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*entitled* The 18th Century Bassoon: Performance Feasibility of  
W. A. Mozart's Wind Sextets

*be accepted as fulfilling this part of the requirements for the degree of* Doctor of Musical Arts

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The 18th Century Bassoon: Performance Feasibility  
of W. A. Mozart's Wind Sextets

Presented by

Theodore Nicholas Atsalis

To fulfill the thesis requirement for the degree of  
Doctor of Musical Arts

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of the  
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## PREFACE

W. A. Mozart composed the six wind-sextets (K. 213, 240, 252, 253, 270 and 289) for two oboes, two horns and two four-keyed bassoons at Salzburg between 1775 and 1777. Being divertimenti, the sextets were intended to be performed soon after they were composed at a festive occasion, possibly outside, as entertainment music. Further, since the sextets were intended to be performed at a casual occasion as "open air music", Mozart probably did not have any specific virtuoso performers in mind while composing but rather any players available at the time.

The first portion of the study will deal with the four-keyed bassoon while defining its technical performance capabilities and limitations. The second portion of the study will examine the sextets for winds by W. A. Mozart in relation to the performance abilities of the four-keyed bassoon - showing that their performance could be readily achieved by a non-virtuoso player.

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## GENERAL DESCRIPTION OF THE 18TH CENTURY BASSOON

The bassoon at the beginning of the 18th century was jointed and had three open keys (B-flat<sub>1</sub>, D and F). An open key is one that remains open all the time unless depressed by a finger; a closed key is the opposite. In general, open keys produce diatonic notes in the fundamental scale of c and closed keys the chromatic notes. Carse<sup>1</sup>, in describing the three-keyed bassoon, says "The modern bassoon is based on the early 18th century type; . . ." Mattheson<sup>2</sup> calls it "the stately bassoon" or the "proud bassoon."

The four-keyed bassoon was the standard bassoon for most of the 18th century. The fourth key (G-sharp, R4) was the first closed key added to the bassoon and made possible for the first time, playing a chromatic note with a key. Eisel in 1738 was one of the earliest to describe the bassoon with four keys.<sup>3</sup> Langwill mentions two surviving bassoons dated 1730 and 1747, which have the G-sharp key.<sup>4</sup>

It was common practice, before the addition of the G-sharp key, either to place the bassoon outside the left leg with the right hand on the upper holes - or the reverse. Because the G-sharp key was placed to the right of the F key in easy reach of the right little finger, but

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<sup>1</sup>Adam Carse, Musical Wind Instruments (London: Macmillan & Co. Ltd., 1939), p. 187.

<sup>2</sup>Johann Mattheson, Das neu-eröffnete Orchestre (Hamburg: 1713) Vol. 111.

<sup>3</sup>J. P. Eisel, Musicus autodiadactus (Erfurt: 1738), p. 104.

<sup>4</sup>Lyndesay G. Langwill, The Bassoon and Contrabassoon (New York: W. W. Norton & Co., 1965), p. 36.

impossible for the left little finger, the hands could no longer be reversed - forcing all players to play off the right leg with the left hand on the top holes.

The fifth (E-flat) and sixth (F-sharp) closed keys were added to the bassoon about 1780. The E-flat key made the first significant difference between the French and German style bassoons. The French positioned the E-flat key for the left thumb while the Germans placed it for the left little finger; the modern French and German bassoons still retain the 1780 methods of positioning the E-flat key.

The keys on the 18th century bassoons, called "saddle" keys, are made of brass, occasionally silver and infrequently wood or ivory. "Saddle" probably refers to the key proper as it looks held in place by two brass walls, one on either side. Carse describes the "saddle" key as ". . . [it] consists of a brass base or floor and two upstanding walls between which the key-lever lies and pivots on an axle supported by the upright walls of the saddle."<sup>1</sup> Closed keys are solid, cut from a single piece of metal, and require one saddle. Open keys are hinged, cut from two or more pieces of metal, and require two saddles. Consequently, the closed key produces a single torque whereas the open key two torques, one clockwise and one counter-clockwise. (See Figure 1, p. 3.) A flat metal spring for sustaining tension is under the finger-end of both open and closed keys. Each has a flat piece of leather fixed to the under side of the tone-hole end as a pad to seal, when closed, the air column. Needless to say that a hermetic seal is almost impossible with the flat leather pad. Langwill, while describing the "new" stuffed pads by Iwan

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<sup>1</sup>Adam Carse, Musical Wind . . . , pp. 54-55.

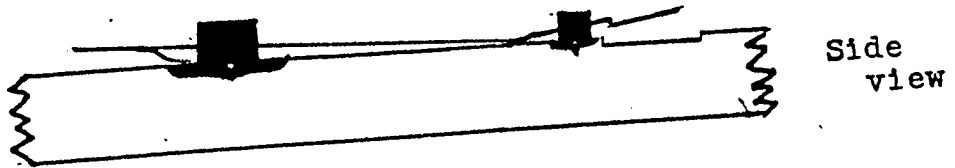
# F Key Finger-ends



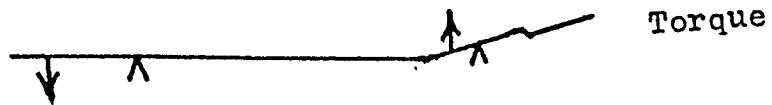
Open Key



Top view.

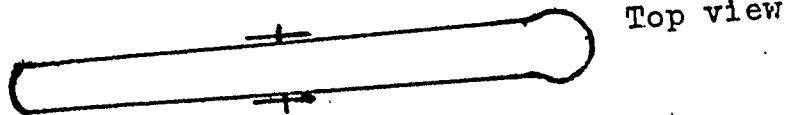


Side view

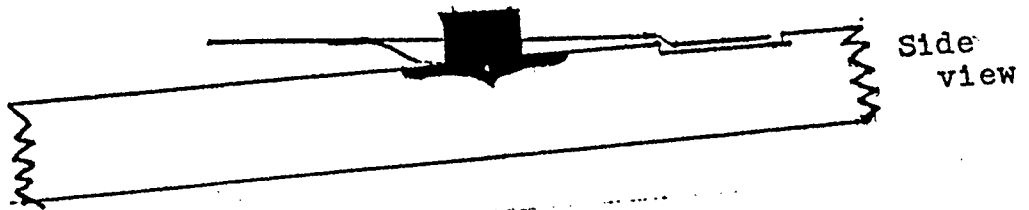


Torque

Closed Key



Top view



Side view



Torque

Figure 1. Open and Closed Keys

Muller (1786-1854) in the 19th century comments on the efficiency of the flat leather pads, ". . . the old flat leather pads which did not ensure air-tight closure of the keys."<sup>1</sup> The shape of the finger-end on the F key is usually quite different from the plain round ends of the other keys. (See Figure 1, p. 3.) The differently shaped F key finger plate is a carry over from the three-keyed bassoon, which allowed the option of playing from the left or right side.

The 18th century bassoon was carried in a green baize (a coarse, long-napped fabric, usually wool) bag that had a draw string to close the open end. The bassoon was supported by a ribbon or cord tied to a ring on the butt-joint and looped over a button on the player's coat. Baines, after describing how the bassoon was supported, comments amusingly, ". . . but of course it is [of] little use with our light modern jackets."<sup>2</sup>

The five parts of the four-keyed bassoon which correspond with the modern bassoon are the brass bocal or crook, the wing-joint, the boot or butt-joint, the long-joint and the bell-joint.<sup>3</sup> (See Figure 2, p. 5.) When assembled, reference is often made regarding "the front" or "the back" of the bassoon. The description "front" or "back" of the bassoon refers to the position of the thumbs and fingers in performance; the fingers control the front holes and keys, whereas the thumbs control the back holes and keys. (See Figure 2, p. 5.)

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<sup>1</sup>Langwill, The Bassoon . . . , p. 51.

<sup>2</sup>Anthony Baines, Woodwind Instruments and Their History (Rev. ed.; New York: W. W. Norton & Co. Inc., 1963), p. 287.

<sup>3</sup>All reference to the "modern bassoon" in this study means the modern German style bassoon.

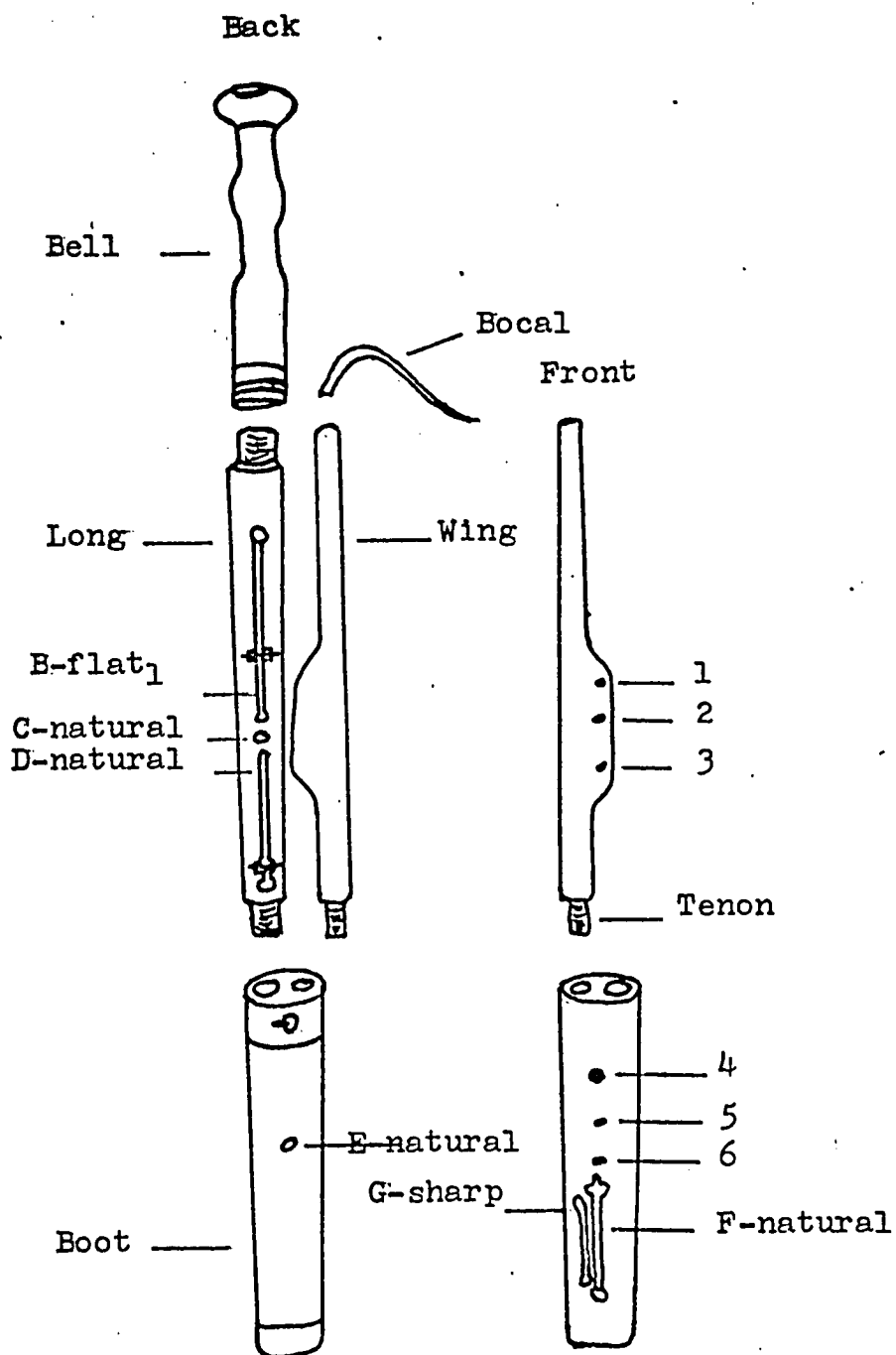


Figure 2. Four-keyed bassoon

The total assembled length of a four-keyed bassoon is approximately the same as the modern bassoon (just over eight feet), because both have B-flat<sub>1</sub> as their lowest note. Laborde, after describing the five parts of the bassoon says,

sa longueur depuis l'extrémité du bocal e, jusqu'à l'extrémité du bonnet A, est déterminée à huit pieds, réduits à quatre, à cause de la courbure. (its length from the end of the bocal e, to the end of the bonnet A, [bell] is eight feet, reduced to four, because of the curve)<sup>1</sup>

Langwill, see below<sup>2</sup>

There are two reasons why it is impossible to determine a precise length for the four-keyed bassoon. First, universal pitch was rising during the second-half of the 18th century, but not at the same time or rate in all countries. The sporadic rise in pitch would necessitate variances in the bore, length and tones holes among bassoons from different countries and times during the second-half of the 18th century. Second, there is some doubt as to the authenticity of makers and dates. Halfpenny shows pictures of four bassoons dated c. 1760. Three out of the four are reasonably the same length; one is obviously much longer. In describing the longer bassoon Halfpenny says,

the spelling of the name and the type face of the incised stamp on all joints differ from all other examples of this maker's [Milhouse] work known to the writer. The instrument is thicker and heavier in build and appearance than the two foregoing, but the keywork is

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<sup>1</sup>J. B. De la Borde and P. J. Roussier Essai sur la Musique ancienne et moderne, (Paris: 1780), p. 328.

<sup>2</sup>Langwill, L. in The Bassoon and Contrabassoon says that the section on the bassoon in Laborde's Essai sur la Musique was written by the bassoon player Pierre Cugnier (b. 1740), pp. 36-37.

identical. The bell and wing differ. The butt is shorter and the bass joint longer. The wing has been shortened and the ferrule is a replacement. Pitch probably raised.<sup>1</sup>

Only generalizations can be made in discussing the length of the four-keyed bassoon in relation to the modern; the bocal, wing and long-joints are shorter and the butt-joint is longer than the modern bassoon.

The tenons, both ends of the long-joint and the large end of the wing-joint, are wrapped with thread to form a seal when the bassoon is assembled. (See Figure 2, p. 5.) The thread is wrapped to a thickness of about 1/8th of an inch. The tenons on the modern bassoon are either wrapped with thread or surfaced with cork. Thread is still considered superior by many players because it functions like a metal band around the relatively thin, vulnerable walls of the tenons.

According to Laborde, "Luthiers" (stringed instrument makers) were often also makers of bassoons during the 18th century. "les Luthers qui fabriquent ces instruments, en général sont en petit nombre, ..." (The Luthiers who make these instruments, in general are few in number).<sup>2</sup> A typical 18th century bassoon was made out of maple wood; the precise species of maple is not discussed by 18th century writers or leading contemporary writers in accounts on the 18th century bassoon. Carse says, "The typical bassoon of the period [late 18th century] is of maple, . . ."<sup>3</sup>

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<sup>1</sup>Eric Halfpenny, "The Evolution of the Bassoon in England, 1750-1800", Galpin Society Journal, X (May 1957), Pl. 1

<sup>2</sup>Laborde, Essai sur la Musique . . . , p. 331.

<sup>3</sup>Carse, Musical Wind . . . , p. 190.

Baines, in describing the early 18th century three-keyed bassoon, says, ". . . with the soft, light woods of which bassoons were made (maple, pear, etc.)."<sup>1</sup> Laborde, after discussing why hardwoods " . . . produira un son aigre & dur" (produce a bitter, sharp tone)...and soft-woods " . . . produira un son sourd" (produce a dull, dark sound)... says, " . . . il faut donc choisir un milieu entre ces deux extremités . . . l'erable est le seul, . . . pour avoir la belle qualite de son que l'on desire." (it is necessary therefore, to choose a medium between these two extremes . . . maple is the only one, . . . to have a beautiful quality of sound that one desires).<sup>2</sup>

Titmuss, in describing the European Maple species as a generic whole points out why they are good woods for building bassoons. "In general the Old World species are pale brown in colour. . . . The grain of the timber is normally straight, the texture fine and even . . . it is difficult to handle in seasoning processes, whether by natural or heat treatment."<sup>3</sup>

The bassoon has a conical bore. The amount and uniformity of conicalness has changed throughout the history of the bassoon starting with the one-piece dulzian type with two keys (1550) up to the modern. The preciseness of the bore is one of the most important factors in producing an all over desirable sound (good intonation with ease and clarity of articulation). The improvements on the bassoon during the

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<sup>1</sup>Baines, Woodwind Instruments . . . , p. 286.

<sup>2</sup>Laborde op. cit., p. 330.

<sup>3</sup>F. H. Titmuss, A Concise Encyclopedia of World Timbers (New York: Philosophical Library, 1949), p. 81.

18th century which achieved a desirable sound centered around the addition of new keys or changing the size and/or location of pre-existing holes. Langwill, in discussing the early efforts of Carl Almenrader (1786-1843) to improve the bassoon says,

Although key after key was added to provide a remedy, the defects were not eliminated because notes produced with the aid of keys sounded even and clear while other notes sounded muffled and uneven. It was finally realised that the body of the instrument was at fault.<sup>1</sup>

There are three problems in trying to determine precisely the bore dimensions of the 18th century bassoon; first, the vagueness of accounts written during the 18th century. Laborde says,

cet instrument [basson] est un tuyau qui va toujours en élargissant depuis l'extrémité du bocal e, jusqu'au bout, du bonnet A ... L'ouverture à l'extrémité e du bocal, peut avoir tout au plus la largeur d'une lentille. ... Elle a un pouce un quart ou un demi de diamètre. (this instrument is a tube which gets larger from the end of the bocal e, to the end of the bonnet A . . . the opening at the end of the bocal can have at most the width of a lentil. . . . It [end of bell] is 1-1/4 or 1-1/2 inches in diameter.)<sup>2</sup>

Second, the pitch of instrumental music was rising during the second half of the 18th century. Halfpenny, in discussing English bassoons during the second half of the 18th century says,

Bassoons being what they are, however, namely rather expensive instruments fairly robust in constitution, many of the earlier ones [before 1770] were preserved in use even after the general pitch of instrumental music began to rise...Consequently it

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<sup>1</sup>Langwill, The Bassoon . . . , p. 49.

<sup>2</sup>Laborde, op. cit., pp. 327-28.

is rare to find an English Baroque bassoon in an original state of preservation.<sup>1</sup>

Third, the role of the bassoon was changing from essentially a member of the continuo and bass of the wind section to one that included independent solos. The change in role demanded a bassoon tone with "presence" (resonant, well focused tone quality), which meant, besides other alterations, a change in the bore. Most of the alterations to the bore of the 18th century bassoon were confined to the bocal and bell-joint. Halfpenny describes the bocal around 1750 as "very narrow" and by 1800 "increased in depth".<sup>2</sup> The importance of this change is not so much that the bocal was altered, but rather how the alteration affected the bore at the top of the wing-joint. The bore size at the top of the wing-joint, where the bocal and the wing-joint meet must be reasonably the same, if the bore of the bocal is made larger, then at least the bore of the top-most portion of the wing-joint must be altered. Langwill's discussion of the bassoon bore points out, "The most vital portion [of the bore] is obviously at the narrow part, so the taper of the bore of the crook and of the wing [-joint] is of supreme importance."<sup>3</sup> Around 1750 the bell-joint had an external baluster contour. According to The Oxford English Dictionary, baluster is "A short pillar or column, of circular section, and curving outline (properly, double-curved), slender above and swelling

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<sup>1</sup>Halfpenny, op. cit., p. 31

<sup>2</sup>Ibid., p. 32.

<sup>3</sup>Langwill, op. cit., p. 147.

below into an elliptical or pear-shaped bulge". By the 17th century, baluster was corrupted in English to barrester or banister. (See Figure 3, p. 12.) The bore of the bell-joint, at the same time, contracted in conicalness causing a "choke" at the end of the expanding cone beginning at the bocal. The change in the bell-joint produced a pronounced internal and external flare toward the top but still "choked" slightly in the middle.

Contemporary accounts are not much help in determining the bore of the standard 18th century bassoon because it is described in either too general terms, or as it was at the end of the 18th century after the alterations were made and more keys added. Baines says, "In the bore, 18th century bassoons vary, but as compared with today[']s they are wider in the crook (which has no hole) and narrower in the butt and long-joint, while the bell contracts to a narrow waist . . ."1

Carse, in describing the bore of the bassoon in the late 18th century gives a little more accurate account. "The bore averages about 10 millimeters at the narrowest part and about 15 millimeters at the lower end of the wing-joint and increases from about 25 millimeters at the narrow end to about 30 millimeters at the bottom of the bell-joint."2

Langwill simply says, "The bassoon has an apparently continuous conical bore and, throughout the history of the instrument, the degree of 'conicity' has constantly been altered to accord with improvements

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<sup>1</sup>Baines, Woodwind Instruments . . . , p. 287.

<sup>2</sup>Carse, Musical Wind . . . , p. 190.

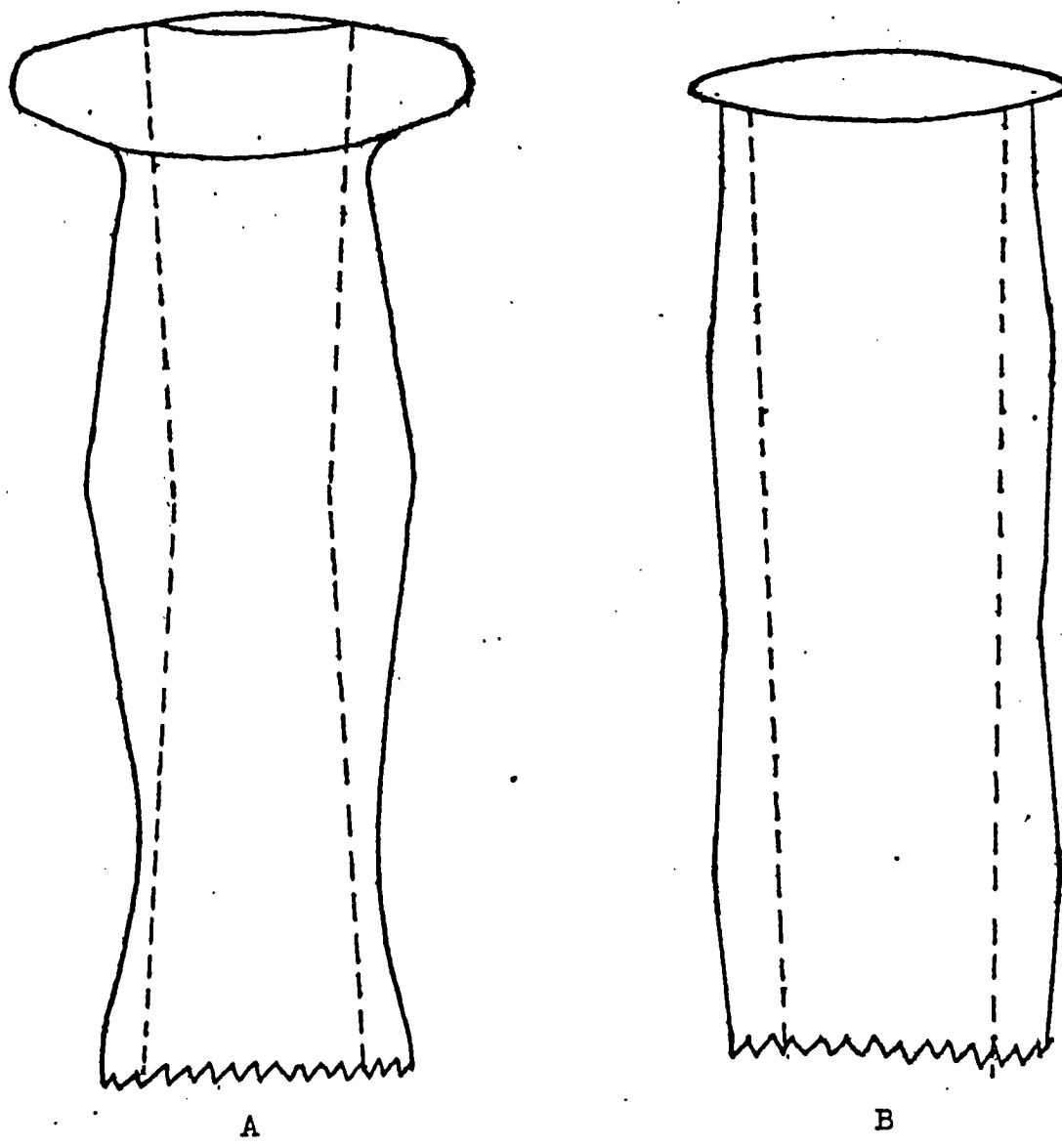


Figure 3. Bells (A) 18th Century (B) Modern

otherwise. Certain portions of the bore are parabolic rather than conical."<sup>1</sup> Sachs reports less, stating only that "The bassoon is a slightly conical double-reed instrument, . . ."<sup>2</sup> According to William Waterhouse there are two main differences in the bore of the four-keyed bassoon and the modern bassoon.<sup>3</sup> First, the four-keyed bassoon has a "choked" bore in the bell-joint; the modern bassoon does not. (See Figure 3, p. 12.)

Second, the four-keyed bassoon has a cork plug instead of a metal elbow (of the modern bassoon) to join the two channels of bore at the bottom end of the butt-joint. The cork plug slides into a slot that extends from the bore whereas the metal elbow is fastened tight by two metal screws. (See Figure 4, p. 14.)

The bore produced by the insertion of the cork plug is somewhat smaller than the bore of the metal elbow. Hermetically sealing the cork plug was very difficult; consequently players were reluctant to remove it for cleaning. The taper of the bore was disturbed by the cork plug because often it was not smooth, conical or even round. Groves gives this account: "The foot of the double-joint was originally closed by a plug of cork which did not allow the bore to be cleaned or dried effectively, nor was the smooth conical course of the bore maintained."<sup>4</sup>

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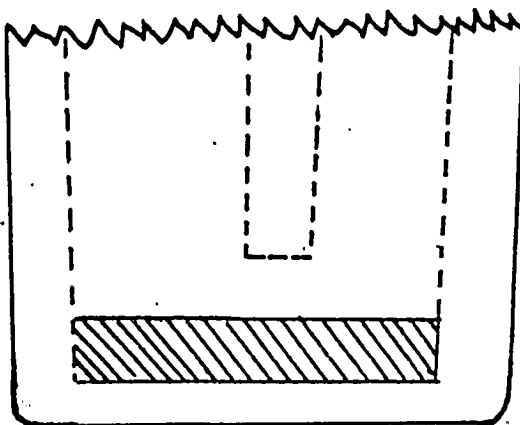
<sup>1</sup>Langwill, op. cit., p. 147.

<sup>2</sup>Curt Sachs, The History of Musical Instruments (New York: W. W. Norton & Co. Inc., 1940), p. 315.

<sup>3</sup>Interview at Indiana University, July 26, 1972.

<sup>4</sup>Eric Blom ed., "Bassoon" Groves Dictionary of Music and Musicians 5th ed. (New York: St. Martin's Press, Inc., 1955) p. 486.

Cork Plug (18th century)



Metal Elbow (modern)

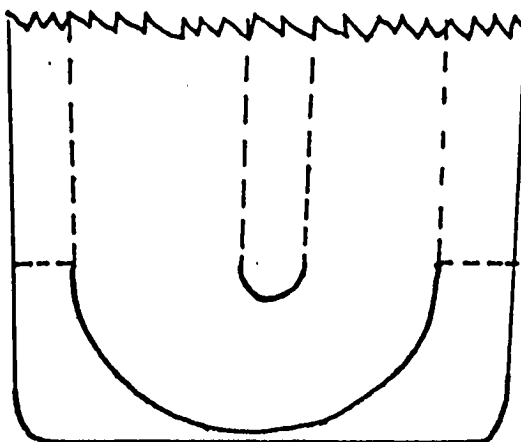


Figure 4. Bore connection at end of boot-joint

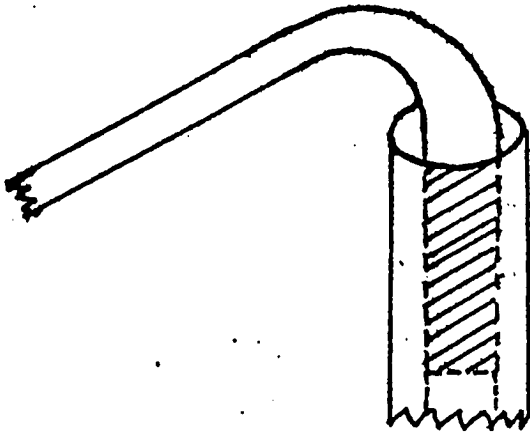
The bocal or crook of the four-keyed bassoon around 1750-70 is considerably shorter in length but larger in bore compared to the modern bocal, which is about 13-1/4 inches long. The bocal for the earlier four-keyed bassoon was larger in diameter, especially at the wing-joint end, and generally longer all over compared to the bocal used in the 1760's and 70's. (See Figure 5, p. 16.) The dimensions of bocals for early four-keyed bassoons (c. 1735-1750), before the universal rise in pitch, are not known because shortening the bocal was one of the first ways explored to raise the pitch during the second half of the century.

Halfpenny says that no bocals for early four-keyed bassoons are known to him and few original bocals, for later four-keyed bassoons are in good condition. He then discloses experiments with many bocals on an early four-keyed bassoon; all produced unfavorable results in pitch and timbre. A specially made bocal, with a long end and wider bore, produced a more even scale at the lower Baroque pitch. His final evaluation of early four-keyed bassoons is, ". . . how necessary it is to refrain from judging such instruments until something at least approximating to the original crook is available."<sup>1</sup>

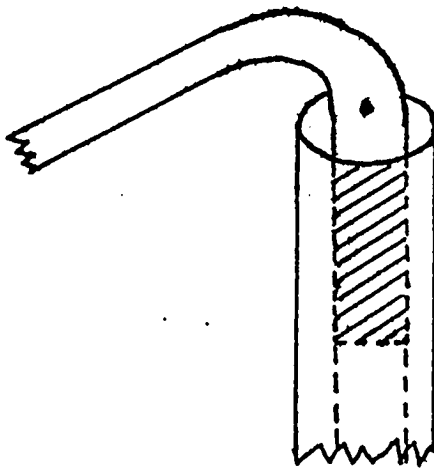
A modern bassoon player takes for granted that bocals have a small hole (pin-hole) located just above the wing-joint, when the bassoon is assembled. The modern wing-joint is equipped with an open key (L-T for German bassoons and R-4 for French bassoons) that extends up to the bocal pin hole. (See Figure 5, p. 16.) The open-key for the bocal pin-hole is commonly referred to as the whisper or piano-key. The purpose of the

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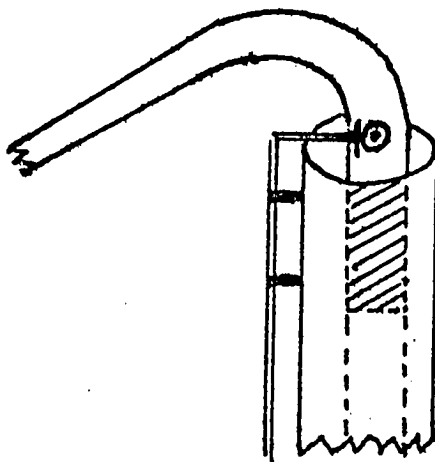
<sup>1</sup>Halfpenny, op. cit., p. 33.



18th Century (1735-50)



18 Century (1750-80)



Modern

Figure 5. Eighteenth and 20th century bocal inserted into wing-joint

pin-hole in the bocal is to vent the bore near the small end of the cone. The notes a up to d' are vented (whisper-key open) but fingered the same as the notes A up to d, which are not vented. Venting a up to d' makes these notes respond more quickly and clearly.

Accounts of the 18th century bassoon do not agree with regard to whether or not bocals had pin-holes and are even less helpful concerning the presence of a whisper-key. Baines, while describing the bore of the crook simply says, ". . . (which has no hole)."<sup>1</sup> Carse avoids the whole issue until discussing the 19th century bassoon. Langwill skirts the issue during the 18th century saying, "The crook of that time [c. 1800] was a heavy brass tube, wider than a modern crook and without a crook-key hole."<sup>2</sup> Waterhouse feels that although a pin-hole in the crook was not common, it did exist; he did not comment on the whisper-key.<sup>3</sup> Laborde, describing the five-keyed bassoon in 1780 says,

On perce au bocal un trou qui se trouve environ un pouce au-dessus de la virolle de la petite piece, du Basson D, dans laquelle il s'emboîte; d'autres le percent plus haut; mais il est mieux placé à l'endroit qu'on vient d'indiquer, parce que l'on peut le boucher, si l'on veut avec une clef que l'on place sur cette même piece D ... (One pierces a hole in the bocal about an inch above the ferrule of the little piece of the bassoon D [wing], in which it fits; others pierce it higher, but it is best placed at the spot just indicated, because one can stop it if he wishes, with a key that is placed on the same piece D.)<sup>4</sup>

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<sup>1</sup>Baines, op. cit., p. 287.

<sup>2</sup>Langwill, op. cit., p. 48.

<sup>3</sup>Waterhouse, op. cit.

<sup>4</sup>Laborde, op. cit., p. 334.

No 18th century fingering chart indicates a whisper-key. All that we can be sure of concerning a pin-hole in the crook, and a whisper-key on the wing-joint, is that by 1780, at least in France, they were known to exist.

## THE EIGHTEENTH CENTURY BASSOON REED

The importance of a quality reed in performance can really be understood only by a reed-instrument player, especially a double-reed. The frustrating element is that the most expensive instrument is at the mercy of a relatively inexpensive piece of cane (*arundo donax*) for ease and clarity of articulation, dynamic flexibility, intonation and timbre. Laborde mentions the importance of the bassoon reed, " ... Quoique cette partie soit en apparence la moindre de l'instrument, elle est cependant une des plus essentielles." (Although this part may appear to be the least important of the instrument, it is however one of the most essential).<sup>1</sup>

The source and quality of cane are two basic problems shared by bassoon players throughout the history of the bassoon. The areas in Spain, France and Italy that border on the Mediterranean sea have supplied the best cane for reed-instruments for a long time. Thomas Warner points out that the French bassoonist, Etienne Ozi, in 1803, recommended the departments (counties) of Bouches-du-Rhone, Var, and Alpes-Maritimes in southern France, but felt that the best cane came from southern Italy because ". . . its [cane] greater maturity, which causes it to be drier and less spongy."<sup>2</sup>

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<sup>1</sup>Ibid., p. 331.

<sup>2</sup>Thomas Warner, "Two Late Eighteenth-Century Instructions for Making Double Reeds," Galpin Society Journal, p. 30.

The main problem is not the source, but the quality of cane. The basic factors determining the quality of cane are the proper outside circumference of the tube, relative hardness and texture, proper curing and reasonable straightness. The problem is compounded by the fact that no two pieces of cane from the same source are exactly the same quality. The differences and the degree of difference usually do not show up until the finishing stages in reed making. Laborde hints that the quality of cane was a problem in the 18th century,

Il y a des règles établies qui déterminent les proportions que doit avoir une anche pour être de qualité requise, ... mais malgré tout la précision avec laquelle on a essayé depuis long-tems d'exécuter tout ce qui est indiqué pour la facture de l'anche, ... il arrive souvent que l'anche la mieux faite dans toutes les proportions, est tout-à-fait mauvaise, & qu'une autre qui sera moins bien faite, sera bonne, ou du moins passable. (There are established rules which determine the proportions the reed must have to be of the required quality, . . . but in spite of all the precision with which one has tried for so long to execute all the steps in reed making, . . . it often happens that the best proportionally made reed is completely bad, and that another which is not so carefully made will be good, or at least passable.)<sup>1</sup>

Bassoon reed making in the 18th century was quite different, in practically all phases, from modern reed making; the differences most critical to a finished reed are the gouge, profile, shape, number and placement of the wires, width, length, and thickness of the vibrating blades.

Gouging or scooping out the cane after the tube has been split into thirds and cut to length, is the first important step in reed making. (See Figure 6, p. 21.) Gouging the cane in the 18th century was done by

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<sup>1</sup>Loc. Cit.

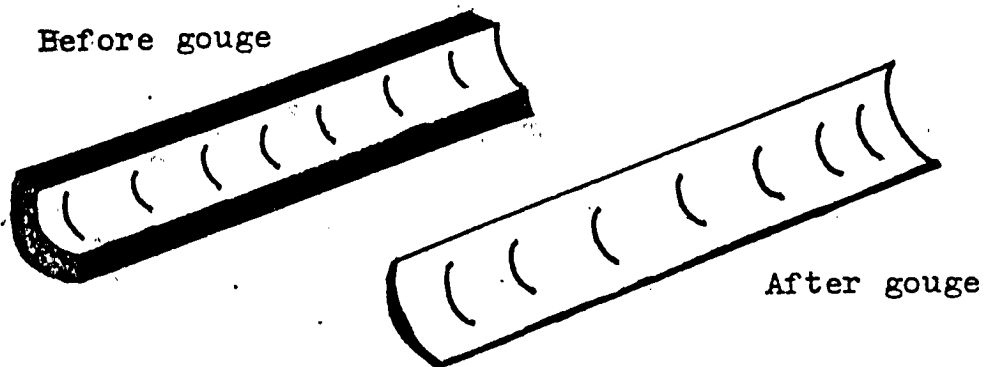
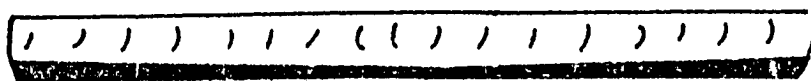


Figure 6. Cane after being split and cut to length. (Top view)

18th Century



20th Century

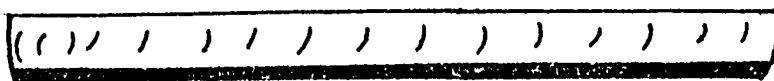


Figure 7. Gouged cane. (Side view)

hand, whereas modern gouging is done by a machine. In the 20th century, the cane is set in a gouging machine and scooped out so that the finished gouge is parallel to the outside bark at a thickness of c. 50/1000. In the 18th century, the cane was gouged out progressively thinner towards the mid-point, beginning about 25mm on each side of the mid-point. (See Figure 7, p. 21.) According to Warner, Ozi recommended scooping out the center more thinly. "The cane is scraped slightly further in the middle of the reed to remove the roughness caused by the gouge, and also to weaken this centre portion, which is where the reed is to be folded."<sup>1</sup> The non-parallel gouge of the 18th century bassoon cane was in essence the main profile of the finished tip-end. All profiling on modern cane is done from the bark side of the cane.

Most modern bassoon players have a tooled piece of metal (shaper), the desired shape that the cane is folded over and clamped firmly against, in order to guide the knife while shaping. In the 18th century, shapers as such did not exist; the cane was shaped by free-hand, probably without any guide for the knife except the eye.

From the shaping stage to the finished reed, only general trends can be discussed, because few actual reeds of the 18th century exist; also, the ones that do are quite different from one another. The following factors compound the problem of determining reed dimensions in the 18th century: (A) No two instruments are the same size in length, bore or tone holes. (B) Each player had his/her own peculiar ways of making

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<sup>1</sup>Warner, op. cit., p. 31.

a reed. (C) Eighteenth century accounts on reed making are imprecise and/or omit vital information. Warner sums up Ozi's instructions on reed making by saying,

Even though the illustration included in Ozi's method does not show the reed's scrape [profile], his verbal description assists in reconstructing the intended lay [contour] . . . Ozi [sic] makes no mention of the dimensions of the instrument for which his reed is intended. . . . The bore and instrument dimensions (not the number of keys) being the governing factors, . . . the performer can only follow their general outlines.<sup>1</sup>

Laborde, after warning the player about a reed being too soft or hard simply says,

On doit aussi faire attention que l'anche ne soit ni trop longue, ni trop courte; l'une & l'autre rendent le Basson faux; la plus longue doit avoir tout au plus trent-deux lignes [c. 65mm], & la plus courte ne peut être moindre de vingt-huit or vingt-neuf lignes [c. 60mm]; on en jugera encore mieux, en les assayant sur l'instrument, que par les proportions au-dessus. (One must take care that the reed be neither too long or short; both render the bassoon false; the reed must not be longer than 36 lines [one line equals 1/12 of an inch] nor shorter than 28 or 29 lines; one should judge the reed on the instrument, rather than by the above proportions.<sup>2</sup>

Waterhouse illustrates, with exact dimensions, four late 18th century English bassoon reeds.<sup>3</sup> (See Figure 8, p. 24.) Two important generalizations can be made in comparing the dimensions of the modern and 18th century reed; the modern reed is much shorter and has much thinner vibrating blades.

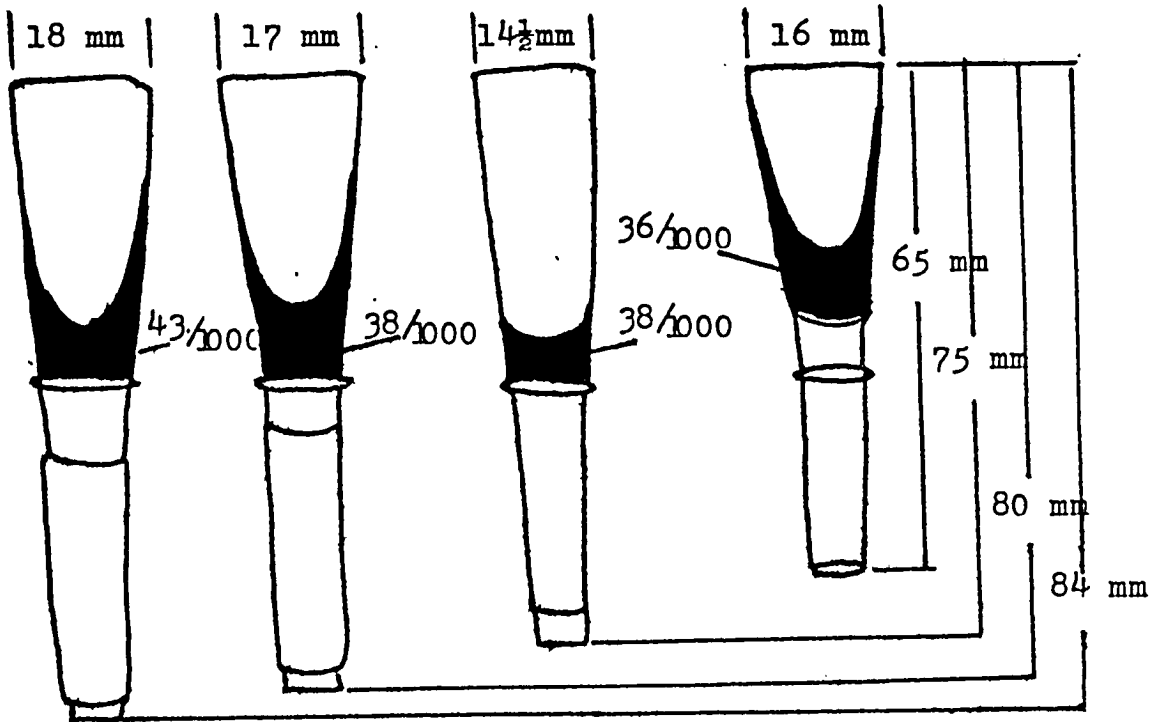
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<sup>1</sup>Loc. Cit.

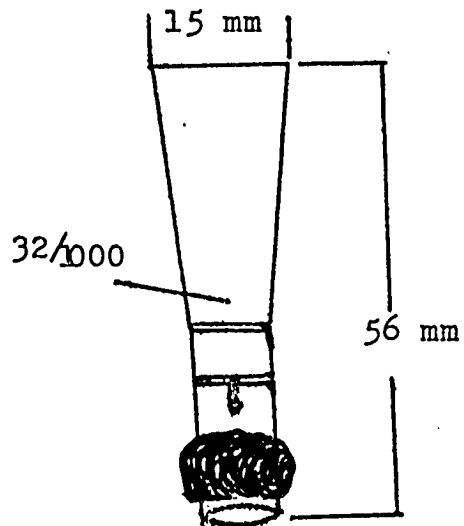
<sup>2</sup>Laborde, op. cit., pp. 331-32

<sup>3</sup>Waterhouse, op. cit.

## 18th Century



## Modern



## Tip Openings



18th Century



Modern

Figure 8. Bassoon reeds from the 18th and 20th centuries.

The large variance in the dimensions of 18th century English bassoon reeds is obvious; the modern reed being from ten to thirty mm shorter. Laborde indicates that by 1780, the French were consistently playing on a shorter reed. Waterhouse's illustration shows that the tips of English bassoon reeds were generally wider than most modern bassoon reeds.

Figure 8 readily shows that 18th century reeds had very thick vibrating blades compared to the modern reed. The profile of the vibrating blades, from the tip to the first wire, is often called "the lay". Most bassoon players, more properly refer to the "thickness or heaviness of the reed", when describing the profile of the vibrating blades. In the 18th century, the basic profile of the vibrating blades was achieved by the gouge. To finish the reed, a player added the U shaped scrape, further thinned down the scraped portion to suit his/her bassoon and playing style. The very end of the vibrating blades (tip) was probably thinned down even further. Eighteenth century accounts are not very helpful concerning the thickness of the finished reed. Laborde simply says that the reed should not be too strong or weak.<sup>1</sup> Warner in paraphrasing Ozi says, "He [Ozi] continues with directions to scrape down the tip. . . . The tip is further thinned and finally smoothed with the edge of a piece of glass."<sup>2</sup> Many modern bassoon players scrape all the bark off the cane back to the first wire; if all the bark is not removed from the

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<sup>1</sup>Loc. Cit.

<sup>2</sup>Loc. Cit.

tip end of the reed, only a small collar, c. 2mm of bark is left in front of the first wire. The opening at the tip, between the two blades, is much greater on 18th century reeds than on modern. (See Figure 8, p. 24.)

The modern reed has three brass wires around the tube to seal and hold the tube in a precise contour. Each brass wire is wound around the tube twice with its ends pulled tight and twisted together. Figure 9 reveals that English bassoon reeds at the end of the 18th century had only one tie around the tube. Waterhouse states that the tie was actually a small metal band, soldered together, made exactly to fit the smaller round open end of the tube. The band was pushed toward the tip to form a seal until it tightened at the beginning of the flair in the tip end. A medium heavy string was evenly wound around the tube end, beginning about 2mm above the open end up to about 6mm from the band. Langwill confirms that the English bassoon reed c. 1800 had only one tie around the tube, ". . . the reed had only one wire (above the binding)."<sup>1</sup>

Additional evidence shows that by 1780, bassoon reeds made on the continent, at least in France, had two metal ties around the tube. Laborde says " ... au milieu [l'anche] de laquelle on fait une ligature de fil ou de laiton g, qui sert à contenir les deux lames de l'anche, ... " (in the middle of [the reed] which one makes another tie of wire or brass g, which serves to contain the two plates of the reed,).<sup>2</sup>

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<sup>1</sup>Langwill, *op. cit.*, p. 159.

<sup>2</sup>Laborde, *op. cit.*, p. 327.

## TONE QUALITY OF THE 18TH CENTURY BASSOON

The typical tone quality of a bassoon for much of the 18th century is closely associated with and often described in terms of its particular function. In the late Baroque (1700-1750), the bassoon was functionally aligned with the bass voice, either as the foundation of the winds, or as a member of the continuo. During the second-half of the 18th century, composers began to free the bassoon from the stereotyped shackle of the bass voice and to use it as a solo color in the tenor and alto range. Laborde, in 1780, outlines the well known Baroque uses of the bassoon,

La Basson sert à jouer les parties de basse, comme le violoncello & la contre-basse: ... [basson] fait sortir le son des autres instruments, avec lesquels it se mêle, ... c'est pour cette raison qu'on l'emploie dans tous les orchestres. Indépendamment de cette propriété, le Basson en a encore une autre essentielle, c'est que par l'analogie qui se trouve entre le son de cet instrument, & celui de la voix humaine, il est très-propre à accompagner la voix, ... il fait aussi un très-bon effect dans le genre de Musique que les Allemans appellent Musique d'harmonie, composee de deux clarinettes, deux Cors & deux Bassons. On l'emploie aussi avantageusement pour accompagner des pieces de Musique arrangees pour la Harpe; (The bassoon plays bass parts, as does the cello and contre-bass [continuo]: . . . [bassoon] produces the sound of other instruments, with which it blends, . . . it is for this reason that one uses it in all orchestras. Besides this property, the bassoon has another essential one; it is the analogy found between the sound of this instrument, and the human voice, it is excellent to accompany the voice, . . . it also serves well in the type of music the Germans call Music of Harmony [wind chamber music], composed of two clarinets, two horns, and two bassoons [foundation of winds]. One uses it to advantage also to accompany the harp;)<sup>1</sup>

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<sup>1</sup>Ibid., p. 324.

As Laborde clearly points out, the bassoon is used in the above ways because of its ability to blend with and enhance the bass voice.

Mattheson in 1713 referred to the bassoon as "the usual bass, foundation or accompaniment of the oboe."<sup>1</sup>

Langwill attributes the stereotyped use of the bassoon, up to about 1760, to the mechanical and physical properties of the instrument.

the bassoon remained virtually unaltered from c. 1550 throughout the seventeenth and [much of the] eighteenth centuries since the dulcian and the three-keyed bassoon possessed much the same musical capabilities. It was natural, therefore, that it should be accorded an unobtrusive bass role throughout the period of basso-continuo which continued until the time of Haydn and Mozart...The only change in the bassoon in the baroque era was the addition of a fourth key (G#).<sup>2</sup>

Laborde, after outlining the well known uses of the bassoon in the Baroque, speaks of the newer uses of the bassoon in the second-half of the 18th century,

enfin on fait aujourd'hui par experience, que cet instrument est porté à un degré, sinon de perfection, du moins propre à faire connaître qu'il est susceptible d'être employé dans presque tous les genres de Musique qui sont en usage actuellement. Il suffit d'avoir entendu les virtuoses, tels que MM. Jadin, Schubart, Ritter, & quelques autres, pour être persuadé que cet instrument est propre à jouer les concerto, & autres genres de Musique. (finally one finds today by experience, that this instrument has been developed to such a degree, if not to perfection, at least sufficient enough to have it known that it is capable of being used in almost all types of music used today. It is sufficient to have heard the virtuosos such as Mr.'s Jadin, Schubart, Ritter, and others, to be persuaded that this instrument is appropriate to play concertos, and other types of music.)<sup>3</sup>

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<sup>1</sup>Mattheson, Das neu-eroffnete . . . Vol. 111.

<sup>2</sup>Langwill, op. cit., p. 72.

<sup>3</sup>Loc. cit.

Langwill's reasoning appears to be somewhat faulty in describing the tone quality of the bassoon after 1750. He reasons that, because most ensembles before 1750 used many bassoons (up to six or seven) and fewer after 1750 (three or four), ". . . the eighteenth and early nineteenth-century bassoons produced a more mellow and less penetrating tone."<sup>1</sup> That fewer bassoons were used in ensembles after 1750, was a result of a change in function, which demanded a more resonant tone, able to compete and penetrate better than before 1750. Halfpenny, in summing up the function and tone quality of the bassoon for the whole 18th century, substantiates that the function placed on the bassoon after 1750 demanded a more resonant tone.

These instruments [bassoons from 1720-1770], though far from incapable of more extended musical use, were essentially part of the general bass in baroque instrumentation. Their characteristic tone, when in full playing order is a deep rich burr, full and soft in quality, and capable of blending with and reinforcing other instrumental sounds without overpowering them. After practical experience of this tone-quality it is easy to understand the comparatively large number of bassoons employed by baroque musical establishments...For these newer purposes [solos and independent bass] the English bassoon was gradually transformed into something quite different from its former self, an instrument of greater sonority [resonance and tonal carrying power] and clarity of speech [articulation], better able to serve as an independent bass to the expanding wind band.<sup>2</sup>

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<sup>1</sup>Langwill, op. cit., p. 87.

<sup>2</sup>Halfpenny, op. cit., pp. 30-31.

## EIGHTEENTH CENTURY BASSOON EMOUCHURE

The embouchure (formation of the lips in performance) of 18th century bassoon players is one area of performance diametrically opposite, in varying degrees, to the modern bassoon player. The 18th century bassoon player relied on embouchure adjustment during performance to achieve the proper tone quality and intonation.

Most contemporary bassoon teachers and players advocate placing the mouth around the reed in as natural a position as possible. The lips should not be thought of as being "tight", but just "firm" enough to give a proper cushion for the reed. The lips function like a draw string on a purse; forming a self-binding circle around the reed; only enough pressure is applied by the lips onto the reed to prevent air escaping. Therefore, with the proper breath support and fingerings, the modern bassoonist must rely on the total instrument, including the reed, for most of the intonation, dynamic flexibility and articulation in performance. Of course, even the best modern bassoon will have troublesome notes, their number and degree dependent on the quality of the reed.

The bassoonist of the 18th century was compelled to use much physical effort through the embouchure during performance. The long, wide reed used by 18th century bassoonists demanded that it be heavy and very open at the tip. (See Figure 8, p. 24.) A reed the length and width of an average 18th century reed, but the heaviness and tip opening of a modern reed would close shut at the tip during performance. Furthermore, the basic diatonic scale would be unrecognizable, pitches above  $c'$

almost impossible, the tone quality thin and raspy, very little dynamic flexibility, and short, fast articulation impossible.

The 18th century bassoonist in performance progressively increased the pressure of the lips onto the reed going from the lowest to the highest note; the opening of the vibrating blades got smaller or larger, depending on the range being played. The lips were placed at the mid-point of the vibrating blades to be able to change the opening of the tip with the greatest efficiency. Laborde gives a clear account of the 18th century bassoon embouchure.

L'anche doit être tenue dans la bouche, depuis son extrémité jusqu'à peu-près le milieu de l'espace qui est entre cette extrémité & la petite ligature en fil ou laiton, servant à contenir les deux lames de l'anche. Pour les tons les plus graves comme le si, ut, re qui sont les premiers du Basson, l'anche doit être pressée légèrement entre les levres, lesquelles doivent se resserrer à proportion que l'on monte, de maniere que pour les tons les plus hauts; elle doit être comprimée entre les levres, ensorte quelle ne forme qu'une ouverture suffisante pour laisser passer le vent dans l'instrument. (the reed must be kept in the mouth from its end to about the middle of the space between the end and the little wire or brass tie, holding the two plates of the reed. For the lowest tones B-flat, C and D on the bassoon, the reed must be pressed lightly between the lips, which tighten proportionally as one rises, so for the highest tones it is compressed between the lips making an opening sufficient only to let wind pass into the instrument.)<sup>1</sup>

According to Laborde, moving the lips toward the wire will spoil the tone quality and cause undue physical strain; moving the lips closer to the end also produces an undesirable tone.

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<sup>1</sup>Laborde, op. cit., p. 332.

Il ne faut pas non plus tenir l'anche sur l'extrémité des deux lames, le son serait maigre, & on entendrait une espee de sifflement, qu'on appelle un son de peigne, parce qu'il ressemble assez un bruit que l'on serait, en passant avec vitesse un lame de couteau sur toutes les dents d'un peigne; ce son est toujours désagréable, ... si au contraire on avançait l'anche dans la bouche beaucoup plus, c'est-à dire, jusqu'au près de la ligature de fil ou laiton, il en résulterait un autre inconvénient, indépendamment de ce qu'elle serait pour lors beaucoup plus dure à jouer, & qu'elle fatigerait par conséquent les levres, le son de l'instrument deviendrait dur & rauque. (You should not hold the reed on the end of the two blades, the sound will be thin and produce a type of whistle called comb, because it resembles the noise produced when a knife blade is passed quickly over a comb; this sound is always disagreeable, . . . if on the contrary, the reed is advanced into the mouth much more, too close to the wire or brass tie, another inconvenience will result, independent of the fact that it will be harder to play and tire the lips, the sound of the instrument would become hard and raucous.)<sup>1</sup>

Because the lips exerted a lot of pressure on the reed, making the opening very small in the upper register, Laborde recommends turning the reed in the mouth so that it does not close completely.

A fin qu'elle ne se ferme pas entièrement, ce qui arriverait si on la tenait tout à plat entre les levres, & serait cause que le vent n'aurait plus de passage, on doit la tenir un peu obliquement; de facon qu'un des côtés de l'anche touche à la levre supérieure, & l'autre à la levre inférieure, à-peu-près de la maniere que représente l'ovale ci-après.



Au moyen de cette position, le vent passe librement dans l'instrument en quantité suffisante, pour produire tous les tons de son étendue. (In order that it [reed] doesn't close entirely, which would happen if one held it flat between the lips, causing the wind passage to shut, one must hold it a little obliquely; the sides of the reed touch the upper and lower lip, about in the manner represented by this oval.



In this position, sufficient wind

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<sup>1</sup>Ibid., p. 333.

passes freely into the instrument to produce all the tones of its range.)<sup>1</sup>

A modern bassoonist places the lips on the reed somewhere between the mid-point and the first wire of the vibrating blades; describing an exact position is not possible because each player will have a slight variation in reed and tone concept. In general, the trend is to place the lips closer to the first wire than the mid-point of the reed.

The basic function of the embouchure during performance points out one of the most distinctive differences between 18th and 20th century bassoon playing.

In the 18th century, different registers were produced and sustained mainly by the embouchure; in the 20th century, different registers are produced by fingering and sustained by the breath. Most bassoonists today refer to the modern concept as "playing on the breath", and the 18th century concept as "playing by embouchure". The latter concept produces intonation problems, inconsistency of tone quality, and a reduction in dynamic flexibility.

The obvious problems of intonation and tone quality inherently produced by the reed and the embouchure of the 18th century, is compounded by the instrument. (See above-Langwill p. 9.) Laborde, in discussing the relationship between the player and the total instrument (including the reed), points out that intonation and tone quality are troublesome areas which are related to embouchure and fingering.

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<sup>1</sup>Ibid., p. 332.

Quelques soins qu'on apporte à fabriquer le Basson, selon les proportions les plus justes, de même que pour le choix de l'anche & du bocal, il n'est queres possible de trouver un instrument qui porte tous les tons & semi-tons justes & fixes, comme on les trouve sur le monochorde; il y a toujours quelques tons qui sont un peu forts ou un peu foibles: l'oreille doit guider l'embouchure, pour donner un peu plus de force aux tons qui se trouvent foibles, & diminuer au contraire ceux qui se trouvent un peu forts.

Par exemple, il est rare que les deux la qui se font d'une octave à l'autre, en bouchant les trous 1, 2, 3, 4, 5, soient exactement justes, ... (whatever care one takes to make the bassoon, according to the soundest proportions, and similarly the choice of the reed and the bocal, it is hardly possible to find an instrument which has perfectly balanced tones and semi-tones, as are found on single stringed instruments; there are always some tones which are a little strong or weak: the ear must guide the embouchure, giving a little more force to the feeble tones, and diminish the strong tones.

For example, it is rare to find the two a's [A-a], which are an octave apart and fingered the same (1, 2, 3, 4, 5), exactly in tune.)<sup>1</sup>

Realizing the wide variance between 18th century reeds and instruments, Laborde wisely avoids giving definite guidelines for overcoming the inherent problems of intonation and tone quality; instead he recommends finding a good teacher to instruct the player in overcoming these problems.

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<sup>1</sup>Ibid., p. 334.

## THE 18TH CENTURY BASSOON IN PERFORMANCE

Fingering charts from the 18th century reflect differences of opinion for the range of the four and five-keyed bassoon; the fifth key (E-flat) produces a chromatic tone in the lowest octave and does not alter the range of the bassoon with four keys. The fingering charts by Gehot<sup>1</sup>, Preston<sup>2</sup>, Prelleur<sup>3</sup>, Purcell<sup>4</sup>, and Tan'sur<sup>5</sup>, give B-flat<sub>1</sub>-g' as the range of the four-keyed bassoon; Diderot et d'Alembert<sup>6</sup> gives A<sub>1</sub>-a'. The A<sub>1</sub> is a theoretical note because it is fingered in the same manner as the B-flat<sub>1</sub> and lipped down.

Abrahame<sup>7</sup> and Bailleux<sup>8</sup> give B-flat<sub>1</sub>-a' as the range of the five-keyed bassoon. An apparent discrepancy in range, reflecting an

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<sup>1</sup>Joseph Gehot, The Complete Instructor various ed. c. 1790-1840, from Halfpenny, Galpin Society Journal X (1957), pp. 34-37.

<sup>2</sup>Preston, Complete Instructions for the Bassoon (London: c. 1785), from Halfpenny, Galpin Society Journal X (1957), pp. 34-39.

<sup>3</sup>Peter Prelleur, The Modern Musick Master (London: c. 1741), copy from L. Langwill.

<sup>4</sup>H. Purcell/J. Sadler, Apollo's Cabinet or The Muses' Delight (London & Liverpool: 1754), copy from L. Langwill.

<sup>5</sup>William Tan'sur, The Elements of Musick display'd: . . . (London: 1767), copy from L. Langwill.

<sup>6</sup>Diderot et d'Alembert, Encyclopedie "Basson de Hautboi" (Paris: 1751), from Halfpenny, Galpin Society Journal X (1957), pp. 34-37.

<sup>7</sup>Abrahame, Principe de Basson (Antwerp: Schott, c. 1780), copy from L. Langwill.

<sup>8</sup>Bailleux, Methods... par Mr. Hotteterre...des tablatures de la Clarinette et du Basson...etc., (Paris: c. 1779), from Halfpenny, Galpin Society Journal X (1957), pp. 34-37.

unrealistic impression, is from the fingering chart by Laborde for the five-keyed bassoon (B-flat, f').<sup>1</sup> Realizing the impracticality of the extremely high upper range, Laborde comments, "Ces dernier tons ne sont point usités, surtout Ut, Re, Mi, Fa, mais dependant ils ne sont pas infesables, ... " (The last notes are not used, especially c', d', e' and f' but are possible to produce . . . ).<sup>2</sup> While discussing the proper major and minor modes to be used with the bassoon, Laborde further limits the upper range of the bassoon by saying, " ... & ne montent pas plus haut que le la bémol, on tout au plus le la naturel, qui est le troisieme la de l'instrument." (and go no higher than a-flat', or at the most a', which is the third a of the bassoon.).<sup>3</sup> Laborde implies that even when the notes b-flat' to f' are attempted under ideal conditions, (by a professional player - in a loud conjunct context - with a perfect reed and quality instrument) they are so unreliable that composers do not consider them useful for the 18th century bassoon.

In general, the intonation, flexibility and reliability of all notes above e' or f' are directly dependent on the quality of the reed in conjunction with a precise lip pressure. A virtuoso bassoon player in the 18th century must be able to consistently produce g' and an occasional g-sharp', a', and b-flat', if approached by a tone or semi-tone. Regarding the use of the 18th century bassoon above g', any one

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<sup>1</sup>Laborde, op. cit., p. 342a.

<sup>2</sup>Loc. cit.

<sup>3</sup>Ibid., p. 335

or combination of the following conditions would require an exceptionally fine player: (1) note(s) approached by a leap, especially slurred, (2) notes at a fast tempo, (3) notes dynamically soft.

Notes above  $\underline{g}'$  were troublesome for the bassoon until the turn of the 19th century when the seventh and eighth keys were added to the wing-joint specifically to aid in the playing of the high register. Baines pin-points the problem in playing above  $\underline{g}'$  on the four or five-keyed bassoon by saying, ". . . without these two keys [seventh and eighth] these two notes [ $\underline{a}'$  and  $\underline{b}\text{-flat}'$ ] are very difficult unless the reed is exactly right."<sup>1</sup>

The 18th century bassoon is an octave overblowing instrument with a basic scale of  $\underline{G}$  mixolydian. The lowest tone produced by covering all six finger-holes (left-hand 1, 2, 3 and right-hand 4, 5, 6) is  $\underline{G}$ . Consecutively lifting the fingers from six to completely open produces the C major scale from  $\underline{G}$  to  $\underline{f}$  or mixolydian G. Beginning with  $\underline{g}$  and continuing diatonically upward, the basic octave is overblown up to  $\underline{f}'$ . (See Figure 9-A, p. 38) From  $\underline{B}\text{-flat}_1$  to  $\underline{F}$  is an extension below the basic mixolydian scale; these fundamentals are not overblown. (See Figure 9-B, p. 38.) All notes above  $\underline{f}'$  are extensions to the basic scale and are not derived directly from their fundamental; they are produced by drawing on other fundamentals and often aided by various notes as reinforcing vents. High  $\underline{g}'$  is fingered like the fundamental  $\underline{c}$  and often reinforced by the G-sharp key; it is therefore the third partial in the C overtone series.

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<sup>1</sup>Baines, Woodwind Instruments . . . , p. 288.

(A) (B) (C) (D)

1  
2  
3  
4  
5  
6  
F  
G#  
E  
D  
C  
B $\flat$

1  
2  
3  
4  
5  
6  
F  
G#  
E  
D  
C  
B $\flat$

1  
2  
3  
4  
5  
6  
F  
G#  
E  
D  
C  
B $\flat$

1  
2  
3  
4  
5  
6  
F  
G#  
E  
D  
C  
B $\flat$

Figure 9. Four-keyed bassoon fingerings. The left-hand fingers cover holes 1, 2, 3 while the right-hand fingers cover holes 4, 5, 6. The F-natural and G-sharp keys are depressed by the right-hand little finger. The right-thumb covers the E-hole, whereas the left-thumb covers the D key, C hole and B-flat key. When more than one fingering is given for a pitch, they will appear in order of frequency reflected by the fingering charts surveyed. ( ) indicates a choice, dependent on the bassoon and does not alter appreciably the basic fingering.  $\odot$  indicates that only half the hole is covered—"half-hole."

High a' is the third partial in the d overtone series aided by the low D. (See Figure 9-C, p. 38.) Figure 9-D illustrates the most common fingerings for the accidentals to the basic scale.

Basically, the modern bassoon is acoustically the same as its 18th century counterpart; it overblows the fundamental octave through d'. However, above d' the fundamental octave is not satisfactory by itself and must be reinforced by other fundamentals.

Fingering charts from the 18th century reveal two reasons why a common set of fingerings for the bassoon is not possible. First, apparent contradictions too basic to be taken as alternate fingerings but possible errors; Tan'sur<sup>1</sup> and Laborde<sup>2</sup> give fingerings that acoustically are questionable. (See Figure 10, p. 40.) Second, 1750-1800 was a period of rising concert pitch - consequently, a constantly changing instrument and reed further compounded by the individuality of each instrument and player-teacher. Laborde, realizing that each bassoon will probably require variation in fingerings like the reed, says,

Na. Il y a d'autres positions pour faire plusieurs tons de différentes manieres suivant les passages ou ils se trouvent employés; il seroit trop long de les demontrer ici; c'est pourquoi on s'est rétraint à donner la Tablature la plus simple et la plus connue; c'est avec Maitres dont on sera choise à enseigner ces différentes positions. (NA. There are alternate fingerings to make several tones [on the chart] to fit the passage where employed; it would be impractical to show them [all] here; that is why I have restricted myself to giving the simplest,

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<sup>1</sup>Tan'sur, op. cit., p. 94.

<sup>2</sup>Laborde, op. cit., p. 342a.

The diagram illustrates fingerings for various notes on a four-keyed bassoon. The notes are G, A, B $\flat$ , B, C, D, E, F, G $\sharp$ , and A. The fingerings are shown on a grid with rows for fingers 1-5 and keys F, G $\sharp$ , E, D, C, B. Asterisks (\*) indicate common fingerings, and T and L indicate fingerings for Tan'sur and Laborde respectively.

Note	Finger 1	Finger 2	Finger 3	Finger 4	Finger 5	Key F	Key G $\sharp$	Key E	Key D	Key C	Key B
G	*	*	*	*	*	*	*	*	*	*	*
A	*	*	*	*	*	*	*	*	*	*	*
B $\flat$	*	*	*	*	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*	*	*	*	*
C	*	*	*	*	*	*	*	*	*	*	*
D	*	*	*	*	*	*	*	*	*	*	*
E	*	*	*	*	*	*	*	*	*	*	*
F	*	*	*	*	*	*	*	*	*	*	*
G $\sharp$	*	*	*	*	*	*	*	*	*	*	*
A	*	*	*	*	*	*	*	*	*	*	*

Figure 10. Contradictions to common four-keyed bassoon fingerings. \* = common, T = Tan'sur, L = Laborde

well known fingering chart; it is up to the teacher one chooses to teach [you] the different fingerings.)<sup>1</sup>

Eighteenth century bassoon fingering charts are perplexing for two reasons; first, the obvious differences between them for some individual notes and second, not knowing precisely the critical physical data about the total bassoon, including the bocal and reed to which each fingering chart refers. Further, the non-availability of such instruments precludes the possibility of proving the real value of each fingering chart. Figure 11, pp. 42-44, illustrates a few of the differences of individual notes between fingering charts for the four and five-keyed bassoon.

Within the range of B-flat<sub>1</sub> to g', the B-natural<sub>1</sub> and C-sharp are the only notes that should be avoided entirely because of intonation; both are theoretical notes like A<sub>1</sub>. The B-natural<sub>1</sub> is pinched (lipped) up from the B-flat<sub>1</sub>. The C-sharp is either pinched up from C or fingered as C with the left-thumb (C hole) partially covered (half-holed).

The basic denominator in understanding the amount of digital dexterity required to perform any piece of music on a four or five-keyed bassoon is the mode in which the music is composed. Laborde discusses the proper major and minor modes to be used for the bassoon.

Le Basson peut jouer dans tous les majeurs & mineurs; mais il y en a qui lui sont plus favorables que d'autres. Les concerto, trio, quatuor & autres morceaux de Musique qu'ont exécuté jusqu'à present sur cet instrument les Virtuoses dont on a parlé, sont composés des tons de fa, ut, so, majeur & mineur, si bémol & mi bémol majeur ...

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<sup>1</sup>Loc. cit.





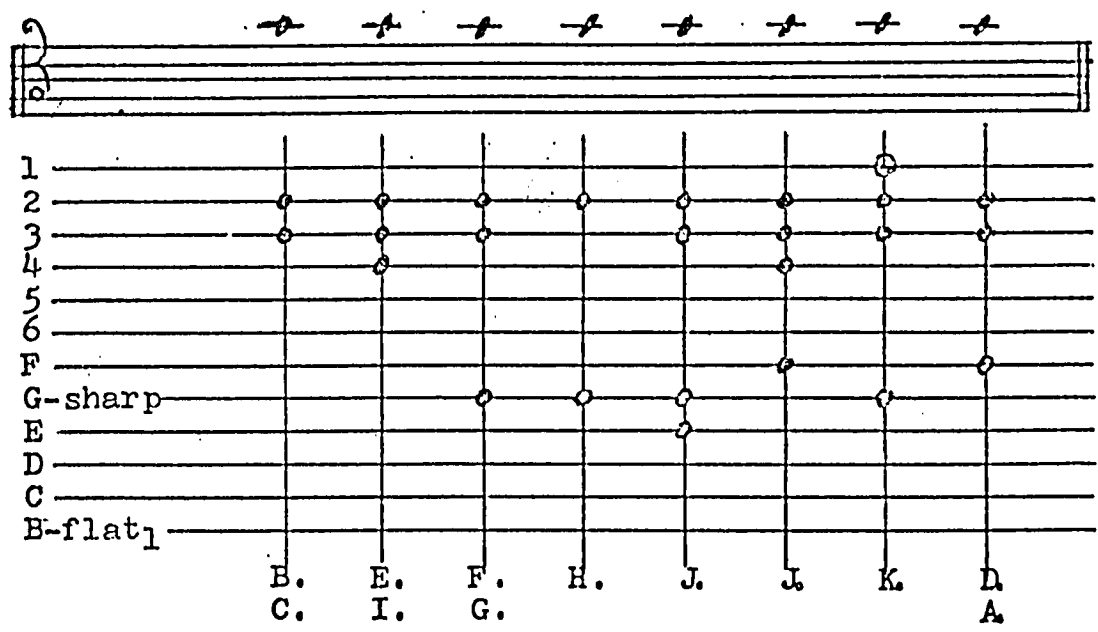
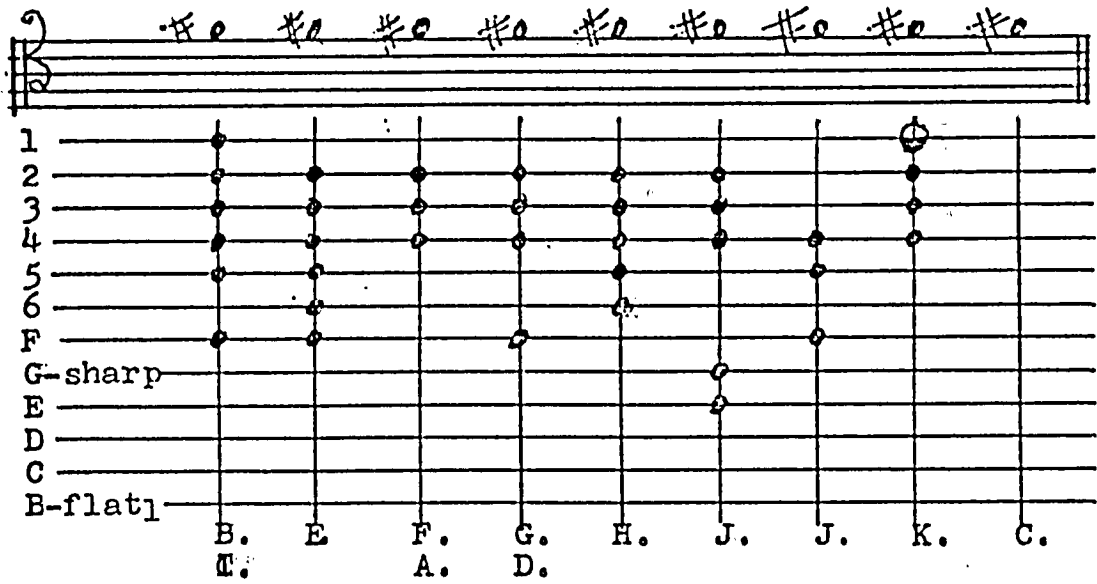


Figure 11. Continued

On peut cependant l'employer dans tons de la & re, majeur & mineur. (The bassoon can play in all the major and minor modes but some are more favorable than others. Concertos, trios, quartets, etc., which have been performed up to the present time on the bassoon by the virtuosos of whom we have spoken [Jadin, Schubert and Ritter], are composed in the modes of E, C, G major and minor, B-flat and E-flat major...One can use it however, in the modes of A and D, major and minor.)<sup>1</sup>

Without explaining why certain major and minor modes are more practical in composing for the bassoon, Laborde points out one of the most obvious digital problems inherent to the four and five-keyed bassoon.

Les passages-ci-dessus sont trop difficiles, & même presque impossibles dans la vitesse, à cause des deux clefs 7 & 8, qui doivent être touchées alternativement avec le petit doigt de la main droit, ... ce qui fait un embarras dans le mouvement de ces clefs, & un cliqueris désagréable. La même difficulté existe à faire ces mêmes passages dans l'octave au-dessus & au-dessous de celle où ils sont notés; ainsi on ne doit point les employer, lorsqu'on composé pour cet instrument. (The above [Example 1A, p. 50] passages are difficult and almost impossible to play quickly because keys 7 (G-sharp) and 8 (F-natural) must be depressed alternately with the little finger of the right hand, . . . which produces an awkwardness in depressing these keys and a disagreeable clicking. The same difficulty exists in playing these notes an octave higher or lower; thus one must never use them [passages] when composing for the bassoon.)<sup>2</sup>

The little-finger of the right-hand is also used successively for the notes F to A-flat. (See Example 2, p. 50.) If the F and G-sharp keys are placed close enough to each other (see Figure 2, p. 5.), depressing them successively requires the right little-finger to slide. The modern bassoonist is required to make the same slide (F to A-flat or vice versa)

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<sup>1</sup>Ibid., p. 335.

<sup>2</sup>Loc. cit.

but usually does not consider it as difficult as Laborde depicts. However, the modern bassoon does have two advantages over the 18th century bassoon; the F and G-sharp keys are equipped with rollers to facilitate a slide and an alternate G-sharp key for the right-thumb. Other passages are cited by Laborde as difficult in certain modes and feasible in others.

Ce trait est de la plus grande difficulté dans le ton où il est note ci-dessus, surtout dans la vitesse; mais il est faisable dans celui qui suit. (This passage [see Example 1-B, p. 50] is very difficult in the key(s) notated above [E-major and c-sharp minor], especially at a fast tempo but, it is feasible in that [E-flat major and c-minor] which follows.)<sup>1</sup>

Laborde mentions certain major and minor modes best suited for the 18th century bassoon in performance, illustrates with examples, but never states that the closer a mode is to C in the circle of fifths, the more desirable it becomes. The reason being the small number of finger-keys on the 18th century bassoon causing technical performance limitations in trilling, in playing notes above  $e'$ , but especially in playing chromatics to the basic scale.

Since the four-keyed bassoon produces only one accidental (G-sharp) by a key, disregarding the B-flat, because it is produced by the bore with all the holes closed, all other accidentals are produced by cross or forked-fingerings. Carse describes the concept of forked-fingering as,

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<sup>1</sup>Loc. cit.

when a finger is raised from a hole (all the holes above it being closed) the sound will issue clearly and in tune only when the holes immediately below it are uncovered; but, when the hole immediately below the one which is sounding is closed by a finger, the pitch of the sounding hole is lowered approximately a semi-tone.<sup>1</sup>

Prelleur explains forked-fingering in colorful 18th century English,

If you find a  $\vee$  before any of these notes it is made by stopping the next hole but one. And if you find a  $\times$  it is made by stopping the next hole & opening the next hole above that . . . <sup>2</sup> (See Figure 12, p. 48.)

There are two basic reasons why B-flat or D major are more desirable and practical than B or D-flat major; the amount and consecutiveness of forked-fingerings. Tones produced by forked-fingering tend to be unstable in pitch and "stuffy" in tone quality. Since lip pressure, in varying degrees, produces different registers and corrects intonation discrepancies of individual notes, the presence of many tones produced by forked-fingerings would unduly compound intonation problems for the performer.

Two or more consecutive forked-fingerings are conducive to digital malfunction, especially at fast tempi. Example 1-B (see p. 50) measure one is an example of two consecutive forked-fingerings (c-sharp, d-sharp) which, along with the f-sharp, g-sharp combination would be common in the major and minor modes of four or more flats or sharps. Measure two of example 1-B has the same problems of measure one but in

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<sup>1</sup>Carse, Musical Wind . . . , pp. 26-27.

<sup>2</sup>Prelleur, The Modern Musick . . .

1-  
2-  
3-  
4-  
5-  
6-  
F-  
G#-  
E-  
D-  
C-  
Eb-

Figure 12. Forked-fingerings. The second octave is basically the same as the fundamental octave except that some pitches in the second octave have various notes that serve as reinforcing vents which do not alter the basic fingering.

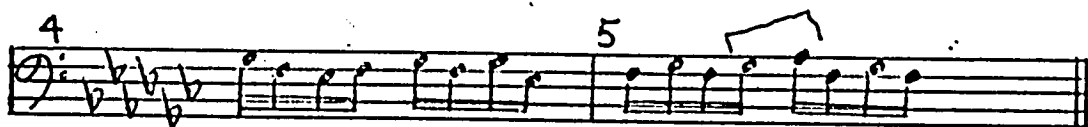
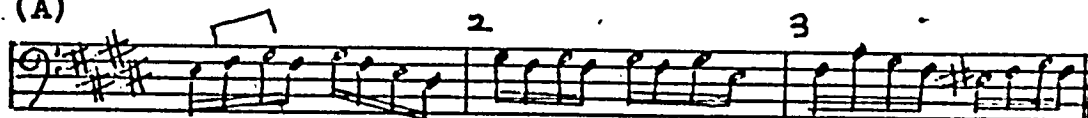
reverse. The problems of measures one and two of example 1-B are compounded in measure three by the a-sharp after the g-sharp. The digital movement from g-sharp to a-sharp requires the lifting of the right hand second and fourth fingers while retaining the first and third; two or more successive g-sharp, a-sharps, as in measure one of Example 3 (see p. 50.) would be digitally very difficult, even at a moderate tempo. Of course, the same sequence of fingerings, except for the c-sharp, can occur in E-flat major. (See Example 3, m 2.) The same passage in B-flat or F major has only one forked-fingering and becomes somewhat easier; in C major with no forked-fingerings it becomes quite easy. Measure five of example 1-B presents another kind of digital problem involving two successive forked-fingerings. The simultaneous upward motion of a finger from one hand with a downward motion of a finger from the other hand produces a variant forked-fingering involving both hands. Measures six and seven of example 1-B present the same digital problems as measures one through five. Laborde cites more examples with similar problems to examples 1 and 2, but again fails to state why they should be used in certain modes and not others.

By almost completely avoiding any information concerning the feasibility of trills by the four and five-keyed bassoon, 18th century fingering charts reflect that the number of usable trills by the 18th century bassoon is quite limited. In general, trilling has more restrictions, magnified many times, as non-embellished finger technique; the difficulty of a trill being critically dependent upon the mode and tempo of the music in which it is found.

Laborde slightly overstates a general premise about trills by

Example 1. Difficult passages from Laborde

(A)



Example 2.



Example 3.



saying, " ... celles que l'on peut faire bien entendre sont en petit nombre ... " (those [trills and other embellishments] that one can make sound good are few in number.)<sup>1</sup> Laborde's discussion concerning trills is of little value because it is based on a fingering chart with too many acoustical contradictions. The discussion itself is unclear in many places concerning which trills are feasible or not - and why.

All diatonic trills in the basic scale from G to d' use normal fingerings except f to g, and present no problems. Prelleur, one of the few 18th century writers to include any information on trills, gives the same fingering for f to g trill as many bassoonists use today.<sup>2</sup> (See Figure 13, m 1.) All tone or semi-tone trills from B-flat<sub>1</sub> to E, present two unique problems on the four and five-keyed bassoon. First, trilling is executed with the pollices (thumbs) which are less agile than the fingers, Figure 13, measure two, shows the most successful trills in this range. Second, some require the thumb to depress a key or tone hole and trill at the same time; a trill of this nature is less successful because it is difficult to execute fast, to sustain, and to make even. (See Figure 13, measure three.) All tone and semi-tone trills involving B-natural<sub>1</sub>, C-sharp, and E-flat are impractical and should not be written.

Specifically, the same reasoning involved for restricting bassoon performance to certain modes is applicable to trills, tone or semi-tone, above F. Using common fingerings, Figure 13, measure four, illustrates the practical tone or semi-tone accidental trills to the basic scale up

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<sup>1</sup>Laborde, op. cit., p. 39.

<sup>2</sup>Prelleur, op. cit.

(1) (2) (3) (4) also octave higher

1  
2  
3  
4  
5  
6  
F  
G#  
E  
D  
C  
Bb

1  
2  
3  
4  
5  
6  
F  
G#  
E  
D  
C  
Bb

Figure 13. Trills on four-keyed bassoon

● = finger involved with trill.

↔ = alternating with another finger or thumb.

also octave higher

(5) (6) (6A)

1  
2  
3  
4  
5  
6  
F  
G#  
E  
D  
C  
B $\flat$

(7) (7A)

1  
2  
3  
4  
5  
6  
F  
G#  
E  
D  
C  
B $\flat$

Figure 13. Cont.

to d'; all the trills in measure four involve one or two fingers making the same motion. Measure five of Figure 13 illustrates difficult tone or semi-tone accidental trills in the same range; at least two fingers alternate in an up and down motion. The C-sharp to A-sharp trill is the only exception, but placed in the difficult category because of the awkward finger dexterity required; the fast up and down motion of right-hand fingers two and four while depressing right-hand fingers one and three. The c-sharp, d-sharp trill is the only difficult trill that involves more than two fingers; fingers two and four, positioned on the chart, alternate with three. Measure six of Figure 13 shows the impractical accidental trills from G to d'. The only questionable trill in the impractical category is f to f-sharp; using common fingerings, it is impractical. Using a fingering based on acoustical logic, the f to f-sharp trill could possibly be executed like the f-g trill; it would then become usable. (See Figure 13, measure 6 A.) The only physically impossible trill, even with practice, is the f-sharp-g-sharp; the little finger of the right hand must alternately depress the F-natural and G-sharp keys.

All tone or semi-tone trills from e' to g' are hard to classify because there are so many alternate fingerings for notes in this range. Measure seven in Figure 13 illustrates the tone and semi-tone trills from e' to g' that are practical, measure seven A the difficult.

Trills as well as certain combination of notes that are digitally difficult or impossible, force a bassoonist of any era to experiment for alternatives. Laborde confirms that 18th century bassoonists were experimentors by saying, " ... c'est encore l'affaire du Maître que l'on

choisira de les enseigner; il seriat trop long de les désigner ici; ..." ([learning all the trill & alternate fingerings] again is the task of the teacher a person chooses to study with; there are too many to indicate here;)<sup>1</sup>

Two main points must be considered when experimenting for a feasible way to execute a difficult trill or series of notes. First, each combination of reed, bocal, and instrument is slightly different; what is successful with one combination will not necessarily be for another. Second, the context of a difficult trill or awkward series of notes which has three sub-considerations: (1) is it digitally possible to arrive and leave the alternate fingering?, (2) what is the tempo of the music in which the trill or series of notes is located?, (3) does the tone quality and intonation produced by the alternate fingering match the surrounding notes? Therefore, it is possible to have an alternative fingering that is designed for a specific musical context.

Articulation, an entity conceived as one of the musical expressions of style, is discussed very little by 18th century writers in terms of bassoon technique. Probably, the reason for the void of information dealing with stylistic articulation in relation to bassoon technique is two-fold: (1) technical limitations of the 18th century bassoon; (2) the technical limitations caused composers often to write notes and rhythms allowing the bassoonist to work out the most feasible articulation, hopefully within the style of the music. Laborde, discussing in very general

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<sup>1</sup>Ibid., p. 339.

terms the varied stroke the tongue makes against the reed (articulation), pointing out that some players are more apt than others, warns above all that the resultant articulation must agree with the style of the music.

Il y a plusieurs manieres d'employer la langue à cet usage; il n'est pas possible de les détailler ici; on dira seulement en général, que toutes les notes qui ne sont pas liées ensemble, doivent être détachées par un coup de langue, qui doit être plus ou moins articulé, selon l'expression & le mouvement qu'exigent les différens morceaux de Musique que l'on exécute

.....  
 mais comme il y en a qui dépendent du plus ou moins de liberté de la langue; de même il y a des personnes à qui les meilleurs Maîtres ne pourront jamais donner la tournure nécessaire pour bien articuler certains morceaux de vitesse. ... D'ailleurs on a toujours remarqué que la grande difficulté est rarement rendue sur le Basson, encore plus particulièrement que sur les autres instrumens à vent, avec la nécessité, la justesse & la précision nécessaires pour la rendre agréable....(There are several ways to use the tongue; space does not allow a detailed discussion here; in general, all notes which are not bound together [slur, tie, etc.] must be detached by a stroke of the tongue, which must be more or less articulated according to the expression and tempo of the music

.....  
 but there are some who are not precise with articulation just as there are some, even with the best teacher and endless number of lessons, cannot learn to articulate certain fast pieces well. . . . However, it has been noticed that very difficult music [requiring fast and precise coordination of the tongue and fingers] is rarely performed on the bassoon-moreso than other wind instruments, with enough soundness and precision to render it agreeable.)<sup>1</sup>

Disregarding the aptness of individual bassoonist to articulate, two facets of articulation must be considered in relation to the technical capabilities of the bassoon. First, articulation can be used to help alleviate digital problems; a digital movement that requires a finger to slide, or the simultaneous movement in opposite directions of

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<sup>1</sup>Ibid., pp. 340-42.

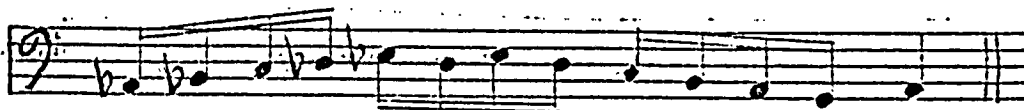
the fingers in changing pitches. Example 4 (see p. 58.) would be very difficult, especially at faster tempi, if it were all slurred; the right little-finger must slide in the movement from f-sharp, g-sharp. (See fingering chart Figure 9, (p. 38.) By articulating the same passage, the little-finger has a split-second to facilitate the movement from f-sharp to g-sharp. If the tempo is very fast, a bassoonist may slur the first and second sixteenth notes in each group and articulate the third and fourth; commonly referred to as "two and two articulation". Example 5 (see p. 58.) illustrates a succession of forked-fingerings, d-flat, e-flat, which are difficult to execute precisely slurred at a fast tempo. Again, articulation makes the same passage somewhat easier by reducing the digital coordination to slightly less than one hundred per cent of precision; of course, the reduction in digital coordination per se, is absorbed at extremely fast tempi by the added coordination required between the tongue and fingers.

Second, certain leaps are almost impossible, especially at faster tempi, unless they are articulated. (See Example 6, p. 58.) The basic technical problem of the Vivaldi and Boismortier excerpts (example 6), stems from the execution of the leaps to and away from the basic octave. The modern bassoon has two distinct advantages over the 18th century bassoon in the execution of large leaps. First, the modern bassoon has a whisper-key mechanism which allows the performer to vent the air column above g-sharp and to close the vent below. Being able to vent the air column allows the modern bassoonist to build a reed that produces the over-blown octave without exerting more lip pressure onto the reed; therefore, no change in the reed tip-opening or embouchure is necessary.

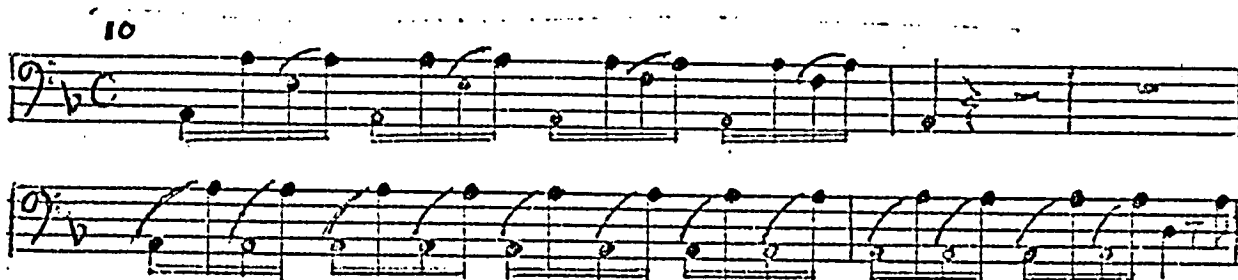
Example 4. Articulation problems



Example 5.



Example 6. Concerto in d minor 1st movement Allegro  
Antonio Vivaldi (1675-1741) ed. Imre Rudas



Concerto in D Major 3rd movement Allegro  
Joseph Bodin de Boismortier ed. Hugo Ruf



The 18th century bassoonist must constantly change the reed tip-opening by embouchure to execute any leaps larger than a third or fourth, especially with a register change. Second, the modern bassoon has keys on the wing-joint commonly referred to as "snip" or "flick-keys". A performer will quickly and lightly brush the left-thumb over a "snip-key", opening and closing it precisely when the fingers move to produce the tone of the leap. The wing-keys, when used for "snipping", function for that instant like an octave key by reinforcing the vent of the whisper-key. Many modern bassoons also have a mechanism to lock the whisper-key closed therefore, temporarily locking the vent closed; the "snip-keys" can then be used as true octave-keys to facilitate rapid leaps. The locking of the whisper-key vent creates two problems. First, the "snip-keys" can only be used from a up to d' successfully with the modern reed. Second, since the whisper-key lock is positioned to operate either by the left or right thumb, depending on the style of the lock, the thumb must be free to engage and disengage the lock when necessary.

Because the 18th century bassoon is an octave overblowing instrument that does not commonly have any possible vents in the air column, a bassoonist usually articulates all leaps larger than a third or fourth at faster tempi; especially leaps of an octave or those encompassing a register change.

Very little direct information is available relating dynamics to the four and five-keyed bassoon in performance. Halfpenny describes the bassoon tone as, ". . . a deep rich burr, full and soft in quality and capable of blending with and reinforcing other instrumental sounds with-

out overpowering them . . . soft, bourdon like tone quality."<sup>1</sup>

Laborde also describes the bassoon tone-quality as suited for blending with other instruments and ideal for accompaniment.

Most sources on the 18th century bassoon describe the tone-quality as rich, blending well with other instruments and soft. The term "soft", curiously used to describe the bassoon tone-quality, does not refer to decibels of sound per se, but the ability of the bassoon tone-quality to project in relation to other instruments. Two points can be deduced from the general descriptions of the tone-quality of the 18th century bassoon; first, in general, the bassoon does not normally sound as loud as many instruments like the clarinet, trumpet, trombone, etc.; second, its unique ability to blend with almost any other musical timbre. Both of the above points are concurred in by the stereotyped use of the bassoon in doubling the bass line and the large number of bassoons used to balance a relatively small number of strings. Langwill says, "The disappearance of the figured-bass continuo began about 1760 and three to six bassoons were common to balance a strong orchestra of about two dozen."<sup>2</sup>

The four and five-keyed bassoon is able to produce some dynamic variance in performance, but much less than the modern bassoon. Several interlocking inherent features of the four and five-keyed bassoon are mainly responsible for its relatively small dynamic range. In comparison

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<sup>1</sup>Halfpenny, The Evolution of the Bassoon . . . , p. 30.

<sup>2</sup>Langwill, The Bassoon . . . , p. 87.

to the modern, the 18th century reed is very open at the tip with long and thick vibrating blades, demanding that the embouchure exert considerable pressure onto the reed during performance. Pressure by the lips onto the reed minimizes its flexibility and, therefore, dynamic variance. The instrument itself will not allow the performer to execute a great deal of dynamic range. The taper of the bore, being generally inconsistent and choked at the bell, reduces dynamic flexibility. The four and five-keyed bassoon required the use of many forked-fingerings. A tone produced by a forked-fingering becomes unstable in pitch and tone-quality when played at the extremes of the dynamic range. The modern bassoon still commonly uses one forked-fingering, e-flat, but reinforces the basic forked-fingering in a way not possible on the 18th century bassoon because the basic forked-fingering is unstable in pitch and tone-quality.

THE PERFORMANCE CAPABILITIES OF THE FOUR-KEYED BASSOON  
IN RELATION TO THE WIND SEXTETS OF MOZART

Mozart's six wind-divertimenti (K. 213, 240, 250, 253, 270, and 289) for two oboes, two horns and two four-keyed bassoons were written between 1775 and 1777. The range employed for the bassoon tends to be conservative, especially in K. 213, 240, and 289.

The basic range is F to f' in K. 213, whereas it is E-flat to f' in K. 240 and 289. In all three divertimenti, pitches outside the basic range are isolated, infrequent and contextually create no digital problems: B-flat<sub>1</sub>, two times in K. 240; C, three times in K. 213; D, three times in K. 240; g', once in K. 213 and four times each in K. 240 and K. 289. The tessitura is g to e' for the first bassoon and c to b-flat for the second.

The basic range for K. 252 and 270 is F to g'. Like the previous three divertimenti, pitches below the basic range are isolated, used sparingly and create no digital problems: B-flat<sub>1</sub>, once in K. 252; C, once in K. 270; D, once in K. 270; E-flat, four times in K. 252. The tessitura is g to f' for the first bassoon and B-flat to b'flat for the second.

The basic range of K. 253 spans the full practical range of the four-keyed bassoon (C to g') except for one isolated B-flat<sub>1</sub>. C is the only pitch below F used frequently, (E-natural occurs twice and E-flat once) and creates no digital problems. The tessitura is g to f' for the first bassoon and B-flat to b-flat for the second. In all six

divertimenti no pitches occur above g'.

The six-wind divertimenti of W. A. Mozart were composed tonally in two sets of three following the circle of fifths around the flat side; F (K. 213), B-flat (K. 240), E-flat (K. 252), F (K. 253), B-flat (K. 270) and E-flat (K. 289). The tonality of each divertimento and its corresponding individual movements is closely related. (See Figure 14, p. 64.) Two observations can be made related to Mozart's use of tonality. First, the general avoidance of sharp-keyed tonalities; out of all six divertimenti only two movements internally establish a sharp-key tonality. (See Figure 14.) G and D major are recommended by Laborde as excellent tonalities in writing for the bassoon of the late 18th century.<sup>1</sup> Second, out of all six divertimenti, only the trio of the K. 252 menuetto (sixteen measures) goes beyond E-flat major in the circle of fifths; there are no digital problems in the A-flat section because it is comprised mostly of quarter note values and a classic minuet is not typically fast.

Mozart's limited use of tonality is significant for the oboe as well as the bassoon. Since the standard 18th century oboe had only two finger keys (C and E-flat) to produce accidentals to its basic scale of D major, it, like the bassoon, relied on forked-fingerings for all other accidentals except g-sharp. Most 18th century oboes had a double hole for the third and fourth finger holes to facilitate the playing of f-sharp and g-sharp. Both double holes were positioned very close to each other to allow one finger to cover both easily. Evidently the double hole for

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<sup>1</sup>See p. 39.

## K.213 (F)

Allegro spiritoso - F(C, F, G)  
 Andante - C (G\*)  
 Menuetto - F(C, F, B-flat)  
 Molto Allegro 'Rondo' - F (C, F, B-flat)

## K.240 (B-flat)

Allegro - B-flat (F, C, g, D\*, E-flat, B-flat)  
 Andante grazioso - E-flat (B-flat)  
 Menuetto - B-flat (F, B-flat, g)  
 Alegro - B-flat (F, C, F, g, B-flat)

## K.242 (E-flat)

Andante - Eflat (B-flat)  
 Menuetto - E-flat (B-flat, E-flat A-flat\*)  
 Andante 'Polonaise' - B-flat (F, g, F)  
 Presto assai - E-flat (F, B-flat, E-flat)

## K.253 (F)

Andante 'Theme & Var.' - F (C, F, g)  
 Menuetto - F (C, C, B-flat)  
 Alegro assai - F (g, C, F)

## K.270 (B-flat)

Allegro molto - B-flat (F, C, F, B-flat)  
 Andantino - F (C, g, F)  
 Menuetto - B-flat (F, B-flat, E-flat)  
 Presto - B-flat (F, B-flat, C, B-flat)

## K.289 (E-flat)

Adagio - E-flat (B-flat, F, B-flat, E-flat)  
 Menuetto - E-flat (B-flat, E-flat)  
 Adagio - E-flat (B-flat, A-flat, E-flat)  
 Finale - E-flat (B-flat, E-flat)

Figure 14. Tonalties in Mozart's wind sextets

the fourth finger also served to correct intonation discrepancies on g' and f'-sharp'; Carse says,

The upper piece contains the three upper note holes, the lower of which (A-hole) consists of two very small holes bored so close together that either both or only one of them might be covered by the L. third finger. When only one is covered the instrument gives a g'-sharp or a'-flat [see Figure 15-B] . . . the g' hole [R first finger] is also doubled, no doubt for the purpose of sharpening the f' sharp, which is generally rather flat, or of lowering the g', which is sometimes sharp.<sup>1</sup>

The 18th century two-keyed oboe and crooked horn had performance limitations comparable to the four-keyed bassoon. The oboe forked f' is similar in performance to the bassoon's forked e'-flat; both forked fingerings are retained by their modern counterpart and not considered troublesome in most contexts. (See Figure 15-C, p. 66.) The modern oboe has an advantage over the modern bassoon; most modern oboes have two alternate f'-keys (R-3 and L little finger) that eliminates many, if the performer chooses, forked f' fingerings. Of course, the forked f' is desirable in certain contexts. (See Figure 15 D.) A modern oboe player would use the forked f' in the context of Figure 15-D instead of the left alternate keyed f' to avoid movement in both hands.

Sachs relates that the crooked horn was quite common by the time Mozart composed the six wind-divertimenti, "Long before the end of the 18th century the orchestral horn had severed its connection with the hunting field;"<sup>2</sup>

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<sup>1</sup>Carse, Musical Wind . . . , p. 130.

<sup>2</sup>Ibid., pp. 217-18.

## (A) Basic scale

(B) (C)

1  
2  
3  
4  
5  
6  
E $\flat$   
C

## (D) Advantageous use of the forked f-natural

1  
2  
3  
4  
5  
6  
E $\flat$   
C

Figure 15. Two-keyed oboe fingerings

Gevaert in discussing the horn says, "The orchestral horn is simply an improved horn of the hunting-horn of Louis XIV's time provided with crooks. . . . Both [trumpet and horn] were essential constituents of the orchestra of the great classic masters, . . ." <sup>1</sup>

Being valveless, the basic scale of the 18th century horn is the harmonic series. (See Figure 16, p. 68.) Kennan describes the 18th century horn and the function of the crooks as,

Being essentially hunting horns and valveless, the horns of Haydn and Mozart's day could only play the notes of one harmonic series at a time, plus a few rather uncertain intermediary tones made possible by insertion of the hand in the bell of the horn and/or by 'lipping'. . . . To cope with the problem of music in different keys, a system of 'crooks' was in use, a crook being a piece of tubing which could be inserted into the tubing of the horn to alter the pitch of its fundamental tone and thus create a new harmonic series . . . the part was invariably written in the key of C. <sup>2</sup>

By 1775 the hand-horn was equipped with crooks in B-flat alto, A, G, F, E, E-flat, D, C, and B-flat bass.

The term hand-horn refers to the method of holding the horn with the right hand inserted in the bell. Hampf in 1753 discovered that cupping the right-hand and inserting it into the bell altered the pitch. Gevaert's discussion of the hand-horn relates why Hampf's discovery was so valuable.

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<sup>1</sup>F. A. Gevaert, A New Treatise on Instrumentation trans E. F. E. Suddard (Paris: Henry Lemoine & Co., 1885), pp. 196-203.

<sup>2</sup>Kent Kennan, The Technique of Orchestration (New Jersey: Prentice Hall, Inc., 1964), p. 117.

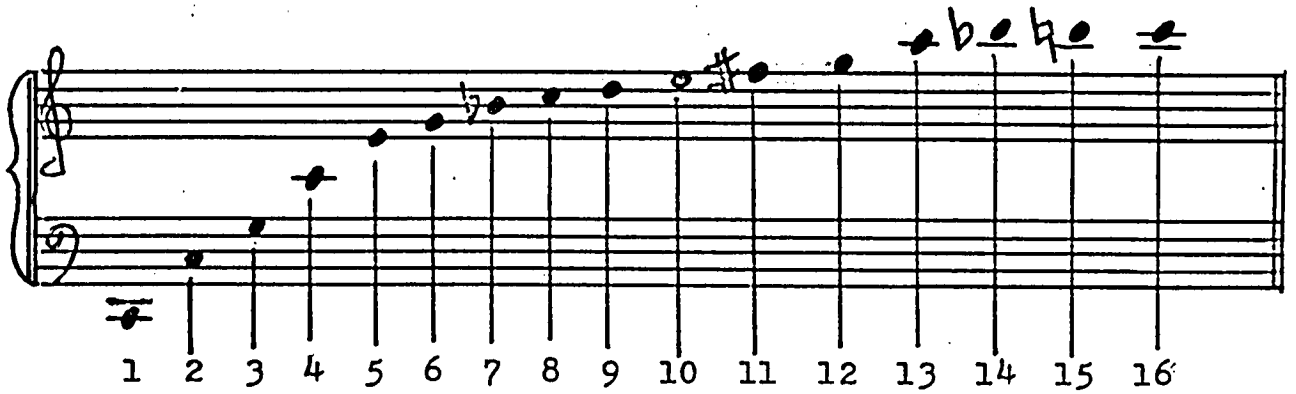


Figure 16. Harmonic series— certain pitches are flat according to the tempered scale; No. 7 and 14 are very flat, No. 11 and 13 not quite as much.

Of the four discordant harmonics of the horn [No. 7 b-flat', No. 11 f-sharp'', No. 13 a'', No. 14 b-flat''] the two B-flats (No. 7 & 14) are the only ones of which any use can [not] be made as open sounds. They are too flat . . . Haydn, Mozart and their contemporaries completely left aside B-flat when writing their horn parts,<sup>1</sup>

Until nearly the end of the 18th century, f-natural (11th partial one-half hand-stopped) was the only pitch that was commonly hand-stopped. It must have been considered very practical and certainly a common technique for all horn players, because Gevaert comments, "The classic masters before Beethoven abstain from using stopped notes in their orchestral works, excepting however F-natural (No. 11 flattened), which they treated as an open sound."<sup>2</sup> The hidden implication in Gevaert's statement is that the other three discordant harmonic partials (No. 7, 13 and 14) were probably played open by most performers.

Mozart's use of the hand-horn in the six wind-divertimenti is significant for three reasons; first, only B-flat bass and alto, E-flat, and F crooks are used, second, a crook change is never demanded during a movement, third, f'-natural (hand-stopped eleventh partial) is the only hand stopped pitch used.

The technical performance factors of the bassoon discussed in chapter three which determine the degree of performance skill required to execute a piece of music on the four-keyed bassoon are carefully controlled by Mozart in the six wind-divertimenti.

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<sup>1</sup>Loc. cit.

<sup>2</sup>Ibid.

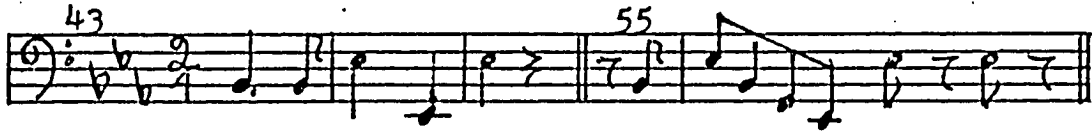
Only one movement (Andante grazioso of K. 240) out of all divertimenti contains, in two different contexts, the consecutive use of the F-natural and G-sharp keys. (See Example 7, p. 71.) In example 7-A no digital problems occur because the tempo is slow, long note values are used and the passage is articulated; example 7-B presents no performance problems because a rest separates the E-flat and A-flat.

Significantly, in F, B-flat and E-flat major two consecutive adjacent forked-fingerings will never occur diatonically. In the above keys, only three forked-fingerings are required, E-flat, B-flat and e-flat; b-flat' and e-flat' are fingered the same as their lower octave counterparts. (See Figure 12, p. 48.) Even by consecutively placing, in any order, all the possible forked-fingerings in E-flat major, no problems should occur because the digital movement will always be simple. A motion where the fingers move in the same direction going from one note to another can be expressed as a simple motion, a complex motion would then be where at least one finger moves simultaneously in the opposite direction to another finger. A complex digital movement involving both hands becomes progressively more difficult and is acutely prorated to the acceleration of tempo as compared to a complex digital movement involving only one hand. Extremely fast tempi may force the performer to adjust the articulation and/or require a better reed with more finesse of embouchure control; this becomes more acute in the extremes of the range. Not only limiting the digital motion to simple, Mozart further abates the difficulty of three or more consecutive forked-fingerings involving the extremes of the range by an immediate return to the middle register or a rest after the third forked-fingerings. (See

Example 7. K.249 Andante grazioso



Example 8. Three or more consecutive forked fingerings  
K. 240 Andante grazioso



K. 252 Menuetto-Trio



Presto



K. 270 Allegro molto

Menuetto (moderato)



K. 289 Allegro



Menuetto



Example 8. continued  
Adagio



Finale (Presto)



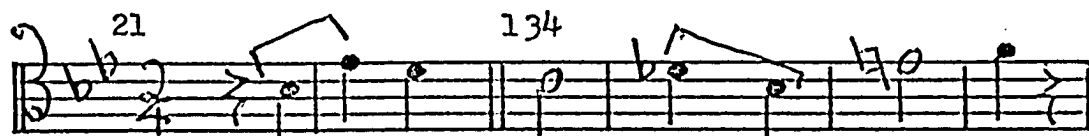
Example 9. Two consecutive forked fingerings (not adjacent)  
(a) K. 213 Menuetto (b) K. 240 Allegro



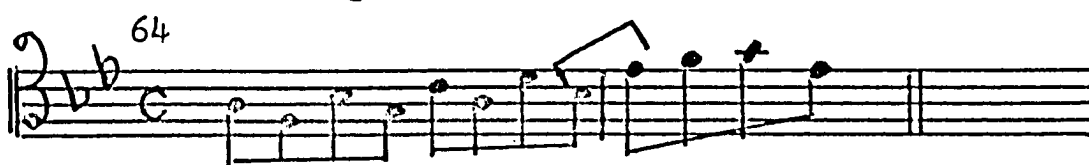
Andante grazioso



Allegro



(c) K. 270 Allegro molto





Example 8, pp. 71-72.)

Only one time does three or more consecutive forked-fingerings occur adjacently in the six wind-divertimenti, the trio of the K. 252 menuetto in A-flat major. (See Example 8-B, m 29.) Two factors help to elevate the four adjacent consecutive forked-fingerings (e-flat', d-flat', e-flat', d-flat'); first, the tempo is only moderately fast and second, the thymh is in quarter notes. Consequently, no problems should arise from the above passage in A-flat major.

Of course, two consecutive non-adjacent forked-fingerings occur frequently in the six wind-divertimenti; no problems should arise because the motion is always simple. (See Example 9, p. 72 for typical examples.)

Two consecutive adjacent forked-fingerings occur five times in the wind divertimenti, always involving the e-flat and d-flat. (See Example 10, p. 73.) The e-flat' to c-sharp' from K. 240 occurs twice; no digital problems should arise because the tempo is not fast, and the c-sharp' is followed by a very simple motion to the d' which in turn is followed by a rest. The K. 252 divertimenti has three consecutive e-flat' to d-flat' forked-fingerings. Certainly no digital problems should arise in performing the consecutive e-flat' to d-flat' in the Andante because a rest follows the d-flat'. The same consecutive notes from the trio of the K. 252 menuetto have been discussed in relation to four adjacent forked-fingerings.

Short chromatic passages are used very sparingly by Mozart in the wind-divertimenti. (See Example 11, p. 75.) All the chromatic passages except one (K. 253 Andante) involve only one accidental to the scale; no digital problems should arise in performing the above passages because they are so short. The passage from the K. 253 Andante should not create

## Example 11.

K. 213

Allegro spiritoso

Molto Allegro

14

K. 240

Menuetto

29

K. 252

Andante

14

K. 253

Andante: Theme &amp; Var.

Var. 111

3

7

tr

K. 270

Allegro Molto

Menuetto

113

19



any performance problems because it is so slow and short.

Since an 18th century bassoon player, going from the low to the high register, progressively closed the reed-tip opening with the lip pressure, large intervals involving a direct leap from one extreme of the range to the other require infinite control of the embouchure and a high quality reed. Of course, factors such as fast tempi, more than one such interval in succession, and softer dynamic levels compound the problem immensely.

Mozart's K. 191 bassoon concerto in B-flat major (1774) has several very large leaps which encompass the extremes of the range and consequently require a virtuoso player on the four-keyed bassoon to execute. (See Example 12, p. 76.)

Conversely, in the six wind-divertimenti, a leap from the low to the high register occurs only once. (See Example 13-A, p. 76.) The leap from the low E-flat to the high e-flat' in example 13-A is minimized because the tempo is slow, relatively long rhythmic values are used, and the pitches involved are well within the common range of the four-keyed bassoon; consequently, a non-virtuoso player should be able to readily execute the interval.

All other large intervals involving the extremes of the range begin from the middle register and should not create performance problems. (See Example 13-B, p. 76.) Two successive intervals involving the extremes of the range never occur.

Mozart uses three kinds of musical ornamentation in the six wind-divertimenti; the long and short Vorschlage (appoggiatura) and the shake (trill). The long and short appoggiature should not create any digital

problems in performance. The short appoggiature are performed as short grace notes just before the beat; the long appoggiature as passing notes within a beat. (See Example 14, p. 79.) Dannreuther in discussing W. A. Mozart's use of ornaments says, "There is no evidence which could lead one to believe that W. A. Mozart departed from his father's practice [Grundliche Violinschule] as regards to [the] rendering of ornaments.<sup>1</sup> In summarizing the above treatise, Dannreuther points out that Leopold Mozart emphasizes certain general practices, "all shakes, even the shortest transient shakes, start with the upper accessory...all short shakes are played with a quick Vorschlag [appoggiatura before the beat] and Nachschlag [short after beats or passing grace notes to the next beat].<sup>2</sup> (See Example 15-A, p. 79.) Two observations become apparent concerning L. Mozart's treatise; it is geared to violin technique and unclear at certain points.

Of course, the upper accessory note of a trill is always diatonic unless otherwise indicated (see example 15-B); the first g trill uses a-natural and the second a-flat. The number of upper accessory notes is directly related to the speed of the basic beat and the duration of the trill.

Since the scope of this study is to investigate the performance strengths and limitations of the four-keyed bassoon in relation to the wind-sextets of W. A. Mozart, trills used in the sextets will not be considered in relation to a precise style (measured or unmeasured, number

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<sup>1</sup>E. Dannreuther, Musical Ornamentation (London: Novello, 1893-95), p. 95.

<sup>2</sup>Ibid., p. 63.

Example 14. Appoggiatura

(Short) K. 213 Menuetto

38

written

played

Detailed description: This block shows two staves of music for Example 14. The top staff is labeled 'written' and the bottom staff is labeled 'played'. Both staves are in 3/4 time and have a key signature of one flat (B-flat). The 'written' staff shows a quarter note G4 followed by a quarter note F4 with a sharp sign above it, then a quarter note E4, and a quarter note D4. The 'played' staff shows the same sequence of notes, but with a handwritten slur over the G4 and F4 notes, and a handwritten sharp sign above the F4 note.

(Long) K. 240 Allegro

30

written

played

Detailed description: This block shows two staves of music for Example 14. The top staff is labeled 'written' and the bottom staff is labeled 'played'. Both staves are in 3/4 time and have a key signature of one flat (B-flat). The 'written' staff shows a quarter note G4, a quarter note F4 with a flat sign above it, a quarter note E4, and a quarter note D4. The 'played' staff shows the same sequence of notes, but with a handwritten slur over the G4 and F4 notes, and a handwritten flat sign above the F4 note.

Example 15. Trills

(A) K. 252 (B)  
Presto assai

written

played

Detailed description: This block shows two staves of music for Example 15. The top staff is labeled 'written' and the bottom staff is labeled 'played'. Both staves are in 3/4 time and have a key signature of one flat (B-flat). The 'written' staff shows three measures: the first measure has a quarter note G4 with a trill sign above it; the second measure has a quarter note F4 with a trill sign above it; the third measure has a quarter note E4 with a trill sign above it. The 'played' staff shows the same sequence of notes, but with a handwritten slur over the G4 and F4 notes in the first measure, and a handwritten flat sign above the F4 note in the second measure.

of accessory notes, etc.) but rather their performance feasibility within a general classic style as outlined above.

Only three trills (d-flat' to e-flat', f to g and a to b-flat) occur in the sextets that cannot be readily performed using standard fingerings. The d-flat' to e-flat' trill from the K. 252 menuetto involves two adjacent forked-fingerings consequently, a complex digital motion involving both hands. (See Example 16, p. 81.) Preston, Gehot, and Baines give (see p. 37) 12-456 as a common fingering for e-flat' on the four-keyed bassoon which has been retained by the modern bassoon. Using the common alternate fingering for e-flat' changes the motion to simple and makes the trill readily playable. The f to g trill from Allegro assai of the K. 253 divertimento is a simple motion that is extremely awkward because five fingers are involved; left hand two, three and right hand one, two, three. Prelleur recommends a fingering (see p. 52, measure 1) for the f to g trill that confines the motion to one hand and eliminates the awkwardness. (See Example 16, p. 81.) Only one time in all six divertimenti does a trill occur that requires a complex finger motion which cannot be played with an alternate fingering. (See example 17, p. 82, K. 270 Allegro Molto - measure 29 - the a to b-flat trill) Because the tempo is very fast, Allegro Molto, the trill probably is very short and performed like a turn.

All the remaining trills used by Mozart in the sextets involve a simple motion and should present no problems in performance. (See Example 17, p. 82.)

Example 16.

K.252 Menuetto

K. 253 Allegro assai

35 36

written

played

1-----●-----●-----●-----●-----

2-----●-----●-----●-----●-----

3-----●-----●-----●-----●-----

4-----●-----●-----●-----●-----

5-----●-----●-----●-----●-----

6-----●-----●-----●-----●-----

Standard fingerings

1-----●-----●-----●-----●-----

2-----●-----●-----●-----●-----

3-----●-----●-----●-----●-----

4-----●-----●-----●-----●-----

5-----●-----●-----●-----●-----

6-----●-----●-----●-----●-----

Alternate fingerings

Example 17. Trills

K. 213 Menuetto

K. 252 Presto assai

37 <sup>tr</sup> *p* 60 <sup>tr</sup>

K. 253

Andante Theme & Var. (111)

<sup>tr</sup> <sup>tr</sup> 17 <sup>tr</sup>

Menuetto

Allegro assai

38 <sup>tr</sup> <sup>tr</sup> 34 <sup>tr</sup>

K. 270

Allegro Molto

Andantino

29 <sup>tr</sup> <sup>tr</sup> 16 <sup>tr</sup>

Menuetto

Presto

3 <sup>tr</sup> 41 <sup>tr</sup> 15 <sup>tr</sup>

## CONCLUSION

The capabilities of the four-keyed bassoon viewed in relation to a performance of the six *sind-divertimenti* of W. A. Mozart never require a virtuoso player but rather a merely adequate one. Mozart's real understanding of the four-keyed bassoon in performance is truly realized through his careful yet enhancing control of its limitations.

The range employed for the bassoon in the six *divertimenti* is significant for three reasons. First, most of the music is within the conservative range of F to g'. Second, in only one instance a pitch below F is approached or left by an interval of a second. Significantly, an E-flat approached and/or left by a D is more difficult than one approached and/or left by an F or G because the left thumb is responsible for all pitches from B-flat<sub>1</sub> to E-flat requiring a higher degree of agility when treated diatonically or chromatically. Third, the pitches from B-flat<sub>1</sub> to E, and the pitches that approach and leave them, are of longer time values.

Mozart admits by usage that pitches in the lowest register and above g' on the four-keyed bassoon in general, are more problematic in performance - fingering, articulation, dynamics, intonation, etc. - than the pitches within the range of F to g'.

Through the limitation of tonality, Mozart greatly reduces the possibility of digital malfunction. Further, all sequences of pitches in the *divertimenti* conducive to digital malfunction created by the consecutive use of the F-natural and G-sharp keys, consecutive forked-

fingerings, chromatics, and ornamentation are always carefully treated.

Articulation and dynamics are moot points to this study for two reasons; first, published editions of classic music tend toward versions that are suited to modern instruments and second, if need be, performers will adjust articulation in such cases as very fast tempi and large intervals, especially fast. By carefully controlling the range, the tonality, large intervals involving the extremes of the range, and sequences of pitches conducive to digital malfunction, Mozart is able to use all standard articulations, dynamics and tempi but still expect a respectable performance by non-virtuoso players.

Because Mozart methodically insures that the bassoon parts in the sextets can be performed by non-virtuoso players on a four-keyed bassoon, it can be assumed that the oboe parts can be performed on the two-keyed oboe and the horn parts on the crooked horn by non-virtuoso players.

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 E-flat major, K. 252 (Pages 147-51)  
 F major, K. 253 (Pages 152-58)  
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