

'The Principle of Balance in the Making of Oboe Reeds'

by Mark Hill

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Like many of my generation, I have often been fascinated by eastern philosophy. The concept of seeking wisdom and peace by learning to find a unity ever present but hidden in the world of opposites and duality is expressed in much of China's ancient culture. Even a perfunctory exploration of traditional Chinese medicine will introduce a curious person to the Taoist concepts of Yin and Yang, the balancing and opposing forces in nature that combine and interact with each other to make up the universe. According to this view, for example, the heavens are yang, the earth yin; the sun yang, the moon yin; fire is yang, water yin; male yang; female yin, etc., etc. Therefore, traditional Chinese medicine is based on the idea that understanding and balancing the various energies in the body according to their respective yin-yang characteristics will result in health and harmony. The precept of "moderation in all things" as a wise approach to healthy living perhaps springs from this general world view.

While I make absolutely no pretense to be more than nominally familiar with this huge and wondrous area of study, at some point in time I became curious about the possibility of conceptually applying the idea of the quest for balance to the study of playing the oboe, particularly in the area of reed-making. I began to associate the various tendencies a reed would have as being either "yin" or "yang," and tried to improve the reed by balancing those tendencies with techniques which I then tended to associate with the opposite quality. Soon I began to see the perfect reed as a beautiful balance between the raw vibrating energy of the piece of cane (yang), and the restraint, stability and subtlety which we can, on a good day, design and build into the reed, (yin).

Understanding the concept of balance seems to me to be key in making reeds that free us to do our best playing. It is probably much more important than the actual physical skills with the knife which we must master.

What follows is a set of principles and guidelines for one system of balancing reeds which I believe is reasonably consistent with what has become the standard American scrape. There are many ways of achieving balance in a reed, and there are many ways of conceptualizing and explaining reed-making. This is simply what I have synthesized from my teachers and from my years of personal experience in playing and teaching. It is very much a "work in progress," as reed-making always is, I suppose, and I am constantly modifying and refining my understanding of the dynamics of reed-making, both for myself and my students.

We endeavor to achieve balance in reed-making on many levels:

- We try to create a balanced distribution of vibrations through the three areas of the reed, both vertically and horizontally, according to each area's function.
- We try to create a balance between the three desired functional attributes of the reed.
 - Response (Yang)
 - Stability (Yin)

- Tone quality
- We try to achieve a balance in our perspective of the relative importance of the reed as it relates to our practicing and performing.

As we shall see, these areas of balance are all interrelated.

Balance is a state of equilibrium to be found at a middle point of center amid various interacting forces. It is generally a fluid state and requires constant adjustment to compensate for and counteract continuous changes in those forces.

(What are some of these variables to which we must continuously adjust?)

The Distribution of Vibrations

Horizontal Distribution

It is important to balance the distribution of vibrations horizontally.

- The nature of the double convex shape of the opening of the reed makes the reed more eager to vibrate down the center than down the sides because there is more space and freedom for the vibrations there.
- In order to distribute the vibrations more evenly through the reed there are several things we do to compensate for this imbalance:
 - The gouge is thicker in the middle than on the sides
 - We leave a spine up the center of the reed
 - We create an inverted "V" shape in the tip, in effect making the tip shorter in the center than on the sides
 - We create a degree of contour in the tip, thinning to the corners

A good principle to remember is paradoxical:

- Scraping the middle of the reed makes the middle of the reed vibrate with more freedom and abandon (Yang)
- Scraping the sides of the reed makes the sides absorb shock in the vibration, thereby dampening or controlling the responsiveness of the reed, yielding more stability and resistance (Yin)

Therefore:

- Scraping the middle of the reed (tip, heart or spine) increases response and brilliance (Yang)
- Scraping the sides of the reed (tip, heart or back) increases resistance, cushions the vibrations, and dulls or darkens the sound quality (Yin)
- Increasing the angle of the inverted "V" of the tip increases Yin attributes

- Decreasing the angle of the inverted "V" of the tip increases Yang attributes

In scraping toward the sides of the reed in the heart and back, it is very important to retain the structural integrity of the rails so that in viewing the reed from the side the rails remain substantially intact from the thread up to the top of the heart.

Vertical Distribution

It is equally important to balance the vibrations vertically through the reed between the tip, heart and back. In order to do this we must understand the function of each of the three areas. The three areas should remain distinct from each other so that their separate functions can be monitored and manipulated.

1. The tip is the source of initial response in the reed. It is the thinnest part of the reed and it is where the air first enters the reed (and therefore the instrument's entire air column). It needs to vibrate independently enough and be short enough to initiate a single high pitch concert "C" when the reed is inserted fully into the embouchure with the lips down near the thread and no lip pressure. If this initially responding pitch is a "b" or lower it will result in a tendency toward flat pitch and instability, especially in the upper register, and it indicates that the length of the initial vibration is too long, either because the tip itself is too long, or because it is not distinct enough in thickness from the heart behind it. There should be a clear barrier for these initial vibrations at the back of the tip.
 - The design concept for the tip will best include a subtle contour or taper in the thickness of the tip from back to front and from center to sides and corners.
2. The heart is the resonating amplification chamber for the initial vibration set up in the tip. It needs to vibrate as a unit and therefore should be basically uniform in thickness from back to front. It should be substantially thicker than the tip.
 - If it is too thin, tip vibrations are likely to be lengthened by "leaking" into the heart area, dropping the pitch of the initial response. Also if the heart is too thin it will tend to encourage too much unrestrained response down the center of the reed thus creating a bright nasal tone.
 - If the heart is too thick it will be unwilling to amplify and deepen the tone of the initial tip vibrations. The reed may be very resistant to respond even if the tip is quite thin. The excessive thickness may tend to create too much opening in the tip, too large a chamber inside and therefore too low and uncontrolled a crow. Also if the tip is vibrating too independently, with no secondary and sympathetic vibration from the heart, it will tend to be very thin in tone quality, especially in the high register.
 - The design of the heart is essentially an evenness in thickness from back to front, and a gently vaulted arch from side to center. (I like to use the image of a squashed gothic arch.) It should not vibrate in a complex pattern but as a resonating unit.

- The transition from the tip to the heart is particularly crucial in the behavior of the reed. It must be sharp enough to define the length of the initial vibrations of the reed at the back of the tip. At the same time it needs to be blended or sloped enough to allow some of the energy of the tip's vibrations to activate the heart's resonance. While an "S" curve is a desirable departure point in achieving both of these goals, the severity of the angle of the curve remains a variable to be manipulated in seeking balance between response, stability and tone quality. Generally speaking, softer cane requires a tighter transition, and harder cane will require a gentler, longer transition.
3. The back's function is to distribute the now stabilized and amplified vibrations over and through the rest of the reed on their way into the oboe.
- If the back is too heavy:
 - The vibrations stay too isolated in the top of the reed and the reed may lack depth and warmth.
 - The reed remains too inflexible, and very possibly too open, for the embouchure to exert any subtle control over color, pitch and dynamic. It usually created the impulse to bite the reed for increased control.
 - If the back is too thin:
 - The reed may become unstable.
 - The reed may tend to collapse, have too small an opening and be limited at the high end of the dynamic range.

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The desirability of attaining each of the functional components which are mentioned above (response, stability of pitch, and tone) is obvious. It is by manipulating the strength and patterns of the vibrations through the reed, based on the principles mentioned above, that we acquire all three attributes in the reed. (In Jay Light's Oboe Reed Book he adds dynamic range and pitch to these basic attributes. I lump stability and pitch together, since it is a given that we want the reed to be stable at a pitch center which matches our colleagues' or the piano we are playing with. The quality of a good dynamic range is of course also very important and often there will again be a trade-off here: a reed which plays exquisite soft low Db attacks may not play the greatest fortissimo high B and vice versa. Generally speaking, the amount of cane left on the reed and the size of the opening will affect the dynamic capabilities of the reed, and the reed should be tailored for the music and the particular demands that will be required of it.)

- Balancing the reed means finding the best mix of the three essential elements that a given piece of cane will yield.

- It is important to understand that finding that best mix by no means guarantees the crafting of a good or even an acceptable reed. Only a percentage of even the best oboist's reed-making efforts yield reeds that truly have all these qualities in abundance. In fact, if the texture of the cane, (or the gouge and/or shape) is inferior, that best mix of elements may very well yield an entirely unacceptable reed. The better the raw materials (and the more skilled the reed-maker) the higher the percentage of success, but keep in mind that accepting a measure "failure" as an inherent part of the routine of reed-making is a healthy, stress-relieving way of proceeding. As other reed-makers have pointed out, major league hitters are considered masterful if they succeed at the plate 3 out of 10 times. While results may vary, (as all the disclaimers read), we need to have the same attitude with ourselves and perhaps somewhat similar expectations out of even the best batch of cane. If we manage to do better, great.
- From a purely practical point of view, it is very important for our sanity and the maintenance of our musical growth to become adept at producing serviceable reeds that function and sound well on which we can play rehearsals and practice, even when they are lacking all the qualities we would like to have in a concert reed. So, where do we compromise?
- Often it seems there is an inverse relationship between response and stability: the reed is responsive but is wild in pitch. We clip the tip and stabilize the pitch and the reed is too hard. We scrape the reed again to free it up and now the pitch stability is gone again, etc.
- The same inverse relationship can exist between tone color and response: the reed has a beautiful sound, but articulation is very sluggish in the low register. We free the reed up so the low notes can be tongued easily, and now the tone is much brighter, and we lost some of our stability to boot!
- Or again, between tone and stability: Nice dark tone, but the reed is flat in the high register and on the low notes. Clip the tip to bring up the pitch, lose response, scrape for response and there goes our beautiful dark tone. So we must decide sometimes what we are willing to sacrifice in a reed that is only going to give us a maximum of 90% of one quality or another, simply because it is not a beautiful piece of cane that "has it all."
- As a general rule, I encourage my students to demand response first and foremost. We need sound on all the notes from top to bottom, and in order to play musically we need to be able to blow with comfort and without strain.
- Demand stability from the reed with practically equal emphasis. Poor intonation is very hard on any musical endeavor, very hard on our colleagues, and hard on our self-esteem. Also the comfort factor becomes important there. Straining to keep the reed in tune with constant excessive embouchure manipulation can be very tiring, and inevitably has an adverse effect on the musical shaping of the line.
- Once you have these two qualities in sufficient proportion, go for a beautiful a tone as you possibly can. Playing with only 90% of your most beautiful tone will probably serve the music much more acceptably, than only 90% of either

response or stability. Tone can be produced and shaped beautifully in many different shades of color, and the "ideal" sound is a very subjective thing. Response and good intonation, however, are (in the words of at least one wonderful pedagogue) non-negotiable.

Design and Proportions of the Reed: Tests for the Reed

Outside the Oboe

- Visual Criteria
 - Check the opening for size and shape
 - Check the reed for symmetry left to right, and blade to blade
 - Close the reed by squeezing the heart between thumb and forefinger, and check for symmetry of strength in the two blades as the reed closes down
 - Check for proper proportions and measurements
 - Check for proper shadings and contours (gently raising a wet plaque under each blade of the tip will reveal a lot of information)
 - Check to see if the sides of the blades of the tip meet all the way up, and will grasp the plaque securely
 - Check the contour of the rails from the side view of the reed
- Does the reed seal?
 - Suction test
- The Peep
 - Place reed in a normal playing embouchure--no pressure from lips or jaw. With a breath attack slowly increase the air speed until sound is produced.
 - How hard must you blow?
 - What is the pitch? (Bb)
- The Crow

Reed-making must be properly balanced amid the entire array of skills we are trying to develop as musicians. Unfortunately the reed is an essential component and exerts an enormous influence on our ability to successfully perform. Often a player will underestimate or choose not to acknowledge to himself the negative impact of playing on inferior reeds (i.e. the student who insists on playing a reed that has a "dark" sound, but can't play softly or which consistently cracks or misses low note attacks. Or a

student who succeeds and revels in making a “free-blowing” reed and somehow is unconscious of its unrefined or unstable qualities). It is also often the case that a player will focus too much on the importance of producing the perfect reed, obsess at the reed desk, neglect the music stand, and judge a performance based on whether he or she had a “good” reed. It is wise for each of us to recognize our own tendencies in this area and be constantly monitoring our balance of time, energy and focus between reed-making and music-making. We need to be spending enough time at the reed-desk to produce reeds that allow us to express our best playing on the instrument, but not so much time that the music-making suffers from neglect and misplaced focus.

Ideally approached and conceptualized, our reed-making can be a wonderful laboratory for experimentation in the concepts of balance, our understanding of which can have positive influence and implications for many of our other pursuits in music and beyond.