Bassoon Reedmaking at Higher Altitudes: An Investigation

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When I decided to reside in Colorado during my sabbatical year 1990-1991, one of the problems I wanted to investigate was how to make bassoon reeds that respond well at higher altitudes. This decision was prompted by difficult experiences I had encountered in the past, two of which I list below. A number of years ago when the Northwest Wind Quintet was on tour in our home state of Idaho, we had performed a school concert in Kamiah, Idaho, on the Clearwater River. The elevation there is probably no more than 1100 feet above sea level. Following that we drove about 50 miles up the South Fork of the Clearwater to the forest service town of Elk City and played another concert. I was astounded. The reed that had responded well at 1100 feet was as stiff as a "popsicle stick" at the 5000 + foot elevation of Elk City. This was one of my first experiences with reed response at high altitudes.

More recently, our quintet performed a series of concerts at the Leadville (Colorado) Music Festival in the summer of 1988. At a whopping 10,300 feet above sea level I was really strapped. I could find only one reasonably responsive reed — a soft vibrating "oldie," which I nursed through three concerts. (Imagine playing the Barber *Summer Music* at 10,300 feet!)

For reasons I don't totally understand, the vibration capability of arundo donax is severely affected by altitude — generally the higher you go, the thinner the air (or barometric pressure) and presumably the greater the "pressure" required to displace it by vibration. That's the problem in a nutshell. It doesn't take much altitude difference to begin affecting the performance of a reed. It is a known fact that the difference in air pressure of 1000 feet is strong enough to artificially produce a sound on a clarinet. Moreover, humidity probably enters the equation somewhere as well. I learned long ago *not* to work on reeds on days of rapid barometric pressure changes, such as rainy days, etc.; but to wait for those stable "high pressure" days to fine tune the "monsters."

To find out how to attack, if not conquer, the problems of altitude I have contacted a number of bassoonists who either reside at high altitude or who have had considerable experiences performing at high altitude. These include Bob Olson, (formerly at the University of Colorado, Boulder, now at the Kansas City College - Conservatory of Music); Carl Rath of the University of Oklahoma, who performs at the Red Lodge (Montana) Music Festival every summer at 6000 feet; Richard Meek of Texas Tech University in Lubbock at 3400 feet, who often performs in New Mexico at higher elevations; John Wetherill, (formerly of the Denver Symphony, now with the Indianapolis Symphony); Kim Walker, who resides in Geneva, Switzerland; and Gary Moody, who teaches at Colorado State University, Ft. Collins, and is a doctoral candidate at the University Northern Colorado, Greeley. Gary, who owns Gem Products and is heavily into reedmaking, has been particularly helpful. His report follows my own summary here.

Although there are some conflicting opinions, the general concensus is that one can make reeds that work well at higher altitudes by using some or all of the following techniques:

1) Use a softer, less resilient cane. Sometimes cane that is too "mushy" or resistant-free at lower altitudes works well. Gary Moody has a special bunch of reeds made from South African cane that he uses when he performs as principal bassoon in the Breckenridge Music Festival every summer at 9600 feet.
2) Use a "bigger shape of reed, that is somewhat wider, perhaps, at the tip and throat, and generally of larger dimensions.
3) Use a thicker gouge than one normally would use. This has been the key factor for me, enabling me to make responsive reeds using good, hard cane and my normal shape that will play well here at Fort Collins (at 4900 feet) and at Boulder (5400 feet). I have been using a gouge of 1.5mm (as opposed to the normal 1.2mm). When you put it on your normal profiler it means you will be cutting deeper into the softer, "older" cane, which seems to respond better at altitude. Gary, himself, prefers a 1.35mm gouge for general use, but I have found these reeds to still be a bit too "tempermental" and stiff when fine tuning them.

Using cane from Dante Biosoto, Glotin and some Var cane purchased from Guy Hardy, who is currently residing in Southern France, I have made reeds that respond very well at this altitude. The Biosoto reeds are the "lightest" of the three, though I have generally been unsuccessful with making them with the 1.35mm gouge. (Kim Walker told me that some Swiss bassoonists gouge as thick as 1.6!).

The final "trick" that I have adopted is to take Manny Ziegler's proposal to heart. (*Double Reed*, Fall, 1990, Vol. 13, No. 2, p. 53). I have begun to store my reeds in the refrigerator. This has stabilized them considerably from playing to playing. I recommend it strongly to you.

John Wetherill, formerly from Denver, now in Indianapolis, has also provided some interesting "food for thought" concerning the subject. John said that his reeds generally became bigger when he moved to Denver. He felt he was sometimes most successful in adjusting his reeds at high altitude by concentrating on the back 1/4-inch of the reed, especially on either side of the spine, since it is

often the low register that suffers the most at high altitude.

John also noted some other factors that seem to affect things generally more at higher altitudes besides the reed: Instruments don't seem to seal as well; inside humidity can be drastically different from outside humidity; even different water could affect reed response. Finally, John strongly recommended that, whenever possible, one should make reeds when one arrives at a high altitude, rather than trying to adjust reeds brought from lower altitudes. The results are generally more satisfactory.

Richard Meek of Lubbock, Texas, has done some experimentation with moving the wires and altering the throat shape for better reed response at high altitudes. His observations are as follows:

"Most of my problem comes with moving from Lubbock to Santa Fe and back, and since the time is rather short, I concentrate more on reed adjustment rather than just making reeds special for the higher altitude and slightly drier climate of New Mexico. Although when I'm involved in playing a rather full season there I will, after two concerts, have my "Santa Fe" reeds for the season.

The first adjustment (attempt) is at the first wire. Especially with my Knochenaur model there is a good taper starting at the middle wire. Frequently just moving the first wire up closer to the blade, using the finger nails, is sufficient to increase tension and add body to the sound. With the lower moisture content the reed usually fails to swell to the wires as much and consequently feels as though it has collapsed. By adjusting the first wire in this manner rather than squeezing at the sides of the first wire, the response is relatively the same, and the scale close to the same. (I first read of the significance of this adjustment in one of the old treatises; Almanraeder I think.)

For a model without this significant taper, middle to first wire, I first try to open the tip by squeezing from the top and bottom of the middle wire, and failing to get the desired result there, then squeeze the sides of the first wire. Either of these adjustments usually requires some slight reworking of the blade.

Response is more difficult at the higher altitude, not just because it is frequently less humid (that is not always the case) but, I believe, because the air is less dense and, therefore, less energy is imparted to the blade for the same expenditure of muscular effort. Therefore, after the above trick with the first wire, I may try flattening the blade by squeezing the first wire from top and bottom and then adjusting the tip opening from the middle wire. A flatter blade, of course, vibrates more readily and without having to remove any wood from a reed that may otherwise be nicely balanced for Lubbock. This adjustment may be used also in conjunction with moving the first wire upward, and should be tried at least before removing wood.

If neither of the wire adjustments work adequately (I, of course, do this to a number of reeds to see which ones may work), I then remove some wood, thinning the blade, and thus making it easier to *energize*. Since most of my reeds tend to be the parallel trim, this is simply a matter of flattening the reed to the plaque and removing wood evenly all over maintaining the overall proportion. If there remains a tuning problem with f# or g, I move to the front third of the blade and retune.

Using less dense cane, or a thicker gouge so that with the trimming of the bark one is working with less dense cane, certainly can be helpful . . . it would be more responsive to the more rarefied air, and also tend to hold more moisture. But as I already use differing gouges and diameters for a variety of reeds just in Lubbock, each model is adjusted for the Santa Fe (or Roswell) area.

When balancing a reed blank from the beginning in Santa Fe, the throat tends to be more oval, esp. at the first wire. The reed is overall thinner, with pyramid trims either being a longer tip *or* thinner back."

These are by no means *all* the answers to reed-making problems at higher altitudes. Perhaps some of the readers have insights that we've overlooked. I earnestly invite your response. Please let us know of *your* thoughts or experiences on the subject.

Following this is a report from Gary Moody, who has lived with altitude his whole life. □