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# The Effects of Four Profiles of Oboe Reeds on Intonation

UNLIKE MOST OTHER wind instruments, which have some sort of permanent mouthpiece or embouchure plate, the whole "mouthpiece" of the oboe must be constructed of a material that is not of a permanent nature. The oboist attempts to make a reed that will satisfy his personal requirements but, because of the destructibility of the oboe reed cane, it is important to be able to duplicate each reed as closely as possible.

In the past, oboists have used a number of methods for making reeds. Before the introduction of the brass staple, upon which the reeds are now tied, oboists would use a piece of cane 5⅝ inches long. This would be bent double, wrapped in silk around its bottom half, and inserted in the opening at the top of the instrument. This method did not allow for very constant or precise reed making. The shrinking that occurred when the cane dried would cause the reed to respond differently each time it was used. However, with the development of the brass tube, more effective procedures became possible.

Although oboists prepare reeds in a similar manner by using cane mounted on a brass tube, they differ in the scrape, or profile, that provides the reed with a thin vibrating area. The profile is that part of the cane from the tip downwards, that has been scraped and thinned with the reed knife after tying the cane on the staple. There are many different types of scrapes to suit different embouchures and methods of playing, and the scrape must also vary according to the type, gouge, and shape of the cane being used. Bhosys (3) states that:

> According to the type of schooling one adhered to, one fell into either the German or French school. The French school has improved on the German type reed. The principle [sic] difference between the two lies in the scrape, as well as in the fact that the German school uses wire around their reeds to keep them open [similar to the English horn reed]. The German reed has a rather long scrape. Their tone is more blatant and less refined than the French, who use the short, v-lay scrape, which allows for greater flexibility and variations in tone color.

In addition to the two mentioned processes, a review of the literature reveals a few other styles. Moore (6) suggests a more rounded scrape that is not as long as the German style. The style he recommends is "really a sort of compromise between the two styles." He states that this style of reed will blow easily, and will be easy to control and to keep in tune. Sprenkle (11) considers the tuning provided through the oboe reed to be of major importance. Podnos (8) considers the "humoring" that must take place when attempting to play an oboe in tune as a sacrifice of better tone quality.

Rothwell (9) suggests the following procedure for testing the new reed for intonation accuracy:

> Play octaves all over the instrument and test their intonation; the G, A, and C (g′, a′, and c′′) are good notes for this. The middle E (e′′) and middle G (g′′) will feel particularly "tight" if the reed needs more scraping. The lower G (g′) will flatten during a diminuendo if there is too little resistance in the middle of the reed behind the tip.

Since many scrapes are mentioned as being potentially good in the production of correct intonation, are some better than others for the school musician? The oboists in the public school musical organizations vary in age, amount of instruction, and degree of muscular control. But regardless of these factors, the oboe's timbre is such that it can be heard at all times when played in ensembles, and it therefore must be played in tune.

The music educator is usually familiar with the process of fixing the oboe reed to make it respond more or less easily, but can he alter the scrape of the reed to make an improvement in intonation accuracy? Since the student oboists he is developing vary in embouchure strength, it is possible that each student may need a slightly different oboe reed profile to play in tune.

The number of possible oboe profiles is unlimited because of the nature of the reed-making process. However Figure 1 shows the four most common profiles currently used by various manufacturers of commercial reeds. This study will attempt to determine what effects these four profiles have on intonation in relation to equitempered tuning.

FOUR OBOE REED PROFILES

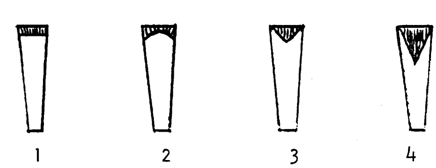


Figure 1

## PROCEDURE

Four oboe reeds were made, and four staples were selected, each having the following measurements: tube length, 1$^{3}/_{16}$ inches; tube diameter, $^{3}/_{16}$ inch at base and $^{1}/_{8}$ inch at top. The cane was slipped over the end of each tube a distance of $^{1}/_{4}$ inch. The cane was tied on to the tube with nylon string. Each reed was scraped in a different manner following the profiles illustrated in Figure 1, and each was identical in its overall length of 2$^{13}/_{16}$ inches.

A standard conservatory system oboe was used in combination with the four oboe reeds. Four oboe students, aged 16 to 19, played each note of a two-octave chromatic scale (c′ to c′′′) and the deviations from equitempered tuning were indicated on a Stroboconn (C. G. Conn, Ltd., Elkhart, Indiana). The students were instructed to face away from the Stroboconn while playing. In this way they would not be tempted to humor the intonation if they noticed any indication of pitch deviation. Each student was allowed to practice a few minutes on each reed before the test was made. The oboe reeds were inserted into the oboe as far as they would go by the author. The same instrument was used throughout the experiment by all performers.

When the testing procedure was completed, the deviations from equitempered tuning for each note in the study were totaled and averaged. Table 1 shows the average deviations for each note indicated in cents.

With the oboe reed inserted its full length into the oboe, the pitch deviations in relation to equitempered tuning were least when the oboe reed with profile number one was used. The greatest number of deviations with this reed were in the low register, and these caused the instrument to be slightly flat. The highest single deviation with this reed was 5.75 cents.

The pitch deviations for profile number two are larger, especially in the middle register. There is a greater tendency for sharpness with this reed than with profile number one.

Profile number three shows the greatest deviations in pitch in relation to equitempered tuning. The instrument showed a tendency to be sharp throughout its two-octave range. Although a pattern is followed in which the pitch is lower at the area around c′ to d′, and again from a♯′′ to c′′′, the entire two-octave range shows a high degree of sharpness.

Profile number four presents a different picture. Although the pitch deviations are not as great as those of reed number three, the tendency toward flatness is unmistakable. The entire range shows pitch deviations that are flat except in the extreme upper register, which is only somewhat sharp. This is the opposite of the pitch production of the other three profiles, which all showed a tendency to drop in pitch in the extreme high register.

TABLE 1

AVERAGE PITCH DEVIATIONS IN CENTS FOR FOUR OBOE REEDS

| | *Oboe Reed Profile* | | | |
|---|---|---|---|---|
| *Pitch* | *Number 1* | *Number 2* | *Number 3* | *Number 4* |
| c′ | −5.00 | −4.00 | +10.50 | −7.50 |
| c#′ | −4.50 | −4.25 | +12.50 | −8.75 |
| d′ | −5.00 | −3.00 | +13.00 | −7.50 |
| d#′ | −5.00 | −4.50 | +16.00 | −7.50 |
| e′ | −3.75 | +1.50 | +18.00 | −2.75 |
| f′ | +3.00 | +4.00 | +18.00 | −1.00 |
| f#′ | +1.00 | +8.00 | +16.25 | −3.50 |
| g′ | +1.75 | +5.75 | +15.75 | −6.25 |
| g#′ | +2.25 | +6.25 | +17.25 | −2.25 |
| a′ | +1.50 | +8.50 | +14.75 | −3.75 |
| a#′ | +1.25 | +8.50 | +14.50 | −7.00 |
| b′ | +1.25 | +5.50 | +10.00 | −9.00 |
| c″ | +1.75 | +7.25 | +14.50 | −8.50 |
| c#″ | +3.75 | +4.25 | +21.25 | −12.00 |
| d″ | +0.25 | +7.25 | +16.50 | −8.25 |
| d#″ | +1.75 | +3.25 | +17.25 | −11.75 |
| e″ | +5.75 | +6.75 | +20.75 | −5.75 |
| f″ | +2.00 | −0.25 | +20.00 | −4.75 |
| f#″ | +4.50 | +10.00 | +21.00 | −5.00 |
| g″ | +4.75 | +5.25 | +16.75 | −5.25 |
| g#″ | +4.00 | +8.75 | +16.25 | −1.25 |
| a″ | +2.00 | +6.25 | +14.50 | +1.75 |
| a#″ | −0.25 | +5.75 | +13.00 | +3.00 |
| b″ | −1.00 | +4.50 | +12.50 | +5.50 |
| c‴ | −2.50 | +1.75 | +12.00 | +4.75 |

− flat
+ sharp

When the total pitch deviations are presented, a more understandable evaluation can be made of the function of each oboe reed profile in regard to intonation. An examination of Table 2 shows that profile one remained relatively stable through the entire range. Profiles two and three showed a great tendency for sharpness. However, this tendency toward a higher pitch level is greater with number three than number two. Profile number four showed a great tendency toward flatness, more so than any of the other reeds tested in this study.

TABLE 2

TOTAL PITCH DEVIATIONS IN CENTS

| | *Number 1* | *Number 2* | *Number 3* | *Number 4* |
|---|---|---|---|---|
| Total flat cents | −27.00 | −16.00 | −0.00 | −129.25 |
| Total sharp cents | +42.50 | +119.00 | +393.75 | +15.00 |

## Conclusions and Recommendations

Oboe reed profile number one, which had a scrape of approximately 1/8 inch from the tip of the reed, showed the least deviation from equitempered tuning. This reed profile, with the reed inserted its full length, could be played in tune very well by all four oboists used in this study.

Profile number two, which had a scrape of 1/8 inch plus a further indentation of 1/8 inch on each side of the reed tip, raised the pitch somewhat more than profile number one. Profile number three, which had a small v-lay of approximately 1/4 inch, showed the greatest deviation from equitempered tuning. This reed profile was sharp throughout the two-octave range tested. Oboe reed number four, which had a long v-lay of approximately 1/2 inch, proved to be flat throughout most of the range tested. Therefore, even though the brass staples and reed lengths were identical, the various reed profiles used in the study affected intonation accuracy, each in a different way.

This information can be used by the music educator in a number of ways. The following recommendations should be considered when attempting to improve intonation accuracy with student oboists:

1. For the student who has a fairly well developed embouchure, oboe reed profile number one should be considered because of the stable intonation level. However, this reed should be inserted its full length.

2. With a student who has a slightly underdeveloped embouchure, with a tendency to play slightly flat, oboe reed profile number two should be considered. When this profile is used on a reed that is inserted its full length, the intonation level is somewhat sharp. This would serve as a compensating device for the weaker embouchure.

3. For the student who has a very weak embouchure, and this would include the beginning oboe student, oboe reed profile number three should be considered. When this profile is used on a reed that is inserted full length, it has an extremely high intonation level. Therefore, it would not require much pressure of the embouchure to enable the student to play in tune.

4. For the student who has an extremely tight, or well developed embouchure, which is likely to be the cause for the student to play somewhat sharp, oboe reed profile number four should be considered. When this profile is used on a reed that is inserted its full length, it has a low intonation level. Therefore, the increased pressure exerted by the embouchure may compensate for this tendency.

The music educator should experiment with the various oboe reed profiles in order to find the types that enable each of his students to play in tune. Different profiles obviously have an effect on the intonation level as related to equitempered tuning.

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