

Arosemena-Ott 1

## **The Aulos and Tibia:**

### **Variation across the Ancient Mediterranean's Principal Woodwind**

by

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Bibliography and Research Skills MUH 530

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The modern oboe is one of the most prominent Classical instruments, whether in chamber music, cinema, opera, or the symphony orchestra. Its penetrating tone, warm timbre, and unique acoustics allow the oboe to best tune a full orchestra, with the principal oboist regarded as the leader of the woodwinds. Albrecht Mayer, principal oboist of the Berliner Philharmoniker, believes “we all realise that there is something very special about [the oboe]... which also has a special history in the orchestra. The technical demands of an oboist are certainly the highest possible, such as playing using circular breathing – that is, while playing, still being able to inhale and exhale – but there are all kinds of difficulties from all sides that push the oboe and oboist to their limits. Master [composers] know exactly what is possible and what isn’t with the oboe, and that is why they are able to exact the full use of the soloist’s skills” (translation). But the history of the modern double reed begins in the Ancient Mediterranean with the Greco-Roman aulos and tibia.

The auloi of the ancient world were woodwind instruments consisting of two pipes, played simultaneously, each with a double reed. Each pipe was constructed from several parts: the bombyx, hypholmion, and holmos, in addition to the glotta. The bombyx comprised the main body of each pipe, where the finger holes, or trupemata, were drilled. It is the covering of the trupemata by the

performer that determined each pipe's precise pitch, or note, sounded. The hypholmion and the holmos in conjunction made up the instrument's mouthpiece, with the hypholmion attaching to the bombyx, and the holmos, to the hypholmion. Lastly, the glotta, a double reed made of cane, was inserted into the holmos. Similar to modern woodwinds, these components would have been unassembled and placed into a leather bag or case, the sybene, for transportation, and reassembled prior to playing, perhaps to ease manufacture, transportation, or to better protect the instrument. To store and safeguard the especially fragile glotta, a glottokomeion was used, much like a modern double reed case<sup>1</sup>. While the Greek auloi were constructed with a cylindrical bore, the latter Roman instruments were conically bored, like the modern oboe<sup>2</sup>.

Of equal importance to the instrument's body itself was the glotta, thus the process by which these double reeds were crafted was both careful and rigorous, beginning with the harvest of the cane. Theophrastus, a fourth century BCE botanist credited with with the first (or oldest surviving) comprehensive encyclopaedia of plant species, writes in his magnum opus *Historia Plantarum*:

“Before the time of Antigenidas [387-53 BCE], when they played without pitch-bending, the time for the cutting, they say, had been under Arcturus in the month of Boedromion [late September]... When they embraced the pitch-

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<sup>1</sup> West.

<sup>2</sup> Hagel.

bending playing style, the cutting changed too: now they cut it during the months of Skirrophorion and Hekatombaion, shortly before or just at [the summer] solstice. They say it becomes usable within three years, requires little preparation, and the reeds permit greater downward inflections of pitch. This is necessary for those playing with pitch-bending.”

Theophrastus’ dialogue provides crucial insight into several realms, including schools of playing, and the gradual adoption of a new style over another, a concept all too familiar to modern oboists amidst a period of passionate debate surrounding the ‘American’ (founded by French oboist Marcel Tabuteau) and ‘European’ schools of playing and reed-making. That the botanist found the topic of such importance to merit placement into his species catalogue, or was even aware of contrasting playing styles in the first place, highlights the incredible importance and influence of music and the aulos across the ancient Mediterranean. This is further corroborated by the meticulous care placed into the harvest and (three-year) ageing of the cane, suggesting a full-scale professional reed-making industry to meet the demands of the professional and highly-acclaimed auletes who purchased their reeds, as was customary for double-reed players until the last century or so. Importantly, his use of preparation here likely signifies one or more of following: physically and/or temporally less scraping required for making the double-reed; a shorter soaking period before playing; a shorter break-in period for

the reeds before reaching peak performance. Describing the cane species itself, Theophrastus states:

“It grows whenever there has been an abundance of rain and the water remains in the lake for at least two years; and it is better if the water stays longer. People recall that this happened, in recent years, most notably at the time of the battle of Chaironea [338 BCE]. Before that, they told me, the lake was deep for several years, and at a later date, when there was a severe plague, the lake filled but the water did not stay in it: the winter rain failed and the cane did not grow. They say, and they seem to be right, that when the lake is deep the cane grows to a greater length, and if it stands during the following year it becomes mature. Thus grows matured yoke [reed] cane, and that around which the water does not remain is bombyx cane.”

Crucially, Theophrastus’ description of the enormous variation in the material characteristics of the cane caused by soil quality, water accessibility, and climate does not correspond with *Arundo Donax*, the resilient and now well-dispersed giant cane species from which double-reeds (to include today’s aulos replica reeds) have been crafted for the past several hundred years, rather, to *Phragmites Australis*<sup>3</sup>. In fact, in his many descriptions of cane species, none seem to depict *Arundo Donax*, suggesting the species is not native to Boeotia, and

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<sup>3</sup> Psaroudakēs.

a latter introduction. According to the World Checklist of Selected Plant Families published by the Royal Botanic Gardens, *Arundo Donax* likely originated in a narrow area bound by Cyprus, Kazakhstan, and Turkmenistan in the west, the Gulf States in the south, and Japan to Myanmar (Burma) in the east, from which it was introduced to the Iberian Peninsula and gradually spread throughout the Mediterranean.

Following the harvest of the cane, the stems were left exposed to the elements for the duration of the winter to increase hardiness<sup>4</sup>. By spring, their leaves were removed and stalks thoroughly cleaned and smoothed to remove the cane's rind, then again laid out until the summer. The stems were then cut above the nodes into internodal segments ('yokes') of approximately 40cm in length (ca. twice that used in the crafting of baroque double-reeds<sup>5</sup>) and left exposed again for some time. Any internodal sections measuring less than two palms' width between nodes were insufficient and discarded. Given the inherent difficulty of the aulos, chiefly, playing two double-reeds simultaneously, reeds were fashioned in pairs from the same yoke of cane to behave most consistently and best complement one another. From each internodal 'yoke,' the reed whose opening pointed upwards (towards the flowering stalk) was used for the lower pipe, and the other reed opening downward (marked by the node at its base), for the higher pipe.

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<sup>4</sup> Mathiesen.

<sup>5</sup> Vas Dias.

“If the reeds are made any other way, they do not sound properly in consonance,” Theophrastus remarks.

The segments cut from the cane shoot nearest the ground made for the softest reed, while the sections cut from the top, the hardest. As with modern double reeds, the softest reeds likely allowed for the easiest manipulation by the performer, as well as demanded less embouchure, reducing fatigue from playing (an important consideration for long performances); however, soft reeds’ quality diminish more quickly and they are more vulnerable to changes caused by fluctuation in temperature, humidity, etc. Presumably, for these reasons, the sections cut nearest the middle of the cane shoot would have been considered to be the ideal, balancing both attributes. In his book *The Reed and Its Uses*, Thomas Southgate hypothesises that, similar to modern double reed instruments, the aulos’ tone, timbre, dynamics, and even range, with regards to overblowing the upper harmonics, “would depend upon the stiffness and length of the reed employed in conjunction with the column of air set in vibration.” Because of this immense level of influence over the instrument, performers likely employed a different reed specifically crafted for each aulos variant and the demands of the particular performance setting.

Additionally, on some instruments, the double-reeds may have been fitted and played with a capsule fully enclosing the double-reed, as found on a set of tibia remains at Pompeii. Such a device would have dampened the instrument’s



penetrating sound, making it more acoustically suitable for indoor music, while severely restricting dynamics, and is seen on future double-reeds, such as the crumhorn and cornamuse, in contrast to the shawm.

The precise origins of the aulos remain highly contentious, with the first recorded appearances in Phrygia, Libya, Egypt, Cypriot, Anatolia, and Mesopotamia in the third millennium BCE. This is further complicated by little to no surviving real-world discussion of its origins in ancient Greece, where it first rose to exceptional prominence. According to Greek mythology, however, the aulos was the invention of the Goddess Athena, thus may have originated in Athens or nearby. She is also credited with inventing the phorbeiá, a leather strap worn horizontally around the head, with a hole for the mouth, to support the player's embouchure, as well as instrument positioning, and minimise fatigue. Upon seeing her reflection in water while playing – especially her bulging, red cheeks – however, she grew ashamed of her disfigured appearance, and discarded the instrument. The aulos was then discovered by the Phrygian satyr Marsyas (perhaps suggesting a known Phrygian origin), who mastered it and subsequently dueled the God Apollo and his lyre in a musical contest. According to one version, Marsyas initially prevailed, but when Apollo played his lyre upside down, Marsyas could not do the same with the aulos. In another, Apollo is deemed the victor by all but King Midas, who is cursed by Apollo with the ears of a donkey as punishment. In both accounts, Marsyas is ultimately hanged from a tree and

flayed alive, forming the river Marsyas in Asia Minor, another potential site of origin.

Ptolemy's *Harmonica* also elaborates upon the difficulty of playing the aulos, revealing "everyone fills the bombykes with difficulty and with considerable strain because of the length of the tube. Moreover, because of the narrowness, the breath, when it escapes to the outside after being compressed, immediately pours out and is dispersed, just like streams carried through straits."

Considering the approximate four to five millennia between the first aulos and modern oboe, it is remarkable how similar the accounts of these instruments are: comparing the myth with the testimony of a modern oboist, Athena's disfigurement while playing the aulos is caused by the very same playing technique - circular breathing - that is employed by oboists today. Furthermore, the concept of Athena's *phorbeia* bears an uncanny resemblance to the support straps modern musicians employ to play the heavier oboe family instruments such as the Oboe d'Amore (alto oboe), Cor Anglais (tenor oboe), and bass oboe. These devices, attached at the instrument's midpoint and worn around the performer's neck, reduce strain on the performer's hands and embouchure by distributing the instruments' weight as well as maintaining its position.

In addition, the myth's conflation of the aulos with hubris, madness, and even death, highlights the strong (and conflicting) socio-cultural tensions that

played a central role in shaping the aulos, which varied widely across the ancient Mediterranean not only in performance practise and setting, but even in construction and make of the instrument itself. For example, the myth's opposition to the aulos and favoritism for the lyre reflects the dominant cultural view of the day in Athens, where the lyre was more popular and associated with Apollo, in stark contrast to Thebes, regarded as the centre of aulos-playing, and Sparta, where the aulos accompanied hoplites into battle and was considered to be Apollo's instrument<sup>6</sup>.

Understanding this socio-culture surrounding the aulos proves an invaluable resource of information both in examining their contemporary variation as well as their evolution over time, via descendants. As the instrument spread across the ancient Mediterranean, it became intrinsically linked to each society, culture, and performative context, forming regional variants. This is not to say that the instrument developed linearly throughout Greece, to the tibia of Rome, and into European descendants – rather, its evolution resembles an interconnected web, spreading bidirectionally throughout the ancient Mediterranean and beyond with increasing variety.

The Greek Onomasticon, written by Julius Pollux in the 2<sup>nd</sup> century AD on Classical antiquity, differentiates the auloi into four distinct ethno-geographic

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<sup>6</sup> Wallace.

species: the Plagiaulos, Monaulos, Gingras, and Elumos<sup>7</sup>. The Libyan Plagiaulos, although relatively rare in Greek iconography, was common in Etruria, and Egypt. Its construction was stopped at one end, allowing it to be played horizontally, similar to a modern flute, either with a side reed, or without one at all (many scholars do not believe that playing with a side reed, as has been suggested for the Plagiaulos, is acoustically possible).

The Egyptian Monaulos was used in Phrygia for threnodies, as well as in Egypt for weddings, specifically the gamelion aulema, an instrumental solo for aulos, and the Hymenaois, another wedding song. Pollux's account is further confirmed and elaborated upon in the works of the Greek comic poets Anaxandrides and Araros, who write in the *Treasury*, "taking up the monaulos, I played the Hymenaois," as well as in the *Birth of Pan*, "snatching up the monaulos, as straight as you could imagine," respectively.

The Phoenician Gingras was a shorter aulos, noted for its penetrating tone, employed by the Carians for lamentation, as well as in the aulema, accompanying dance.

Finally, on the Elumos, also known as the Phrygian aulos, Pollux notes, "if you take two auloi equal in length but differing in the widths of their bores, as are the Phrygian with respect to the Greek, you will discover, on the whole, that the

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<sup>7</sup> Schlesinger.

wide-bore instrument emits a higher note than the narrow-bore. We see that the Phrygian auloi are narrow in respect to their bores and project much lower sounds than the Greek auloi. And with respect to this, the cause is the speed of motion, for in those with narrow channels, because the breath has a difficult road and is compressed by the smallness of the channel, its motion is slower; but in those using a wider bore, as there is no obstruction, the exit of the breath is faster; and the same thing can be perceived in a single aulos” (Düring 34.11-21). Foremost, Pollux reveals that the Phrygian aulos, in contrast to the other species, was constructed so that one bore (i.e. the left pipe’s) was larger, and the wood surrounding both bores, thinner. The left pipe also sported a curved bell, similar to that of modern oboes, at the end, and both were constructed of boxwood, as were the first oboes<sup>8</sup>. Importantly, Pollux implies a musical niche as the impetus behind such variations: a downward shift in pitch and key, afforded by the thinner-wood instruments, in addition to a greater overall range, granted by pipes of differing bore sizes. The left pipe’s curved bell, in addition to aulos’ construction out of boxwood, may have also served a musical purpose similar to that of the oboe, whose bell smooths out the quality of tone over the entire range of the instrument, and whose boxwood makes for a warmer sound; however, a boxwood construction also provided another key benefit: it can be turned very precisely<sup>9</sup>.

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<sup>8</sup> Bélis.

<sup>9</sup> Vas Dias.

So precisely and smoothly that modern manufacturers of historical oboes, such as Harry Vas Dias, given sharp turning tools, do not need sandpaper to achieve a final finish. This may have been especially important in the ancient Mediterranean, which lacked the technology that makers use today. If the Elumos' boxwood construction served an aesthetic purpose in addition to that of facilitated construction and warmer acoustics, the curved bell may have satisfied an ornamental purpose as well. Unfortunately, Pollux does not discuss variation within the species' glotta, which could also have distinctly affected pitch, key, tone, timbre, articulation, embouchure, etc., aside from commenting that the majority of players, including professionals, purchased their reeds, further lending credence to a sophisticated and highly specialised glotta construction.

Nevertheless, with each species of aulos built for a particular socio-cultural performance setting, with a distinct range, key, tone, and timbre, professional performers came to own several species in order to satisfy these demands: "for a time, auletes had three types of auloi. They played Dorian aulema on one, different auloi were made for pieces in the Phrygian harmonia, and the so-called Lydian aulema was played on other auloi." Presumably, these auloi were the Monaulos, Elumos, and Gingras, respectively. However, as time and technology progressed, "Pronomus was the first to have made auloi that were suited to every species of harmonia and the first to play on the same auloi mele that differed to such a degree. It is also said that he delighted his audience exceedingly with the

form of his countenance and the movement of his entire body... so the Thebans erected this statue here.” The importance of this monumental innovation, a complex instrument capable of playing in multiple keys, over a range of several auloi species, and perhaps even in different tones and timbres (especially when considering the possibility of employing a different glotta to match each type of piece), cannot be understated: an aulos performer no longer had to own multiple species of instrument, as the new aulos could be altered to play a variety of performances<sup>10</sup>. On this innovation, the 4<sup>th</sup> century AD grammarian Arcadius comments, “those who discovered the holes of the auloi devised some kerata or bombykes to stop or open the holes whenever they wish by turning them up and down, left and right.” Thus, whereas prior auloi were confined to no more than four trupemata on each pipe, corresponding to the performer’s fingers, Pronomus’s instrument included rotatable metal bands fitted around the pipe and over the trupemata, with each collar having an accompanying knob, or kerata, so that certain tone-holes could be easily covered or uncovered depending on the requirements of the performance<sup>1112</sup>. Interestingly, this innovation also reveals that professional performers, or at least some, actively took part in their instruments innovation and construction process, with instrument manufacturers working in tandem with the leading performers of the day, a concept that

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<sup>10</sup> West.

<sup>11</sup> Masiriki

<sup>12</sup> Mathiesen

continues with modern oboes (e.g. Gebrüder Mönning oboes models 150 and 155 A.M., “developed in close cooperation with Albrecht Mayer”). Additionally, Pronomus’ delightful body movements and expression while playing further supports the notion of an aesthetic component of aulos performance, perhaps even of equal importance to the music itself. Lastly, the sheer obsession and hysteria of ancient audiences for virtuoso aulos performers is exemplified by the immortalising of Pronomus via the construction of a statue in commemoration. This same mass adoration for, even deification of, virtuoso musicians is also seen in the Baroque, Classical, and Romantic periods in Europe, where audiences swooned for the leading instrumentalists, opera singers (especially castrati), and composers of the day. In fact, many such statues survive, such as the Beethoven monument in Bonn, Germany, the Brahms monument in Vienna, Austria, and the Chopin monument in Warsaw, Poland.

Accompanying the gradual converge of the auloi into Pronomus’ new instrument, came a new level of standardisation in relative, or perhaps even absolute, pitch across the ancient Mediterranean. As outlined in Pollux’s *Onomasticon*, referencing a (tragically) lost treaty of Aristoxenus on Auloi Boring (which in itself suggests some degree of intrinsic standardisation in instrument construction, and thus performance) as well as the Harmonica, the Aulos family consisted of five members, spanning a total range of more than three octaves! This family included the Parthenioi (maidens), Paidikoi (boys), Kitharisterioi



(kithara), Teleioi (dithyramb), and Hyperteleioi (men) auloi, foreshadowing the Modern oboe family: the piccolo oboe (centred at Eb5), the (soprano) oboe (C5), the oboe d'Amore, or alto oboe (A4), the Cor Anglais, English horn, or tenor oboe (F4), as well as the bass oboe and Heckelphone (C4). Unfortunately, little is known concerning the musical impetus for an entire aulos family, such as the possibility that these instruments played together in ensemble, as their Modern counterparts do, or simply if different ranges were required for various performance settings.

Pronomus' improvements also enabled additional variation, in the shape and size of the trupemata themselves. Manufacturers lengthened the tone-holes on one side, while shortening the other, allowing a performer to further manipulate available pitch, as the rotating band could cover the tone-hole entirely, on only one side, or not at all<sup>13</sup>. Furthermore, the sheer number of trupemata on each instrument, no longer restricted by the performer's available fingers, greatly increased, with late auloi possessing as many as fifteen<sup>14</sup>. In another modification, a half-band (rather than a full) is pushed down by a rod with a button at the top end, reminiscent of the key system on modern double reeds.

The concept of variation in instrument construction and performance practice across different regions, societies, and cultures, as well as over time, is

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<sup>13</sup> Hagel.

<sup>14</sup> B elis.

familiar territory to oboe musicologists. The shawm, considered the first true ancestor of the modern oboe, was introduced to Europe by returning crusaders in the 11<sup>th</sup>-13<sup>th</sup> centuries AD<sup>15</sup>. It consisted of a single piece, cylindrical body with a conical bore, 6-7 tone-holes, and a pirouette, into which a staple was inserted, onto which the double reed was placed<sup>16</sup>. As its use in music and prevalence spread across Europe, several distinct species formed, including the Deutsche Schalmei, and the French Hautboy. Over time, variants converged into the Baroque hautbois, or Baroque oboe, by the late 17<sup>th</sup> century; however, regional variation by no means entirely disappeared. The Baroque and subsequent Classical and Romantic oboes continued to have several variants across Germany (e.g. Eichentopf, Denner, Scherer, Oberlender; Grundmann, Floth, Lempp; Golde), England (e.g. Stanesby), France (e.g. Hotteterre, Galpin), Switzerland (e.g. Schlegel), and Italy (e.g. Anciuti), among others. Additionally, the modern oboe as we know it has two main variants of construction, and four unique fingering system schema – the French oboe, the more common, with either the French (conservatoire/ring), English (plate), or German (automatic) fingering systems, as well as the Viennese oboe, with its own fingering system.

Similar to the largely variable musical pitch systems across the ancient Mediterranean, until a gradual adoption following the invention of Pronomus'

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<sup>15</sup> Fronckowiak.

<sup>16</sup> Vas Dias.

aulos, pitch standards varied widely across Europe through the 17<sup>th</sup> century. In one instance, a cathedral organ was found to be pitched approximately 5 semitones lower (a several hundred Hertz difference) than keyboards in the same city, and, according to Praetorius' *Syntagma Musicum*, contemporary pitch systems in Germany ranged as high as A = 523 Hz<sup>17</sup>. At the turn of the century, as the Baroque oboe was gradually adopted across the continent, distinct pitch systems began to appear, as pitch began converging to the Baroque range of A = 390-460 Hz, with 415 Hz being the most common. This convergence continued into the Classical (A = 430-440 Hz, with 430 Hz most common), culminating in the adoption of Stuttgart (A = 440 Hz) or French (A = 435 Hz) pitch standards by the late Romantic. Interestingly, this trend is manifested in the tuning forks of the time period: A = 422 Hz (1740 AD, London), A = 409 Hz (1780, London), A = 423 Hz (1815, Dresden), A = 451 Hz (1820, Milan), and A = 435 Hz (1826, Dresden). However, variation in (as well as debate over) standard pitch still continues to this day, with North American oboists, and the orchestras they tune, using A= 440-442 Hz, while Europeans use A = 444-446 Hz.

The aesthetic ornamentation of double reed instruments, beginning with the Phrygian aulos and more heavily decorated tibiae, also continued as an integral tradition in constructing the shawm, and Baroque, Classical, late Romantic, and

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<sup>17</sup> Becker.

even modern oboes. In addition to lavish wood stains on the external body, oboe ornamentation also frequently included ivory rings surrounding each separable part, or 'joint', of the instrument, as well as sophisticated curves and moulding. Following the ban of ivory, precious metals such as silver or gold took its place on the instrument's rings. This rich tradition of ornamentation is particularly well survived in the modern Viennese oboe.

Nearly four to five millennia since the birth of the aulos of the ancient Mediterranean, we have arrived at the modern oboe. Over this time period, the aulos spread across many cultures, societies, and performance settings, and as a result, evolved and underwent countless developments. Although we may never know the true lineage, or 'missing link(s),' between the aulos and tibia, and the modern oboe, the striking similarities between both instruments' rich musical histories cannot be ignored: our knowledge of ancient double-reeds will continue to serve as an invaluable tool, a lens through which we can enrich contemporary music, performance, and instruments, and guide them into the future.

## Appendix

1. Mural, Etruria (480-470 BC)



2. Attic Vase, British Museum (480 BC)

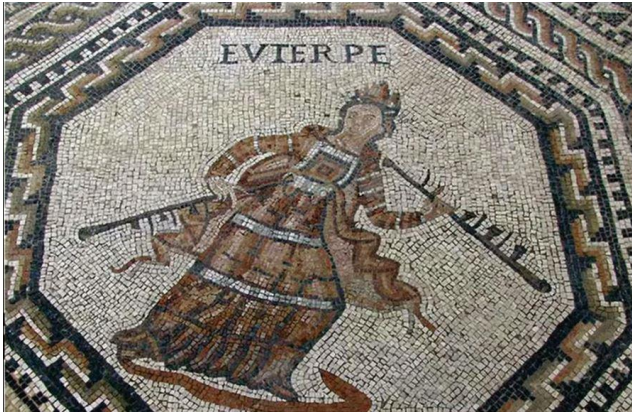


3. Sarcophagus, Louvre (100-150 AD)





5. Mosaic, Luxembourg City (ca. 240 AD)



6. Mosaic, Rheinisches Landesmuseum (200-300s AD)



7. Attic Cup, Louvre (460-450 BC)



8. Satyr playing the Phrygian Pipes, unknown





9. Neptune Mosaic, Bardo Nat'l Museum



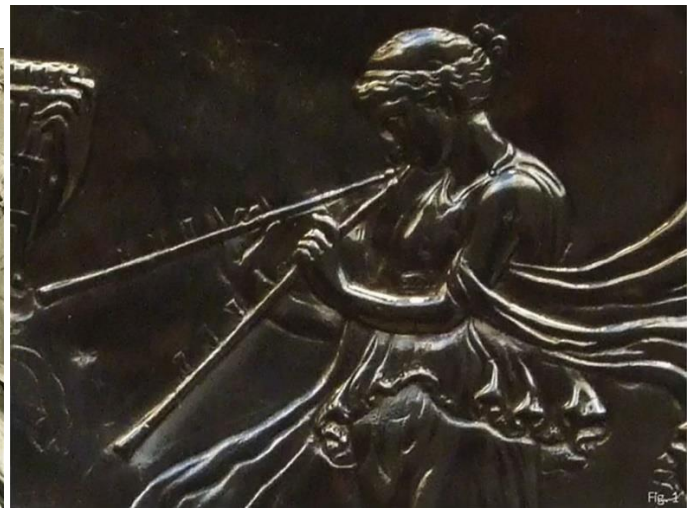
10. Fresco, Ephesus (300AD)



11. Marble Relief, National Archaeological Museum (100-200AD)



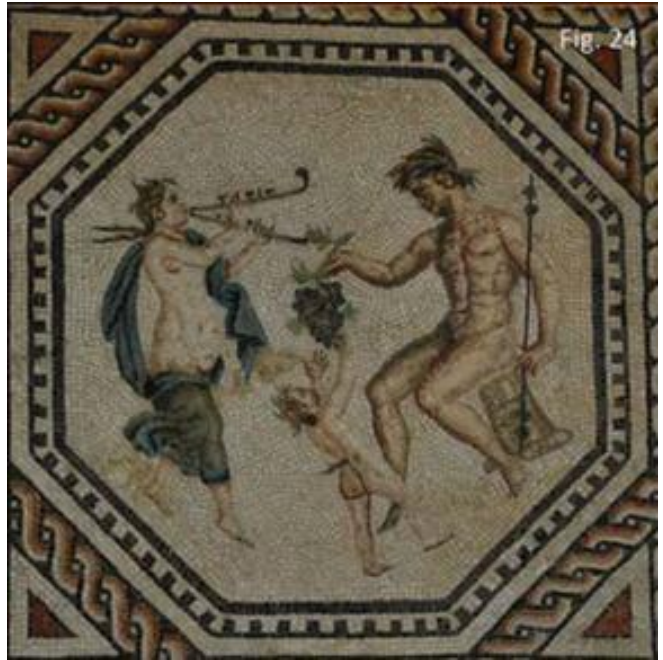
12. Bacchic Platter, British Museum (300AD)



13. Marble Relief, Rome (ca. 250AD)



14. Dionysis Mosaic, Cologne (ca. 230AD)



15. Aulos, British Museum (ca. 500 BC)

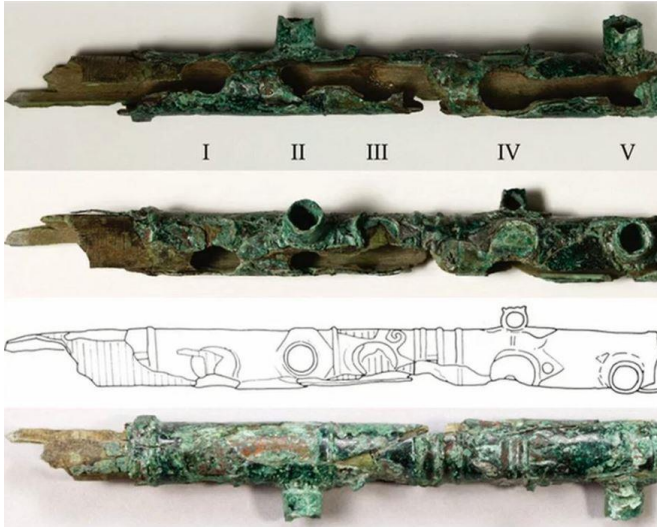


16. Tibia, Poetovio (100-200s AD)





9. Tibia, Poetovio (100-200s AD)



10. Tibia, Lombardia (unknown)



11. European Shawm, rec. (ca. 1300 AD)



12. Deutsche Schalmei, rec. (ca. 1670 AD)



13. Stanesby Baroque Oboe, rec (ca. 1720AD)    14. Modern Oboe Family (2018)



15. Baroque Oboes, Metropolitan Museum

16. Wiener Oboe, Guntram Wolf (2018)



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