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Ancient Greek music: A high art between pure intonation and melismatic style.

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Abstract

Studying ancient Greek musical fragments, an observation can be made that not only helps reconstruct the exact tuning of these fragments, but, put into the broader historical context, it also establishes ancient Greek music as a high art on a par with ancient Greek architecture, sculpture, or theater. It can be observed that fragments written for lyre or kithara allow for perfect tuning, whereas fragments written for wind instruments or unaccompanied voice do not. Thus, pieces for lyre and kithara were likely played with pure intervals arranged in sequences of notes that allowed for perfect tuning, while pieces for wind instruments or voice forced the performer to adopt a more melismatic style. The perfect tuning and the way it is implemented in actual music for lyre and kithara make ancient Greek composition particularly appealing to both ancient and modern ears. Perfect tuning sometimes restricts a musician to using only few tones that are perfectly tunable, which may come through as boring. Yet, ancient Greek musicians found a way to avoid the problem. It is true that each composition for lyre or kithara is restricted to few distinct tones, but the tones are chosen carefully, and unexpected sequences of tones greatly surprise the listener. Thus, limitations in the tonal structure imposed by perfect tuning come through as an economy of means that can make surprises feel all the more exciting. Modern audiences could enjoy this type of composition as well as most other ancient Greek art as some sort of minimalism. Most ancient Greek art lives from the contrast between strict economy of means and surprising optical, dramaturgic, or acoustic effects that are achieved in spite of it. The same vein is also found in some ancient Greek philosophy that held that the world is composed of only few distinct atomic elements that are combined to stunning effect. Such worldview was certainly known to musicians and is still valid today.

Introduction

How was ancient Greek music tuned? Did fine-tuning make it particularly appealing? In this brief essay, I review an observation about ancient Greek music that I have previously made and discussed as part of my thesis in architectural acoustics in 2008. The observation escaped other researchers, but it should be relevant because of the interpretation that it affords. During my travels through Greece, I have therefore chosen to present the same finding in this self-standing report.

The observation and its technical meaning

In music, a sequence of any two notes can be purely intonated, which conveys a sense of perfection and clarity. To get a sense of how a pure interval sounds, one can compare it to the sound of a clean gong or a liquid-sounding acoustic signal.

This type of acoustic purity can be maintained when the same sequence of two notes is expanded with a third note. If the first interval (from the first to the second note) is pure and the second interval (from the second to the third note) is also pure,

then the combination of both intervals (from the first to the third note) is pure, as well. Two pure intervals add up to another pure interval that conveys a similar sense of perfection.

However, there are limits to pure intonation. Musical scales often combine many tones. As a consequence of this richness, conflicts arise. On wind instruments, such conflicts can be solved. One can adopt tiny microtonal adjustments or ornaments, in their most elaborate form also known as melismas, which can help mitigate the conflicts. On the other hand, the conflicts cannot be mitigated on instruments with strings of unchangeable length, as are ancient Greek lyres or kitharas. A composer has then the choice between (1) forcing themselves to avoid tuning conflicts by carefully developing the composition, or (2) simply not using perfect tuning, as is done on harps (Hagel 2005).

The observation that I made about ancient Greek music is that composers chose the first of these two options. Musical fragments written for a lyre or kithara (encoded in ancient Greek instrumental notation) use few distinct tones and allow for perfect tuning (with pure intervals for any sequence of tones that are played one after the other).

This observation is likely no happenstance. Compositions written for wind instruments or unaccompanied voice (encoded in ancient Greek vocal notation), even if they use few distinct tones, often quickly lead into tuning conflicts, which, provided that pure intonation was still preferred, must have forced the performer to adopt a melismatic style, potentially related, for example, to the musical style attested for Byzantine music, a millennium later.

How to reproduce the main observation

Take the most comprehensive collection of ancient Greek musical fragments (Pöhlmann and West 2001). Tune the fragments written in instrumental notation. Obtain perfect tuning by using only pure intervals in any sequence of two tones of the size of a minor third or more (ratio $5/6$ or above). In the case of Limenios' composition (ibid. fragment nr. 21), first split the composition into its various parts following the section breaks made by the ancient engraver. Tune thereafter.

Now attempt to obtain perfect tuning for all pieces written in vocal notation, and you will more quickly fail, for example in the Ode to the Muse (ibid. fragment nr. 24).

In the upcoming years and decades, new musical fragments written in instrumental notation may appear, rediscovered on lost inscriptions. It will be interesting to tune them and to see whether they preferably limit themselves to sequences of intervals allow for perfect tuning.

Interpretation

The observation made above suggests two important things about ancient Greek musicians and their audiences:

First, ancient Greek musicians and their audiences preferred compositions that sounded natural, although not artless. This interpretation is also supported by at least one other key observation that researchers have made when closely studying the surviving musical fragments. It has been observed that many ancient Greek melodies that were sung with lyrics are composed to follow word accent: the melodies tend to fall in pitch just after the word accents (West 1994). This previous observation also suggested a

preference for natural sounding compositions. In a way, musicians kept the inborn melody of language when they turned language to song.

Together, both observations make the interpretation more likely that compositions were preferred that sounded natural although not artless. Singing with perfect intonation certainly is not artless, nor is writing lyrics that can be turned into music while maintaining the melody of the spoken language.

Second, it can be observed that instrumental fragments rarely exceed seven or eight different tones, which gains a new meaning in the context of perfect tuning.

The use of only few tones coincides with the number of strings seen on many lyres and kitharas. Certainly, this limitation to few tones may have historical reasons. One could hold that people did not use more strings simply because this is what they had done for centuries. Yet, it is rather unlikely that ancient Greek audiences did not feel the need to hear much more complex compositions with many more different tones only to conform with the preferences of their less sophisticated ancestors. The observation that the fragments allow for perfect tuning suggests a different, perhaps more likely interpretation.

Perhaps, each composition was limited to few distinct tones because perfect tuning inspires the composer to play the role of what I call a minimalist. A minimalist would think like this: If I decide to use only few distinct tones, the audience will interpret this self-imposed limitation as "economy of means", and it will be all the more surprised by new, unexpected sequences of tones. On the other hand, if I choose to go for many different tones, it is hard to avoid conflict in tuning, and the audiences will expect more variety, feeling less surprised by new sequences of tones but disturbed by intervals that are tuned imperfectly.

Thus, the choice of only few tones for each piece can be interpreted as a wish to signal to audiences that one would like surprise them with unexpected effects in spite of an evident economy of means, seen already on the fact that the instrument at hand only has seven strings that can evidently only be played as they are.

In other words, audiences would have found delight in ancient Greek compositions because of the way great acoustic effects were created on apparently simple instruments and with limited means. Listening to ancient Greek melodies, one would have been stunned by just how many pure sequences of notes can be played on only seven strings of fixed length. When listening to a composition, the moment one thought all pure sequences of notes had been played, a new sequence could come that would delight the listener through its unexpected purity.

Just such a delight may be experienced when listening to Limenios' composition for voice and kithara that was played in Delphi and inscribed on the treasury of the Athenians, in the lower front corner of the sidewall facing the valley (ibid. fragment nr. 21).

The composition has multiple parts, each restricted to seven different tones and to sequences of tones that can be purely intonated. In many of these parts of Limenios' composition, one can first hear the melody go up and down in repeated sequences of tones. As expected, all intervals can be purely intonated. As expected, too, these repetitive sequences make one eventually feel the limitations of perfect tuning. It eventually seems to the listener that those regular ups and downs are just what one can play on the particular instrument that the musician chose.

Just at this critical point, when expectations for something new are broken, an unexpected sequence of intervals resounds that can also be purely intonated, but with

new intervals that delight the ear, not only because they are different, but especially because they come unexpected, played on that same humble instrument.

Today, the fragment is in display in the archeological museum in Delphi.

Context

According to the interpretation given above, ancient Greek music likely delighted its audiences through great acoustic effects and natural appearance in spite of strict economy of means. Certainly, such were not limited to ancient Greek music, rather, they were also key to other ancient Greek arts such as architecture, sculpture, and theater. Examples are given below.

In ancient Greek architecture, designs were highly refined. Often refinements inspire great awe, although they are done with much skill and are barely noticeable. Early archaeologists who studied ancient Greek temples did not at first realize how many of the lines that appear straight are indeed slightly curved. It is now well known that temples such as the Parthenon do not lay on perfectly flat platforms. The platforms are very gently curved to look more natural. Also, the columns are slightly tilted towards each other, the shafts are slightly tapered toward the tops, and they are slightly swollen towards the centers, etc.

Such refinements, although difficult to notice, are important for the overall appearance and success of the designs. Reproductions of ancient Greek temples with perfectly straight lines instead of slightly bent lines look brutalized.

All of these slight adjustments in ancient Greek temple design were introduced over time, to add natural appearance. Archaic temples had columns that were tapered towards the bottom (the opposite way), and the platforms were flat. Ancient Greek architects refined the curvatures over generations. Herein lies both an attempt to make the temples look as natural as possible to the eye, as well as an evident desire to impress onlookers with barely perceptible means. The curvatures of ancient Greek temples are difficult to consciously see.

In addition, economy of means is apparent in the overall composition of the designs. Many temple designs are composed of only few architectural elements (platform, columns, walls, and roofs), and these elements are chosen in a very restrictive style of composition. From outside, the Parthenon is all around primarily columns of one type. The grace lies in the stunning effect that is obtained with just that one type of columns.

The same preference for natural appearance and economy of means is also found in ancient Greek sculpture. Over time, sculpture changed towards more natural feel and more economy of means. Archaic Kouroi are perfectly straight standing figures. They are a form of artistic expression that the Greeks inherited from ancient Egyptian art. Everyone who has seen them knows that they seem to pose in a less natural manner than the classical and Hellenistic figures that stand in the more natural, easy, and relaxed contrapost-position, with their shoulders and head gently leaning towards one or the other side. To enhance the natural appearance, sculptors began removing supporting back walls early on.

In sculpture too, natural appearance was accompanied by economy of means, which is found for example in the frequent focus of artists on the naked human body and in the gradual improvement of bronze casting technology to increase the size of the

bronze pieces that are cast separately, thus reducing unwanted seams between separate elements of the same sculpture.

Natural appearance and economy of means may be best known to modern audiences from ancient Greek theater. Already as architectural structures, ancient Greek theaters excel through their economy of means. They lacked a back wall behind the scene, which made the local scenery the one single stage set that was always present. The beauty of such scenery can still be witnessed today in places such as Epidauros, where, sitting in the theater, one first looks over bright green pine forests, followed by gently rolling hills, followed by the silhouettes of rough mountains that shine in hues of bright blue and purple, depending on day and time.

The theater compositions themselves are famous around the world primarily for their economy of means, known in literary jargon as "unity of time and place". Events in an ancient Greek play had to take place ideally all within the same day, and at the same place. Certainly, events that took place in one day and at the same place would make most sense displayed in front of an unchanging natural coulisse, such as the one at Epidauros. Evidently, natural appearance and economy of means were key to great ancient Greek theater.

Natural appearance and economy of means are key not only to ancient Greek art, but also to some modern art, such as Minimalism. Minimalist architects use only few architectural elements to great effect. Similarly minimalist music repeats sequences of tones, only to occasionally surprise with unexpected ones.

Maybe artistic finesse that is that is hard to consciously identify (of the kind of temple curvatures and pure intonation) is a consequence of preferring art that combines natural appearance with economy of means. This kind of finesse is not unique to Greek art, either.

For example, graphic designers know the detail that with only the customary primary colors used in print (cyan, magenta, and yellow), you cannot mix all the pure tones in between. For example orange, warm green, or cobalt blue will always appear just slightly broken rather than pure in tone, and they will also vary in hue from print to print, because the mixing of colors might involve unequal fluctuations in the flow of the colors during the printing process. A cobalt blue logo would first be a broken cobalt blue, and then it would appear once cooler, once warmer in hue, which is also unwanted. To avoid these effects, one can choose a special color of its own, to be printed with separate ink that is not mixed on the go. Graphic designers know of this detail and take advantage of it to make their designs appear more perfect. The surprising color that they chose, especially if it is a pure color, is something akin to a musical composition that uses only seven fixed strings, but uses these strings in a way that is thought through very well and surprises audiences with an unexpected pure interval.

Conclusion

Ancient Greek music played on lyres and kitharas probably delighted its audiences through contrast between economy of means and great acoustic effects: each composition was limited to only few distinct tones, but those tones likely surprised the listeners with carefully-composed, ingenious sequences of pure intervals. Greek musicians may have made such surprises of perfect tuning feel all the more exciting by using instruments with few strings.

Perhaps, the concept of serendipity should be mentioned here. "Serendipity" occurs when you use a system, and you keep using it, until suddenly, you don't know how, you achieve a surprising and beautiful effect with it. If the interpretation proposed in this article is correct, ancient Greek music lived from its serendipity. When musicians began playing a piece, one would hear them use a chosen scale. They would play it up and down on the seven or eight strings of their lyre or kithara, and they would stay with their scale, perhaps a well-known one, until suddenly, the same unchanged scale would surprise the audience with an unexpected sequence of sounds that were just as purely intonated as the previous, but not expected to be possible right there in that tonal arrangement.

The effect of such surprise was certainly only enhanced by the contrast that audiences could have perceived between this pure music and the music written for wind instruments that did not observe the same restriction to few notes, and in which intervals were modulated and enhanced with one or another kind of melismatic effects. Melismas are not attested with certainty for ancient Greek music, but the fragments composed by Mesomedes, which inspired the birth of modern Opera in the late Renaissance, involve some notation that has been interpreted melismas. It is evident that, if perfect intonation was preferred, compositions that did not allow for perfect tuning, would have forced the performer to make microtonal adjustments, and thus, a kind of melismatic ornamentation.

Besides economy of means to break expectations, followed by surprise, the other main feature of ancient Greek music and art is natural appearance. Together, natural appearance, economy of means, and surprising effects are themes that are typical for ancient Greek art, and they also inspired Greek philosophy. Natural philosophers in Ancient Greece developed their "atomism" as a system of thinking that explained the world, with all of its surprising effects, as combinations of a strictly limited number of different atomic elements.

The Latin poet Lucretius, turned this philosophy into poetry. His work was inspired from Greek philosophy. He held that nothing happened without a cause. Yet his didactic poem of causal thinking and atomism begins with verses dedicated to Venus. Lucretius' world is a world of atoms, and it is a world strictly ruled by causality, but it also is a world in which causality can lead to surprising effects and beauty, through serendipitous combination and recombination of elements. This philosophical perspective was certainly not entirely unknown to ancient Greek musicians, and it is still appealing today.

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