mean after all violinists do it, with varying exactness, but the really good violists, they don't think twice about it, they know where those notes are.*

Q. Do you think it would be a good thing for learner to begin on it, a student flute, do you think it would be much easier to start straight on it?

A. *I don't know about that, whether one would begin playing flute on a Glissando headjoint, I'll think about that one, it could be done, and with a more talented young kid maybe, or an adult, for ones who just trying to learn how to hear musically it might be a little too much.*

Q. How did you decide the length of the glide, the extra extension on the end?

A. *This is basically practical, when you have it all the way in, you have a regular flute, so that means its that long, so you can slide it out, but you can't keep going, because then you run out of headjoint, so basically the length of the headjoint and you have to leave a bit at the end so that it seals well. And then what you want is to have the top and bottom of the flute at a musical range, its nice that on C, if you go all the way out, you really are on a major third. Obviously there's going to be some in the middle, on the way to the major second. But at least the kind of it the starting and ending points.*

Q. What do you think is next for you, the 'electric flute'?

A. *Well, what's next might be trying to find some way to adapt this to other sizes of flutes, although again the length of the headjoint on the bass flute, pitch wise, is not nearly what it is on the C flute. What I would really like to do is find a way to get, really effectively get, a microphone into the top of the flute. If you're going to take an acoustic flute and want to really mike it directly, the place to do so is through the cork. There have been some quasi successful systems where they drill through the side of the headjoint and put the mike, there, but my problem with that is that anything that I would drill through the side of, I really don't want to play, and anything I want to play, I wouldn't want to drill through the side of, so, that's a good little conundrum, maybe I'm being a little bit conservative. If Cooper teaches us anything it is that if you can drill a hole, and you can seal it up, and it will be as if it*

never happened, and its really true, but ultimately maybe that will have to be the way, but for now I'm still concentrating on solving this problem.

The reasons for wanting to do that are to make a flute play all of its sounds in the kind of context that people find themselves today, on stage with a drummer, an electric bass player, an electric guitar player, you might not be playing at The Who level volumes, and hopefully you're not, well Pete Townsend is damn near deaf at this point, but still, they need to be heard, the reason the flute is not part of this whole history in jazz in a way is that they were not loud enough when the music was playing. I mean they came up against the trumpet, the clarinet, the way plenty of players in New Orleans would set up, they were really loud, so they could compete and be heard, well the flute couldn't do that so, we got left behind. Now someone like Ian Anderson is playing in a very high volume contexts, but he's not using all the sounds of the flute, he's only using sounds that are in need of the embouchure hole open, and there is a whole other dimension, and those sounds that happen with the flute hole closed, and the head set mike that he is wearing well it can't hear any of those, and if you put a microphone in the bottom of the flute then the tongue stops up at the top of the flute are really far away, and as you get closer you get, the last couple, 'boom'. So the place where they're all equal is next to the source. So that's what I'm tackling, I have met someone who is developing a true flute controller, something that actually will measure the pressure of the air, and there's mini wind controllers for single read instruments.

...

But the population of flutists is pretty much classical, and it's a sad but true statement that, when you're talking to a room full of classical musicians, not just flutists, you are talking to a group that has essentially pre-selected itself for non-creativity, or at least to embrace non-creativity, and so it's difficult to sell them something that is designed for a person who has their imagination in full gear, I mean they all should be jumping at it, but they don't.

For the people that want to go in to baroque, I would urge them to go all the way, I mean don't get in my face about tradition, and hold a Boehm flute. If you're going to be traditionalist, and you want credibility from me well, you know, I want to see a traverso in you hand. Of course, if their really going all the way, they get into the whole amazingly musically creative world of the baroque, its not just for playing the notes on the page, at all. The real baroque musician is far more creative, it's the nineteenth century musician who's really a stick in the mud, and the ones who've accepted this role of put the music in front of me, I play it, no more, no less, their the problems. A lot of the time reasons why people go to traditional baroque music is because they're really frustrated with that, they want to go some place where the musician has a greater chance to be a musician, I think that great, and if that's the music that captures your ear and your soul, well then that's fantastic, I really like the way that if you listen to five really good recordings of the K. P. E Bach Sonata played by traverso players they will be vastly more different from each other than five good recordings played on a Boehm flute, there will be differences, but not nearly as personal. So if they're going to get traditional, the tradition is creativity, and the aberration is non-creativity and we're coming to a full circle, the creative musician will have a much greater future than the non-creative musician. The non-creative musician can be replaced by the synthesiser, and as all those broadways show players, many of whom have lost their jobs.

Some of them a whole band has been replaced, other times there'll be a synthesiser in the pit playing the part that you know a dozen string players used to

do, and its one person doing it now. In a way that's good, and in a way that's bad. Its sad to see work taken away from other musicians, but then, what kind of work is that? Really, really boring, but it does mean in the end, there will be fewer professional players of acoustic instruments, and those players will be doing a much higher level of music making, much more a kin to how jazz players play, and their going to really need to know music, not just their instrument, and they will have a far more entrepreneurial approach to the world because there will not be those situations where you can just audition and get the job, and other people make all the decisions, its going to be a much more self pirated, Quantz had to sell throughout his career. The jobs of the drones, they will be the new population of electronic players and as time goes on even they will be replaced by artificial intelligence. So we, the musicians who really want to stay human really will need to be more interactive in every aspect of our lives, so what's next though in terms of the flute? Ultimately I would like to see the left hand mechanism reorganised, it would involve learning a new fingering system, but I just don't think it would be that deep, I think it could become much more direct and more simple Every key you can take off the instrument, makes it a more 'musicianly' thing.

The thing about this flute is that, you could play it, all the things that it does that are beyond the what a regular Boehm flute does are there, but you could just play it as a regular Boehm flute, and you wouldn't think twice about it, as long as you were careful not to hit anything that you didn't know what it does, and if there was a different fingering system, well, you're back to square one, but I've learnt many different fingerings systems in the course of prototyping instruments and it's not nearly a bigger deal as one fears, I don't know why. In fact I do know why, classical music is a world of fear, because it is a world that's shrinking, and people are afraid that, if I take some risk, 'I'm lost'.

Thank you.

Appendix 9A:
Email received prior to interview.[133]

1)What are the advantages of the Kingma system?
The flute plays like an absolutely 'normal' flute, but has many more options for alternative fingerings, whether used for contemporary music, or more traditional music. Even on a normal flute, it is common practise to use unusual fingerings if this helps the music - with the Kingma System, many more options are possible. These alternative fingers help in finding new colours and resonances for the playing of specific passages.
2) How did you hear about the Kingma system?
I met Eva Kingma several times at flute conventions in Paris, Atlanta and the UK. I tried a flute of hers in Atlanta briefly, but was not convinced initially, although I was intrigued.
3) What made you want to perform with the Kingma design, did you feel the flute you had was lacking in some way and how?
For 20 years I played on a tin Lebret, with a tin Louis Lot Headjoint (Lafin lip plate). I was very loyal to this wonderful instrument, which was not necessarily 'easy to play' but it had real character and was (and still is) a unique flute.

[133] Received on 21st November, 2004.

When I turned 40, I was feeling that I was ready to move on, but was not interested in moving to a 'modern' flute that has the usual characteristics of big sound and consistency of registers...I wanted a flute that I could expand into, while retaining the sound quality that I had developed through my many years playing. I also knew that I was not interested in changing flutes every couple of years...I do not have this kind of relationship with my flutes, as I feel that it takes years to develop a real connection and consistency with a flute.

I decided that I would keep my headjoint (the heart and soul of an instrument) and expand into a the 'quarter-tone' system, to help me in my pursuit of music of different idioms...particularly in contemporary music and folk/ethnic music, which are so rich in the exploration of pitch beyond the limitations of semitones.

I have since discovered that even 'classical' music is often far more flexible pitch wise, than the conventional Boehm system implies or facilitates. You only need to listen to singers and string players, to discover how meaningful and desirable it is, to be able to manipulate the pitch in subtle ways (without necessarily bending notes from the embouchure, which can sometimes compromise the quality of sound).

Brannen brought their supreme engineering and workmanship to the Kingma-System; they were also very helpful in being open to my suggestions regarding small issues of the shape of my hand, in relation to some keys. With my own headjoint that I have played for 25 years now, I feel that I have been able to expand into a new acoustic world, while retaining many of the qualities I did not want to lose by moving on.

Appendix 9B: Edited transcriptions from the Interview with Wissam Boustany[134]

Q. Are you surprised the Kingma system flute hasn't taken over more?
A. *Yes I am surprised, a little bit, I would have thought that by now it would have used a bit more.*
Q. Do you feel that the Boehm flute might be at a point where it has become out of date?
A. *The thing is, I think the problem is that it is associated with contemporary music, and people assume, 'oh my God', I've got to get used to this and what it is for, for me to play contemporary music, I don't want to specialise in contemporary music. But I am not revolutionary, like Robert Dick is, I actually play a lot of romantic, conventional stuff. But I also play a certain amount of contemporary stuff, and even for the normal repertoire, it's got its uses.*
...
Q. Does it help with pitch control as well?
A. *I think so, but then it's your ears that do most of it. Are people playing that Dreliner, I've never seen it?*
Q. Yeah, there's Alexa Still,
A. *She's not? She plays one?*
Q. Well, she's promoting it.
A. *Is that because she believes in it, or because she's making a lot of money?*

[134]The interview took place on 7th January, 2005. The photograph of Wissam Boustany was taken during the interview.

Q. I was wondering that myself, since it doesn't really seem to enable anything, it seems more for comfort. You can change it, and play it the other way around,
A. *Oh, I see.*
Q. Do you only use this flute for everything?
A. *Yeah, I don't like swapping, even if I had Boehm flute, I would only play that, I wouldn't swap it. I don't know how people can just change flutes four times in a recital,*
Q. You said that when you first saw the Kingma you were a bit unsure, intrigued?
A. *Yeah, I was in Paris, I met Eva and she had a stall, I suppose it was right at the beginning, it must have been about ten years ago, so she was making her flutes, at this time Brannen was not making them, or maybe Osten Brannen had just started making for her. So I was intrigued, what this quartertone flute was. Of course I come from Lebanon and the music there it has a lot of quartertones in it and I've always had a fascination in that kind of ethnic music, that kind of 'not the conventional scale's if you like, all western scales are a bit square.*

So I was intrigued by it, I looked at it and I did feel that for now it seemed too scary for me, and she said you know, 'oh it's just a normal flute, you can play it, you just have to avoid certain keys, and that's it'. Because at the time when I looked at it, I wasn't event thinking of changing, I was just deeply, deeply, deeply in love with my libret, tin libret, a very old flute. And there came a point where, I was hitting a kind of block in my playing, certain aspects of the sound weren't developing, and I also had some tension problems with my neck, I started to wonder whether, if I was playing on another instrument, whether the tension problems might relax. I loved the quality of the sound I could get out of my old flute, but it was taking me too much work to make it happen. If I've had my flute for twenty years, and I'm forty, I don't want to leave it too late, I don't want to wait 'till I fifty, fifty five for a big change, it's too late. So if I change now, it's something very much different, 'cause I can grow into it. I thought, well, I've always liked my headjoint, I've made some changes to my headjoint, I want to keep my headjoint, and I thought of the quartertone system. So we contacted Brannen, I said not only do I want the flute, I want to play it concerts and that, 'cause its difficult to judge a flute just like that, you have to put it through tests and concerts, when you are really pushing yourself. So I had it for about five weeks and I made my decision based on that.

I didn't buy the headjoint with Brannen, I decided that, I kind of decided on, I would treat it like a normal flute to start with, I wasn't immediately going to try and use all the buttons that are there, I wanted to fall in love with the basic sound of the scale, and how I would play everything normally. I said 'give yourself several months, maybe a year before you start to do unusual things'. But the opportunity to use things is there, you can't help yourself, but try things, and before you know it you just sort of expand to the things. But I didn't try to play contemporary music on it to start with I was testing it on normal music.
Q. Do you find your self playing different music, music that has got a lot of quartertones in?
…
A. *No, the fact that I own a Kingma style flute, I hasn't made me decide oh, now I will try this piece because I have the flute. No, whatever I play my attitude to that has changed because of the flute. I mean when you think of someone like Dave Heath for instance, he plays a closed hole flute, and yet he's technique is so, flexible and the glissandi, the unusual fingerings. Even on a closed hole flute, there's a lot of*

flexibility to be found. You don't need every gismo on an instrument to be able to find sounds, but if you have things available to help you, that's pressure off.

The instrument facilitates things for you. You don't choose the instrument for the certain qualities, the piece that you want, but the instrument facilitates certain aspects of your playing. The key question really is how important are the fingers versus the blowing. Because there's a huge amount of flexibility to be had from blowing, and of course you can have extended fingerings as well, well you'd know all about that from Ian. The reason why you change fingerings is to get different colours, and to take pressure off the blowing. So it follows that the more options for fingerings that you have, the more freedom you have with your blowing. You may still want to glissando with your lip, if you want to, but you're not restricted to that choice.

Glissandos are difficult, I think that's the most difficult aspect of extended techniques really on a Boehm flute.

Q. Have you tried the Glissando headjoint?

A. *That is a serious new development, I've never tried it, I've seen it, actually I've tried it a little bit, but not enough to feel comfortable with it.*

Q. Have you tried the Butterfly headjoint?

A. *No, What does it do?*

Q. It's basically got a butterfly shaped lip plate instead of a round lip plate, it directs the air.

A. *This [lafin] is supposed to direct the air a little bit, with the wings, its supposed to help channel downwards, but sometimes if there is too much of that, then you can't get out. The headjoint is telling you to, come in that way, and makes it to difficult for you to climb out of that, that can be problematic. It'd be interesting to see that, I haven't tried that.*

Q. So, have you found Kingma useful for matching timbres, in ensemble work?

A. *Just in general, I don't put things into boxes, ensemble, orchestra. Anything that works. You'd find some combination that gets you what you want. So having those keys on keys gives you 1,2,3,4,5,6,7, extra choices, and because they're quartertones the difference between the notes is more refined, so they're more subtle. But to try and say I've got a quartertone flute which means that I can make the best sound in the world, then no, it's still really hard, its still keys. If you want the most advanced flute, it should be without any keys at all, that's really that most advance that you could have, but it's limited because you need a lot of fingers. But if you listen to the Indian flute, well, you know the glissandos they could do, the bending, is just astonishing how flexible, it's basically a transverse flute, but having no keys there allows real connection with the air stream. The keys allow us a wider range, and of course with the larger range, a bigger sound, cause the more keys you have, the more choices you have, but we've paid for it, we've paid for it by loosing flexibility, between notes*.

Q. Do you think the Kingma system is for everyone?

Well I think you need to fall in love with the sound of the instrument, more important then the mechanisms. If the sound is consistent, that's a flute head that you want, if the sound is able to project and be flexible, to play quietly, to play strongly that's important, then it's a matter of what you're demanding of your self really. I think a lot of players don't really ask themselves questions like 'okay what's the intonation'? Intonation isn't like set, whether your in tune, on one level, you're either in tune or not. I don't mean intonation in that sense, I mean at a much more advanced level, where you have choices to make, about the way you pitch certain

notes, in the tune that you're playing, in the chord that you're in, when your playing with people, in the voice that you're in, the style that you're playing, that's a very, very refined pitch control I'm talking about, that there is this surprising leeway and choices to be had within being in tune. For instance, it's interesting, I don't see why someone like Wibb would be doing with a Kingma system flute.

Q. Why's that?

A. *Just his way of playing, even though he's, I mean Wibb's reputation, William Bennett. Well, he is one of the biggest influences on flute playing in the world, not just in the U.K, and he's known for his sound, which is unbelievably big and the fact that he's supposed to play in tune much better than almost anyone, he's known for having, he has changed the flute, the scale of the flute, specially with Altus flutes, and he's left his mark and made flute players more aware of the importance of playing in tune. A lot of players around just sound sharp, or they are flat as soon as they play quietly, you know, but he has actually made a big issue of playing in tune but, his ear is not necessarily guided or sensitised to have the style of intonation that maybe a shakahashi or an Arabic knight, the Indian flute of the Andes, each of the indigenous ethnic styles of music making they have their own modes, and they play in tune, it might sound out-of-tune to us, with our western ear, but they want to sound like that, that particular intonation is what makes the way they play different and beautiful. His ear is a very western ear. So I don't see him particularly using the Kingma, anyway he plays all old French flutes.*

Q. So the flute isn't for everyone but it certainly can be for anyone. The question is, do they need it?

A. *Let me see, I've got fifteen students here, the answer would be they could, if they have the right head for it they could all expand into a Kingma system, but is it crucial for their musicality, no, they could play just about any piece that's written for them on their ordinary flute. It depends how evolutionary you are, if you had a discussion about this with Robert Dick, I mean he is twenty times more advanced in the whole issue of scales and ethnic instruments, and pitch and all that than I am, and he would probably want thirty more choices if you could have them, but he's right, right, right at the forefront. He's not the first one to do the keys but he certainly took a stand to only playing contemporary music, for a long time he only played his own music and he inspired Ian Clarke I think to a very large extent and yet in many people eyes Ian is quite a revolution because of his extended techniques. It's just, it's really how strong your desires, to break through the limitations of our instrument and no matter what instrument you have it has limitations. Any instrument has good things and not so good things no matter how fantastic it is, and our job as performers is always to go to the outer edge of what's possible with what you have and a lot of it is to do with your mind, not your fingers, it's to do with the way you approach the music.*

But you don't need it at the early stages of, you know you don't need a eight thousand pound flute when you're thirteen years old, you don't need it, you still have a lot to grow into with a student model flute. But when you refine your blowing and your attitudes, when your body grows enough to play with a power and subtlety that you can control then you need another instrument to push you to a new level, I think that's the best way I can find to answer that question of, whether its in the year 2005 is this what every flute player should have, in order to be able to play all of the pieces that are composed these days, and the answer is not necessarily.

Q. Where do think the inspiration for these designs should comes from?

A. *I think it's both, because there is a huge grey area between the concept of the piece in the composer's head, then that finds its way on to a piece of paper, then the performer, who has often never met the composer, tries to find that sound world, sometimes they fall very short of what the composer had thought, but sometimes he might have thought of approaches that the composer never even dreamt of but they might still be relevant, and that happens often. And of course composers are inspired by the players that they hear, a composer might hear a flute one day, and say oh that's a superficial instrument, because the player was superficial, and might hear another flute player getting really unusual sounds, and be totally transformed, and want to write something with that kind of mood and colour. So, composers need performers lead and performers need the vision and the ability not to limit themselves to their instrument so much, in order to grow out of our little world, the flute. So the meeting point between the instrument, composer and the performer, it's wrong to say this is what leads, at any given point, the design of the flute can engender a change in the whole culture of flute players, but so can a performer, and so can the demands of a piece, that out there and inspire all these players. So it would be a mistake to say this is what makes the change, it would be a mistake.*

Q. Is this regeneration necessary to keep the flute alive?

A. *I think, unless you're on the edge you don't find your real limits. Unless you're on the edge, working beyond that edge, that's when you're at the point when you can expand you're great horizons, and that's where all great work lies, if you're sitting pretty, sitting comfortable all the time, I think that's a small world, you're comfortable, but it's a small world. You created that control by the narrowing down of your options. I think it's more exciting to be pushing, to the forefront, and finding a way to make those things, happen, whether on the flute-making side, or on the performing side, or on the composing side. And I think it's important that the flute evolves, constantly, and when the flute evolves it doesn't mean it negates anything before it, the baroque flute is not, a lesser instrument than the modern flute, and the little flute with one key on it that was played five thousand years ago was not a lesser instrument than this. It represented the whole, the spirituality of man kind at that time, with that technology and at that point this was a huge breakthrough, without those steps you wouldn't get to where we are now, and anyway we're not better for it, what's better about our world to five thousand years ago. In many way technology allows us to be more of what we are, that's for the good things and the bad things as well. You can get caught up in your instrument, to the point when you start to feel that the instrument is giving you the choices that you make, no, you always play the instrument, what you ask of it is what it gives you. Just because you have seven more buttons of the instrument doesn't mean that you're really going to play in tune, and it doesn't mean that you are going to use them fully either. It's an interesting point.*

I think it very important to remember that when you talk about pitch, when you talk about sound, when you talk about colours and sounds, there are not different boxes, they're all very, very, very tightly related. When you choose a certain fingering, you're not only choosing it for the pitch or for the colour, but for the whole combination of things to be represented.

I've just got used to wanting something different, now I'd do that whether the Kingma system was there or not, but the fact that its there give me thirty, forty percent more choices.

It is really important what you are doing for Eva.

Brannen have done a great job, I think Brannen are better craftsmen and engineers than Eva. Eva had the genius of thinking of the idea, and Brannen in the

workshop, they're really genius at refining, and the craftsmanship of making the instrument, and one of the principle worries I had was that it wouldn't be a reliable instrument, I though that it having more keys, and would mean more maintenance and pad changes, I've had this flute for four years, but none of the quartertones pads have gone, and I've never had any leaks, and I also thought the keys might be a bit dainty and prone for bending with usage, I've not had that problem, it's a very reliable instrument, which is important, I think that because a lot of the keys are on top they don't get as damp as the keys lower down, so they last longer.

Thank you.

Appendix 10:
Telephone Interview with Eva Kingma[135]

Q. Can you give a brief history of the Kingma quartertone system?

A. *A Dutch flautist came to be in what must have '87,'89, and asked for an open hole alto flute, it was just me and my uncle at that stage, and I thought it was just going to be a one off, but then it really grew, I didn't expect such a market to grow. It was really crazy, we then moved onto an open hole bass flute which really was impractical with an open hole ring system. I applied for a patent in the early '90s, which took a year and lots of money, and finally got one fromm the US patent office, for my 'key on key' system. After that I started working on the C flute, which is unusual because most people start on a C flute and then move to the lower flutes, but I started the other way around. The C flute has different problems because it is smaller, so I looked to Brickford Brannen to work on this, since he is really important and someone that I could trust. So it must have been about eleven years ago I was invited to Albert Cooper's 70th birthday party, I met Bickford there and asked him to stay on another few days, we discussed ideas, and started working secretly, sending faxes and drawings. From there it has developed, Brannen Brothers now make the C flutes, and I make the lower flutes.*

Q. Do you play on the Kingma system?

A. *Well, I play it to try it out, and test my headjoint, but I don't have any aims of being on the stage, I was always taking my flute apart rather than practising my scales.*

Q. Do you see it expanding, and being for everyone, or more specific?

A. *No, I want to keep it to a specific market, I am not focused on a big market, I like it to be personal, that people can come in my shop and I can help them, not every bass flute being the same.*

Q. Do you think it needs special repertoire?

A. *Well there is more and more music that composers are writing for it, but mainly people apply it to the music that they have. But the growth of lower flutes is really taking off. The amount of flute choirs is increasing, especially in Scotland and Ireland and America, and orchestras and conservatoires are ordering the lower flutes now, which was unheard of before. People have always played the lower flutes as their 2nd or 3rd instrument, with exceptions, like Carla Rees and Christian de Jong*

Q. Have you heard of any others who are making quartertone flutes?

A. *Well I think I am the only one, this system is the only practical way of doing it, and it is unique to me. Technically the alternative to the 'key on key' system is to have many more holes, which would mean extra key work, extra weight, and the*

[135] Interviewed on 11th April, 2005.

sound would be effected due to so many perforations on the flute body, it would lose the sound.
Q. Can you explain the 'key on key' system?
A. *It's difficult to explain on the phone, it works with bridges, and rests, operated by a secular. It means there are less keys and that you can vent the keys. It is slightly different on a bass flute.*
Q. So, what is next for you?
A. *I am working with Mathias Ziegler on a bass flute with a G foot, it's very long, nearly as long as the middle body, very heavy, and has a T design to play it in front of you. I am also working on a contra in G, and a sub contra, which is even bigger.*

Thank you.

Appendix 11: Discussions.

11 A: Discussions with Helen Murray[136]

Helen Murray explained that after making several investigations into alterations of the design of the Boehm flute she came to the conclusion that the Boehm design is in fact the most appropriate compromise. She feels that any extra complications to solve certain issues, causes other problems to arise. She explained that perhaps the solution is to correct the body posture of the player through solutions such as the Alexander technique. When discussing the Drelinger headjoint,which Helen Murray has investigated flute in the past, she wondered whether this design would create other, perhaps unforeseen discomforts, particularly issues regarding the way the weight of the instrument would now be placed on the thumbs. She felt a better elimination of tension might be achieved by an inclined angle rather than a vertical headjoint.

Helen Murray explained that she feels physical discomfort is a definite issue which has to be addressed and wonders whether, in this culture of suing and disclaimers, whether organisations will have to take this into consideration. In the same way that office companies have to make sure that people have to have wrist rests at the computer keypad ensuring that workings don't receive strain injury, will suppliers of flutes, or instruments have to ensure that no injury can be created?

Helen Murray explained that a lighter flute, such as the stainless steel design by Stephen Wessel, ultimately results in a flute that produces less volume.

Helen Murray explained that the alteration which she made were interested in the production of different key-work for children to eliminate such a stretch of fingers in the left hand. She also discussed the use of a D foot, which can make a flute seem more free, because of its lighter weight.

When discussing the Drelinger Helen Murray also explained how she feels that the shape of the instrument is important to the essence of its sound. She feels that although a straight and curved alto flute both sound like an alto flute, there is great difference in the timbre produced by each.

When discussing the Glissando headjoint, Helen Murray was interested by the effect on the pitch and scale of the flute body, that the slide, and how one would play at the new position.

When discussing the Kingma system Helen Murray commented on elegance maintained with the addition of the extra keys to the flute, it has not created a cumbersome instrument.

[136]Opinions gathered during meeting, 4th February, 2005.

When discussing whether such developments should and is lead by composer, performers or flute-makers. She stated she feels it is a combination. However she feel there is a strong influence from the performers. She then mentioned that perhaps certain elements were led by different people, for instance the investigation into different materials may be mainly led by the makers.

We discussed the fact that not all flute makers are performers and how surprising this is since we both perceived flute making as an art form not just the mechanics, and since the smallest alteration may not make any mechanical or mathematical significance can prove to make an important musical and audible difference. Helen Murray felt that any developments to take away from the Boehm would have to be very radical to be remembered and that some designs, like the Drelinger will remembered as an eccentric past.

11B: Discussions with Ian Clarke.[137]

Ian Clarke, a teacher at the Guildhall School of Music and Drama, described how he feels if he owned a quartertone flute, regardless of the whether his compositions were possible on the Boehm flutes, that a barrier would be formed between him and some of his students. The student may be unconvinced by the quartertone possibilities of a Boehm flute, since their teacher has a quartertone flute. Ian Clarke states if there is a quartertone that he cannot produce on his Boehm flute he uses an alternative fingering, creating a different and often interesting timbre.

As a composer Ian Clarke feels that he should write for the Boehm flute, and incorporate the extended techniques into the repertoire of the Boehm, to make his pieces accessible to all.

Ian Clarke considers the popularity of flute and flute accessories to be somewhat market led. Taking the example of a B foot, Ian Clarke describes the Japanese flute market as slightly conservative in approach, flutes are generally made with a C foot and the purchase of B foot can be costly due to the additional manufacturing required. Whilst in America the flute manufactures generally produce flutes with a B foot, and consequently the reverse is true, that the purchase of C foots can be costly.

Ian Clarke feels that the Kingma system was made with passion rather than economically and that maybe certain aspects of the flute could be adjusted, perhaps removing elements that enhance features which are in fact already possible on the Boehm. These alterations may lower the price and raise the acceptance of the flute by more people, indeed he would be tempted to purchase one. He comments that if people are going to stretch further economically it is usually in the way of a more expensive material.

Appendix 12: The edited responses from emails.

12A. Butterfly headjoint

Damian Bursill-Hill[138]

[137]This comments are collected from many lessons.

[138]Received on 22nd November, 2004.

1) What are the advantages of the Butterfly headjoint?
I think the advantages that I have found with them have to do with 1, the immediacy of response, especially in the 3rd octave and 2, the rather beautiful tone colour. In addition, listening to myself on playback I became aware that it resulted in substantially fewer attacks (inaccurately and unhelpfully) described by most flutists as "cracked" notes.
2) How did you hear about the design? Have you tried any others?
Going way back to the late 80s it seems that I heard and played one owned by a colleague at a Festival in Canada. By that time I was well aware of the reputation of the flutes made by Jack Goosman. Yes, many.
3) What made you want to perform with a Butterfly headjoint? Did you feel the flute you had was lacking in some way, and how?
Probably having played a long time on a very fine and strong sounding flute, I was fed up with the Music Director constantly shushing me, so I wanted a head that would not compromise my sound in soft passages and be easy to manage at those lower dynamic levels. So the switch to the Goosman was a radical change more than anything.

Janice Coleman[139]

I use the Butterfly with my 14k gold Jack Moore as it really evens out the registers, possesses good intonation capabilities, and has a beautiful, smooth, rich sound. I did not seek out this headjoint for any particular contemporary technique qualities. As a second flutist in the SLSO, my desire was to have a sonority which would blend well in the section.
1) What are the advantages of the Butterfly headjoint?
I found that the gold Butterfly headjoint I purchased from Mara Goosman gave a more even quality to the tone of my Jack Moore gold flute throughout the registers. It improved the intonation capabilities, and also seemed to increase the smoothness of response, enhance the richness of tone and provide a more beautiful sound in general.
2) How did you hear about the design? Have you tried any others?
I heard about the Butterfly from advertisements in flute magazines, tried the headjoint at flute conventions, and finally actually bought the headjoint while trying various models that Mara Goosman had with her while visiting St. Louis and Jan Smith. I began my search for the sound I desired early on through trying different headjoints as far back as the 1960's. I tried different headjoints for a Powell flute I once owned from various sources: purchased one from Powell to Joseph Mariano specifications (high wall); Drelinger headjoint; Jack Moore headjoints. Then after purchasing the Jack Moore gold flute, I tried another Drelinger headjoint for it (gold), and finally settled on the Goosman gold. I still own the Drelinger gold in addition to the original Jack Moore and the Goosman.
3) What made you want to perform with a Butterfly headjoint? Did you feel the flute you had was lacking in some way, and how?
Firstly, the original Jack Moore flute headjoint actually had the embouchure plate come unsoldered during an orchestral performance in Tokyo, and although it was repaired by Miramatsu while in Japan, I began a search for a better headjoint. My experience with the Drelinger I then bought was quite disappointing and did not successfully answer my needs. Goosman was my next quest for a beautiful, even

[139]Received, 23rd November, 2004.

sound rich in quality and better ease with performance.

4) Performers have found that the Butterfly headjoint creates easier travel between octaves and interval leaps, makes playing long phrases easier, stabilises intonation, that the dynamic range and control is improved, that there is a better response to tonguing in the lower register and more response in general, with a more immediate articulation. Have you experienced these advantages?

Yes, I have experienced these advantages as you have assigned them.

Nancy Ruffer[140]

I use the Goosman Butterfly headjoint on my old Armstrong alto flute. I am not into any new flute keys or head-joints. If I were just starting out in contemporary music I might, but at this stage in my career I feel it would take up too much time to learn any new system. I do micro and quartertones either by fingerings or embouchure changes.

1) What advantages do you find of the Butterfly headjoint?

The headjoint directs the air better, creating a more focused sound. Easier to blow, and was designed so that it fit the Armstrong alto flute especially. That's what I used it with. Now I use my ordinary Kingma alto flute, without a quartertone system.

2) How did you hear about the design? When did you begin performing with it? Do you use it to perform all of your repertoire?

I heard about it through my flute teacher Bernard Goldberg, who I think taught Goosman the flute. Anyway, I met him at Goldberg's house in Pittsburgh and tried out the headjoint there, many years ago, and chose one with a gold riser. I used to use it all the time.

3) What made you want to perform with a Butterfly headjoint? Did you feel the flute you had was lacking in some way, and how?

Yes, the Armstrong was lacking a full and focused sound and the Butterfly headjoint made it sound wonderful.

4) Performers have found that the Butterfly headjoint creates easier travel between octaves and interval leaps, makes playing long phrases easier, stabilises intonation, that the dynamic range and control is improved, that there is a better response to tonguing in the lower register and more response in general, with a more immediate articulation. Have you experienced these advantages?

Never really thought about it; just knew that it was easy to play and sounded great.

12B. Glissando headjoint

Stefan Keller[141]

1) What are the advantages of the Glissando headjoint? Also what are the advantages of the Kingma system flute?

[140]Received on 9th March, 2005.

[141]Received on 2nd January, 2005.

The Glissando headjoint offers a new approach in flute playing. For playing ethnic music, I now have much more possibilities. The Kingma system lets you play real quartertone scales with no problems. Also you can play more multiphonics in an easier way.

2) How did you hear about each of these flutes? When did you begin performing on them? What repertoire do you perform with these flutes?

The Glissando headjoint, I have known Robert Dick personally for years. He told me about it several times. I have had the Kingma system flute for 9 years. I read about it on the Internet and tried at an exhibition in Frankfurt. I use the Kingma system flute for all the repertoire. The Glissando only for specific music I have to explore right know.

3) What made you want to perform with these flutes, did you feel the flute you had was lacking in some way and how?

I am always curious about new possibilities in the flute design.

4) It is stated that a Kingma system flute helps to maintain a perfect pitch control, and helps flexibility in matching timbres and intonation in ensemble work. Have you found this to be the case?

I am not using it in this way. I play in an ensemble just the "normal" way.

5) What genre do you feel that the new Glissando headjoint has helped you to explore in more detail, jazzy improvisations or portamento violin transcriptions, or simply the ability to cross between many genres?

To cross between many genres is the great advantage of this headjoint.

Michael Pestel[142]

In general, I make use of the following headjoint devices: Robert Dick's glissando headjoint, Kotato's membrane headjoint, a 19th C. "upright" headjoint (not Drelinger's), and a shakuhachi headjoint by John Neptune. I also have a Drelinger headjoint with a platinum air reed and modified lip plate. In the past, I've played a Kingma system quartertone flute, but don't currently own one.

1) What are the advantages of the Glissando headjoint? Also what are the advantages of the Kingma system flute?

Let me say, first of all, that every mechanical addition to the basic flute, starting with a hollow reed with holes in it (a bansuri or shakuhachi, for example), gives you something and also takes something away. A bansuri or shakuhachi remains unexcelled in terms of sound quality, depth of sound and ability to move freely on the instrument. With Boehm, however, the emphasis is on as precise an accommodation of equal temperament as possible and, along with the newly designed ease of fingering, a homogenisation of sound throughout the instrument. Great invention, but none of the meditative beauty and quirkiness of the simpler instruments.

Having said that, people like Eva Kingma have sought to restore to the modern flute the ability to reliably and predictably play scales other than the standard Western diatonic ones. Kingma system flutes allow a smooth connection between the diatonic, equally tempered Boehm system and the universe of quartertones. That is what is gained in such a flute. However, what is lost, even in comparison to the standard open-holed flute, is ease and quickness of movement and certain kinds of finger movements along the keys that are blocked by the additional mechanism.

[142]Received on 17th January, 2005.

By the way, the best conventional flute currently on the market is made by Nagahara in Boston. His full-concert model is the first rethinking of Boehm's tone-hole positions in nearly 150 years. The bores and tone holes on these flutes are the largest available and have the ability to play very loud and very soft.

With Robert dick's Glissando headjoint, the conventional slide whistle is married to the transverse flute. He used to wear a football helmet with the headjoint affixed to the face shield and allow the body of the flute to move in and out. Then Bic Brannen came up with the idea to just get the lip plate and cork to move in a longer headjoint tube. What is gained here is both a kind of "wha wha pedal" effect and extended glissandi off any note and at any speed. Really an incredible invention, the notes are no longer fixed within the conventional minor-to-major second glissando possible on the open-hole flute (mind you, there are players who have learned to do relatively smooth glissandos of an entire octave or more - actually that's easier done on a bansuri or shakuhachi - but nobody can duplicate the smoothness or rapidity of the Glissando headjoint!) on the other hand, what is lost in this headjoint is the ability to play freely without the "dental dam" around your cheeks. It is also not quite as resonant as normal headjoints because it has a huge notch cut out of it in order to accommodate the sliding mechanism at the top of the elongated headjoint.

I have twice tried the Drelinger 'UpRite' and came close to buying one because it eliminates the torso twist that the conventional flute stance forces one into and is a perennial plague to many flutists. (Indeed that is the worst aspect of the flute: the stance. Ultimately detrimental to the body.) The 'UpRite' is a brilliant development, but is still waiting for someone to redesign the rest of the flute to accommodate the upright stance. As it is now, the flute simply does not play proficiently in this position because it is designed to be played off to the side. I do have a 19th century upright style headjoint that is not as efficient as the Drelinger, but works well nonetheless.

I also have a shakuhachi headjoint made by John Neptune in Japan that is quite wonderful. It is also upright in stance and marries the sound of the shakuhachi to the flute. Very cool.

Another kind of headjoint that I play was designed by Kotato in Tokyo based on the ancient Chinese membrane flute. Here, there is a membrane of rice paper just below the embouchure hole which vibrates when the flute is played creating a reedy effect like a clarinet or soprano saxophone. This adds some punch to the normal sound of the flute.

Beyond all the above, I also bring a whole range of vocalizations to play on the flute and this must be taken into any account of how modern players approach the instrument since the voice can blend seamlessly with the flute more than any other instrument. In addition, I attach a range of bird sound devices to my flutes with which I can access other sounds rapidly while playing the flute.

2) How did you hear about the each of these flutes? When did you begin performing on them? What repertoire do you perform with these flutes?

I heard about most of this stuff via friends, the Internet, the grape vine and some of it was invented out of necessity. I have been interested in extending the conventional flute since about 1990 and apply this exploration primarily to improvisation, especially in my long term project of performing live with birds around the world.

3) What made you want to perform with these flutes, did you feel the flute you had was lacking in some way and how?

Yes, one gets tired of conventions and searches for new frontiers of unexplored terrain. One wants to shake people out of their complacency because change is the

one constant in this universe. I also had the feeling that there are hundreds of flutists out there who can play Bach and Poulenc etc much better than I can or wish to give the time towards developing and so why not develop something new and exciting. This, of course, is a never-ending process.

4) It is stated that a Kingma system flute helps to maintain a perfect pitch control, and helps flexibility in matching timbres and intonation in ensemble work. Have you found this to be the case?

Well, that is most assuredly true because her flute allows microtonal adjustments on every single note. But any accomplished player can do the same thing on an open-holed flute when confronted with the standard repertoire.

5) What genre do you feel that the new Glissando headjoint has helped you to explore in more detail, jazzy improvisations or portamento violin transcriptions, or simply the ability to cross between many genres?

The latter and the invention of new styles.

I would also be very interested to know a lot more about the other flutes that you mention, and the way that you 'prepare' your flute.

Yes, as far as I know nobody is "preparing" flutes quite the way I do. For one thing, as I mentioned, I'm interested in bird sound. The syrinx in some birds splits the air sack in such a way as to produce multiphonics unrivalled by any modern or ancient flute. In order to mimic this, I have inserted a small cylindrical object into the flute which is free to move along the length of the tube. The tube is closed off at the far end with a screen to prevent the cylinder from falling out. Depending on where the short cylinder is located at any particular point, different kinds of overtones, timbres, glissandos and multiphonics occur. The difficulty in controlling this movement is half the challenge and fun, the unpredictable nature of these effects make for very dynamic playing.

I also use the flute in combination with paper "bullets" that fit into the tube near the embouchure hole. Like with the above syrinxial effect, the paper ball also affects the overtones, timbre and range of multiphonics. In this case, my playing with the object in the tube culminates with a blow-gun like blast which propels the ball into distant sonic objects such as gongs, piano soundboards and string instruments. It is a way of engaging the space one is playing in physically and taking advantage of something that no other woodwind instrument is capable of doing.

12C. Kingma Quartertone System Flute

Anne La Berge[143]

1) What are the advantages of the Kingma system?

[143]Received on 17th November, 2004.

The Kingma systems allows me to independently open and close more keys than on the conventional flute. Thus, I have more tuning, more sonority, more pitch and more multiphonic options.

2) How did you hear about the Kingma system? When did you begin performing on it?

I was one of the performers being consulted during the development of the flute. I performed on a prototype in the mid 1990's during the flute's development period. Now I own a Brannen/Kingma flute. I also own a quarter tone Kingma system alto flute.

3) What made you want to perform with the Kingma design, did you feel the flute you had was lacking in some way and how?

I have been an extended technique and microtonal flute player since 1974. Thus, the chance to extend my playing possibilities in terms of number 1 above were more than welcome by the mid 1990's!

4) It is stated that a Kingma system flute helps to maintain a perfect pitch control, and helps flexibility in matching timbres and intonation in ensemble work. Have you found this to be the case?

Yes. I would like to avoid the word perfect because it does not imply musical decisions. Perhaps one could say: the Kingma system flute helps one make more detailed pitch decisions and gives the flutist more options in timbres and intonation possibilities in ensemble playing, including with electronic and acoustic instruments.

John Fonville[144]

1) What are the advantages of the Kingma system flute?

There are several: accurate and acoustically optimal quarter tones, greater glissandi options, more alternate fingerings to play in tune at extreme dynamics given all of the above, a greater palette and expressivity in all forms of music that might be enhanced from the above

2) How did you hear about the Kingma system? When did you begin performing on it? What repertoire do you perform with the Kingma system?

The history has been documented in several articles including one I wrote for flutist's quarterly many years back. Let me know if you can find it. I heard about Eva in 1987 and met her the next year to discuss the possibility of a quarter tone flute. Some time later 1990 she made for me the first Kingma system alto flute. It is (was)very primitive compare to today's system. I perform all music on her system but only use the extra keys only when required, such as Ferneyhough and a large number of other composers here (and formerly here). Ben Johnston's work is certainly more possible now as well.

3) What made you want to perform with a Kingma system, did you feel the flute you had was lacking in some way and how?

Given my interest in microtonality I have long been frustrated with the lack of consistent microtonal potentials. This frustration goes back to about 1975.

4) It is stated that a Kingma system flute helps to maintain a perfect pitch control, and helps flexibility in matching timbres and intonation in ensemble work. Have you found this to be the case?

I was trained to only use alternate fingerings in extreme cases, otherwise good traditional technique would provide everything in the normal realm. That said, this flute gives us more options.

[144]Received on 3rd January, 2005.

Marion Garver[145]

I play Kingma system flutes. My concert, alto, bass and contraBass(and soon, contr'alto) all have her system on them.

1) What are the advantages of the Kingma system?

The ability to play more microtones and multiphonics. Even in jazz or pop music, I am able to bend notes for effects. And the fact that I am unique!

2) How did you hear about the Kingma system? When did you begin performing on it?

I heard about Eva from my teacher at California Institute of the Arts. Her name is Rachel Rudich. I first bought an open-holed alto flute from Eva. Then I met her on a trip to Europe and became more interested in the Brannen-Kingma system(1995). I got my Brannen-Cooper-Kingma in 1996 and then got my bass flute(with an extra C#+ key(lowest possible quartertone key so far!), then alto(1998) and then contrabass(the only one in existence with the Kingma system) in 2000.

3) What made you want to perform with the Kingma design, did you feel the flute you had was lacking in some way and how?

I did not play any quartertones, just some bending before I got the Kingma. I was thinking about a Master's degree and the flute professor at the University of California, San Diego (John Fonville) was someone who had a Kingma proto-type and was performing and composing on and for the instrument. I was interested in taking my own performance further and I love Eva's instruments.

4) It is stated that a Kingma system flute helps to maintain a perfect pitch control, and helps flexibility in matching timbres and intonation in ensemble work. Have you found this to be the case?

I do not use my instrument's keys to improve my pitch. I still roll in and out and use my ears. I do find the quartertones in pitch, but the timbre is simply more interesting to me.

I have performed mostly contemporary classical and improvised electronic pieces with my flutes. Most of the works I have studied or premiered are not specifically written for the quartertones, but include microtones and are easier to play on the Kingmas.

I have compiled a small list of pieces I perform on the Kingma system instruments that include a short piece I wrote for my Master's thesis which uses allthe Kingma keys. The only premieres will be the contrabass pieces, so far. Hope this helps

Concert flute:
Quoq for solo flute(1978) Robert Erickson
Thinking, Speaking for flute and bass flute(1996) Matthew Shlomowitz
B-down Blues for G(for Kingma-system flute)(1999) Marion Garver
Venus Noodles(1996) John Fonville
Alto flute
Susanis Echo for Alto flote(1985) Karlheinz Stockhausen
Quays for flute(alto flute) solo Giacinto Scelsi
Raga Kalyan: alaap for Alto Flute(2003) Jim Palmer
Bass flute
Thinking,Speaking II(bass flute) Matthew Shlomowitz
Current commissions:

[145]Received on 12th November, 2004.

Contrabass flute pieces(with use of Kingma-system keys)
Shawn Pinchbeck- electroacoustic composer, Edmonton, Alberta, Canada
June 2005
Chris Fulford-Brown- electroacoustic composer, San Diego, California, USA
2005.

Jennifer Higdon[146]

1) What are the advantages of the Kingma system flute?
The flute is more flexible, with more keys to add to the control of the pitch, colour, and sound. It's a far superior flute that the regular Boehm flute.
2) How did you hear about the Kingma system? When did you begin on it? What repertoire do you perform with the Kingma system?
I knew flute makers at Brannen Brothers (I have an Osten/Brannen/Kingma flute), they told me about it, and then I tried one out at the National Flute Convention. I began playing on one around 1997. I play primarily just the standard repertoire. It's just a more flexible flute.
3) What made you want to Kingma system, did you feel the flute you had was lacking in some way and how?
I knew it was just a better instrument.
4) It is stated that a Kingma system flute helps to maintain a perfect pitch control, and helps flexibility in matching timbres and intonation in ensemble work. Have you found this to be the case*?*
Absolutely.
5) It looks as though you compose for the conventional Boehm flute, is this the case? Why do you choose not to compose for the Kingma system flute?
I write for the performers who commission me...it's just that no one who plays a Kingma flute has commissioned me.

Myrto korkokiou[147]

I have an Eva Kingma flute and I am very satisfied with it. I can use it in all styles of music (baroque to modern).You can also use it in orchestral playing-using the extra keys for intonation. Also to make new music, using extra multiphonics and alternative fingerings.
1) What are the advantages of the Kingma system?
As you already know Brannen-Cooper Kingma System Flute is the first C concert flute to offer a full quartertone scale. It has six extra keys in addition to the standard Boehm mechanism. So the first obvious advantage of this flute is to play accurate quartertone scales. Some of them are produced by extra keys and some other by venting the open holes. Therefore, you can perform easier non Western and jazz music. The second advantage is that the extra keys offer to flutist the ability to produce unique multiphonics. For example you can play chromatic quarter-steps multiphonics. Another advantage is the superb pitch control, since you can use the extra keys to alter the pitch.
2)How did you hear about the Kingma System? When did you begin performing on it?
When I was in London I had some lessons with Robert Dick. He has a Kingma System flute. I heard about this flute from him.

[146]Received on 22nd December, 2004.

[147]Received on 18th November, 2005.

3) What made you want to perform with the Kingma design, did you feel the flute you had was lacking in some way and how?
The flute that I had was an intermediate range flute (Sankyo silver-sonic). I wasn't happy with this and I needed a professional flute. So, instead of buying a standard good professional flute, I decided to give some extra money to have a flute that offers me more possibilities. I like performing modern music and also I compose. Especially in composition I use all these extra fingerings and sound effects.
4) It is stated that a Kingma system flute helps to maintain a perfect pitch control, and helps flexibility in matching timbres and intonation in ensemble work. Have you found this to be the case?
This is of course an advantage and gives you the flexibility to gain a very good pitch control in ensemble work. For example, pitches like high G and A can be shaded down by closing rings such as F# and G# respectively. You can also have more alternative keys for the high F#. Personally, I didn't buy this flute for that reason, because I believe that you can have a good pitch control in a standard professional French model flute. I wouldn't buy this flute only for this reason! I do use my quartertone in my compositions, but mostly to produce different timbres and multiphonics. I use it as a source of sound. I haven't composed a piece only for this flute. The piece, includes some fingerings of quarter tone flute, but it is not based on that. I know that some flutists have composed pieces for that flute.

Kate Lukas[148]
1) I have had a Kingma system bass flute for a number of years, and have performed Ferneyhough's "Mnemosyne" on it, as well as some standard repertoire. I have given Eva Kingma some feedback during the development of her flute and headjoint.
2) When she teamed up with Brannen-Cooper, I played one of the prototypes of the C-flute with its quartertone additions.
3) No experience with the Drelinger headjoint.
4) I saw Robert Dick demonstrate his glissando headjoint at the NFA convention last summer and played it a bit myself.
5) I have tried the Goosman Butterfly design over many years, but never bought one.

Carla Rees[149]
1) What are the advantages of the Kingma system flute?
Open holes (especially important on an alto where most are closed hole), F# footjoint (rare for an alto), reliable, even sounding quarter tone scale, greater possibilities for contemporary techniques, e.g. multiphonics, alternative fingerings, glisses, timbral trills etc incredibly well made instrument with excellent headjoint – very responsive. Also custom made so completely suits me and the things I want to do.
2) How did you hear about the Kingma system? When did you begin performing on it? What repertoire do you perform with the Kingma system?
Originally had heard about it through various contact with Robert Dick. Then I was researching alto flute design and got into contact with Eva. She told me she'd never made a full system alto, so I commissioned one from her. It was finished in 2000. I play pieces which have been written for me and my ensemble, I have quite a library

[148]Received on 7th February, 2005.

[149]Received in 21st January, 2005.

of music now (several hundred pieces). I do lots of premieres (about 60 I think so far). I play standard and microtonal music on it, it works well with all repertoire.
3) What made you want to perform with a Kingma system, did you feel the flute you had was lacking in some way and how?
Alto flute is very lacking in contemporary possibilities – ironic for what is essentially a contemporary instrument. Closed holes are a massive limitation to multiphonics and alternative fingerings, especially. Also I do a lot of work with electronics and was becoming more and more interested in the use of microtones.
4) It is stated that a Kingma system flute helps to maintain a perfect pitch control, and helps flexibility in matching timbres and intonation in ensemble work. Have you found this to be the case?
Yes but you need a very good ear too. Playing quartertones helps to develop a good sense of pitch (how many musicians can accurately hear a perfectly in tune quartertone?) and the instrument has more flexibility because of all the extra fingerings etc available.

After a recital given by Carla Rees she made some further comments:[150]

Carla Rees explained the Kingma system alto flute she owns is the only alto flute which has the complete quartertone scale, since the other alto Kingmas owned by a Parisian flautist and by Robert Dick have one key missing. Carla Rees explained she only owns a Kingma system alto flute, not a concert flute as well. She is an alto flute specialist and she initially wanted an open-holed alto to fully explore contemporary alto flute music, and later the newly commissioned work that she would receive. Since an open-holed model would need to be specially made she felt that she should go all the way and get a full quartertone model.

Carla Rees described the extra weight added to flute by the additional key-work. She finds this a problem in pieces which do not include a sufficient amount of rests written into the piece for her to rest her arms. When she began her career, specialising in the performance of this instrument, she had to weight train to prepare her shoulders for prolonged holding of this weight.

Great care is taken in the individual production of the Kingma system and it is individually tailored to each performer. She explained that Eva Kingma placed the open tones holes of the keys in comfortable reach for Carla Rees, by measuring her hands.

Carla Rees discussed her astonishment at the quantity and frequency of compositions that her and her ensemble receive. They regularly receives new composition every week.

12D. Drelinger 'UpRite' headjoint

Professor Moshe Aron Epstein[151]

As to the 'UpRite': It is a great innovation, although not the first one in flute history; maybe the more successful one, though. I believe Sandy's idea was just to make it

[150]Opinions gathered after a recital on 18th February, 2005.

[151]Received on 19th March, 2005.

happen - to produce a vertical head joint, functioning and playing the flute well. Well, he did succeed. You need no adjustments as of the tone production, only holding the flute vertically needs getting used to. For the hands it is not so extremely comfortable in spite of the somewhat bulky mechanics Sandy developed for it. It may have been better to create a whole new flute, where the keys are no more in on row but actually arranged like in a bow, so the fingers can reach them without strain. Of course, the question of how to control the amount of mouth piece coverage is completely different than in the "normal" flute: you have to raise the whole instrument in order to cover more or take it down to expose it more. The whole stability of holding the instrument is new to define, but is not difficult to achieve. As to the sound: first of all the way the player hears his/herself is totally different. We anyway hear ourselves differently than the listeners do, in the vertical flute all sound comes from a different place, for us players. The quality of sound is also different from the horizontal "normal" flute: it has more air stream in the edge of it, it sounds a bit jazzy, I would say. Also I found the sound hard in its basic, although it allows for all dynamic range and for colours. I think for Baroque music this head joint is less suitable than to 20th century's. I normally play the Baroque pieces on an old wooden Rudall&Carte flute (from 1902) and a wooden head joint made by Robert Bigio. This combination sounds much warmer and smoother.

Alexa Still[152]

1) What advantages do you find that the Dreligner 'UpRite' headjoint brings?
Basically the flute is held vertically. Both hands are in front of the torso, and lower, and there isn't the tension in the shoulders/upper back that can come from lifting the arms to hold a transverse flute. I think the differences one feels in playing vertically can be very educational in teaching us about necessary body involvement versus extraneous/unecessary tension in playing the traditional transverse flute.

2) How did you hear about the Drelinger 'UpRite' headjoint?
From the maker- Sandford Drelinger (a friend of mine)

When did you begin performing on it?
Many years ago- as soon as he had a prototype, I was trying it out from time to time as our visits allowed.

What repertoire do you perform with the headjoint?
Anything. I don't see any limitation...

Do you have other headjoints that you use for other repertoire?
I have a wooden (thick wall) headjoint that I use for Baroque and classical repertoire. Ordinarily I play a Drelinger headjoint (transverse, 9 k tubing, 10 k lip plate, free flow with platinum air-reed and a tootsweet stopper design) on a silver Brannen flute.

3) What made you want to perform with a Drelinger 'UpRite' headjoint, did you feel the flute you had was lacking in some way and how?
No. I don't personally have any need for this, and my interest is primarily that of a teacher/performer of possible influence. I have had students who had various physical ailments, requiring an alternative holding position or else.... So, my interest was initially of one exploring options for my students, then graduating to an interest in doing what I can to help promote a fabulous idea. (I want to make sure that it is clearly understood that my interest is self motivated. I take pride in not being beholden to any flute company or maker!) I know of quite a few folks where this

[152]Received in 26th February, 2005.

gadget makes it possible for them to play when they would otherwise have to quit the flute....

4) It is stated that the Drelinger 'UpRite' headjoint improves technique due to overcoming the physical discomfort of the awkward position of the transverse, have you experinced improvements?

For me personally, I think the added awareness I learn about how I physically function leads to better technique. Obviously for other people, this upRite makes it possible versus not possible to play- I guess that counts as quite a substantial improvement in technique.

5) It is also stated that not only does the flute project sound vertically to the listener, giving a richer flute tone, but that the player no longer has to compensate for the fact the music is produced is heard more by the right ear. Have you noticed the effects of this?

It is frankly alarming, at first, to hear the flute sound essentially balanced in both ears, and I believe that effect alone does change how people play. The additional improvement would come for the reduced tension involved in holding it. I think that body resonance accounts for a great deal in tone quality.

6) Do you find it challenging adjusting to the vertical position from the transverse?

Initially, yes. After a while; no, not at all. It has taken me some time to work on this with the people I have helped. Drelinger has made numerous improvements in recent years to the equipment supplied to help hold it and that has helped a lot. Just as with a normal flute, everyone is built differently, and has different personal issues to accommodate. Once those issues are sorted out and some consistency in positioning is there, it is actually very easy to swap from one to the other.

7) Have you tried any other contemporary designs, such as the Kingma quartertone system flute, the new Glissando headjoint by Robert Dick, or the Goosman butterfly headjoint?

Yes to all of the above. My next purchase will probably be a Glissando headjoint. I like the Kingma flutes a great deal, but I don't feel I play enough of that repertoire to need that quarter tones at this stage. I could see getting more use out of the glissando potential. The Goosman design is, in my opinion, just one more headjoint design that affects air direction and turbulence around the head joint. I play a Drelinger "free flo" design which looks a little like the reverse of a Goosman, and find that suits me much better because of my slight teardrop embouchure.

12E. Those who do not own one of the flutes

Robert Aitken[153]

[153]Received on 17th January, 2005.

I just play a basic Powell flute with a low B and open holes. At times, there are certainly problems to be encountered with contemporary pieces, but I still prefer a beautiful flute sound which cannot always be produced on the more complicated instruments. I know very few players who can play traditional music on a quarter tone flute, one of the best exceptions being Harry Staarefeld from Amsterdam who now teaches in Bremen. I think I have tried all of the flute devices you mentioned but do not feel it is worth the financial investment for the limited repertoire one can play. I am sorry that I do not have very much time to enlarge on this.

Sebastian Bell[154]

1.Performers will always seek to improve the instrument that they play. The modifications to Boehm's original design however are relatively minor – the initial concept remains as it was.

2.With very few exceptions, all flute repertoire can be played on flutes of existing design and in my opinion it is an open question whether or not a radically altered instrument (e.g. A quarter tone Kingma flute) is properly described as a flute within the normal meaning of the word. It should be borne in mind that sweeping changes to design might well mean that the instrument is no longer suitable for performance of mainstream compositions.

3.I do not play any of the headjoints in your list. If I find the need for some form of "special" equipment I would construct it myself.

In conclusion I must say that I strongly believe that "new" instruments should be created in response to composers' demands, not the other way round.

Richard Craig[155]

I play on an Altus 807 (which I think is the one with a metal not silver tube) with a Lafin headjoint. I have played contemporary on it for a few years now and it is a reliable instrument. For anything with a low B I use a Pearl B joint. Simple as that. I have thought about quarter tone flutes, my only hesitation with quarter tone instruments is that they are a little heavier because of the extra key work and in a sense, a new fingering system that is superimposed upon the original. For slow quarter tone passages this is fine but for more dexterous work I think that it would be problem. Again, I have yet to experience this first hand. To be honest, I have still to hear someone in the contemporary scene play a quarter tone instrument with conviction and using a standard contemporary piece. Once such piece is 'Sgothan' by James Dillon which is full of quarter tones.

With reference to Robert Dicks 'wah-wah' headjoint I struggle to think where else it could be used apart from jazz, improvisation and his own music. Although a marvellous achievement I can't say that I would invest in one. Unfortunately I have not come across the others you mention apart from photos in Pan magazine. Perhaps I am discouraged because the 'gimmick' of such an instrument?

I think composers who have written especially for a specific instrument or player automatically limit the performance of the piece and thus, as yet, they have been slightly cautious to this. A few examples are works written for Pierre-Yves Artaud. He has numerous works for Octo bass flute and bass in G, which are relatively rare outside of flute bands. The upshot is, no one else can play them apart from him. There was a piece written recently by Rodger Redgate (he is a lecturer in

[154]Received on 18th November, 2004.

[155]Received on 1st February, 2005.

Goldsmiths) for the flute player Anna la Berge. She has a quartertone flute and this piece is written for that instrument. The work is called 'Atem Kristal' and when I asked Rodger Redgate about the viability of playing on a 'normal' system he said that it would be ok. It may be 'ok' but since the quartertone scale on the normal system is slightly unbalanced I feel that the interpretation would be compromised.

Detta Danford[156]

I don't use any of the flute types you mentioned but I do play a lot of comtemporary flute music and have managed to conquer whatever challenges they set, thus far with the standard open holed flute. I play pieces such as Xi by Stockhausen, which I know Ian plays, consisting of long scales of microtones and I have found it very interesting and challenging to work out fingerings etc to get the best sound for these pieces without any specially designed system.

Phillipa Davies[157]

I have looked at the Kingma and know about Robert's glissando headjoint with curiosity but not really seriously. I believe that the challenge is to try out extended technique with existing instrument although I am impressed with these developments. Also it retains the all rounded nature of ones playing (i.e. not just contemporary but the whole gamut of styles)

Joanne G'Froerer[158]

I do play contemporary music on occasion, but it is not my speciality as it is for some flutists. Most of my time is spent playing standard orchestral repertoire, which does not require much in the way of extended techniques. I do play concertos a few times a year, and quite a bit of chamber music, but have never felt the need to change my equipment or set-up to play the occasional pitch-bend, key-click or multiphonic that might come along. I play on a 14K gold Brannen-Cooper flute made in the early 1990's. I have tried the Goosman butterfly headjoints a couple times in the past, but have not tried the other headjoints you mentioned or the Kimgma system flute.

Guy Harries[159]

As to the modifications of the flute, I must say I have never tried them. I was aware of some of the modifications you mention, but somehow found my flute sufficient for my purposes. Robert Dick´s famous book about the flute did inspire some of my experimentation with flute techniques, and encouraged me to find more techniques that would suit my interests. In the piece you heard my main idea was to create shifts between ´noise´and ´pitch´. This was based on the idea that any breathy sound which is basically noise will have particular prominent pitch centres. And the electronics helped me expand on the idea. Using the flute as it is actually helped me make the shift between the ´familiar´ (pitch) and ´extended´ or ´unfamiliar´ more obvious. I also use electronics a lot, so this already extends the sound vocabulary quite a lot, enabling me to use the familiar instrument as the initial ´interface´.

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Dave Heath[160]

Quarter tone flutes etc are interesting but I seem to find the opposte of most people ie I find closed holes easier to control and more reliable and easier to bend notes than open holes so Im sticking with that for the time being.

Larry Krantz[161]

I don't use any of the systems you mentioned above. If I were often called upon to perform repertoire that included quarter tones then I would most certainly look to Eva's flute for that purpose. Sandy Drelinger's upright head is designed primarily to eliminate physical problems associated with the traditional transverse holding position of a flute. I have experienced no problems in that regard therefore have had no personal need to look in that direction. Alexa Still plays on one of Sandy's traditional heads and loves it. She also agreed to record a demo CD for him using his 'UpRite' head. Robert is rightly very serious about his glissando head but I must say that I tend to view it as mostly a novelty. I suspect that it will be welcomed with open arms by many jazz flute players but until demands for that feature increase in classical composition I suspect that it will not be widely adopted by traditional flute players. I have no experience with Mara's Butterfly head. Along the same line of approach... J.R. Lafin makes a very successful head that uses Adler wings on the lip plate. My understanding is that the work of Alexander Murray during the 50's, 60's, & 70's represented the most significant departure from the standard Boehm design that has happened since the Boehm flute first appeared. Many of Murray's students began using his design in the 70's and there were likely others as well. As far as I know, the Murray flute is no longer in production so it would seem to be fair to say that his design was not widely adopted.

Ruth Morley[162]

I play a very standard openhole flute. I heard Robert playing his glissando head joint a few years ago when he was still developing it, and it's an interesting sound.
Most of what I do is connected to playing contemporary music and working with composers, and have so far managed to do everything required on my very normal flute. Most composers will talk to a player to find out what is possible if they want to use some extended techniques, and discuss ways to produce the sound they are after. When using quarter tones I've managed to doctor conventional fingerings ie half hole, lip up or down etc to achieve the pitches. I can think of one piece which I played last year which would have been much easier with a quarter tone flute, but it was still playable on my flute.
It is an interesting question whether composers will write for these new flutes when as yet not many people have them, and therefore they will be writing a piece which not many people can perform if the music relies on the new instrument. On the other hand until there is more music which needs a new design many players will maybe not see it as a necessary thing to possess such an instrument. So I wonder which will happen first? Probably a bit of both.

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Alexander Murray [163]

I have been playing a "modified Boehm flute" since 1958. The first model was described by Philip Bate in his book "The Flute" (about 1960). In the early 80's I became a friend of the leading Nuclear Physicist at the University of Illinois, who is an amateur flutist (Baroque) and who used a super-computer to model the acoustics of flutes ancient and modern. Initially (until 1977) Albert Cooper made my instruments, but Jack Moore began making them when he was at Armstrong's in 1968 and made my final instrument this year. There are a couple in the Bate collection, Oxford (an early Armstrong and the last Cooper). About 5 years ago I saw the Brannen quarter tone flute and designed one that was mechanically much simpler which Jack made. It was a flute down to D, no foot mechanism, but at 392 - a tone lower so that D sounded C. I gave it to a former student. I designed a flute for Robert Dick in 1978 - the "Multiple Option" which Jack built - Robert wrote a piece for it. It was for making all multiphonics possible. Personally I have never been a fan of unconventional flute sounds, preferring Mozart and Bach.

Rachael Rudich[164]

I do not own or play any of the flutes you mention, though I am familiar with them, and have played on them briefly. I would not personally choose a quartertone flute. I don't play enough music that uses alternate tuning systems to warrant such a huge technical change to my equipment (even though I do primarily play only contemporary music!) I find using alternate fingerings, half holes, and changes in embouchure suffice. Now as for alto and bass flutes that are just open hole (not quarter tone) - Yes I would love to own these instruments - well made, hand crafted and beautiful to play - but they are out of my price range, or what I would be willing to spend on auxiliary instruments. (If I won the lottery, sure I'd buy them!)

I have more of an interest in modifications makers are making for those with hand, wrist, and elbow problems. I do not have these problems myself, but increasingly I see more and more problems in my students. Brannen makes extensions to the left hand keys that aid those with tendonitis or other overuse injuries - I have a student who is back to playing full time after an injury of trigger finger in her left hand. Without these extensions, she would be unable to play. The vertical flute is another option, but I think requires more of a change in basic technique. Being a nationally certified yoga and pilates instructor, I am trained and skilled in anatomy and in treating injuries. More and more I use these skills to help musicians. If we did more to promote changes in the instruments, to make them more ergonomic to fit our bodies, we would see less injuries, especially to the young, conservatory students who practice (perhaps) too many hours each day year after year.

Suzanne Shulman[165]

I have not tried any new flutes beyond my traditional Brannen. There is so much repertoire that consumes my time and interest with the trio and as a soloist that I have never really explored further. I have also been too busy to go to flute conventions, but I read about these new flutes with interest.

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12F. Composers

Daniel Giorgetti[166]

I approached composing for the quartertone alto flute in much the same way as for any other instrument. I always try to exploit the unique and interesting aspects of an instrument - and indeed the player for whom the piece is intended. However, as the quartertone alto flute is a relatively rare instrument, it's difficult to find any information on it - it doesn't appear in any orchestration book I know of. So it was just as well that I had flautist Carla Rees, who commissioned the piece, on hand to advise me. We had a couple of sessions before I wrote a single note. I wanted to build up a pallet of ideas which stem from the special nature of the instrument. From these sessions I could get an idea of how the instrument sounded in each register and also learnt about any techniques specific to the instrument, such as playing quartertone trills - which to me has a very special timbral quality. There were also one or two rather practical considerations such as the fact that the instrument weighs more than an average alto flute due to all the extra keys, so I tried to give Carla enough opportunities to rest during the piece. Once I got down to actually writing it, I really wanted to show off the fact that this instrument can play perfect quartertones - so there are some passages in the piece where the flute has a slow and simple melody full of quartertones so that the listener has a chance to really hear them. Such passages demonstrate how the quartertone alto flute really is different from any other instrument in the flute family - its hypnotic sound is truly unique.
My piece is called 'Panic and Echoes' and it's written for quartertone alto flute (Kingma) and piano.

Andrew March[167]

As flutes are ubiquitous, and even the open-holed concert 'C' Flutes are in use in most professional situations, it took the extraordinary invention of the open-holed Kingma system alto flute to truly capture my interest and conceptual freedom. As the Kingma System alto was an instrument which had seven extra keys, and was open-holed, with a designed-in predisposition towards easily facilitated and sustained multiphonics, it became so much easier to write advanced technique material with this instrument, such as quartertones in more rapid passages (if placed carefully), harmonics chords where the fundamental was a stable quartertone, and even whole pieces just using multiphonics (because they are so much more reliable). The most amazing thing that happened during my phase of composition for this instrument was that it took me places, technically that I would not have dared to go with a conventional flute (alto flute in fact). I would not have dared to write the music that I did on the closed-holed alto. However, the really fascinating thing is that because in the year 2000 and thereafter, there were only maybe five or so Kingma alto's in existence, I included 'ossia' alternatives on smaller music staves with complex fingerings that tried to bring the same or closer possibilities to the conventional readily available instrument, i.e. the closed-holed Alto. I wrote one solo piece for the Kingma (no ossia), four others with as alto and harp duos, all have conventional Alto ossia, and I wrote two pieces with ensemble of Kingma alto, harp, marimba,

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vibraphone and strings. This piece was accepted onto the current SPNM shortlist (Society for the Promotion of New Music).

Patrick Nunn[168]

*I began writing for quartertone alto flute with Carla Rees a couple of years back - she wanted a solo work for the instrument and had commissioned me to write something for her. At the time, I was very much interested in Arabic music - so here was the perfect tool - an instrument that could play all those wonderful quartertones so evident in Arabic music. The result was a piece called Maqamat (which means scales in Arabic). This now appears on Carla's CD-Rom of the instrument which carefully explained everything from dynamic range to multiphonics to the complete quarter-tone spectrum. Carla then held a competition under her ensemble name Rarescale at the Royal College where she was studying. She begged me to write a piece. The result.... Into My Burning Veins a Poison for quartertone alto flute, piano and electronics. I was surprised when the piece won the competition and I was subsequently asked to study a PhD in composition at the RAM with Simon Bainbridge. Now in my 2nd term, Carla has taken session*s *at the Academy with student composers and her repertoire looks set to expand.*

John Thow[169]

I was contacted by Carla Rees to write a piece for the Kingma alto flute for one of her recitals for the RCM. I am a flute player, but did not know the Kingma quartertone system so she sent me a fingering chart. Without having an instrument at hand I did the best I could. She showed me some passages that were too awkward and we worked things out when I went to London for the recital in late May of 2001 as I recall. It was based on a native American lullaby. I subsequently redid parts of the piece for a normal C-flute with open holes and also parts went into a concerto for flute (not Kingma) and strings.

When Carla Rees gave me the Kingma system alto to play I could hardly hold it up because of the numerous extra keys. It also had a straight head so the weight of the body was much farther down than even a bass flute, but Carla plays it magnificently.

Rolf Martinsson[170]

I have known Magnus Båge for a couple of years and last year he told me about his invention. In October 2004 he visited me in Limhamn and showed me how the 'intonation slide worked. I intend to use it in all possible registers to give the concerto an "unusual" sound. Especially in the low register I think that this invention is great. In one of the cadenza's I will mix the sound of the low flute register (using intonation slide) with a bamboo-flute sound because of their similar sounds.

12G. Flute-makers

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Magnus Båge[171]

To start with I met Robert Dick in London a few years ago and we considered working together with our mutual invention but suggested to go our own way. Robert and I are friends and the two different ideas will hopefully reach flute players in the future. I can also slide quite a lot with my own headjoint but not as much as Robert's, at least not yet. The design is so far "homemade". I have been working with a machine engineer in Stockholm but he is not headjoint maker. I will be working in the near future with an American flute maker if there will be enough interest.

Maarten Visser.[172]

I make the Swan Neck headjoint, and also the vertical headjoint.

1) I am interested to know where your inspiration comes from for these ergonomic designs, do you experience physical discomfort when playing?

When I was 16, I joined a club where they made bamboo flutes. One time someone did a slide show about special instruments for multiply disabled kids in a local rehabilitation centre. I was amazed how eager these kids were! The designs were innovative and free of traditionalism. So, after I studied woodwind making in Newark, UK, I picked up a specialisation in making adapted wind instruments for disabled players. I still do that today. In the late eighties, government funding fell away for much of that, so I tried my hand at adapting instruments for people who were not disabled. Needless to say why the flute drew my attention! I did experience trouble myself, I had a very painful shoulder. Then I took my own invention to rehearsals. The shoulder is all cured now, thanks to Chinese massage and acupuncture.

2) Does your vertical headjoint and swan neck headjoint use the same Boehm scale as the transverse flute?

Yes, but the "parabola" of the bore had to be modified to get tuning and sound right.

3) When were each of these ergonomic designs made, and what responses have you had?

The Swan-neck dates back to 1992, and response has been increasingly good. I must say, they have improved a lot, as in the beginning the bore and embouchure cuts were not quite right. Now they are. The first vertical flute I made in 2003. I thought it was not a good idea, because it caused extreme pronation of the right wrist, and a lot of pressure on the right thumb. Also acoustically I foresaw problems (rightly so) and it was technically difficult. But then a client insisted I made one, and so I did. She was very happy, so I decided it could be a useful product for some people.

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