

ACOUSTICAL MASKS AND SOUND ASPECTS OF ANCIENT GREEK THEATRE

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MÁSCARAS ACÚSTICAS E DIMENSÕES SONORAS DO TEATRO GREGO ANTIGO

RESUMO: É impossível imaginar o antigo teatro grego sem o recurso da máscara, seja na tragédia, comédia ou dramas satíricos. Todas as formas teatrais desenvolvidas em Atenas durante os séculos VI e V a.C foram formas de drama com máscaras. A máscara foi um elemento orgânico nessa forma nova chamada 'teatro' pois era o meio por excelência para materialização do Outro, e participava na criação do espaço de cena como lugar de diálogo entre o Eu e o Outro. Ainda, a organicidade da máscara se revelava em sua conexão estreita entre a aparência da rosto e gritos lancinantes encontrados nos textos dramáticos e que ecoram na acústica dos teatro. A questão acústica estava presente em todos os aspectos do antigo teatro grego, e foi um modo de se intensificar a participação da audiência por meio da ampliação de sua experiência acústico-visual e sinestésica.

PALAVRAS-CHAVE: Teatro grego antigo, Máscaras acústicas cênicas, Theatron, propopon, Catarse.

ABSTRACT: It is impossible to imagine the ancient Greek theatre without the mask, whether it is tragedy, comedy or satyr plays. All theatrical forms that developed in Athens during the 6th and 5th centuries BC were forms of masked drama. The mask was an organic element in this new form called theatre because the mask is the medium per excellence for the embodiment of the Other and participates in the creation of the stage as a site of the dialogue between the Self and the Other. But the mask was an organic element of the the-

atre because in ancient Greek theatre the mask is organically connected through its facial appearance to the ecstatic cries found in the dramatic texts and to the theatre space through its acoustical form. Acoustics permeated all aspects of the ancient Greek theatre and was a way to create even better participation for the audience enhancing its acoustico-visual and synaesthetic experience.

KEYWORDS: Ancient Greek Theatre, acoustical theatre masks, theatron, prosopon, catharsis

THE ARCHITECTURAL FORM OF THE THEATRE AND THE SURROUNDING LANDSCAPE

The word theatre (“*Theatron*” in Greek) means a place to watch and is derived etymologically from the verb *theaomai* meaning to view, to look on, to gaze at, behold with a sense of wonder, to contemplate and *-tron*, suffix denoting place.

Theaomai means to bring to light, make apparent, to witness a spectacle. The word is derived from *thea*, sight, view, the sense of watching something attentively for a long time, especially from above, as from a mountaintop.

The above words are akin to *theoria*, the sense of engaging in contemplation and collective consciousness, also meaning the sending of *theoroi*, persons who travel in order to see things; state ambassadors send to consult an oracle or to attend games and religious festivals as official representations of the state.

Theatron is akin to *thauma*, a wonder, marvel, a thing compelling to gaze seen in a state of ecstasy and to *thamvos*, astonishment, amazement, consternation seen in bright light.¹

From the etymological cluster of the related derivatives theatre emerges as an outdoor place where in daylight people are engaged in a collective vision watching attentively for a long time, in a state of astonishment, marvel or ecstasy.

Even though the etymology of the word *theatron* gives primacy to vision we must first have in mind that the Greek attitude towards visual perception was different from ours.

Modern visuality is an individualistic and detached mode of perception based on the dichotomy between the im-

1. I. Stamatakos: *Lexicon tis archeas ellhnikis glossis* (Lexicon of Ancient Greek Language), Fenix Editions Athens 1972
Panagis Lorendzatos
Homeric Lexicon,
Kakoulidis Editions
Athens 1989

age and the gaze, the seer and the seen, the subject and the object. Vision in ancient Greek culture was a process of engagement, an interactive, participatory and collective form. A transformative experience of revelatory nature where the seer recognized in the seen cosmos the presence of the divine.²

But even if sight seems to be the privileged sense in ancient Greek culture we must keep in mind that hearing was of great importance and the acoustic sense permeated Greek culture.³

Pythagoras and Plato used the term *akroasis* for the harmony of the planets and the Greek concept of music *mousike*, stands for all the arts presided over by the Muses. Music was the unity of poetry, music and dance, all of them constituent elements of the Greek theatre.⁴

Theatrical performances were acoustico-visual events based on a text of complex interwoven rhythmical structures written for a chorus, actors and musicians. A text to be spoken, sung, recited, danced and performed. A basic element of theatre performances was the creation of an intensive soundscape.

Theatre architecture was developed further towards a unit that transcended the hegemony of vision creating a new architectural form more appropriate to contain this multi-sensorial, synaesthetic experience. A mode of perception that contains the corporeal and the 'ineffable', the intellectual and instinctual. A sensual experience which overwhelms the process of cognition

I propose that in search for greater participation and inclusiveness of the citizens and for better acoustics that could promote the creation of such a synaesthetic experience, the form of the theatre changed progressively from rectangular and trapezoid forms to the circular form that it is now considered as the typical one for such spaces.

Theatres were usually built on the side of a hill, with a hollow recess that sloped down at an angle of approximately 45 degrees. They generally had quite good acoustics. The choice of place gave a shape to the auditorium that matches almost perfectly the directivity of the human voice, which presents an almost unvarying sound distribution within the angle of 180 degrees.⁵

There are other constructions in Greek theatre architecture which produce beneficial effects. The skene, built of wood and later of masonry was situated less than three metres behind the orchestra and so very close to the performers and it acted as both an acoustic reflector for their voices and an acoustic shield for unwanted external noise.

2. Jas Elsner: "Between mimesis and divine power: Visuality in the Graeco-Roman World" in *Visuality before and Beyond the Renaissance* ed Robert Nelson Cambridge, Cambridge University Press, 45-69.

3. Günther Wille, *Akroasis. Der akustische Sinnesbereich in der griechischen Literatur bis zum Ende der klassischen Zeit.* Tübinger Phänomenologische Bibliothek, Tübingen, Attempo, 2001.

4. John Landels: *Music in Ancient Greece and Rome.* Taylor Francis Ltd, United Kingdom 2000.

5. Z. Maekawa & P. Lord: *Environmental and Architectural Acoustics.* E & F N Spon. London, Great Britain. 1994. p.28.

6.B Hunningher: *Acoustics and Acting in the Theatre of Dionysos Eleuthereus*. Medelingen der Kon Nedelr Academie van Wetenschappen. Deel. 19. No. 9. Amsterdam 1956. p. 15.

B. Hunningher reports that comparison between the theatre at Syracuse where the skene construction is destroyed and the theatre at Taormina where a large part of it is still standing shows that the skene is very important in the generation of consonance. He goes as far as to suggest that the skene was built first and foremost to improve acoustics rather than to define an arena for action.⁶

The same function is ascribed to *paraskenia*, side-wings to the *skene*, extensions of the skene which embrace the orchestra and almost unite the *skene* and the auditorium. Only two passages remain, one on each side of the *skene*, between the *paraskenia* and the orchestra, for the entrances and exits of the chorus. The *paraskenia* were presumably as high as the *skene*. The orchestra floor was always flat. In the early days it was of compacted earth and later it was covered with marble – possibly for acoustic reasons.

The Theatre of Dionysus

All ancient tragedies and comedies known to us were probably written in order to be performed at the Dionysus Theatre situated on the slopes of the Acropolis in Athens. Its oldest parts date from the late 6th century BC. In the beginning this space probably consisted only of the orchestra, the audience standing on the hillside. Later wooden benches were built. The orchestra was surrounded by the shell shaped auditorium, the whole being embraced by the landscape. Around the middle of the 5th century a stage was erected. There is evidence that the theatre of Dionysus did not have excellent acoustics, but it is difficult to be sure since it underwent many changes during the centuries and is not well preserved today.⁷

7.Savvas Gogos: *To archaio theatro tou Dionysou*, Militos Publications, Athens 2000.

If we follow the development of theatre architecture from the 6th century to the beginning of the Hellenistic period in the 4th century, it is obvious that there is a desire to develop a theatre space with better acoustics and better visibility as a way to further increase the feeling of inclusiveness of the vast amount of spectators. The dimensions of the theatre of Dionysus best resemble the dimensions of the theatre of Epidaurus, which is very well preserved.

The Theatre of Epidaurus

The development towards better visibility and acoustics culminates with the theatre of Epidaurus. Built about 320 BC it is not representative of the 5th century BC theatre buildings but contains in its architectural form the essence of the concept of theatre as conceived and developed by the Ancient Greeks. It is attributed to the architect Polykleitos, follower of the Pythagorean School and is located in the sanctuary of Asclepius, the god of Health and medicine in Peloponnesus.

The building is the expression of an age that saw the flourishing of mathematics and acoustics, the influence of Pythagorean science. It is the best preserved of the classical Greek theatres and nearly all the seats are in their original places. It has remarkable acoustics for speech intelligibility, solo delivery or unison chanting and for solo musical instruments. Rather than a single factor it is the cumulative effect of many refinements that contribute to its acoustical excellence.

The theatre can accommodate at least 14 000 people, it is 387 feet in diameter and the orchestra is a complete circle 67 feet in diameter. The building is based on a single module. The dimensions of all parts correspond with each other in a system based on multiples of that module, which is a cubit, a unit of measurement related to the human body. The centre of the orchestra is occupied by a stone with a radius of 35 cm. This seems to be the unit and all the measurements are multiplications of this basic unit in an elaborate system of corresponding measures. There are totally 55 rows of seats, 34 rows below the horizontal cross aisle and 21 rows above. The relationship between these numbers, 34 to 21 and 55 to 34, is based upon the Pythagorean golden section. Which is a reciprocal relationship between two unequal parts of a whole in which the small part stands in the same proportion to the large part as the large part stands to the whole. The horizontal lay out of the orchestra is planned on the pentagram, a Pythagorean symbol for health.⁸

The perfection of the geometrical arrangement of seats, results in many early reflected sounds being received by all listeners in the auditorium almost together with the direct sound. The lower part of the auditorium circle extends to 210 degrees and the upper part to 192 degrees. The central sections of seats have their focus at the centre of the

8. – Armin von Gerkan und Wolfgang Müller. *Das Theater von Epidauros*. Wiener Kohlhammer Verlag Stuttgart 1961.

– A Fossum: *Harmony in the Theatre of Epidauros*. *American Journal of Archeology*, 30. 1926. p. 70–74.

– W Lepik: *Mathematical Planning of Ancient Theatres*. *Travaux de la Societé des Sciences et des Lettres de Wroclaw, seria A*, no. 22, Wroclaw 1949.

orchestra. But the extensions of the radiating aisles of the two wedges of seats, at either side below the diazoma, have their focal points located at either side of the centre of the orchestra. This seating layout with three foci has the important acoustical effect in that there is a much less pronounced echo tone near the centre of the orchestra than in theatres where the rows of seats are located on perfect circles with only one common centre at the middle of the orchestra. In cross-section, the tiered seating is inclined at an ever increasing angle as it recedes from the orchestra towards the back of the auditorium. An imaginary straight line drawn from back to front passes over the concave curve of the seating below. On plan, the tiers of seats are also curved giving the auditorium the form of a shell. The audience is held together in this shell, or bowl like form, as close as possible to the orchestra. This form retains sound, minimizes the sound energy loss during sound production and facilitates resonance. It also ensures that spectators' lines of view are unobstructed by the rows of people in front of them. The perfection of the geometrical arrangement results in the acoustical and visual excellence.⁹

9. – R Shankland:
Acoustics of Greek
Theatres. *Physics Today*,
Oct. 1973. p. 30–35.
– F Canac: *L'acoustique
des theatres antiques*.
Editions du centre national
de la recherche scientifique.
Paris 1967. p.173–175.

Both visual and acoustic criteria dominate the design of the theatre. Reflected sounds reach the listener within 50 milliseconds after the initial sound, and a consonance phenomenon is generated. It produces in the listener's consciousness a single acoustical image of greater intensity and enhanced quality than that of the direct sound alone.

The lines of the auditorium converge in the area of the orchestra, where the focus of the *thymele* at the centre of the orchestra has a magnetic force. This focused space produces an enormous concentration of the spectators who all look downwards being focused and at the same time, being able to see the fellow citizens. The Greek theatre, in general and Epidaurus in particular is a democratic space that permits the creation of the union of the audience in a common body. A space that permits its inhabitants to contemplate together, a space based upon the unity of thought and emotion. The actors can not look away from the audience or over their heads. The actors are in full contact with the audience and get energy from it without being in a dominant position, but more in a position of unity with the audience, embraced by it. The thea-

the architecture focuses the audience, centers the bodies of the actors and unites them in a common body. It becomes clear that the interest the Greeks developed in the acoustics maybe surpass the plain level of simply hearing and understanding the dramatic texts.

It shows a will to create a theatre building that can function as a great musical instrument oscillating in harmony with the human voice.

Theatres were modifications of the landscape and not impositions – and always conceived in consideration of the view of the surrounding landscape. The open-air theatre and the landscape co-existed in a dynamic balance.

Theatron, the unity created by the space of the actors and the space of the spectators, was always a part of the landscape, a part of a network of already existent spatial relationships. The space of drama is the orchestra and the stage. The auditorium is the watching place of the spectator who simultaneously watches and contemplates both upon the action in the space of the drama and upon another space, a space beyond drama, the surrounding landscape. The landscape becomes the container of the drama, a space beyond dramatic narrative in progress; a landscape where drama is imbedded in a greater narrative of divine presence.¹⁰

The relation between *theatron* and its surrounding landscape is based upon the construction of a double space, where the one is dramatic **and focused and the other is beyond drama, panoramic and contemplative**. A double gaze is developed where drama and conflict is imbedded in the contemplative presence of the sacred landscape.

The theatre of Epidaurus is part of a complex of buildings situated in the nearby valley. They all belong to the sanctuary of Asclepius the god of health, medicine and healing. It was the most famous medical and healing centre during Antiquity with baths, springs, temples, libraries, hotel, restaurant, and stadium. The healing process was based upon the cathartic power of the water and the presence of the god in the dreams of the diseased.¹¹

The mountains surrounding the theatre and the valley are: on the northern side of the valley the mountain of *Arachneon* which was one of the residences of Zeus and Hera, on the northern side of the valley but nearer to the

10. Susan Guettel Cole : "Landscapes, Gender, and Ritual Space", University of California Press, Berkeley 2004.

11. Charitonidou, Angeliki: *Epidaurus To Iero tou Asklepiou kai to Mouseio*. Kleio Editions, Athens 1978.

sanctuary the mount *Titthion* where Asclepius himself was born, on the south east side of the valley the mountain of *Kynortion* where *Apollon Maleatas*, the father of Asclepius, was born. On the southern side of *Kynortion* we have the mountain of *Koryptheon*, the residence of Artemis. This gives us a hint about how a space might be perceived as a sacred and spirited landscape.

The experience of the audience seems to be marked by these two aspects, the intensive soundscape and the double space, dramatic and contemplative.

ACTOR, CHORUS, VOICE AND TEXT

Voice has a natural importance in all oral societies, so it is quiet natural that ancient Greek society relied heavily on oral expression. The Athenians, specifically, were famous for their love of speech, which in its many forms played a crucial role in constructing civic identity. To be a citizen meant to participate in the speech of the city in court, at the agora and at the Assembly. The Homeric epics were recited and the skills of rhetoric were developed and employed in public speaking – political discourses, courtroom argumentations, symposia declamations, festival addresses, funeral eulogies, victory orations, theatrical speeches. Society was permeated by the speech, the word, the voice. As actors and spectators in the theatre festivals and all the arenas of public life, the Athenians, were spectators of speeches and the skills required for actors and orators were strong voices, capable of modulating volume, pitch, and rhythm.

The structure of the dramatic texts are complex and is certainly inspired by older forms. The tragedies embrace and reorganize forms from the epics, lyrical poetry, hymns, and wedding, funeral and victory songs. They are also influenced by political debate, speeches in trials and city meetings, of rhetoric and philosophy. The dramatic texts are written for a chorus, actors and musicians and theatre was the child of a brilliant oral culture which was built on the power of the spoken word.

Standards were demanding for both the chorus and particularly for the actors. They should be able to speak and recite as well as sing. They had to master music and dance because the

Greek theatre was not merely a speaking theatre but a theatre of highly rhythmical text and music, even though the exact nature of tone intervals and of Greek musical scales is not known precisely. The actors trained their voices, extended their vocal range and improved their articulation. The voice had to be flexible in order to embody different persons and express emotions.

Plutarch wrote that it was important that the actor's voice should command a wide register of emotions and temperament. He also wrote in his biography of Demosthenes, the great rhetorician, about the lesson Demosthenes learned from Satyrus, the actor who showed to him how the appropriate sentiment and disposition changed totally the perception of the speech.¹²

All choruses were made up of men who were free citizens. They were amateurs who had to practice their singing and dancing skills. Chorus training was rigorous – almost military in nature, which is perhaps why research has coupled chorus practice with military training.¹³

The chorus members were provided with food and daily wages during this period, which might last longer than six months. The tragic chorus had twelve to fifteen members and the comic chorus twenty-four. The first actors were initially the authors of the works, but gradually acting developed into a separate profession. Actors were all men and free citizens. They were called *hypokrites*, which means he who gives answer, he who responds but the word implies also an interpreter "...as of omens and oracles."¹⁴

Aristotle gave witness to actors' voice exercises and the fasting that preceded training and performances.¹⁵ And according to him, the art of the actor is founded on the voice. *Hypokrisis* "is a matter of voice, as to the mode in which it should be used for each particular emotion; when it should be loud, when low, when intermediate; and how tones, that is, shrill, deep, and intermediate, should be used; and what rhythms are adapted to each subject. For there are three qualities that are considered – volume, harmony, rhythm. Those who use these properly nearly always carry off the prizes in dramatic contests".¹⁶

Performers were required to have an attractive, unforced, harmonic and musical voice, clear articulation and great adaptability. The voice was the theatre's most important

12. Plutarch: Demosthenes. vii. 1–3. Loeb Classical Library, p. 17–18 Harvard University Press, 1982.

13. J Winkler: Nothing to do with Dionysos? Princeton University Press, 1990.

14. David Wiles Mask and Performance in Greek tragedy Cambridge University Press 2007, p. 179.

15. Aristotle: Problems. xi 22. Loeb Classical Library, p.267 and. xi. 46. p.285, Harvard University Press, 1982.

16. Aristotle: Rhetorics. iii. 1404 b,4. Loeb Classical Library, p.353 Harvard University Press. London 1983.

instrument, “for words are imitations and the voice also of which all our parts is best adapted for imitations”.¹⁷

17. Aristotle: Rhetorics. iii. 1404 a, 25. As above.

The three voice qualities Aristotle considered vital – volume, harmony, rhythm are especially important for communication in outdoor theatre.¹⁸

18. Thanos Vovolis; Prosopon. The acoustical mask in Greek tragedy and in Contemporary Theatre, Dramatiska Institutet, Stockholm, 2009 p 149.

THE MASK

All theatrical forms that developed in Athens during the 6th and 5th centuries BC, whether it is tragedy, comedy or satyr plays, were forms of masked drama, i.e. the actors always performed wearing masks.

Ancient Greece was a civilization rich in masked expression and before the invention of the theatre masks were used in rituals connected especially with the cults of Dionysus, Artemis and Demeter. Gods that defined and guaranteed the limits of civilization and guarded the passages between the Civilized and the Savage, between the Self and the Other.¹⁹

19. Jean–Pierre Vernant: “Figures, idoles, masques”, Julliard, Paris 1990

Ancient testimony attests that the shift from preexisting narrative modes of rhapsodic contests and oral epic to the new poetic species of dramatic mode was made in mid 6th c BC.

Masks had never been used in epic performance before and were until then associated only with rituals connected to the cults of Dionysus, Artemis and Demeter.

20. Aristotle Poetics V 2-3 Loeb Classical Library No. 199 .Translation Stephen Halliwell, 1995

According to Aristotle no one knows who introduced the comic masks but he implies that the tragic mask was introduced at a specific historical moment.²⁰

It seems that the radical innovation of dramatic impersonation needed the mask as an agent of the transformation of the actor in a way that the human face was obviously inadequate to achieve. Mask was an object endowed with agency, engaged in a process of becoming “other”²¹.

21. David Wiles :”Mask and Performance in Greek Tragedy”. Cambridge University Press, Cambridge, 2007 p 237-260

An object which has the inherent power to become a subject .The masked gestalts were epiphanies in human form of the mythological figures of the past emerging into the liminal space of the theatre “...for purposes of *theoria* in honour of a god”²²

22. David Wiles Mask and Performance in Greek tragedy Cambridge University Press 2007, p. 247

So, the mask was “reinvented” for the stage and became one of the defining elements of its theatricality.

Prosopon

The word used in 5thc Greece to connote mask was *prosopon*, the same term for face. *Prosopon* means that which is before the eyes, between eyes that see each other, face– but also dramatic persona, mask. The word contains the relationship between two subjects, pointing towards a dialogue, a reflection, contemplation, a meeting or an opposition with the other. In the mental universe of Ancient Greece there was no distinction between the mask and the face.

There is not a single theatre mask surviving from classical times, which indicates how fragile they must have been. Theatre masks were probably made of perishable materials much more easily decomposed than ceramics, the material which was used at least for some of the masks for the rituals performed in honor of Artemis and Dionysus.²³

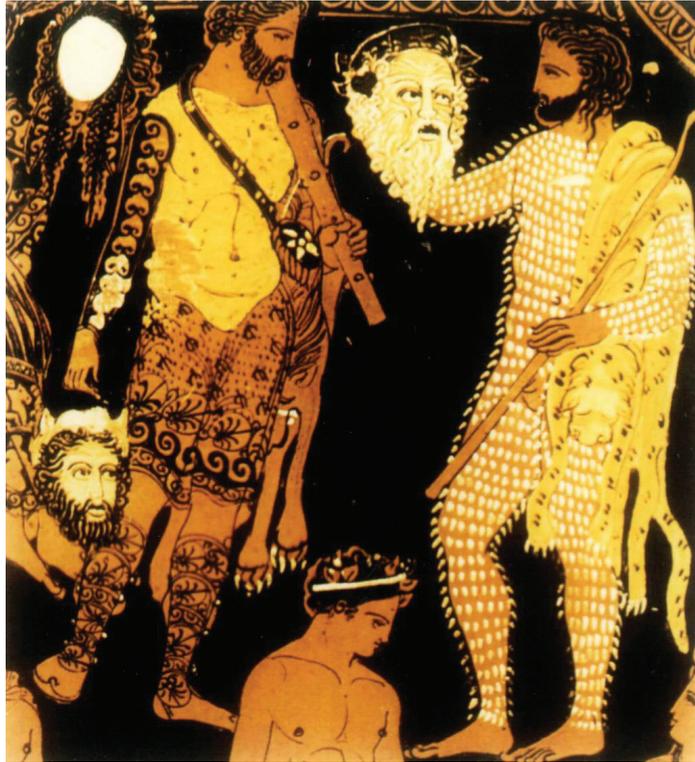
Our information about the masks comes then from secondary sources; images of theatre masks painted on ceramics, marble reliefs and ornamental marble copies

We have also some doubtful information about ancient Greek theatre masks from Pollux's *Onomasticon*, an encyclopedia written during the Roman times and Suida's *Lexicon*, an 10th century Byzantine encyclopedia. Masks, it is said, were made of linen cloth dipped in plaster which was then laid in moulds or pieces of textile glued together.²⁴

The representations of masks and theatre scenes during the 5 and 4th centuries BC show masks that covered the entire head and were closely fitted to it. They were not much bigger than the human head, and had a very intense, concentrated, extroverted expression without pronounced facial features or physiognomic traits. The masks had rather small mouth and eye openings. On the masks depicted on ceramics, both the whites and the pupils of the eyes are painted, suggesting that the eye holes of the original masks were as small in size as the pupils of a living person. These early masks had no elaborate coiffure. It is assumed that the hair of the masks was made by linen, or that animal or human hair was used. The masks of the main figures, choruses of tragedy and satyr plays had the same appearance.

23.R.M. Dawkins, *The Sanctuary of Artemis Orthia at Sparta*, *Journal of Hellenic Studies*, supplement no. 5, London, 1929 Chapter XII, London : MacMillan and Co., Limited, 1929.

24.Aristophanes: "The Frogs", *Loeb Classical Library*, London, 1950 p. 406.



The masks of members of choruses in satyr plays were satyr masks, having flat noses, horses' ears and red faces and the masks used in comedies were grotesque caricatures or images of animals as required by the texts.

Winning actors dedicated their masks to Dionysus. Presumably those masks which were not damaged were saved for use in the following year's festivals, however, considering the number of roles played each year and the individual needs of the actors it is obvious that the mask makers, *skeuopoioi*, were kept busy.

The mask form that covered the entire head dictates some important functionalities. Before presenting the masks' mental and corporeal influence on the performer and the acoustical properties that emerge from the form of the mask I would like to present another important connection between voice and mask. The connection between the cries and the facial appearance of the tragic mask.

The Cries and the facial appearance of the Mask

In all the dramatic texts we find words which are actually shouts, cries and wails; sound formations that translators strive in vain to explain and interpret. In English translations they often found as “alas!” or “woe!”. The words mean nothing in themselves. These cries are special forms of breathing for the communication of the great emotions – sorrow, pain, rage, joy. They are sound forms that mankind has used from ancient times to express feelings, communicate, pray to the gods and frighten enemies. They are archetypal ritual forms which have no linguistic meaning but which correspond with different feelings and spaces in the body. They lead to emptiness, ecstasy and catharsis.

The cries not only played a large role in the theatre, but were of course much older than the theatre and played an important role in social and religious life. They were used to bring about a state of ecstasy, to come into union with the god. They were extant throughout the Asiatic and Greek worlds. However, the cries are most often associated with the cult of Dionysus. Iacchos, Iacchos, Iaochos, Iachos was the name of the divine child of Persephone and Zeus, who together with Demeter and Persephone were celebrated in the Eleusinian mysteries. Iacchos is identified as the young Dionysus.²⁵

There was also a festival in Athens called Iobacheia. It seems to have been a women’s festival dedicated to Dionysus, was held under the auspices of the city.²⁶

We also know of Iobachoi, male associations under the protection of Dionysus, and presumably the shared experience of ecstasy was important. Parts of the archives of one of these clubs, Iobacchoi in Athens, are extant and we learn from them that members took part in a sort of mystery play about Dionysus and that they used the ritual cries *ιω ιω ιου ιου*.²⁷

Iobacchoi was also the name of a poetic form originating in Ionia. It was dedicated to Dionysus and was intended to be sung at the beginning of a dithyramb.²⁸

C. Theander traced the origin of the word Ionians, the name of one of the four Greek folk groups, from the cries *ιά,ιω*- iota alpha, iota omega.

He claimed that the Ionic rhythms and Ionic music had a distinctly orgiastic and ecstatic character and that devotees

25. P M C Forbes-Irving: *Metamorphosis in Greek Myths*. Clarendon Press, London 1992. p. 69–72 & 211–216.

26. H W Parke: *Festivals of the Athenians*. Thames and Hudson, London 1977. p. 65– 69.

27. L Moretti: *Il regolamento degli Iobacchi Ateniesi*. In the volume: *L’association dionysiaque dans les sociétés anciennes*. École Française de Rome 1986, p. 247–254.

28. H Jeanmaire: *Dionysos. Histoire du culte de Bacchus*. Payot, Paris 1951, p. 65, 306–307, 340, 536.

29. C Theander:
Ololygai und Ia. Ein
Sprachanalytischen Beitrag
zur Geschichte der Ägäisch
– Hellenischen Kultur.
Del i, Vol. xv, 1917, p.
94–160. Del ii, Vol. xx,
1921, p. 1–50. Eranos,
Acta Philologica Sveca,
Gothenburg.

emitted these ritual cries unconsciously during moments of rapture. Eventually they were incorporated in religious ceremonies and rituals as a means of stimulating ecstasy.²⁹

It is obvious that the cries are the archetype, the original archaic form, for prayer and appeal to the gods. They lead mankind to ecstasy, to experience the presence of the gods and to union with the gods. The cries are linked, in particular, with Dionysus and the ritual theatre of classical antiquity incorporated them in its texts and performances.

The cries and the texts

The cries are often repeated twice, sometimes four times. They are so placed in the text so that one is given time to bring them forth. They are always to be found at the most dramatic moments – at times of intensity and in great emotional outbursts evoking an enormous range of emotional connotations.

Texts that follow the screams may express complaint, sorrow, despair, fear, hate, rage, agony, entreaty or great joy. Here the human emotional state is so overwhelming that speech dissolves into cries. The cries open up the body to express these feelings so that the text may be heard in full force.

The change-overs between recitation, song and cries create constant transformations and the text finds itself in perpetual flux, like a living organism.

When one considers the number of cries to be found in the dramas, one can imagine what immense power, energy and intensity they can create in a performance. We get some idea of the forces released in a performance swinging between order and total chaos.

When the performer adopts the appropriate corporeal form required to produce such cries he/she becomes a resonance chamber for these primeval, archetypical, thousand-year old sounds which are expressions common to many cultures. The cries are a path to emptiness and to the metamorphosis in which the actor is transformed and expresses raw archetypical emotions. He/she can express joy, grief, fear, rage, and generate such feelings in the audience, as they resonate with him/her. We can view the body as a resonance chamber for the voice, but also a sounding board for the feelings, they too being vibrations in the body. Buried emotions dwelling in the body may be recalled by the voice vibrating, resonating, in the spaces in which the emotions are hidden, but

first the conditions must be created which will enable the body to vibrate. Then the body may act like a musical instrument in which different resonance chambers call forth different emotions. The actor can adopt certain physical attitudes, corporeal forms which will lead the voice to resonate in these inner spaces. The human voice possesses forces which are seldom released.

In my research³⁰ I have suggested that the cries and especially the cries with the vowel iota *ιώ,ιά,ιή,ιοί, ιού,ιό* create during its peak performance a tremendously high and loud tone. It stabilises and flows from the fontanelle high up on the head and out into space. This iota passes through all matter. Plato writes in *Cratylus* : “*Iota again, he employs for everything subtle, which can most readily pass through all things*”.³¹

It is this process which causes the metamorphosis in the appearance of the face of the performer. A metamorphosis occurs; an ecstatic state of mind is mirrored on the human face. The utterance of the cries creates a state of emptiness and the expression on the face is an expression of this emptiness. To be more precise, this is not about expression. It is not an expression of an emotion as rage, joy, sorrow, etc. No, in this case very specific changes in the face occur – the eyes are unfocused, slightly squinting, there is tension and concentration in the forehead, the mouth is open, the tongue free and the jaw muscles are slack. The neck is stretched and the chin drawn in so that the face is directed forward and the entire face radiates a great intensity and presence. The face is expressionless; it exists in a state – a state of emptiness and presence.

30. Thanos Vovolis
Prosopon. As ovan.

31. Plato: *Cratylus*. 426.
p. 145. Loeb Classical
Library. Harvard University
Press, London 1988.



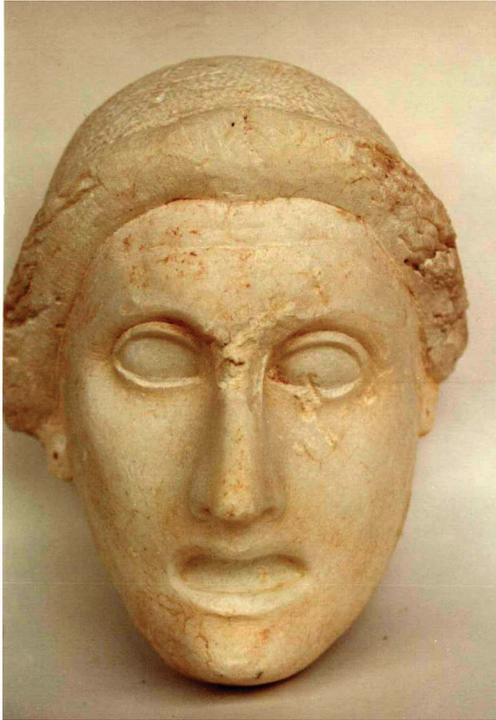
I call this state kenosis, which in Greek means emptying, emptiness. In kenosis a feeling of inner stillness and lightness occurs; a widening of consciousness, presence and control is experienced. It is akin to standing outside oneself and watching oneself objectively. One feels free and later, cleansed and renewed. Kenosis and ecstasy lead to catharsis.

I have observed that all the cries generate the same kenosis, but the *iota* brings about a special tension in the forehead, in the area above and between the eyebrows. The whole process may be accomplished standing or walking, but this requires greater control to maintain continuous contact with the force of gravity and simultaneously remain in ecstasy—move from the given position.

Investigating further the state of kenosis in the human face I found out that almost the same appearance, with different intensity of course, becomes visible in the face when the person is in a state of total concentration on one single point, a point or a goal outside him/her self. Athletes at the peak of their efforts we can see that their faces radiate great intensity and presence. The faces are expressionless, in a state of alertness, focusing at a point outside oneself, a state of total presence, a state of emptiness. Total emptiness is thus total presence.



The facial appearance of the Greek theatre masks and especially of the tragic and satyr play masks of the classical era is a representation of this body/mind state of being created by the voice—or more specifically—by the cries.



The tragic mask represents the body/mind state of kenosis and this is the state of mind the actor has to embody on stage and the particular way that the actor has to relate to his consciousness on stage. I define the theatre mask as the mask of kenosis.

We may as well use the word ecstasy and call the masks, masks of ecstasy. *Ek-stasis* means to leave, to come away from a given position and “... *stasis* signifies the negation of motion”.³²

Since the word implies both literally and metaphorically the concept of movement, I prefer to use the mask of ecstasy to define the “total mask”, the gestalt created by the costumed and masked performer on stage and in action.

Moving on, another important aspect of the mask that influences the acoustico-visual perception of the performer is the small eyeholes of the Mask.

32. Plato: *Cratylus*. 426. p. 145. As ovan.

The Small Eyeholes of the Mask

As I have already mentioned the masks had rather small mouth and eye openings. On the masks depicted on ceramics, both

the whites and the pupils of the eyes are painted, suggesting that the eye holes of the original masks were as small in size as the pupils of a living person.

The small size of the eyeholes affects the field of view and play a significant role by functioning as lenses for the gaze of the actor. When peripheral vision is lost and as the gaze is directed through this construction, the optic field becomes very narrow and after a while the actor has the feeling that he is looking through a single eyehole – a ‘third eye’ – placed in the area between the eyebrows.

The strong extrovert direction given by the new field of view promotes an increased awareness of the body’s axis, the spine and the pelvis. This construction puts the actor in a meditative state and he develops a more conscious feeling for the body’s axes, the spine (vertical) and the pelvic area (horizontal). The actor becomes more aware of a series of physical actions such as the angle of the head, the drop of the shoulders, the position of the spine and the pelvis. This awareness influences the control of the voice because all the above are closely related to the production of a powerful and free voice. Minimizing the range of vision induces a sharpening of other senses resulting in a maximizing of bodily awareness.

But the minimisation of sight leads in particular to a maximisation of listening to the other actors, enabling a different awareness of their presence based not so much on seeing but on hearing. It leads the actor to the act of akroasis (conscious and active listening)

Vision and hearing are interconnected and the change of the one affects the other. But the most acoustically important aspect of the mask is its function as a resonance chamber for the voice of the performer.

A Resonance Chamber for the voice of the Performer

The mask encloses the entire head and this form creates an extra resonance chamber for the voice of the actor. An acoustic phenomenon is produced in the space between the actor's head and the mask. This effect has been described by the Roman architect Vitruvius in his book “De Architectura” where he describes the architecture of the Greek theatres, as consonance; the only positive acoustic phenomenon that oc-

curs in Greek theatres: *“The Consonant(sounds) are those in which it is supported from below, increases as it goes up, and reaches the ears in words which are distinct and clear in tone”*.³³

W. C. Sabine, who translated Vitruvius terms to modern nomenclature, writes: *“For consonance, we have unfortunately no single term, but the concept is fundamental”*³⁴ adding later that *“consonance is the process whereby due to suitably placed reflecting walls the voice is supported and strengthened, it is the one acoustical virtue that is positive”*.³⁵

When sound strikes a surface which is far from its source its reflection time may be so long that the reflected sound returns to a listener who is still hearing sound direct from its source. The reflected sound mixes with the direct sound and overlaps it. In speech, what happens is that syllables overlap making words difficult to understand. If, however, there is no resonance we experience sound as dead and dry, the space seems lifeless and listening is neither interesting nor attractive. But when a reflection surface is near the sound source, the reflection time is so short that the reflected sound reinforces the direct sound from the source. Regarding the effect on speech of the acoustic resonance mask, the interval between direct speech and its echo is so short that the echo boosts and gives force to the direct speech. Instead of an audible and confusing overlap of syllables, the voice is amplified and the words are distinct. *“Two identical waves arriving at the same point at the same time combine to produce the sum of their effects”*.³⁶

So the most appropriate word for the acoustic phenomenon that occurs in the mask is not resonance but consonance.

The mask creates consonance and amplifies further the natural head resonator of the performer. The whole body is capable of resonance but the most important resonators are the head resonators because they produce harmonics that can easily pierce through space. The mask becomes an instrument for the actor to control the volume of the voice, the direction, the rhythm, the articulation, and the tone. This helps to achieve maximum resonance for each vowel and clear definition of the consonants, which is crucial in large spaces, because the energy content in consonants is small and they are easily muffled, although they are critical for speech intelligibility. One experiences a different quality. The speech becomes richer, attractive, alive, enjoyable and even one's surroundings are experienced in the same way. The mask be-

33. Vitruvius: The Ten Books on Architecture. Chapter viii, On Acoustics. Harvard University Press 1914. p.153.

34. W C Sabine: Collected Papers on Acoustics. Harvard University Press 1923,p.163.

35. W C Sabine: As above. p. 197.

36 .29. R Berg & D Stork: The Physics of Sound. Prentice Hall, USA 1982. p.41.

comes the actor's own resonance chamber and its use gives life to the entire theatre space. Consonance generates a living and pleasant space but it also endows the voice with a clarity that is necessary for communication with an audience. The mask also helps to achieve this desired and essential clarity by making consonants more distinct. The sounds of human speech consist of consonants and vowels. Vowel sounds are a blend of several sound wave frequencies. In certain vowels, "i" and "e", high frequencies dominate, while others such as "a" and "o" are dominated by lower frequencies. Vowels with lower frequencies require a larger space in which to resonate and do so in the lower parts of the body, such as the chest. However, many consonants, "d, b, v, z, l, m, n and r", in which high frequencies dominate, resonate in the head. The high frequencies in speech sounds play an important role in the communication of content and meaning and these high frequencies are important components in the structure of consonants. This is why the consonants are so important in the understanding of speech... how they strike the mask... how the consonants become strong, clean, vibrant, both in the head and in the mask. Consonance and speech comprehension create highly effective and pleasing communication and a living, vibrant space.

So, apart from the obvious change of the visual appearance of the performers, the masks also alter the acoustic characteristics of their voices. Therefore, both from the spectator's and the performers' point of view the masks significantly modify the acoustic events and inevitably transform the overall theatrical experience. The theatre mask apart from giving the performer a new face was also giving him a new voice and a new self sound perception.

Measurements of the acoustic radiation properties of masks.

It has never been conducted any extended study providing acoustic measurements of reconstructed ancient Greek theatre masks with the above mentioned characteristics

Together with the Laboratory of the Electrical and Computer Engineering Department, at the University of Patras³⁷, Greece we collaborated to conduct a series of experiments in order to measure the corresponding acoustic characteristics of the masks.

37. Audio and Acoustic Technology Group, Wire Communications Laboratory of the Electrical and Computer Engineering Department, at the University of Patras, Greece under the head of professor John Mourjopoulos.

A series of masks were created and a KEMAR manikin was used under semi-anechoic conditions. The acoustic impulse responses were measured both from the listener's and the speaker's point of view and the obtained acoustic measurements, provided insights on the perceptual impact of the masks' employment.

We presented the first results of our collaboration at The Acoustics of Ancient Theatres Conference at Patras, September 2011³⁸ and the results show that (i) the mask realises an angle-dependent acoustic filter, (ii) the acoustic radiation of the actor's voice is significantly enhanced for the off-axis scenarios and (iii) the mask significantly boosts the actor's own voice in the entrances of his own ear canals. These preliminary results are in line with the reports of the performer and audience experiences I have already discussed.

From the scientific results, appears that these masks have an angle-dependent filtering radiation effect and in general, they would enhance projection and possibly speech intelligibility for the off-axis angles for the actor's voice. Furthermore, they significantly modify the actor's self-voice perception.³⁹

These results are a first step towards a scientific understanding of the acoustic properties of ancient Greek theatre masks, and during the year 2012 we continue our collaboration with the creation of a new series of masks and new measurements trying to answer questions that arose during the first phase of our common work. Questions about what was the acoustic coupling between the mask and the ancient theatres and how would effects benefit the actor's voice reflections on the stage walls when he was located on the stage (*proskenion*) i.e. at acoustically more adverse positions

38. The Acoustics of Ancient Theatres Conference, Patras, September 18-21, 2011.

39. http://www.wcl.ece.upatras.gr/audiogroup/publications/Ancient_masks_TsilfidisEtAl.pdf.

THEATRE AND CATHARSIS

As we saw all the parts that constituted the ancient Greek theatre from the architecture to the text, acting and masks have acoustic aspects. One might think that the Greeks interest for the voice and for acoustics was excessive were it not for the fact that this interest was coupled to another aspect of speech, music and sound. In Greek culture knowledge was conveyed primarily by speech. Speech was the bearer of the

myths, history, the epics, philosophy, poetry, the whole cultural continuum, but it also had another function.

The word held therapeutic powers. There is evidence that from the time of Homer the Greeks used prayer (*euché*, magic spells and *epodé*, invocations) and encouraging exhortations (*terpnós*, *thelkterios* logos) for therapeutic purposes.⁴⁰ These magical formulas, these mantras were recited, sung and noted down and put into amulets. They were used to cure sickness and mental disorders and to give psychosomatic cleansing – catharsis. They are found in the Orphic teachings and with the Pythagoreans, in Hippocratic medicine, in the Eleusinian mysteries, in the cults of Asclepius and Dionysus. They were known to Plato and Aristotle. The formulas were usually coupled to the healing power of music. Word and rhythm were interlinked; they formed a rhythmic musical entity. Sicknesses were cured, but above all isonomia, psychosomatic balance, was achieved. Depressions, grief, rage, negative feelings were relieved and happiness was bestowed. “*in the case of Aristotelian verbal catharsis the action of the word is so intensive that it operates as though the speech itself were an actual medicament*”, writes P Lain Entralgo.⁴¹

In *Politics* 1341–1342 Aristotle describes the cathartic power of music and in *Poetics* 1496 he notes that the tragedies have the same power. By engendering feelings of sympathy and fear, the tragic texts bring forth catharsis. We may therefore assume that the performance of the tragedies, combining the powers of speech and music with that of the text, stimulated similar feelings of cleansing in an audience. There is yet another aspect of catharsis – the feeling of cleansing which may be experienced through the pulsating rhythm of the human voice and music, through the vibrations of the body of a fellow human being. The great interest for acoustics supports the credibility of this assumption. I suggest that this interest goes far beyond concern that what is said should be understood. The verbal was a visceral act and perception resided firmly in fused sensual experience which overwhelms any subsequent process of cognition. It is indeed reminiscent of modern research into the therapeutic effects on the body of music, sound and vibration.⁴²

We can see then that text, voice, song, music – most of the elements of the performance – can have therapeutic effects which not only stimulate intellectual, moral and aesthetic cleansing but above all grant psychosomatic catharsis.

40. P Lain Entralgo: *The Therapy of the Word in Classical Antiquity*. Yale University Press 1970.

41. P Lain Entralgo: *As above*. p.245.

42. – Barbara L. Wheeler: *Music Therapy Research*, Barcelona Publishers, 2005
– David Aldridge: *Music Therapy Research and Practice in Medicine*
– Jessica Kingsley edition 1996
– Richard Gerber: *Vibrational Medicine*, William Morrow Paperbacks 2001.

Dionysus the patron of the theatre was, after all, the great specialist in catharsis. He led his followers to catharsis through ecstasy, hallucinations and intoxication. He was the liberator, the source of health, the therapist. It is clear that the experience of cleansing was central in the Dionysian rituals. The description of the effects of Dionysian initiations by Aristides Quintilianus, the Greek author of an ancient treatise on music *Peri Mousikes*, who probably lived in the third century AD may be said to apply to the theatre: “*This is the purpose of Bacchic initiation, that the depressive anxiety (ptoiesis) of less educated people, produced by their state of life, or some misfortune, be cleared away through the melodies and dances of the ritual in a joyful and playful way*”.⁴³

As Burkert writes in his book *Ancient Mystery Cults* in this description there is a social aspect of the cleansing process. It was especially important for the uneducated poor because *ptoiesis*, a feeling of tiredness, depression and lack of vitality caused by a difficult social situation, or an accident could be alleviated with the help of ritual song, music and dance. Well-being, happiness and the will to live returned. Perhaps this applied to the tragedies and theatre because they were both founded in the body, in physicality. They did not only stimulate intellectual or aesthetic pleasure, but also an entirely physiological mode of appreciation ;an immediate, visceral cognition, an embodied knowledge.

Greek interest in acoustics and in the human voice could be due to sound as a major creational and healing form. Modern research describes the World and the Cosmos in terms of Rhythm and Sound. Sound consists of vibrations or oscillations in particles and these vibrations are found throughout the Universe.⁴⁴

On a macro- and microcosmic scale, sound is a universal and invisible force which is always present and actual. These insights stemming from discoveries in physics suggest that the Earth and the Universe-organic and inorganic, plants, animals and human beings-not only produce vibrations but are in fact vibrations, as vibrations exist in both waves and particles. Actually, Material is vibration in proportional relationship-that is rhythm and sound. Sound causes changes on the physical, the emotional, mental and spiritual plane. The human body is formed in harmonic proportions and can be likened to a very complex, unique and finely tuned musical instru-

43.W Burkert: Ancient Mystery Cults. Harvard University Press, Cambridge, Massachusetts, 1987. p. 113.

44.Mine Takeuti , Dimitar D. Sasselov Editors: Stellar Pulsation .Nonlinear Studies (Astrophysics and Space Science Library, Volume 257, Kluwer Academic 2001.

ment. The human voice always produces a base tone containing overtones that are harmonic frequencies. Harmonic resonance, when the overtones are in harmonic proportion to the base tone, is a way of creating and maintaining good physical and mental health.⁴⁵

This way of perceiving the world can be applied to the Theatre . Sound is a force and a basic component in theatre. Theatre is both a visual and an acoustic phenomenon and encompasses several art forms. In many cultures theatre is synonymous with music and dance. Western theatre is mainly based on text and dialogue, and for sometime now it has been dominated by a psychologically realistic attitude. This has resulted in the fact that knowledge of, and expressive use of, sound /voice/acoustics are under-developed in the mainstream of modern theatre .In contemporary theatre Character and Plot are still two dominant categories appealing to the logical and emotional level of the audience and its desire to understand and feel. Both are connected with the semantic levels of language but they do not necessarily awaken the other more subtle levels of human consciousness that I suggest theatre did for the ancient Greeks. The fact that the theatre was a highly political art form of social discourse which was developed during the creation of the Athenian democracy doesn't mean that we have to neglect its ritual, religious/cosmological and cathartic aspects.

The political and the religious /ritual aspects coexist; as also the agonistic and cathartic aspects do. Some parts address the intellectual perception and conscious understanding of the audience and other parts address an unconscious perception which is based upon bodily osmosis in order to affect an audience on a sensate level and produce a visceral experience.

I understand these oppositions as complementary parts and not mutually exclusive. The tension created by the opposites is the most creative relationship that is developed when we try to embrace the differences and keep the tension in between them.

Based on the energy of logos and the vibration of sound, and without betraying its semantic and visual aspects, theatre restores the soul and the body. It provides a way to bring people to peace, to restore the body/ mind balance, to purge, to purify, and to heal. It provides a democratic space, a space that through the exchange of energy, osmosis, creates the unity of

the audience and the actor in one body. Theatre becomes the embodiment of the principle of catharsis.

The mask is a indispensable part of the ancient Greek theatre .A political, ritual agonistic and cathartic theatre form based upon the Mask; a masked theatre devoted to the narration of Myth, a theatre where the citizens joined together to form a common body in order to contemplate the World.

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