William Winstead's Bassoon-Reed Methodology: Dial Indicator Measurements and "Stabilization Process"

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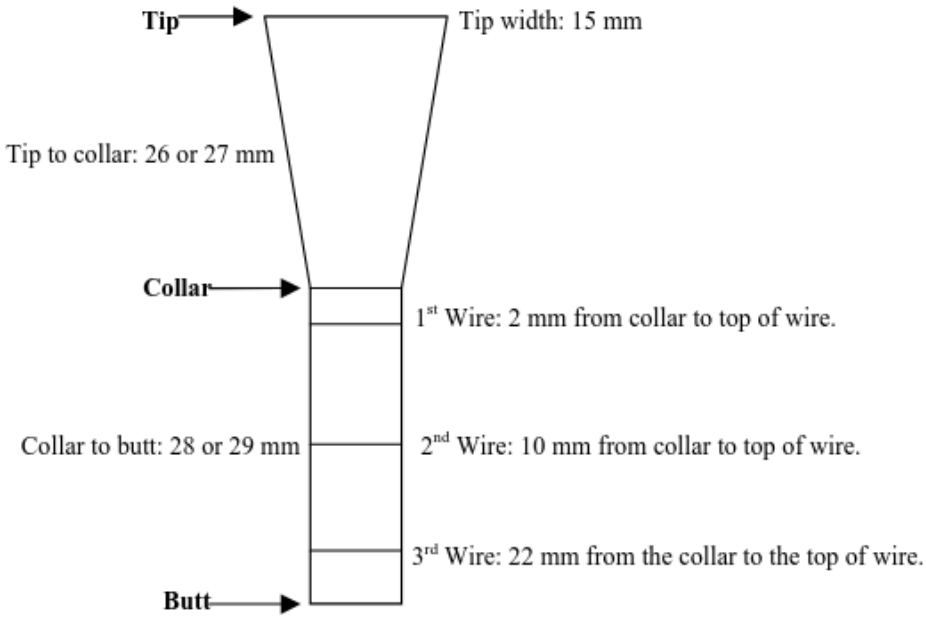
INTRODUCTION

William Winstead has developed a highly systematic approach to scraping the reed, using a dial indicator to measure multiple points on each blade. The methodology employs a system of proportional measurements that are applied in successive stages until the reed stops changing, thereby producing well-playing reeds as consistently and efficiently as possible. It is important to stress that this system can be adapted to any reed style and that the methodology of the "stabilization process" is more important than Winstead's own numbers per se, which are given below. Before introducing the details of the scraping process, some basic information on common North American reed styles and lengths is useful. The following method will work with any style of reed blank.

MEASUREMENTS OF THE REED BLANK

Total length: 54 or 55 millimeters
Length from butt to collar: 28–29 mm
Length from collar to blade tip: 26–27 mm
Width of tip: 15 mm
Wire placement from collar:
- 1st wire: 2 mm
- 2nd wire: 10 mm
- 3rd wire: 22 mm

Figure 1: Length and width measurements of the reed blank.



BLADE THICKNESS MEASUREMENTS PART 1: SPINE

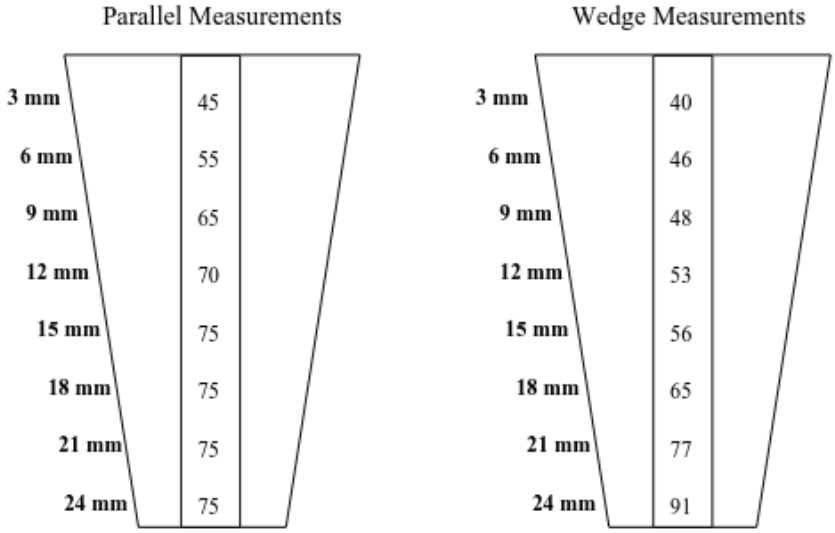
Two Basic Blade Styles: "Parallel" and "Wedge"

Figure 2:

Parallel Scrape: The parallel scrape begins with a slope at the tip and levels off for the second half of the blade. The measurements in Figure 3 represent the thickest starting point. They are then proportionally reduced in the "stabilization process" described below. (Winstead prefers this scrape.)

Wedge Scrape: The wedge scrape slopes up from the tip to the collar. It usually has a wider range of thickness than the parallel scrape, starting thinner at the tip and ending thicker before the collar.

Figure 3: Sample Spine Measurements. The following spine-thickness measurements are in hundredths of a millimeter and can be measured with a dial indicator, preferably equipped with a "Winstead stylus," which has a small diameter and is scored every three millimeters.[1]



BLADE THICKNESS MEASUREMENTS PART 2: CHANNELS AND RAILS

In both the parallel and wedge scrapes the channels of the blade taper down in a slope from the spine to the rails. The measurement at the center of the channels ranges from .05 to .15 mm less than the spine, but .10 mm is the most common.

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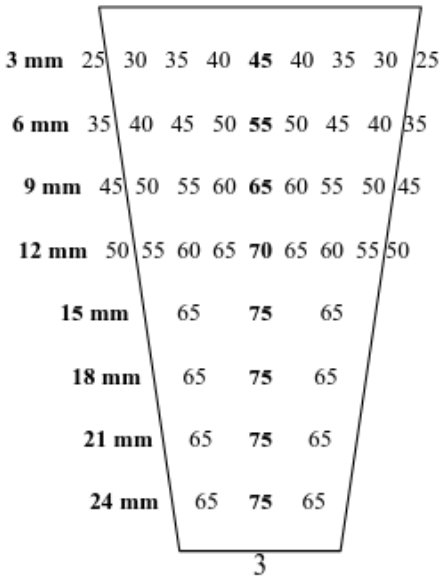
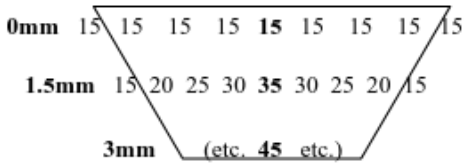
Figure 4: Sample channel and rail measurements on a parallel-scrape blade. (The numbers outside of the diagram represent rail measurements.)



BLADE THICKNESS MEASUREMENTS PART 3: TIP

The tip of the reed – the area of the blade from approximately 0 mm to 2.5 mm – descends rapidly from the measurement at 3 mm creating a steeper slope than anywhere else on the blade. The channel concept applies to the tip as well, although the channels gradually disappear from 1.5 to 0 mm, arriving at a constant thickness (.15, .20, or .25 mm) all across the extreme tip. The common concept of a "thumbnail" shape in this area is consistent with this method, but it is produced by applying the set of tapering measurements.

Figure 5: Sample tip measurements on either parallel or wedge reed.



"STABILIZATION PROCESS" AND MEASUREMENTS

Regardless of what reed type or specific measurements one uses, the "stabilization process" is a critical step in bringing the reed to a settled state – the point at which the reed performs well without significant further adjustment. Most reeds change quickly after the first scraping and then require more work. During the stabilization process the reed is scraped down in levels that are proportional to the original measurements (sample measurements included at the end in Tables 1a/b). With these ratios, the back of the reed decreases more in actual thickness than the front, but the proportions remain the same. Therefore, the back may decrease .050 mm while the 3 mm section may decrease only .025 mm.

Once the reed reaches a freer state and remains there without changing it has stabilized. Winstead prefers his reeds to crow the pitch F, which is dependent on many factors like reed dimensions and cane hardness. The normal range for a reed crow is from E♭ for the lightest reeds to G for the heaviest reeds. Furthermore, there are certain notes one can test to determine if a reed has stabilized:

1. E♭ in the bass-clef staff should be stable at mezzo-forte and louder without added fingers or keys in the right hand.
2. E in the bass-clef staff should be close to the point of sagging but not sag involuntarily.
3. The response of extreme low and high notes should be predictable.
4. D/E♭/E above the bass-clef staff should be stable and easy to control.

If all of these tests work the reed should be stable. Sometimes it takes ten or more minutes of playing for a freshly scraped reed to settle and not be flat or too responsive. It is important to let the reed "recover" by playing on it before making further changes.

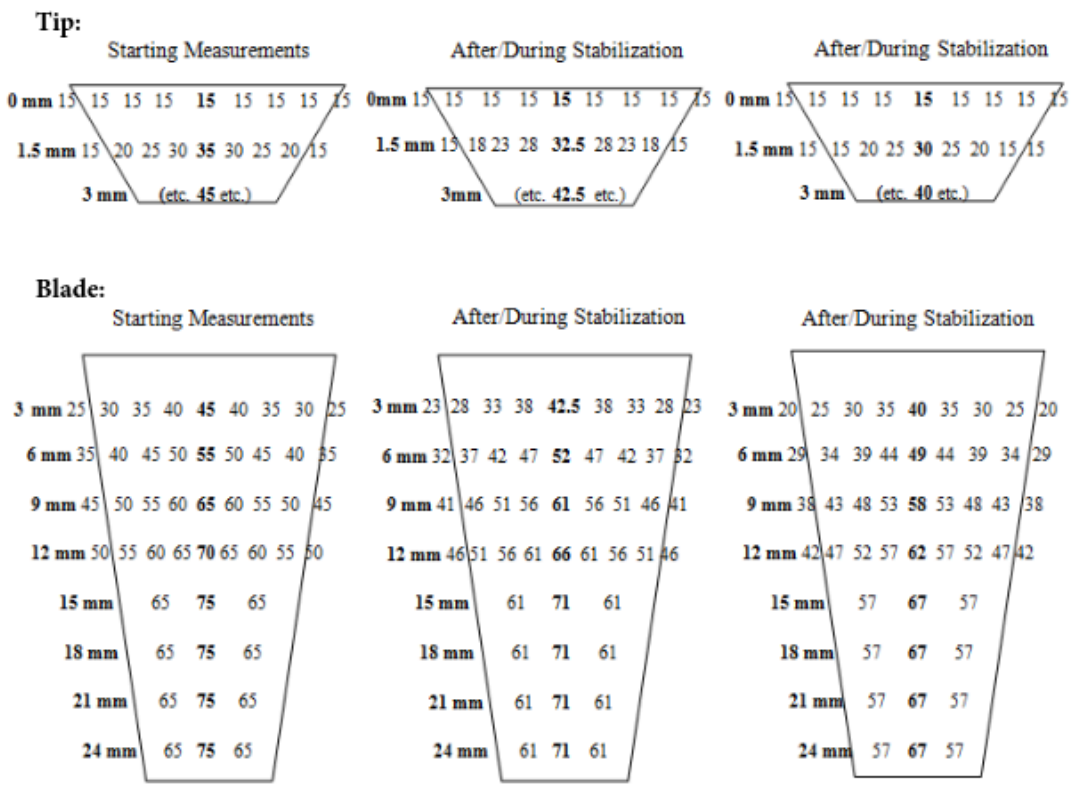
Figure 6: Representation of "stabilization process." Repeat as necessary over several days until the reed has settled.

Trim reed—Play reed to "break-in"—Reed recovers/hardens—Trim—Play etc.

Various factors can affect the level at which a reed stabilizes, including:

1. Type of cane – relative hardness and softness.
2. Type of gouge – concentric or eccentric – and depth of gouge. The thicker the gouge is, the softer the cane is because cane further away from the bark is softer than cane closer to the bark.
3. Length of blade – the shorter the blade is, the thinner it should be.
4. Shape of blade – the narrower the blade is, the thinner it should be.

Figure 7: Examples of parallel-scrape reeds before and after/during two possible stages of the "stabilization process."



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HYPOTHETICAL REED SCENARIO

In order to understand Winstead's scraping methodology, it would be useful to apply it to a hypothetical reed. Imagine starting a new blank by bringing both tips to the set of measurements from the left diagram in Figure 7. It is possible to complete the scraping of this area entirely before moving on to the rest of the blade. Next move through all of the spine, channel, and rail measurements on both blades (left diagram in Figure 7). In actuality this does not require as much time as it may seem because previous scraping experience allows you to finish two, three, or more segments at one time. If the reed has reached a comfortable crow pitch, try testing the reed on the bassoon. Let us assume the reed plays well and put it away to dry.

The next day when the reed has changed – becoming stiffer, more resistant, and with a much higher crow pitch – apply Winstead's proportional measurements down to .425 mm at 3 mm in the stabilization process shown in the middle diagram of Figure 7. The pitch of the crow will lower again, and after being played for a while, perhaps the reed will seem to have reached its stabilized point. Put it back to dry again.

If the reed stiffens again, reduce the thickness of the reed another "level" to the right diagram in Figure 7. Sometimes it is necessary to continue this process to measurements as thin as .30 mm at 3 mm, but only in rare cases.

CALCULATING PROPORTIONAL MEASUREMENTS

The various levels of measurements laid out in the stabilization process must be proportionally related to an initial set of working measurements. With this system the basic scrape of the reed is not altered, just reduced proportionally. The following section explains the method for calculating the measurements in Table 1a, and the method could be applied to other measurements based on a personal reed style.

Figure 8

1. Take Winstead's measurements (or another set of measurements based on your own reed style), and put them in a vertical column. Choose starting measurements for the remaining levels, and put them in a horizontal row. The starting measurements in the horizontal row are based on the concept of scraping just a little thinner each time. These are Winstead's starting parallel-scrape measurements in hundredths of a millimeter:

At 3 mm:	**45**	**42.5**	**40**	**37.5**	**35**
	55				
	65				
	70				
	75				

2. Calculate the ratio between the first number in each column and the successive numbers by dividing the successive numbers by the first number. Using the above column, take each successive number – 55, 65, 70, and 75 – and divide it by the first number 45:

55 ÷ 45 = 1.222
65 ÷ 45 = 1.444
70 ÷ 45 = 1.555
75 ÷ 45 = 1.666

3. To create a new column of proportional measurements, multiply the quotients from Step 2 (1.222, 1.4444, 1.555, 1.666) with the starting measurements for each level. In Table 1a, the column starting with 42.5 is calculated with the following equations:

4. **42.5 x 1.222 = 52**
42.5 x 1.444 = 61
42.5 x 1.555 = 66
42.5 x 1.666 = 71

40 x 1.222 = 49
40 x 1.444 = 58
and so on…

5. Proportional fractions might be a more convenient method:

$$\frac{45}{55} = \frac{42.5}{x}, x = 52$$

$$\frac{45}{65} = \frac{42.5}{x}, x = 61$$

$$\frac{45}{70} = \frac{42.5}{x}, x = 66$$

$$\frac{45}{75} = \frac{42.5}{x}, x = 71$$

Table 1a: The following columns of measurements represent spine levels, not channels. It is unnecessary to calculate channel measurements proportionally. Instead, simply apply the minus .10 mm concept to each spine measurement. Again all numbers are in hundredths of a millimeter.

Parallel-Scrape Spine Levels

45	42.5	40	37.5	35
55	52	49	46	43
65	61	58	54	51
70	66	62	58	54
75	71	67	62	58
75	71	67	62	58
75	71	67	62	58
75	71	67	62	58

Table 1b:

Wedge-Scrape Spine Levels

45	42.5	40	37.5	35
52	49	46	43	40
54	51	48	45	42
60	56	53	50	46
63	60	56	53	49
73	69	65	61	57
87	82	77	72	67
102	97	91	85	80

CONCLUSION

It is important to reiterate that the above measurements are not strict rules but rather constitute a system that one can adapt to all other reed styles. Furthermore, they represent a successful working method that has been tested and utilized in many different forms by Winstead and many of his students for nearly twenty-five years. Finally, this methodology takes much of the guesswork out of scraping the reed and ultimately makes the process exceptionally precise and efficient.

James Massol *holds a BM in bassoon performance and an MM in both bassoon performance and music history from the Cincinnati College-Conservatory of Music, and he is currently a doctoral candidate in bassoon performance and pedagogy at the University of Colorado. During the 2007–2008 academic year he was a Fulbright grantee to the Hochschule für Musik in Würzburg, Germany, from which he received a Konzert Diplom. His primary teachers have been* ***William Winstead****,* ***Albrecht Holder****, and* ***Yoshiyuki Ishikawa****. He has presented at national and international conferences, including a lecture recital on ornamentation at the 2009 IDRS conference in Birmingham, and in 2010 Accolade will publish a new edition of Mozart's* Sonata K. 292 *with his realization of the basso for keyboard.*

William Winstead *is the principal bassoonist of the Cincinnati Symphony Orchestra, professor of bassoon at the Cincinnati College-Conservatory of Music, and a senior member of both the Marlboro Music Festival and the Sarasota Music Festival. He was president of IDRS from 1985–1988.*

ENDNOTES

1 The "Winstead stylus" is currently available from Miller Marketing. It was formerly produced by James Keyes, Berdon, Satco, and Accurate Music.

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