

The Pronomos Flute:

A development of the Boehm system for extended techniques

By Stephen Wessel

The Pronomos, known more prosaically as the Complex Flute, is the modern realisation of acoustic ideas worked out by the Hungarian player István Matuz and Attila Nagy, an instrument maker, some thirty years ago. Matuz believed that despite the unrivalled success of the Boehm system for the expression of western music, its inherent simple efficiency in making it possible to control sixteen or seventeen tone holes with only nine fingers limits its ability to handle the more fluid tonal world inhabited by contemporary music enthusiasts. From the 1970s onwards, composers and players have searched for a new sound vocabulary, encompassing quarter tones, multiphonics and other effects, all usually performed on the standard Boehm flute. It would be hard to find a greater testament to Boehm's genius than that such things have been possible on a flute little changed from his day.

Matuz and Nagy therefore set about extending the standard flute, removing what they saw as innate drawbacks while maintaining its integrity as a basic engineering and fingering system. The new idea was to find a way in which every tone hole could be opened or closed independently from the others without disturbing the existing layout. Here is an example: the F# key on a normal flute is a slave key; it closes only when either R1, R2 or R3 closes one of the lower keys. It can be closed independently of course, either by stretching R1 up from its habitual position or by adding the separate little Brossa key, but it cannot be opened while one of the other keys is closed. Why should we need this?

The answer to this question I will come to later but for the moment let's see if it can be done. Matuz decided to cut an additional full size tone hole alongside the existing G hole placed further around the body but at the same distance from the embouchure hole. The hole is fitted with its own, normally closed, key and operated by L4 via a simple linkage. So now when F# is fingered normally (R3) its duplicate can, if desired, be kept open by L4. In other words, the Boehm F# fingering can now be overridden to allow several new cross-fingerings. A similar arrangement in the left hand allows a duplicate B hole to be opened, cancelling the action of the clutch between the A and A# keys. This duplicate is fingered by the right hand thumb. Notes produced in this way will of course sound dreadful to the classically-trained ear, but please bear with me.

It is worth noting that on the usual closed G# system this idea of the duplicate key is already there. Finger G and two keys go down. If they could be worked independently as on the open G# system (preferred by many including Boehm himself), G# could be produced with no need for the hole opposite. Strictly speaking, it is the G# hole at the back which is the duplicate, not the one on top which is often named as such.

Stephen Wessel is an English flute maker with an original approach to the subject of responsiveness. His unconventional techniques and choice of keywork materials have resulted in well over a hundred highly distinctive instruments, many of which are in the hands of distinguished players. With a solid background of professional mechanical engineering, clarinet playing and harpsichord making, Stephen's wide understanding and experience of engineering materials and acoustics have enabled him to bring a much-needed fresh angle to flute making.

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Matuz realised that a further enormous increase in the potential number of sounds and fingerings could become available by extending the idea of open holes. As anyone who plays an open-hole flute knows, they allow more intonation control, some quarter tones and multiphonics. But there are only five open holes! Matuz therefore perforated several of the others including the new duplicate keys and gave them separately controlled little keys sitting on top. This principle has become known as the 'key on key' or 'double cup' system and is used by Eva Kingma for her quarter-tone instruments.

Matuz and Nagy did much experimental work on all this during the early 1980s but for various reasons were unable to interest the flute-making industry in producing even one purpose-made prototype, let alone serious production; all the development work had been reconstruction of ordinary flutes of somewhat mediocre quality. So their ideas went into eclipse.

In 1996 István Matuz acquired a young Spanish student, Julian Elvira. Julian had a special interest not only in contemporary western music but in non-European music, especially Asian and Middle Eastern. On trying out the Matuz-Nagy flute he was captivated by its extraordinary flexibility. At once he found he could imitate a shakuhachi, while in the next moment it could become a ney. But in reality it wasn't either—it was simply an extended Boehm. So Julian began to dream of owning one of these curiosities and taking it around every country he could manage, playing the local music in the local style, interspersed with Spanish contemporary plus the standard repertoire, all on one instrument.

In 2007 I received an email from a lady in Spain asking if I would consider making what she called the 'Complex Flute' for her client, Julian Elvira. At this point I had never heard of him, or of István Matuz, for that matter, and had my finger poised over the delete button. For all my life as a flute maker I have been trying to keep my instruments simple, uncluttered with extra mechanism and light in weight, so the word 'Complex' naturally rang alarm bells. I fended her off politely and thought no more about it, especially as she had told me nothing about what it actually was. She contacted me again, very sweet and persuasive, promising that her client would happily travel to England just to tell me all about it and that I could still reserve the option of saying no if I were to remain unconvinced by any aspect of the project. To cut a long story short, Julian eventually came to see me with an interpreter and a prototype of his flute, a somewhat battered old Yamaha much doctored by Ricardo Monroy of Madrid.

While we sat in our kitchen, Julian demonstrated his remarkable repertoire of (how can I put this politely?) sounds I never knew a flute could produce. I cooled, warmed, then cooled again. With no disrespect to Ricardo, the flute itself looked like a nightmare; considering he had had to work entirely from sketches and decide on key positions mostly by trial and error, he had done an excellent job with the available materials.

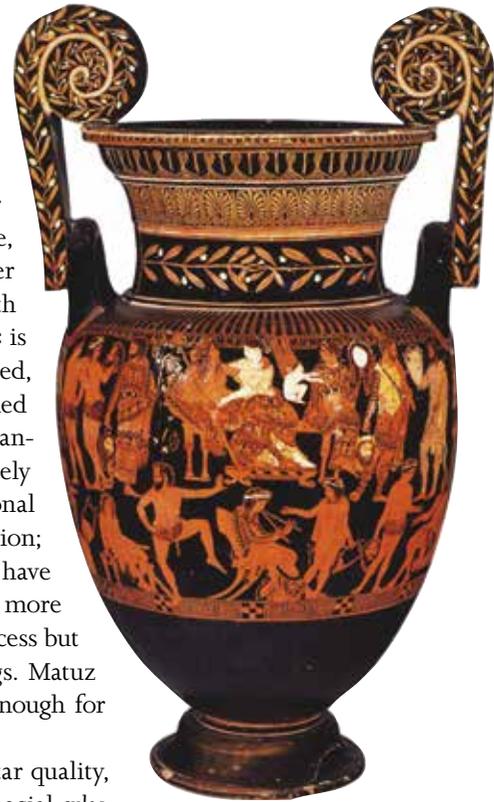
I kept wondering how I could get out of this project. After an hour or so I decided to bring Julian down to earth and asked him if by any chance it would also play Bach, half expecting a grimace. Immediately he picked it up and played a whole movement from one of the sonatas from memory and perfectly. That did it. I was hooked. It was clear that he is an outstanding musician. What he wanted was a properly engineered, elegant version of the instrument and I agreed to make it.

At that time Julian's English was practically nonexistent, so not being a Spanish speaker myself, all communication had to be carried out through various interpreters, none of whom was even a musician let alone a flute player. It was quite tough at the beginning until my ears got tuned into what he was trying to do. The one word he kept using was 'combinations', by which I understood him to mean cross-fingerings, for want of a better word. This is the practice of using fingers out of the normal sequence, generally unnecessary on Boehm instruments except in the upper register but much used on the recorder and early types of flute. The problem with any kind of cross-fingering is that the venting is inhibited: the Boehm F# is in fact an example of this; played as usual with R3 the note is slightly veiled, even more so if R2 is used. In extreme cases a note will be not only veiled but out of tune. Sometimes, of course, cross fingerings are used to advantage to improve an otherwise difficult note. Julian, however, was deliberately seeking out a whole new vocabulary of sound using quite unconventional fingerings. To some classically-trained ears such sounds are an abomination; all improvements to the flute by Boehm and many others before and since have been directed towards making such fingerings redundant, resulting in a more even scale and an easier life. The Pronomos Flute does not reverse this process but offers the player new musical insights with the use of peculiar fingerings. Matuz calculated a total of 4,723,920 possible fingerings for his design, surely enough for most of us.

Pronomos was an ancient Greek player of the *aulos*. He evidently had star quality, also making his own instruments. Pronomos is said to have invented a special *aulos* that would allow him to change modes. There is a fine depiction of him on the Pronomos Vase in the Museo Archeologico Nazionale in Naples. The *aulos* is more like a double oboe and is definitely not a transverse flute. Unfortunately *aulos* has been mistranslated over the years as a flute. Despite this fact we had got into the habit of referring to our new flute as the Pronomos and now it is too late to change!

I took on the job early in 2009 and it was finished by the summer. Like all my other flutes it has a silver body tube with stainless steel keywork. Most of the keys have a black acrylic inlay to both lighten them and reduce slipperiness. It has both the extra holes referred to above plus a C# 'trill' hole, which is in its normal position just above the thumb hole but carries a double cup. The left hand little finger L4 has a lot to do: it has no less than five spatulas to work either singly or in combinations. L1 works not only the usual C key but both the new C# keys, again either singly or in combination. The B footjoint was very tricky indeed. The Eb key has a double cup, the C-C# clutch can be disengaged allowing the C key to close without taking the C# key with it and there are no fewer than five gizmos so that every possible combination of closed keys is possible, just with the one finger.

All this description makes the flute sound impossibly complicated. Yet if you start from the premise that the normal Boehm flute is much, much simpler than, say, the oboe, the Pronomos additions don't add up to real mechanical complexity. The reason for this is that the new keys are mostly separated from the normal keywork. That is to say there are no articulated levers, no new clutches and no more adjustment screws. Parts of it, like



The Pronomos Vase. Museo Archeologico Nazionale, Naples. Reproduced by kind permission.

Julian Elvira.



All photographs of the flute by kind permission of Daphne Osmond



the C# assembly in the left hand and the footjoint Eb keys are tricky to dismantle and reassemble but there are no areas of possible mechanical conflict or unreasonably heavy springing. Padding is of course crucial, and there are many more pads but all the new ones are closed-standing, so tend to stay airtight. I am quite sure that using steel, which is so much stronger and stiffer than the precious metals usually employed for keywork, has helped this flute be relatively light, streamlined in appearance and positive in action.

Once complete I showed it to several previous customers who had expressed interest during its gestation. One of them, Anita Hall, managed most of *Flight of the Bumblebee* straight off, despite having to cope with a perforated thumb key and other oddities. Another professional couldn't play a note and had to reach for the smelling salts. Julian, fairly predictably, went into ecstasies as soon as he tried it, rattling up and down with complete familiarity. He kept us entertained for the entire weekend, taking us on a virtual tour of the world. The high point had to be his version of traditional snake charmer's music, alternately blowing the flute endwise and doing an imitation (we didn't have a live one to hand) of the cobra getting more and more stupefied.

So the Pronomos is certainly a valid development of the Boehm flute. It does offer possibilities that an 'ordinary' quarter-tone flute cannot, while being little more complicated in its mechanism. For those exploring the outer boundaries of the known acoustic world of the flute it may be an instrument to consider. My own feelings on the subject as a maker, however are still rather ambivalent. On the one hand I support Julian and his utter dedication to it with fascination: he is already promoting it and teaching with it; he, along with Matuz, Nagy and Monroy deserve wide recognition for their work. On the other hand I cannot help be reminded of many earlier inventions: the sixteenth-century harpsichord makers such as Zarlino and Pesenti with their enharmonic keyboards; quarter-tone pianos of the 1930s; the Schüller quarter-tone clarinet from the same period. Our museums are littered with the whimsical efforts of makers trying to anticipate players' needs, getting bogged down in too much complexity, then going out of business.

Here though we see the opposite process: a fine musician leading the way, with the maker tagging along trying to keep up! That's how it should be. 

