RAINER WEBER

Early Double-Reeds

(Translated from the original German by William Waterhouse)

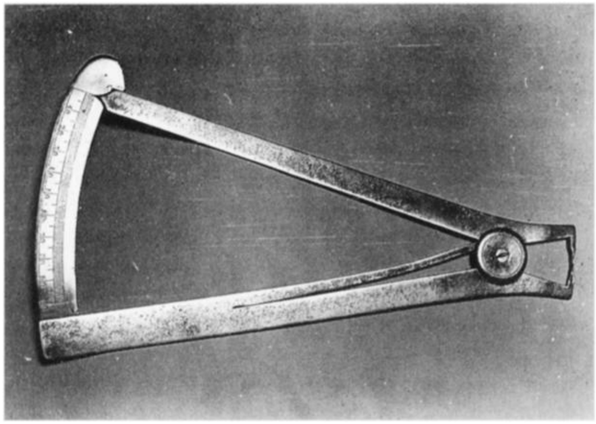
The nineteenth century brought about decisive changes in the construction of woodwind instruments, particularly in the increased number of keys for chromatic notes. Hand in hand with equal temperament went the desire for even-sounding semitones. It was required that distant keys should not sound tonally different - each note needed to sound equally good. For the reed-player these requirements brought about not only considerable alterations to his instrument, but also to the design of his reed. It was here at the sound-generator that the actual core of his tone was produced: without it even the finest instrument would not be able to sound. It was only natural that alterations to the reed would go hand in hand with alterations to the design of the instrument.

Reeds, and remnants of reed, that survive from the eighteenth and early nineteenth century show an entirely different picture from that to which we are accustomed today. Paul White, in his article 'Early Bassoon Reeds: a Survey of some important Examples', published very informative drawings of comparatively well-preserved bassoon reeds, and these can be supplemented by actual examples of surviving oboe reeds. Even better preserved remains are to be found in old bagpipes which, in spite of some basic differences, also confirm certain tendencies.

Wherein do the most striking differences from modern practice lie? Even a casual glance at the 26 drawings given by White show striking deviations in external shape, even though it is only bassoon reeds with which he is dealing. No standard norms for shape and size had yet been established. If we take a closer look at their external shape, we will notice an often quite careless regard for the fundamental principles of symmetry. It is apparent that the shape was cut by hand without the use of a shaper, merely relying on a practised eye and steady hand. It must have been the same regarding the working of the inner surface – the 'gouging'. Modern gouging machines did not yet exist, and one had to manage the thinning of the rough pieces by using rounded chisels of varying diameter. Fröhlich, in his *Musikschule*, illustrated the most important tools used in bassoon reed-making. Making reeds this way must certainly have called for considerable time and practice. First of all the hand had somehow to acquire the necessary 'feel' for the job.

Micrometers and dial-gauges for measuring cane-thickness did not yet exist. Here too the eye and instinctive touch must certainly have played an important part. At some time in the nineteenth century excellent testing-devices for measuring thickness became available, where an ingenious

Figure 1.
Thickness gauge



lever-system permitted the rapid measurement of thicknesses with an accuracy of ±0.1mm. These are still ideal for this purpose today.

Many things that in those days were the norm are quite impossible for us to conceive of today. What has remained unaltered since then is the basic reed material - *arundo donax*, although even here certain questions may be raised. There were, and always have been, regional differences; and today we might also ask to what extent matters have been affected by such environmental influences as climatic change, fertilizers and modern agricultural methods etc. The question can hardly be answered as to how, and to what extent, such differences might play a role today. But at least the type of plant we use has remained the same.

The reed-cane we use, *arundo donax*, belongs to the family of *arundinea*, or phragmites, marsh reeds - as does also bamboo. The material itself is extremely non-homogeneous. The 'bark' area is very hard, thanks to its content of amorphic silicilic acid, and the density directly under the rind (epidermis) is considerably higher than further towards the interior of the cane.

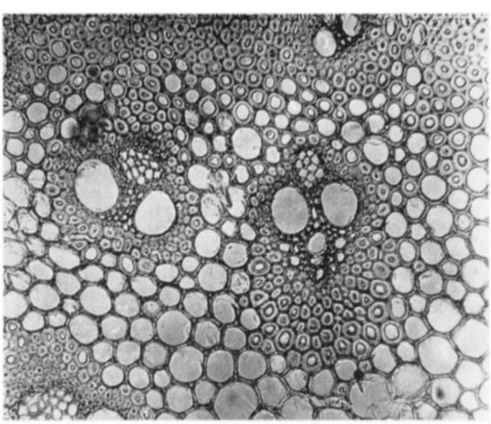


Figure 2. *Cane in cross-section, magnification* c.*80 times, upper rind area (photograph by Rainer Weber).*

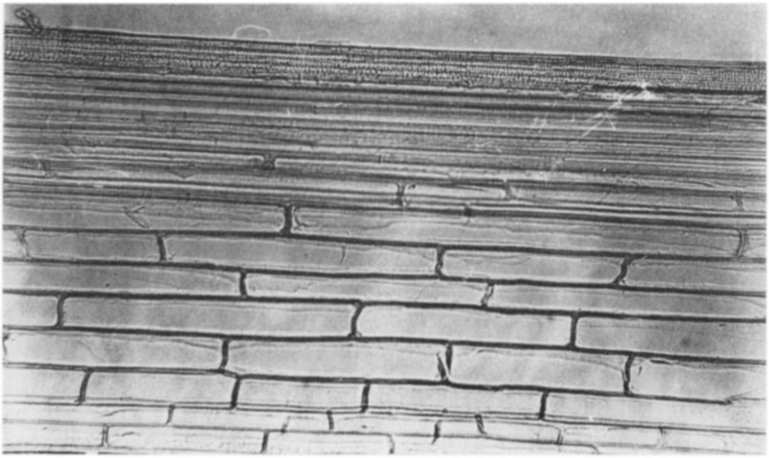
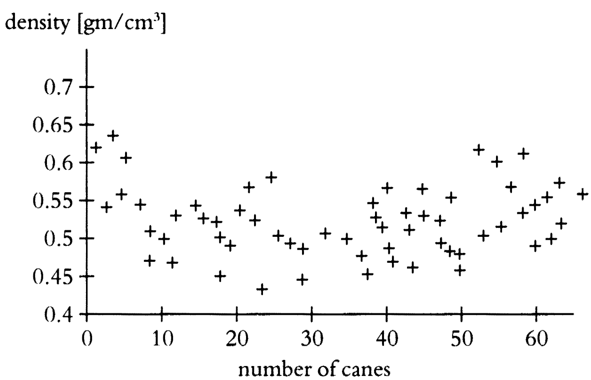


Figure 3. *Cane lengthways (transverse view), right hand side of rind area (photograph by Rainer Weber).*

While the capillaries near to the rind area are smaller, those deeper inside are larger. They are surrounded by a sleeve of *sclerenchyme* and filled with *parenchyme*. On the bark, or epidermis, are deposits of wax which offer protection against evaporation and also penetration by damp, but there are considerable differences in hardness and density between individual pieces of cane and areas of cane. Here the determining factor is not only the actual size of cell but the volume ratio between the wall of the cell and its plasma-filled interior. For example, the density of cane suitable for bassoon reeds gives values between 0.38 – 0.78 g/cm^3.[1]



Reed cane density: Experiment No. 1.
Split canes ungouged (supplied by Rieger). Graph by Harald Schäfer.

[1] I am grateful to Harald Schäfer for his help and for the preparation of this table.

Those sections of cane that are of smaller diameter are subjected to greater mechanical stress in relation to their surface area. The tissues show a higher degree of textural strength and thus possess a higher density. These are used primarily for oboe reeds, while sections with a lower degree of density and hardness are especially suitable for reeds for windcap-instruments.

It is obvious that an inhomogeneous material of this kind, with large differences between bark, inner parenchyme and capillary bundles surrounded by their hard layers of sclerenchyme, will make heavy demands on the tools, and on the skill and understanding of the maker. Today modern technology can relieve us of much of this, but the question still remains: how were reeds made in the past? Without understanding how the actual technical principles involved developed, there can be no understanding of the finished product.

When we examine the surviving reed fragments it becomes clear straight away that the reed-blade was worked far closer below the bark. Thus in cross-section the piece of cane was the shape of a crescent moon and gouged far thinner on the inside - especially in the central area which, after being folded over, forms the tip aperture. The blade itself was scraped 'flat', while at the edges the bark was often left untouched up as far as the tip. This frequently occurring phenomenon shows that, when scraping, a slightly convex-shaped tongue was inserted into the reed, over which the bark could then be removed evenly and the material removed down to the desired thickness using just a straight knife. Some reeds even show the marks of a flat file.

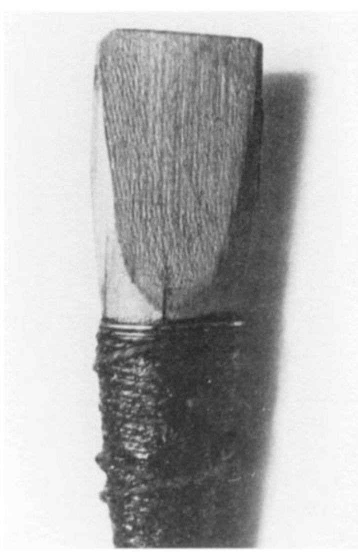
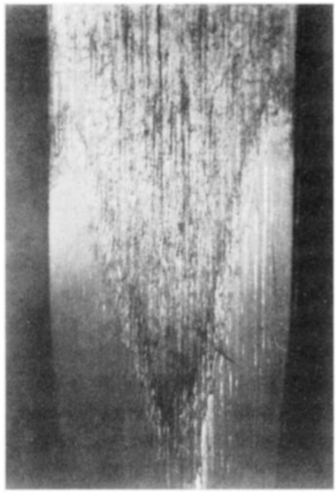


Figure 4. *Reed on staple, ex Claudius Collection, Musikhistorisk Museum, Copenhagen (see below).*

Figure 5. *Microscopic enlargement (10 times) of an oboe reed, found in its original box, with an oboe by H. Grenser (Bonn, Beethovenhaus).*



In this respect it is significant to note that it was just where the blade commences - close to the wire, that is – that, depending on the varying degree of curvature of the throat, the deeper and less dense part of the cane was exposed. It was here, where today we would expect to find a central spine or heart, that by contrast the material is found to be weak. A comparable picture is also presented by nineteenth-century oboe reeds.

There are however also surviving reeds whose area of retained bark extends far less along the edges. In these cases the gouge producing the inner lateral profile must have been 'flatter' rather than moon-shaped. Thus it is clear that here there were appreciable differences, which in turn also affected reed shape and especially the butting of the edges. The uniformity of our way of thinking today was as yet unknown.

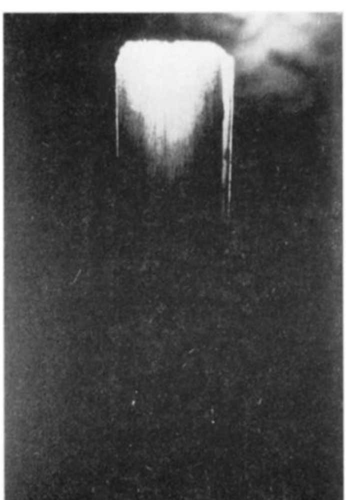


Figure 6. *Photograph of the above reed, taken against the light.*

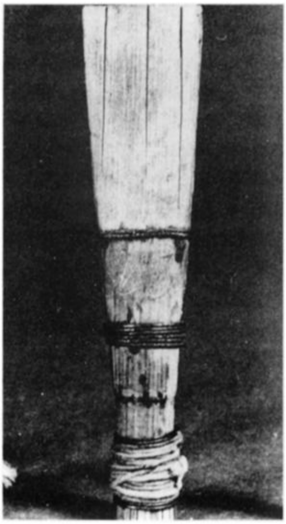


Figure 7.
Reed from one of the crumhorns in the Brussels Museum.
(museum photo)

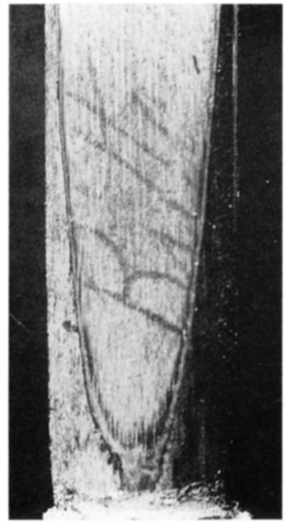


Figure 8.
Reed of the chanter from a large 'zampogna'.

Early reports and written sources dealing with reed-making and reed-cane are unfortunately very scarce. One of the earliest of these, which is relatively unknown, is the *Baumeisteretat* (accounts of the building department) of Augsburg. This reported in 1570 that a certain Jörg Bremer had received payment for crumhorn and schryari reeds. Sandberger[2] mentions among payments dated 28th June 1568 one from Venice for three florins concerning Pfeiffen-Rohr. This must refer to a bill for imported shawm reed-cane.

Reed-makers for various instruments would thus appear to have existed by the sixteenth century. The chanter reed from a large *zampogna* (Sicilian bagpipe) is preserved which bears the inscription 'Ritter' written in pencil on the blade – which is presumably the signature of the maker.

Such considerable differences in shape and size naturally affected the tone colour and possibilities available to the player. In the nineteenth century a 'Berlin School' was identified, whose best known representative was probably Carl Bärmann (1780-1862). It is his style of reed-making that Joseph Fröhlich described in his treatise of 1829. These reeds were described as being decidedly narrow, with a tone praised for its flexibility and elegance, especially in the upper register. Bärmann must have set great store on quality of tone. It is known that he slightly roughened his reeds with a file on the inside surface of the tip in order to produce a velvety tone. He also expressly recommended that each player should make his own reeds. However his contemporaries often found shortcomings in his tone, complaining that it lacked fullness in the bottom register. Georg Wenzel Ritter (1748-1808), with whom Mozart was friendly, also came from this school.

[2] Personal communication from Jean-Marie Heinrich.

The 'Paris-London' school stood in clear contrast to this, according to contemporary reports and reviews. Their reeds were described as being broader and more powerful. The most important representative of this other tendency in German-speaking lands was probably Carl Almenräder (1786-1843), famous for his tutor and as an instrument-maker. His reed-making was reported on by Weber in the periodical *Caecilia* in 1826. Almenräder's reed was described as being wider than the Saxon and Berlin models, which were 'too thin and narrow at the wire'.

Three years later Fröhlich stated categorically in his tutor that Bärmann had declared his opposition to reeds that were too wide. Almenräder's reeds were able in this way to produce a fuller tone, especially in the low register. The English bassoonist James Holmes was praised in 1819 in the columns of the Leipzig *Allgemeine Musikalische Zeitung* for the fullness and soft quality of his bottom register. Naturally enough there were encounters between the representatives of both schools. For example, in 1814 Bärmann was compared with Anton Romberg (1771-1842) of Stuttgart when they performed a concerto together for two bassoons: 'Romberg's tone was fuller, more Italianate and clearer than that of Bärmann.' Contemporary reports also testify to the fact that the use of broader reeds did not prejudice the upper register. It was thus purely a question of tone-colour.

Together with the considerable differences in design of instrument between the French and German systems that still persist, there were thus also basic differences in the design of reed, not only within the confines of country but individually between player and player.

Especially in N. Europe bassoon reeds were sometimes bound on to a short staple made of springy unsoldered metal that could be firmly fixed on the crook. This naturally gave good stability against any sideways shift of the blades. Reeds of this kind survive in Stockholm and Copenhagen. It is striking that the vibrating blade seems to have been cut almost square in shape; thus at the binding the throat is already wide and thus flatter, the scrape being completely flat and without heart. Sometimes the blade has even been worked flat with a file (see Figure 4). However this style cannot have been very widespread.

Let us state once again the most important deviations from the practice of today: There was no absolute standardization of external shape! There existed a far-reaching and individual range of possibilities, each according to the tonal conception of the player, as well as to the peculiarities of the instrument and the material including:

1. Removal of cane from the inside, up to a point just under the rind area, leaving it *c.*0.8mm thick at the centre, while even thinner towards the edges (moon-shaped), and lengthwise leaving it somewhat thicker at each end for the stock;

2. Taking advantage of the greater degree of density and hardness of the material immediately under the bark;

3. Giving a flat scrape to the blade, without 'spine' or 'heart'.

It is also important to dip such reeds in water only briefly – repeating the process if necessary. On no account should the binding at the stock become soaked or softened. The whole material is sufficiently thin for it to absorb enough moisture quickly. Especially in the case of a new reed, it should be left somewhat hard and only blown in graduallly. It can always be softened by scraping later on. We should always allow the reed – and ourselves – plenty of time!

Are these principles of reed-making to be found in use anywhere today? I know of reeds of this type that are in current use in several Mediterranean folk instruments. I am thinking here of Italian and Catalan shawms. As and when required, replacement reeds that have already been bound up can be finally scraped and fixed with amazing speed; they work straight away, produce a very fresh sound and last for a long time. By and large there is a correspondence between the way in which these are made today and what we can deduce from old specimens.

When we compare the aperture of this reed with that of a modern bassoon reed, the differences are even more obvious.

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Plate ix:- 'Reeds found with French (18th-century) musette...', in *GSJ* XXXI (1978), facing p. 144.

Figure 9.
Spanish tenor shawm ('tenora') reed, front view.

Figure 10.
Side view of the above reed.

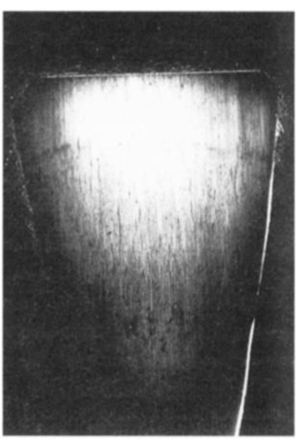

Figure 11.
Photo of the above reed taken against the light.

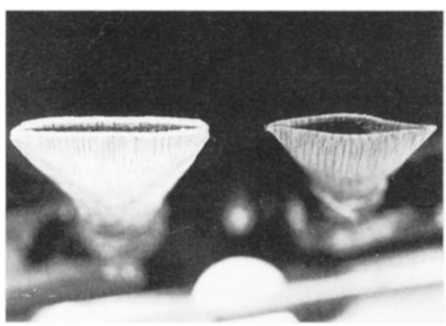

Figure 12.
Left tenora, right bassoon (photos by Rainer Weber).