An Experiment in Treatment of Arundo Donax

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Bassoonists and oboists, like other musicians, tend to be predominantly a strongly tradition-bound group. Thus, most of us are likely to believe that the correct way to make reeds is the way we were first taught. As a result, if one were to ask a group of double reed players how long cane should be soaked before being profiled or shaped, answers likely would range from "not at all" to "it doesn't matter," with a preponderance of responses being "the shortest possible time." Yet, it would not be very likely that a significant number of these players had ever tried a procedure other than the one they were first taught, nor might it have occurred to them to question their customary practice.

The generally stated reason for avoiding a lengthy soaking period is that the cane will become "water-logged." Of course, logic would seem to indicate that if water enters the pores of the cane, it will also dissipate or evaporate when the cane is later allowed to dry. Nevertheless, this is the principle many of us have learned and adhered to for many years, perhaps never considering the possibility that some other procedure might be more advantageous. However, if we will be less reticent about asking the question "Why?" when presented with procedures, techniques or truisms concerning reed-making, then we may benefit from a much increased range of useful approaches.

At this point, the writer wishes to acknowledge the assistance of some individuals who have aided him in adopting a more questioning or perhaps skeptical viewpoint concerning various aspects of the reed-making process. First, my teacher, Mr. Leonard Sharrow, whose reed-making technique is perhaps less burdened with mysticism than that of many others, initially led me to regard the cane and the reed as my servant rather than my master. And, secondly, Mr. Lewis Hugh Cooper, whom I believe to be among the most detailed and critical thinkers about the equipment of the bassoonist, has generously shared on several occasions his expertise and experience on these matters.

It was Mr. Cooper who first suggested to me that it might be not only possible, but perhaps desirable, to soak the cane for a much longer period of time. I think he first started this procedure as a matter of convenience. That is, he could always have on hand in his studio a supply of soaked cane for demonstrating reed-making techniques to his students, as well as for his own needs. He noticed that upon the initial soaking, the water would appear to become a pale green in color, but that in subsequent changes of the water, it would remain clear. The conclusion was that certain contents of the pores of the cane were leaching out during the process of soaking.

Here it is probably necessary to refer to an experience which no doubt many of us have had. Sometimes, cane which has inadvertently soaked for a long period may have become extremely hard to work, with a consistency almost like iron. However, it seems that this may be the result of extraneous matter being picked up from the water or air, or to the growth of algae or mold. These problems can be avoided by the utilization of procedures to be outlined below.

After learning of Mr. Cooper's results, I decided to try the process he outlined. As time went on, some additional procedures were attempted with varying degrees of success. Eventually it was determined that in order to make it practical to soak the cane for extended periods, the following procedures should be followed:

1. The container should be kept tightly covered, in order to avoid the picking up of bacteria or mold spores from the air.
2. The container should be kept in a dark place, as algae need light in order to multiply. Also, it is recommended that the soaking cane not be subjected to extremes of temperature.
3. The water should be changed periodically. Visual observation indicated that the period of time between changes of the water should be about forty-eight hours. The experimental procedure referred to below tended to confirm that fact.

Utilizing these procedures with some success, I began to notice some unexpected positive results with my reeds, and so I determined to try to find out more precisely what was happening to the cane, and what would be the optimum period of time for the soaking procedure. It seemed that any effects on the playing characteristics of the reeds must be due to the removal by the leaching process of minerals or organic matter from the pores of the cane. In order to avoid the possibility that these minerals might in part simply be replaced by others which were present in the water supply, it was decided to soak the cane in distilled water. This in turn allowed a still longer soaking period. At one point, I made some reeds from cane which had been soaking for more than eight months with no apparent negative effects.

It then occurred to me to wonder precisely what substances were being removed from the

cane, and exactly what period of time would be required for the completion of the process. Inquiries of some biologists and chemists revealed that what could be expected to be present in the pores would depend in large measure upon the mineral content of the soil, but that one likely category of compounds would be the water-soluble salts. Thus, sodium might be expected to be an indicator. While, according to plant physiology, this element is not necessary to plant life, plants will pick it up if it is present in the soil. In addition, there would likely be trace amounts of other elements, such as calcium, copper, iron, magnesium and others. However, fortunately, sodium should be among the easiest to detect.

The Experimental Procedure...

Three pieces of cane were selected from each of four lots. Four different suppliers were represented. Each batch of three pieces was soaked in 240 ml of distilled water. The water was changed every forty-eight hours for a period of 14 days, resulting in seven water samples for each batch. Additionally, samples of the water itself were collected and tested for the absence of sodium. Twelve reeds were made from this cane, with results which will be noted below. Further, for purposes of comparison, an additional sample from each of the tested groups of cane was selected, and a reed was constructed from each, this time soaking the cane for a much shorter period, in this case less than twelve hours.

Then, with the able and valued assistance of my colleague, Dr. Vernon Shaw, Associate Professor of Chemistry at the University of Evansville, the water samples from the test group were analyzed for sodium content using a Beckman Atomic Absorption Spectrophotometer, Model 448, configured as a flame spectrophotometer. First, samples of saline solution were prepared which were known to be of concentrations of .5, 1, 1.5 and 2 ppm. These samples were run in order to calibrate the standards which would be used. Then, the samples of water from the soaking of the cane were tested in the same manner. Table I shows the resulting values after the first 48-hour soaking period, while Table II shows the comparions between the four lots of cane for all the samples in which sodium was detected.

Perhaps the most noteworthy feature of the Tables can be seen in the rapid depletion of the sodium content of the pores of the cane. It will be noted that the values obtained already had fallen to very low levels after two soaking periods. The cane in Lot 2 was considerably wider and the gouge a bit thicker than in the case of the other groups, and the significantly greater volume of cane no doubt accounts to a large degree for the much higher sodium levels found in the water samples from that lot. However, the values still have fallen to nil for all the groups including Lot 2 as of the end of the third sample, representing six days of soaking.

Conclusions...

The test results indicate that the sodium levels found in the third water sample for each group had fallen to negligible levels which could not be detected by the Spectrophotometer, confirming what had been surmised on the basis of visual observation. Thus, it may be concluded that the minimum soaking period for leaching of sodium from the pores of the cane is six days, comprising three soaking periods of 48 hours each. Subsequent experiments have indicated that since the greatest amount of material is being leached out early in the process, the minimum soaking period may be reduced to five days, with the water being changed after periods of 24, 48, and 48 hours. Additional soaking without any deleterious effects is certainly possible, for periods of up to several months, provided the procedures listed above are followed.

While the results of the sodium test cannot necessarily be extrapolated to other minerals or particulate matter which may be present in the pores, it would seem that these are likely to be affected in a similar way. Further, other elements could be expected to be present in still lower concentrations, and it would not be practicable to determine in every case whether other substances detected were bound up in chemical combinations with the basic materials of the plant, while the sodium-related compounds which are being measured should be present in the pores of the cane and not as a part of the chemical structure of the plant matter itself.

Results which I have observed, and which I believe could be obtained by any double reed player using these procedures can be summarized as follows:

1. Cane from various lots, with varying appearances before soaking, will tend to have more similar appearances after the soaking process. Cane which may have had various tints of green or brown will tend to appear more nearly a uniform pale golden yellow.
2. Cane will tend to be more pliable and more nearly similar from sample to sample with

Table I
Measured intensities and concentrations
of sodium levels after 24 hours

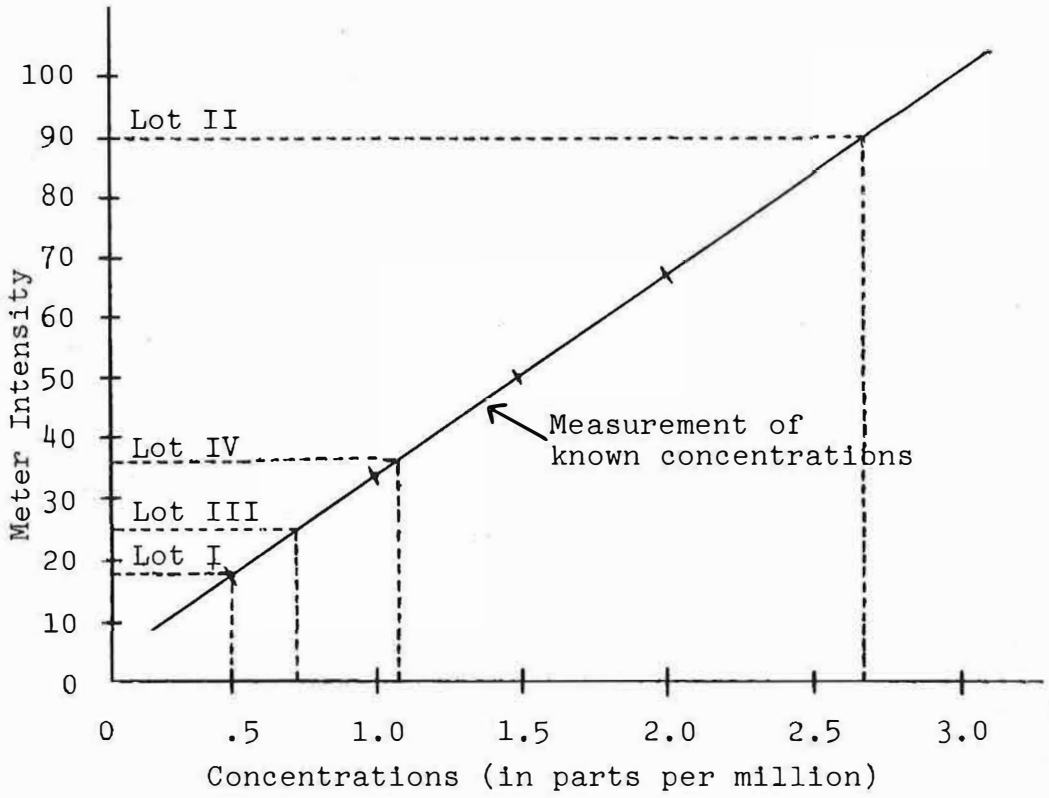

Table II
Comparison of sodium levels
in the samples, meter intensity

Sample	Lot 1	Lot 2	Lot 3	Lot 4
1	18	90	25	36
2	2	8	2	3
3	0	0	0	0
4	0	0	0	0

Note: Each water sample represents a 48 hour soaking period.
No sodium was detected in later samples.

regard to its texture and consistency.

3. Reeds made from cane soaked in this manner will not need a break-in period, and their playing characteristics will not be so highly susceptible to changes upon repeated usage. This would seem to be due to the fact that further materials are not being removed from the pores of the cane upon repeated wettings and dryings.
4. These reeds will last longer, probably in part because one is less likely to want to continually work on the reed with knife or file.
5. It will probably be found that a much greater degree of consistency can be achieved in the results of reed making, as some of the variable qualities inherent in the cane can be substantially reduced in the manner outlined above.

As to the twelve reeds which were constructed from the cane in the experiment, all twelve were playable, and six were considered excellent, while four others were very good. As compared to these, the reeds made from cane subjected to the short soaking period were noticeably more divergent in color and texture. They also required a break-in period of several repeated reworkings, and were much less predictable from one usage to the next as to their playing characteristics.

My current practice is to construct lots of six or eight reeds at a time in a manner outlined here, and, once completed, to refrain from reworking them. While a group of reeds of this type will, as mentioned, have a much greater degree of consistency, there will be minor differences between them in terms of tonal characteristics and response. Therefore, instead of readjusting my reeds to accommodate changes in weather or for more responsive or less responsive halls, I now simply change to a different reed, with confidence that the reed I might have intended to use will be better suited to conditions which will exist on some future occasion. In this manner, a group of six or eight reeds will last for many months, and a reed will always be on hand which will work in all but the most extreme circumstances. I should mention that, especially since I intend that reeds should last a very long time, I keep them meticulously clean, using an ultra-sonic cleaner between playings. Also, I wet my reeds only in distilled water, which seems to further prolong their life.

For those who gouge their own cane, the soaking procedure should probably begin after the cane has been gouged. There would seem to be no particular benefit to leaching out minerals from that portion of the cane which is going to be removed by gouging.

Some of my oboist colleagues have tried these techniques with success as well. The minimum soaking period may be somewhat shorter for the thinner oboe cane. Further, some of my students and I have tried similar experiments on completed saxophone reeds with good results.

For those who may be inclined to further pursue research into this topic, there are several areas remaining which might yield beneficial results. For example, it would be instructive to know what would be revealed by microphotography about the appearance of the molecular structure of the cane before and after soaking. Also, mechanical tests might be done on the degree of resiliency of the cane at various stages of the process.

It is the writer's hope that other players will be motivated to experiment with these procedures and to further refine and expand upon them. Ultimately, our lives could be made simpler if we could reduce our dependence upon this most variable of the several variables with which we must deal in attempting to perform to the highest level of our ability.

About the writer...

Dr. Edwin Lacy holds the position of Professor of Music at the University of Evansville in Evansville, Indiana, and is principal bassoonist of the Evansville Philharmonic Orchestra. He earned the Master of Music degree in Bassoon and the Doctor of Music in Woodwinds from Indiana University. He served three terms as Secretary of the I.D.R.S., and was local host and program chairman of the Society's 1977 annual meeting in Evansville.