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The Importance of Cane Selection in Historical Bassoon Reed-Making

Since the 1970s when the first modern players of period instruments began to perform on copies of original 18th-century bassoons, there has been much discussion about the techniques used to make playable historical reeds for these instruments. In addition, articles and books have been written that summarize the bassoon reed-making techniques as described in early bassoon methods. Two recent examples that address this topic have been published in the *Galpin Society Journal* (See: *Galpin Society Journal*, LIV, April 2001, 'Early Double Reeds' by Rainer Weber and *Galpin Society Journal*, LVI, April 2003 for a follow-up article). Throughout the history of the bassoon, reeds have been fabricated using the giant reed *arundo donax*, but in these articles and books there has been little or no discussion of the properties of this material. (The article by Rainer Weber in *Galpin Society Journal* Number LVI referred to above is one of the rare extant discussions of the raw material used to make bassoon reeds.) It has been assumed that, for the most part, this material has more or less remained the same throughout the long period of its use.

For the modern reed-maker attempting to make a playable reed for a historical bassoon using historical reed-making principles, cane selection is an important element in the process. Careful cane selection is important because I believe that the cane available to the reed makers in the 17th and 18th centuries was of a different density from that generally available to the modern reed-maker. Today it is not difficult to obtain high quality cane that has been produced under excellent growing conditions. The use of irrigation and fertilizer will,

of course, affect the quality, density, and size of the cane. According to Robert Stevens, modern cane is fertilized like any other grass with the use of liquid fertilizer in the irrigation system. I believe that these modern growing conditions tend to produce cane of a higher density than that which was available to the 18th-century reed maker.¹

Reed-making methods described in the early bassoon methods were developed as a response to the raw material available to the reed-makers at that time. So it is logical that if one is going to make a bassoon reed using these techniques, it is essential to choose cane having properties similar to those of the cane that was available to reed makers during this era. The modern historical reed-maker has a readily available source of high quality cane not available to the reed-maker in the past. The modern historical reed-maker, therefore, must decide whether to use the same high-density cane that performs well on a modern bassoon reed system or to choose cane that has similar characteristics to that which was used in the 17th and 18th centuries.

The idea that cane selection is an important element in the reed-making process is not new; many of the early methods and primary sources mention it. Many writers say that cane determines the tone quality of the reed, not the manner in which the reed was made. Cugnier said in the Laborde, *Essai sur la musique* (1780), 'Since the reed is made with cane, the quality of the sound that the reed produces is dependent on the cane of which the reed is made'.² Fröhlich, in his *Fagott Schule* (1810) says 'Although a great deal depends on the right cut and the proper preparation of the reed, still, of greatest importance to anyone intending to prepare his own reeds is the

¹I am grateful to Robin Howell, David Mings and Robert Stevens who gave me invaluable information regarding bassoon reed cane.

²Laborde. 1780. *Essai sur la musique*, 'Méthode de Pierre Cugnier', 331. 'Comme l'anche est faite avec du Roseau, la qualité du son qu'elle produit, dépend aussi de celle du Roseau qu'on y emploie.'

procurement of good cane, since without it all care and effort are fruitless.³

In my opinion, the use of the tapered gouge is a historical bassoon reed-making technique that was developed as a response to the less dense or softer cane that was available to the reed-makers during that time. Tapered gouge (*contrepenle*) is a technique in which the majority of the removal of cane to make the reed was done on the inside of the cane—a very different method from the modern reed-making technique of removing material from the bark side of the cane to make the reed. There can be no doubt that *contrepenle* technique was used: five of the most detailed primary sources on reed-making discuss it in detail (Cugnier, Ozi, Fröhlich, Cokken, Almenraeder, Willent-Bordogni).⁴ But the *contrepenle* was used only when making bassoon reeds. Since most reed makers made both oboe and bassoon type reeds, why didn't they use the same techniques for making oboe and bassoon reeds? In my opinion, the reason that they developed the tapered gouge technique for bassoon reeds was because the cane was, in general, soft. One of the reasons why *arundo donax* works so well as the raw material for making reeds is that the different layers of the cane have different levels of stiffness.⁵ To compensate for the less dense cane, early reed-makers developed the *contrepenle* technique to place the vibrating portion of the reed in the stiffer layer of the cane.⁶ If 18th-century cane was of the same higher density that is found today, 18th-century makers would not have needed to use the *contrepenle*. This is because the larger the diameter of cane tube, the lower the density; the smaller the diameter, like that used for oboe reeds, the higher the density.⁷ I believe that the primary sources do not mention the use of the

tapered gouge on oboe reeds because makers knew that the result of such a technique would be a reed that was much too stiff. This difference in cane tube density could be one of the reasons that Van-Der-Hagen said that the cane used for bassoons and clarinets cannot be used for the oboe.⁸

The fact that early reed-makers developed the tapered gouge is not the only clue that the material used to make historical reeds was less dense than one finds today. The following are other arguments that I believe support this theory. Many are from the most detailed reed-making instructions written in the late 18th and early 19th centuries.

In the 17th and 18th centuries when historical bassoon-reed making techniques were developed, the climate was much cooler than today. Climatologists call this period the 'Little Ice Age'. Depending on the author, this 'Little Ice Age'⁹ lasted from 1300 to 1850 or the late 17th century to mid 19th century. Whatever the length of this cold period, it is certain that the climate was very different back in the 17th and 18th centuries. In fact, modern research shows that the period from 1805 to 1820 was one of the coldest in Europe.¹⁰ So there is no doubt that considering the differences between the climate of the Mediterranean region today and that of the 18th and 19th centuries, the cane was certain to have been affected and was different from present-day cane.

The country of choice for cane in many of the primary sources was not France, but Italy and Spain. Because of the colder climate in times past, cane had to be obtained from a more southerly region than the south of France. (The majority of cane used by modern reed-makers is produced in France.) Not surprisingly, the Italian and Spanish cane was

³ Marvin DaGrade. 1970. *A translation and study of the Bassoon section of Joseph Fröhlich's Vollständige Theoretisch-Praktische Musiklehre*, Document, Indiana University, 9.

⁴ Cugnier, 1780, 'Méthode de Pierre Cugnier', in Laborde, *Essai sur la musique*; Ozi, 1803, *Nouvelle Méthode de Bassoon*; Fröhlich, 1810, *Vollständige theoretisch-practische Musikschule*; Fröhlich, 1829, *Systematischer Unterricht in den Vorzüglichsten Orchester Instrumenten*; Cokken, 1842, *Méthode de Basson*; Almenraeder, 1843, *Die Kunst des Fagottblasens*, 1843 or the French Text, *Méthode complète de Basson*; Willent-Bordogni, 1844, *Méthode complète pour le bassoon*.

⁵ In 2002–2003 I researched the properties of *arundo donax* at the United States National Forest Products Laboratory in Madison, Wisconsin, USA. Using a loading machine that tests the stiffness of the cane, I have proved that there is a difference in density between the different layers of cane and that cane layers closest to the bark (the epidermis and the fibre band) are the densest. In addition, I have found a correlation between high density and high stiffness in cane. This would be another way of saying that denser cane is stiffer than soft cane. These facts are known to any experienced reed-maker, however, it was important for my line of research that I have numbers to substantiate these claims.

⁶ I must thank Jean-Marie Heinrich of Mulhouse, France, for this information in 1998.

⁷ Discussion with Jean-Marie Heinrich, 1998.

⁸ Van-Der-Hagen. 1792. *Méthode nouvelle et raisonnée pour le Hautbois*, 5. '...car celui dont on se sert pour les anches de clarinettes et bassons, ne vaut rien pour le hautbois.'

⁹ See Brian Fagan. 2000. *The little Ice Age*, New York, Basic Books and H. H. Lamb. 1995. *Climate, History and the Modern World*, second edition, London, Routledge.

¹⁰ Brian Fagan. 2000. *The little Ice Age*, New York, Basic Books, 170.

different from the cane of France because of the different soil and growing conditions. For cane to grow and mature, a region must have a cold season in order for it to become dormant, but cane cannot be exposed to a hard freeze.¹¹ Ozi, who was writing before the cold period of 1805 to 1820, recommends 'les départemens [sic] des bouches du Rhône, du Var et des Alpes maritimes'¹² in France, then goes on to say 'the cane from the parts of southern Italy is still preferred, because there it acquires a degree of maturity and that makes it more dry and less spongy.'¹³ Writing after this cold period, Cokken in his *Méthode* (1842) and Willent-Bordogni in his *Méthode complete* (1845) used the same language, word for word, repeating the recommendation of Ozi. Almenraeder in his *Die Kunst des Fagottblasens* (1843) says 'For the reeds one uses the cane from Spain and Italy.'¹⁴ He does mention the cane from the Midi of France, but says that it is not known [in Germany]. Brod in his *Méthode pour le Hautbois* (1825) says that 'Cane of good quality is rare in France; there is hardly any except in the south. That of Fréjus, of the area around Marseille, and of Perpignan¹⁵ is reputed to be best.'¹⁶

Most bassoon primary source materials warn not to use spongy cane. Even Jancourt writing in 1846 speaks against spongy cane. His warning is especially curious considering he gives very little information regarding the reed-making process.¹⁷

Cokken mentions *spongieux* cane twice in his *Méthode*.¹⁸ In addition, there are primary source materials for the clarinet that also warn against spongy cane. This is not the case for the oboe. Frequently, oboe source materials say to use cane that has a fine grain and is mature.¹⁹ It seems that the spongy cane problem was confined to the clarinet and the bassoon, both instruments that use cane of a larger diameter (about 25mm or more).

Spongieux in French means having the consistency of a sponge. I believe that when the primary sources warn against spongy cane they mean that one should avoid cane that has a coarse grainy structure and therefore, is porous. Whereas most primary sources simply say to avoid spongy cane, Vanderhagen, in his *Méthode nouvelle et raisonnée pour la Clarinet* (1785), gives meaning to the word *spongieux*. He speaks against using cane that is spongy and to select dryish cane with pores that are neither too large nor too small.²⁰ When using the Heinrich density test,²¹ cane that has a density of about 0.45 or less looks spongy; the grain is noticeably large.²² Taking this frequent warning against spongy cane to the next step, I believe that spongy cane is soft cane. Generally speaking, once cane density is in the 0.46 to 0.52 range, the grain of the cane has a more or less normal appearance.

Since so many primary sources warn again spongy cane, this is another indication of the general

¹¹ Conversation with Robert Stevens, a retired cane grower and reed-maker in Healdsburg, California, USA, April 2001.

¹² Ozi. 1803. *Nouvelle Méthode de Bassoon*, 142.

¹³ Ozi. 1803. *Nouvelle Méthode de Bassoon*, 142. 'celui des parties méridionales de l'Italie a encore la préférence, parce qu'il y acquiert un degré de maturité qui le rend plus sec et moins spongieux.'

¹⁴ Almenraeder. 1843. *Die Kunst des Fagottblasens*, 123.

¹⁵ Perpignan is in the department of Pyrénées-Orientales, on the Spanish border; about as far south as one can get in France.

¹⁶ Henri Brod. 1825. *Méthode pour le Hautbois*, 111. 'Le roseau de bonne qualité est rare en France ce n'est guère que dans le midi qu'on peut s'en procurer, celui de Fréjus, des environs de Marseille et de Perpignan est réputé pour le meilleur.'

¹⁷ Eugène Jancourt. 1847. *Méthode théorique et pratique pour le basson*, 16. 'Le roseau ne doit pas être spongieux; ce qu'il est facile de connaître, quand, étant mouillé, il s'imbibe trop facilement.'

¹⁸ Cokken. 1842. *Méthode de Basson*, in 'Article 7', 12 and in the '*Indication sur la Manière de Faire des Anches*' 125.

¹⁹ Van-Der-Hagen. 1792. *Méthode nouvelle et raisonnée pour le Hautbois*, 5. 'Pour faire une bonne anche, il faut d'abord du bon roseau, et ce roseau doit être bien mûr et fin, car celui dont on se sert pour les anches de clarinettes et bassons, ne vaut rien pour le hautbois.' Also see, Garnier. 1798. *Méthode raisonnée pour le haut-bois*. He uses the words 'Le canon doit être sain et vif...' (healthy and vivacious). Also see Brod. 1830. *Méthode pour le Hautbois*.

²⁰ Colin Lawson. 2000. *The Early Clarinet*, Cambridge University Press, 36.

²¹ An excellent method to test a piece of cane to obtain a number in which hardness can be assigned is the density test devised by Jean-Marie Heinrich of Mulhouse, France. Briefly, Mr. Heinrich's test is a measurement of specific gravity where the mass of the cane is compared to that of water. For example, a very hard piece of cane might have a number of say 0.7 and a very soft piece of cane might have a number of 0.35. Cane for modern bassoon reeds need to be in the range of 0.58 to 0.62, whereas I have found that cane in the range of 0.46 to 0.52 works well for historical reeds made with *contrepente*. I have even made reeds that play well from cane with a specific gravity of 0.38. [In this paper, all density numbers were obtained using the Heinrich density test.]

²² In a conversation with Robert Stevens on July 9, 2003, I asked him what spongy cane meant to him, he replied immediately, 'spongy and soft...'

softer density of the cane in the 18th and early 19th centuries. At the least, it demonstrates that the cane then available to the bassoonist was different, and this difference must be a factor in the comparison of old and new reeds.²³ So reading between the lines, when Cokken in his *Méthode* (1842) and Willent-Bordogni in his *Méthode complète* (1845) say ‘the cane in the southern parts of Italy is preferred because it has acquired a degree of maturity that makes the cane more dry and less spongy’,²⁴ they are advising that the hardest cane possible should be used because normally, in their experience, they found the available cane soft and spongy.

Fröhlich in his *Systematischer Unterricht* (1829) says, ‘For the bassoon one should not take an overly mature, and consequently too hard, cane. The clarinet requires a firm cane, the oboe a somewhat softer one, the bassoon an even softer cane that is otherwise good and mature.’²⁵ It is interesting to note that Fröhlich in his *Fagottschule* (1810) gives approximately the same warning as Ozi.²⁶ Fröhlich says, ‘One must obtain from the southern regions good cane which is not spongy, but properly dry, and sufficiently ripe.’²⁷

Almenraeder in his *Fagottblasens* (1843) makes several interesting statements regarding the hardness of cane, which, in my opinion, support the soft cane argument. First, Almenraeder responds to the argument that the best reeds are made from the hardest cane. He says if this argument were taken to its conclusion, a harder wood other than cane would be used. Almenraeder goes on to say that he is certain that he could obtain a better reed using pine-wood

than dense cane.²⁸ I deduce that bassoonists were constantly searching for harder and harder cane because, in general, cane at that time was soft.²⁹ Second, he describes a fingernail test to discern the hardness of cane. He says that if one forces the fingernail over the curvature of the cane, and if it makes no impression in it, then the wood is too hard. I have found this test is only accurate at the extreme ends of the hardness scale because cane with a density in the 0.4 range can be marked with the fingernail and cane with a density in the 0.6 range cannot. The problem occurs in the 0.5 range since the fingernail test may or may not be marked. But what can be deduced from Almenraeder is that he thought cane that could not be marked by using the fingernail test was too hard. Therefore, he did not approve of cane of modern density, or in the 0.6 density range.

Incidentally, it is interesting that if you ask any carpenter who specializes in remodelling older homes if the wood that one purchases today is the same as it was when the older homes were built, most will tell you that one cannot find modern wood to match the original wood, and so wood recovered from other older buildings must be used.

In conclusion, I know many period instrument players and reed-makers who do not use historical reed-making methods. I believe that many have tried these early reed-making techniques but have had little success because they used the same higher density cane that they use to make reeds for modern instruments. Many more of these reed-makers would have success using historical techniques if a less dense cane were to be used as the raw material.

²³ Conversation with Robin Howell, July 7, 2003. There are some reed researchers who feel that when the primary sources say *spongieux* they are referring to cane that is porous and that there is no relation between porosity and density.

²⁴ Cokken. 1842. *Méthode de Basson*, 125 and Willent-Bordogni. 1845. *Méthode complète*, 102. ‘celui des parties Méridionales de l’Italie a encore la préférence, parce qu’il y acquiert un degré de maturité qui le rend plus sec et moins spongieux.’

²⁵ Joseph Fröhlich. 1829. *Systematischer Unterricht in den Vorzüglichsten Orchester Instrumenten*, Translation by Gene Griswold in ‘A Translation of the Bassoon Reed Making Instructions in Joseph Fröhlich’s 1829 “Fagott-Schule”’ in the *Journal of the I.R.D.S.*, 19, 1991, 27.

²⁶ Ozi. 1803. *Nouvelle Méthode de Basson*, 142. ‘celui des parties Méridionales de l’Italie a encore la préférence, parce qu’il y acquiert un degré de maturité qui le rend plus sec et moins spongieux.’

²⁷ Marvin DaGrade. 1970. *A translation and study of the Bassoon section of Joseph Fröhlich’s Vollständige Theoretisch-Praktische Musiklehre*. Document, Indiana University, 10.

²⁸ Almenraeder, 1843. *Die Kunst des Fagottblasens*, 123. ‘tandis que j’ai la certitude d’obtenir plutôt une bonne anche de bois de pinastre que d’un roseau trop dense.’ The German text is as follows, ‘obschon ich mich getraue, eher ein taugliches Fagottrohr aus Kiefernholz als ein solches aus zu festem Schilfrohr zu wege zu bringen.’

²⁹ This passage has been used as a justification for the widespread use of hard cane in the early 19th century. The translation of this passage by Ester Froese published in the *Journal of the IRDS*, 1980, p. 23, says the following, ‘Although many will reply that “The hardest most solid cane is most suited to the making of bassoon reeds,” I will answer that if such reasoning were followed to its conclusion, apparently even better reeds could be made from wood that is harder and more solid than cane. Personally, I would rather make my reeds out of a piece of pine wood than use the hard cane which some bassoonists use.’ The last clause, ‘which some bassoonists use,’ is neither in the French nor the German text. In addition, regarding the translated phrase ‘Although many will reply,’ in the French text he says certain persons (Certaines personnes) and in the German Almenraeder uses the word some (manche). I believe that in either text, the connotation is not that many bassoonist, but some or a few bassoonist use hard cane.