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A Study of Some Aspects of the Clarinet Embouchure

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A STUDY OF SOME ASPECTS OF
THE CLARINET EMOUCHURE

A Research Paper
Presented to
the Graduate Faculty
Central Washington College of Education

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
Philip C. Lowry
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THIS PAPER IS APPROVED AS MEETING
THE PLAN 2 REQUIREMENT FOR THE
COMPLETION OF A RESEARCH PAPER.

G. Russell Ross
FOR THE GRADUATE FACULTY

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

Most musicians would agree that a good embouchure, with a good mouthpiece and reed, is of primary importance to the development of a good clarinetist. A controlled embouchure is needed before a satisfactory tone can be produced. Kaplan explains that "embouchure is not the only factor responsible for tone, intonation, high notes, or tonguing but it contributes so greatly to these points as to warrant its constant emphasis" (9:12).

I. THE PROBLEM

Statement of problem. This paper will (1) investigate some mechanical aspects of the clarinet embouchure, (2) investigate some physical aspects of the embouchure, and (3) report the findings of the study.

Importance of study. Good sound is one of the ultimate goals of clarinet playing. Producing good sound or tone involves many factors. Kaplan states:

We also want our youngsters to become aware of the subtleties in playing of expression, nuance, and taste. However, without the mastery of certain mechanical factors many of these goals will be difficult if not impossible to reach. A control of embouchure is needed before a good sound can be obtained. This does not minimize the importance

of sound and listening. What will become obvious is that if these factors are to have any value, first must come controlled embouchure (9:12).

Limitations of study. Even though references to tone production and tone quality will be made throughout, no attempt will be made to develop this aspect as it is beyond the area of this paper. Although breath support is of vital concern in production of tone, an exhaustive study of breath support also is beyond the purposes of this study.

The materials used in this study were obtained through a critical review of leading periodicals and books, many of which are on file in the library at Central Washington College of Education, Ellensburg, Washington.

II. DEFINITIONS OF TERMS USED

Clarinetist. The term clarinetist is used to refer to both the professional and the beginning clarinet player.

Facing. The part that is shaved from a mouthpiece to allow an opening when a reed is clamped to the mouthpiece is called the facing.

Lay. This term is used interchangeably with the term facing.

Embouchure. This, the method of placing the mouthpiece into the mouth, involves the chin, lips, teeth, cheeks, throat, and tongue.

Tone. Tone is the sound produced by playing the clarinet.

Double lip embouchure. This is the method of using both the upper and lower lips to cover the teeth.

Mouthpiece. That part of the instrument into which the player blows.

Reed. This, a piece of cane cut and shaved to fit over the flat opening of the mouthpiece, when caused to vibrate, produces tone.

Ligature. A ligature, a metal device with one or more screws, is used to hold the reed to the mouthpiece.

CHAPTER II

SURVEY OF THE LITERATURE

Since development of a satisfactory embouchure necessarily depends somewhat on the quality of equipment the beginner is to use, it is necessary to discuss the equipment prior to studying the embouchure itself.

I. MECHANICAL ASPECTS OF EMBOUCHURE

The mouthpiece. The mouthpiece is that part of the instrument into which the player blows. Willaman describes the mouthpiece thusly:

All clarinet mouthpieces are quite similar in outward shape and appearance, except for color. The tapered round body has one side flattened to form a table on which the reed is fastened by a metal ligature. The smaller end is sharpened into the beak to require the minimum opening for the mouth for playing. The interior throat or tone chamber remains about the same from the earliest days, though minor changes in shape have been introduced by different makers searching for better tone quality. However, the greatest single factor in tone quality after the reed, is the lay of the mouthpiece. This is the curve of the table for the last 5/8 inch (approximately) of its length, which provides room for the reed to vibrate and thus produce the tone (20:25).

Proper selection of the mouthpiece is of prime importance. Langenus states, "The mouthpiece is the most important part of the clarinet. It is preferable to have a good mouthpiece and an inferior instrument than the contrary" (10:vi).

Stein agrees:

Accomplished clarinetists, given the choice of performing with a poor mouthpiece on a fine clarinet or a fine mouthpiece on an unsatisfactory clarinet, would be forced to choose the latter, since the mouthpiece is the first point of contact and its reaction greatly affects the response of the clarinet (16:5).

Gower and Voxman also say that "a good reed and mouthpiece are absolutely essential to the proper development of good performance. In the long run no economy is effected by using unsuitable reeds and cheap stock mouthpieces" (5:3).

Perhaps Mr. Ayres best sums it: "The most important part of playing the clarinet is the producing of a beautiful tone. A good mouthpiece and reed are essential points in tone production" (1:2).

There are several types of mouthpieces available. Bored rod rubber, crystal, soft cast rubber, plastic, and wood are used, although the wood mouthpiece seems to have been abandoned by most clarinetists. Generally, the bored rod rubber and crystal are most acceptable:

Specially prepared hard rod rubber is used by the best mouthpiece makers; it is more expensive than the soft cast rubber mouthpieces, but the former will outlast the latter many times. Crystal is also used to a certain extent but a good one is seldom found on account that [sic] it is very difficult to make it with the right proportions (10:vi).

Stein, in his new booklet "The Art of Clarinet

Playing," favors the crystal mouthpiece: "Bored rod rubber (steel-ebonite) or crystal are the best materials for clarinet mouthpieces." He also states, "Do not invest in plastic or other colored composition materials because, to date, they are inferior in tone quality" (16:5).

The bore of the mouthpiece, that is, the hole in the center, is also significant:

No two mouthpieces, even though they be the same brand and facing specifications, tune or speak alike. This is due to both known and unknown factors. Suffice it to say that the bore size should match the internal measurements of both barrel and upper joints (16:5).

The facing or lay of the mouthpiece is the amount of opening and curvature from the tip back to the point of contact with the reed. Langenus describes the lay as, "that part of the mouthpiece on which the reed lies. It is almost level, except near the tip, where the two sides slope away from the reed, leaving a slight opening for the reed to vibrate upon" (10:vi).

Most mouthpiece makers produce mouthpieces that vary from extreme closed lay to extreme open lay. A mouthpiece with a quite open facing may require the student to bite the mouthpiece and keep him from developing the proper embouchure control. A closed lay mouthpiece will allow the student to play with very little effort

in the lower register but will probably cause intonation problems in the higher register.

The mouthpiece that is selected should not require an extremely heavy reed nor an extremely light one. The belief that production of a "big" tone requires a very long and open mouthpiece is a popular misconception. Extremes should always be avoided (8:12).

"A balance of medium length taper and medium tip opening should nearly always be specified. Never allow a player to accustom himself to an excessively open facing" (16:5).

Selection of a mouthpiece, then, is an important aspect of clarinet playing. Instrument dealers will generally substitute a specified mouthpiece on the beginning instrument at very little additional cost to the student.

The reed. The reed is a thin piece of cane cut to fit on the flat part of the mouthpiece. Thicker at the base, it is shaved to a quite fine point near the tip. The thinness to which it is shaved constitutes the basis for grading the reed 1, 2, 3, 4, 5, etc., number 1 being softer and number 5 being stiffer. Some companies grade their reeds soft, medium soft, medium, medium hard, and hard instead of using numbers.

The reed should be tested with the mouthpiece,

as most grading systems are not continuously accurate enough so that one can always specify a particular grade of reed and get the same consistency in stiffness.

When choosing a reed, some of the physical characteristics to look for are: "Clear white or creamy color in the cut section, with close straight-running fibers which run to the tip." Also,

(1) thickness in the heel of the cut sections, (2) an even taper graduated to the tip, (3) a ridge or peak running down the center of the cut portion and tapering off each side and (4) a decided resistance point beginning approximately $1/4$ to $3/8$ of an inch back from the tip (16:7).

A medium-soft reed is generally recommended for the beginner. If too stiff a reed is used the beginner may be forced to bite the mouthpiece in order to close the opening sufficiently to allow the controlled vibration of the reed. However, too soft a reed may cause insufficient exercise of the embouchure and result in bad embouchure development as well as intonation problems.

A reed which is too soft will not permit the normal "grip" essential to proper clarinet embouchure. Other characteristics include a thin, reedy tone quality, flatness in the high register, and/or the tendency to close against the mouthpiece around high A, B or C above the staff, thus stopping the vibration and production of tone.

Conversely, a reed which is too heavy will require more than normal lip tension to produce and sustain the tone. This will result in early fatigue in the muscles surrounding the mouth, and possibly soreness

on the inside of the lower lip. The tone quality by an overly stiff reed will be hard and brittle. Pianissimo attacks will be noticeably difficult with a reed that is too heavy (7:56).

Over the course of the years reed makers have experimented with various types of reeds other than cane in an attempt to develop a reed that would be more consistent.

Willaman said: "as long ago as 1914 aluminum and hard rubber were tried. The ingredients and the shape could be accurately controlled but the results were literally awful." He later adds: "Recently plastic reeds have been marketed in some quantity. So far none of them are equal in tone quality or maneuverability--especially in the high notes--of really good cane reeds" (20:43).

With the continual improvement of plastics, we may one day have a plastic to construct a fine reed. As of yet, however, most attempts along this line have not gained any great prestige, and cane reeds are still predominately accepted as the best.

The ligature. The ligature is a circular mechanical device used to hold the reed to the mouthpiece. It may have one or more screws used to tighten the ligature. The ligature used should match the mouthpiece. If too

small a ligature is used, it will fall on the forward part of the mouthpiece and tend to impede the required vibration of the reed. On the other hand, too large a ligature will slide too far onto the mouthpiece and allow too much play in the reed, possibly causing control problems.

The ligature may seem to be a minor item, but it can ruin reed response and reed life immediately by pinching the cane on the sides. This results in a concavity which destroys free vibration. Match the ligature to the mouthpiece so that the inside edges of the bands nearly meet. When there is more space than $1/16$ of an inch between the inside edges the tendency is to tighten the screws too much, causing central indentation and an ultimate buckling of the reed. Experiment with a two-screw ligature by tightening the top screw securely, then the lower screw just enough so that it barely takes hold. This gives the reed additional elasticity (16:6).

Placement of the ligature is important to insure the best results from the reed and mouthpiece. Hovey explains that

Before tightening the ligature screws, he should check the lateral position of the heel (thick end) of the reed. It should overlap the flat side of the mouthpiece and equal amount on both sides.

Next, locate the ligature at the lines marked on the mouthpiece and tighten the screws just enough to keep them from vibrating. Pulling the screws too tight will warp the reed, and may, over a period of time, warp the mouthpiece (7:8).

Ayres also agrees with this procedure: "Place the ligature just about where the lines are marked on the mouthpiece, and tighten the screws just enough to keep

the reed from slipping. Too much pressure will stop the free vibration of the reed, and will deaden the tone" (1:2).

The ligature is an active element in the production of a good tone and should be given consideration by the beginning student who wishes to get the best from his mouthpiece and reed.

II. PHYSICAL ASPECTS OF EMOUCHURE

Many approaches are taken to the development of a good clarinet embouchure. Seldom do any two teachers explain, in the same manner, their method of developing the embouchure. Perhaps each clarinetist has incorporated into his method those things he finds work best for him.

Insertion of mouthpiece. There are several explanations of placing the mouthpiece in the mouth. Some clarinetists are specific, some are not.

Snively uses an approximation as he states, "Place the mouthpiece in the mouth approximately one-half inch." Snively qualified this statement by saying:

The amount of mouthpiece placed in the mouth will vary with the player and with the mouthpiece. One-half inch is generally successful to begin with. If too much mouthpiece is placed in the mouth, the sound will be squeaky or uncontrolled, with too little, the tone will be very soft; in extreme cases no sound at all will be emitted (15:8).

Hovey also uses an approximation: "The upper teeth rest lightly on top of the mouthpiece, approximately $\frac{1}{2}$ inch from the tip" (7:6).

Baermann is more precise: "The teeth should be set $\frac{5}{16}$ of an inch from the tip of the mouthpiece" (2:8).

Waln thinks that "generally the mouthpiece should be in the mouth from $\frac{3}{8}$ to $\frac{1}{2}$ " measured from the spot where the teeth contact it to the tip" (18:19). Gower and Voxman state:

Place the reed on the lower lip far enough from the reed-tip that a little more than one-fourth of an inch of reed is free to vibrate in the mouth. Rest the upper teeth lightly on the mouthpiece between three-eighths and one-half of an inch from the point. These figures vary somewhat with the amount of malocclusion of the jaws (5:4).

Bone is somewhat specific: "Upper teeth sit on top of the mouthpiece approximately one-fourth inch down from its tip; never more than three-eighths inch down from the tip" (4:18).

Stein never makes any statement as to how far in inches the mouthpiece should be injected. He does refer to the "off-center bite" and states, "When the mouthpiece is inserted correctly, the lower lip will be $\frac{1}{4}$ to $\frac{3}{8}$ of an inch more advanced on the mouthpiece than the upper lip" (16:15).

Nor does Palmer make any specific recommendations

other than that "the tone will be choked if there is too little mouthpiece in the mouth" (12:13).

Bodegraven is not specific, but believes that "if too much mouthpiece is taken in the mouth, squeaks will result; if too little is used, the tone will be very thin" (3:9).

Another approach taken by some is that the lay or facing of the mouthpiece is the determining factor.

Ritchie explains that "it depends on the facing (lay) of the mouthpiece." He further states that,

in general, the student will find that the short and short-medium facings in common use today will give far better results when placed well into the mouth. Even this is not a steadfast rule; it must be modified according to the individual embouchure as well as the length of the facing (14:10).

Vagner thinks the lay is important to the embouchure but explains it more exactly. He states, "the mouthpiece is placed in the mouth approximately where the reed and the lay of the mouthpiece meet. There is likely to be a difference with various mouthpieces" (17:16).

Placement of the mouthpiece in the mouth seems to vary in distance with each individual. The important things to be considered are the lay of the mouthpiece and the individual player. Therefore, it is impractical to recommend a specific distance. One should, if possible,

spend time with each individual to find what works best for him.

Facial aspects of embouchure. Positioning of the jaw, lips, teeth, and cheeks in such a manner as to allow effective control is all important to the clarinetist. Most recommendations are that the upper teeth be placed in direct contact with the top of the mouthpiece.

Vagner states, "The upper teeth are usually placed on top of the mouthpiece. (I say usually because there are a few players who cushion the upper teeth with the upper lip)" (17:16). Waln explains, "The player should be examined during each of the first two or three lessons to make sure his upper teeth are actually in contact with the mouthpiece" (18:19).

Many authorities think that the muscles in the cheeks, lips, and mouth are determining factors in setting the embouchure. Hovey states:

Both lips are drawn firmly around the mouthpiece, exerting a steady grip which controls the vibration of the reed. Note that control of the reed is a muscular action. Excessive biting action of the teeth will impede reed vibration resulting in a pinched tone, or none at all (7:6).

Langenus explains that, "The lips and especially the corners of the mouth must be pressed inwardly around the mouthpiece like an elastic band" (10:viii).

Ritchie describes it as "firm but relaxed lip support" and states:

Consciously avoid biting the mouthpiece to play the tones of the clarion register--or, for that matter, any register. The only part the teeth play in the formation of the embouchure is to lend support to the lips, with the direct support coming from the lip muscles. There should be enough support from the lower lip alone to play in tune with good tone quality.

It is best to think of the lip muscles giving firm support and, at the same time, being flexible in the center so that the embouchure does not bind or restrict the reed (14:10).

Ritchie also discussed the function of the upper lip as opposed to the lower lip:

Remember, the upper lip should play just as important a role as the lower lip, whether the player is using a double lip embouchure or placing the upper teeth directly on the mouthpiece. In order to have a balanced embouchure, one must train the muscles of the upper lip to remain firm and to have a slight feeling of downward pressure toward the top and sides of the mouthpiece (14:10).

Some writers consider the embouchure as a whole and do not speak of the teeth, the chin, the lips, etc., as separated from the problem as a whole. Vagner states:

The lips are drawn in around the mouthpiece from all directions; and in order not to choke the tone, the muscles controlling the jaws are pulling slightly away from the mouthpiece. The lower jaw is a little forward. The red part of the lower lip should show on either side of the mouthpiece (17:16).

Low uses about the same method as Vagner but covers a few more characteristics of the embouchure:

About one-half of the red of the lower lip should be slightly drawn over the lower teeth. This should feel natural, not uncomfortable. The reed of the clarinet rests on or rather against the lower lip at an angle of about forty-five degrees.

Press the corners of the mouth as tightly and firmly as possible in toward the teeth. Do not puff the cheeks even slightly--keep the cheeks close to the jaws.

Try to have the jaws wide open but the lips tightly closed. This will keep the chin down and the lower teeth from biting (11:15).

There are other views taken of the beginning embouchure. Bone contends that the beginner or anyone with under five years of experience should use a smiling embouchure. That is, the lower lip should be stretched as thin as possible. In addition to pointing the jaw out and down, by "pulling the corners of the mouth back in the beginning of a smile you will increase the feeling of flatness and of stretching the skin" (4:18).

Low refutes this approach:

It is frequently advocated that the clarinet student pull the corners of the mouth back toward the ears like in a big grin. I cannot imagine any good reason for it, because such a position has a tendency to cause the player to bite on the reed and also to cause the flesh of the chin to creep upward. Both conditions are detrimental to good tone production (11:15).

It is important, then, to keep the lips firm and the cheeks close to the jaws. The chin should be pointed out and down to firm the skin between the lower lip and

chin. This also helps keep an excessive amount of lower lip from going over the lower teeth.

Many experts believe that the lips should form around the mouthpiece to prevent air leakage and maintain an even control from all sides. However, since there are differences of opinion, no conclusion is reached.

The tongue. Tonguing is an important part of good clarinet tone. In discussing tone production and quality, the breath, embouchure, intonation, and mechanical aspects of the instrument are often stressed but the relationship of the tongue to tone is often overlooked (13:14).

The tongue is often used to start the tone and sometimes to release the tone. Pound states:

The term "tonguing" usually is taken to have reference to the beginning of the tone (attack), but more often than not the performer uses his tongue at the ending (release) of the tone as well (13:14).

Two basic methods are recommended for tonguing, i.e., starting the tone with the tongue under the reed or at the tip of the reed. One of these methods is explained by Holvik: "The tip of the tongue is placed under the reed near the tip" (6:12). The other method, as stated by Ayers, is to "start the tone by putting the point of your tongue against the tip of the reed" (1:3). Waln agrees with Ayers: "The tongue's quick light return to

the tip of the reed will momentarily halt the reed vibration in preparation for its release to start the second tone" (19:32).

Many clarinetists recommend the use of the top side of the tongue against the reed rather than the tip of the tongue approach. Palmer, for example, states:

If the pupil tongues quite poorly, he can try lightly anchoring the lip of the tongue near the gumline of the lower teeth and pronounce the syllable 'ta' which will cause a portion of the tongue about three-eighths of an inch back from the tip to rise up and stroke the reed at its tip. Another common method of tonguing [sic] and perhaps the best for the average player is having the tip of the tongue stroke just under the tip of the reed (12:12-13).

Willaman, in describing tonguing, states:

Slide tongue forward in the most natural and comfortable way until it touches tip of reed and mouthpiece. This contact will take place with most people at a spot on top of the tongue about 1/4 inch behind the tip (20:62).

Langenus recommends that, "the tip of the tongue be curved downward and always remain in that position when playing. Consequently, the reed is touched by that part of the tongue about a fourth of an inch from its end" (10:ix).

Stein mentions both the tip of tongue to tip of reed and top of tongue to under side of reed methods. He states:

A superior method for an average tongue length is the following: Lightly rest the tip end of the tongue on the inner membrane of the lower lip. Then bend the remainder over frontward until it touches the reed.

The most conventional method, especially adapted for short tongues, is the "tip-to-tip" method. Here the end quarter inch of the tongue touches the very tip edge of the reed (16:25).

Although methods of tonguing vary with different experts, tonguing is an essential aspect of clarinet playing. And even though no specific recommendations are made here, it is important that tonguing be given due consideration in teaching the clarinet.

In general, then, two methods of tonguing are suggested: (1) The tip of the tongue to the tip of the reed and (2) the top of the tongue about 1/4 inch from the tip striking the under side of the reed.

CHAPTER III

SUMMARY AND CONCLUSIONS

The purpose of this paper was to consider some of the varied problems in teaching the beginning clarinet embouchure.

The mouthpiece is one important aspect of the embouchure development. General recommendations for the beginning student mouthpiece are that (1) the mouthpiece have a medium lay or facing and (2) bored rod rubber (steel-ebonite) and crystal are the best materials from which to select the mouthpiece.

Plastic, or any other than cane reeds, have not been accepted as satisfactory. The strength suggested for the beginner is medium-soft.

The ligature should be selected to fit the mouthpiece properly. Care should be used in clamping the ligature so that the reed vibration is not affected.

On the basis of recommendations by experts, no specific distance for inserting the mouthpiece can be given as conclusive. However, $3/8$ to $1/2$ inch of insertion, mentioned by several, may be a beginning for further experimentation subject to individual differences.

Most of the available data suggested that the top teeth should be placed directly on the top of the mouth-

piece. Many experts believe that the muscles of the cheeks, lips, and mouth are determining factors in establishing the embouchure. The general consensus was that these muscles should be of even firmness around the mouthpiece. However, a few believe that the lips should assume the form of a partial smile. In both, the cheeks should be held firmly to the teeth to achieve firmness.

According to the existing data there are two approaches to tonguing. One approach contends that the tip of the tongue should contact the tip of the mouthpiece and reed. The other suggests that the upper part of the tongue, almost 1/4 inch back from the tip, strike the underside of the reed.

This study is not definitive in all aspects of clarinet playing. Other factors such as range, tone quality, breath control, etc., are of primary importance. The present study was concerned only with certain mechanical and physical features. Further study is needed to provide a comprehensive approach to the art of clarinet playing.

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