## Reshaping the Flute

by Maarten Visser

If it feels good, it must be good. So how can a playing position which feels relaxed and comfortable be a problem? The reality is that for a lot of people playing a flute does not feel comfortable at all, if not painful. And most of the people who are comfortable with their flute, are close to the danger zone.



illustration 1

This is why: at 4 points the joints are extended to near their maximal range of movement: the left shoulder, the neck, the left wrist and the right shoulder. If, at any of these points the amount of movement is reduced, no matter how little, we have to compensate elsewhere. This is most prominent with the neck and the right shoulder.

For example, imagine that when you were sleeping, your pillow was too high and you woke up with a stiff neck. You cannot turn your head sideways, so you have to hold the flute straight in front of you. Playing like that feels very tight for your back and both shoulders. After playing like this for a while, discomfort turns to pain. Playing this way for a prolonged period will eventually lead to repetetive strain injury (RSI). The stiff neck won't normally last that long, but other small movement reductions may. Especially as we get older, we get stiffer.



Every problem in one of the four danger zones will lead to problems in the other danger zones. It is this chain reaction which makes the flutist so prone to physical problems, even if you have the best possible playing position.

Luckily, there is a lot we can do to prevent problems. Staying fit, paying attention to strength, stamina and suppleness is one thing we can do. Being aware of stresses, pains, tingling and overuse symptoms is another way to stay on top of maintaining one of the most important and irreplacable tools we have- our bodies.

Once problems arise physical therapists will suggest physical therapy and medics will insist on medical treatment. But what about the flute itself, which is so undeniably part of the problem? Isn't there a way to *il* construct a flute that does not cause these problems? The answer is: yes. Even more, today's

*lustration 2* problems? Th ergonomic flute designs have evolved over a long time.



Illustration ?

The most venerable of ergonomic flute designs is the recurved bass that was depicted in "Encyclopédie of Diderot and d'Alembert" (Paris, 1762) (illustration 1). This design is still used today on bass and alto flutes, and we have all seen it on children's flutes. The balance of this design is fragile, and there are some problems with the sound. But, many flutists secretly borrow their kid's flutes for a pain-free practice session!

Another design is the vertical flute. It was first patented by Pfaff in 1857. Later, they were made by Wünnenberg (illustration 2) . Recently, a drawing has been unearthed by Ludwig Boehm, grandson of Theobald Boehm who invented the modern flute. The drawing depicts a vertical headjoint exactly as shown by Pfaff's patent.

The vertical headjoint is not as easy to hold as it looks, because the support point on the left index finger is pretty much lost, necesitating a special left hand support. Also, all of the weight must be supported by the right thumb. Yet, for many flute players this design makes the difference between playing and not playing.

Cleverly designed handrests,

left and right, make it quite manageable. This type of headjoint is being manufactured by Drelinger and myself, and slowly gaining ground in the flute-playing world (illustration 3).

Another approach to holding the flute vertically was pioneered by Giorgi. Here the headjoint is straight, the tube being terminated by the embouchure hole. It never gained much popularity, but a modern Boehm type is currently being made by Wesley. It is most notably being played by jazz flutist Chip Shelton.

Last member of this family is depicted in Nancy Toff's "Development of the Modern Flute". It is the angled headjoint. Dr Burghley of Camden Town, London has the honor of being the first to attempt to make an angled flute (illustration 4); around 1850. He had a number of inventions, none of which caught on. They are preserved in the Dayton C. Miller collection This flute has an angled head to allow an easy playing position. Much later, in the nineties of last century, angled head joints were made by the Emerson company. They sounded quite good, but lacked stability. The more you pressed the flute to your lips, the less stable it became, opposite of what you are used to experiencing. The playing position it invoked was very comfortable but, due to this imbalance, it was difficult to play.



III 1

An evolution from the angled headjoint is the Swan-Neck headjoint (illustration 5). It also



allows the player to hold the flute at a downward angle, but without the instability of the angled design. What it accomplishes ergonomically is quite simple: it gets you out of the danger zone by reducing extreme positions. You can hold the flute lower and a bit more forward and it does feel very relaxed indeed.

The mechanics of balance are a bit more complicated. The 3 or 4 points of balance of the flute (lip, base of left index finger, right thumb, right pinky) have to be all in the same line. If one of the points is out of line, a rotational force is introduced (illustration 6). The Swan Neck headjoint uses 2 bends to solve this problem: 1 large bend near the embouchure hole to create a comfortable playing angle. And a much smaller second bend near the tenon to get the lip plate back in line with the flute body.

The main reason flute players are wary of these alternative headjoint styles is the fear it may harm the sound quality. The acoustical effects are not strong, but rather complex. First: the behaviour of the wave inside the head. The wave tries to cut the corner, as it were. Bent woodwind bores

sharpen the pitch. By reducing the bore diameter and conicity in the bend, these effects can

be precisely compensated. Another complexity is the effect of turbulence near the embouchure hole. Turbulence causes noise, but that is not necessarily a bad thing: too little noise makes the sound harsh. too much and the flute will sound woolly. Bends close to the embouchure hole dissipate the turbulent energy in a slightly different way. To obtain a clear sound, the embouchure cut needs to be very smooth. The third effect was discovered not so long ago. Due to the phase shift at the embouchure hole. the lowest frequencies coming from the embouchure hole, cancel those coming from the end of the flute, to some extent. This effect is slightly less with Swan Neck flutes, and much



less with recurved head joints. This results in a very noticeable improvement in the lowest fifth.

Nowadays, vertical and swan neck flute headjoints have come of age. Acoustical and ergonomic problems have been sorted out, and more and more flute players are enjoying pleasure of playing without pain, or stress.

These are not the first, and certainly not the last of developments towards an ergonomic flute, but it does show the shape of things to come.

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