Ex Ionia Scientia
'Knowledge' in Archaic Greece

International Conference
National and Kapodistrian University of Athens

11-14
December
2016

PROGRAM
ABSTRACTS
PARTICIPANTS

locations, program, participants, abstracts: http://enlightenedionia.siu.edu

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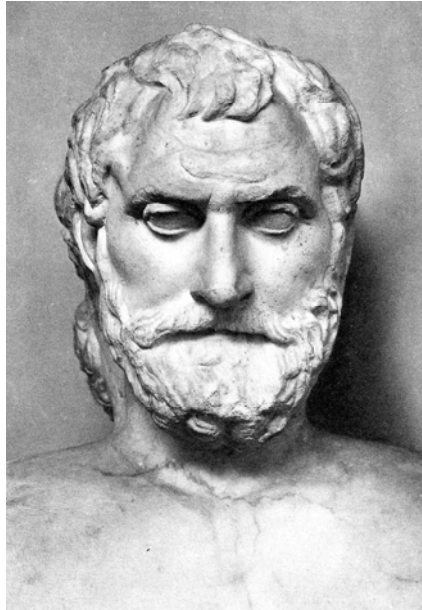
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EX IONIA SCIENTIA – KNOWLEDGE IN ARCHAIC GREECE

INTERNATIONAL CONFERENCE
NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS
DEC 11-14, 2016

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For more information, visit our Website:

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EX IONIA SCIENTIA – KNOWLEDGE IN ARCHAIC GREECE

INTERNATIONAL CONFERENCE
NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS, DEC 11-14, 2016

PROGRAM

SUNDAY 11 DECEMBER
Theocharakis Foundation, 9 Vasilissis Sofias & Merlin Street, 10671 Athens

16:00-16:45
WELCOME ADRESSES/INTRODUCTORY REMARKS
chair: Panagiotis PANTAZAKOS

1) Meletios A. DIMOPOULOS (Rector of National and Kapodistrian University of Athens)

2) Theodosios PELEGRINIS (Former Rector of National and Kapodistrian University of Athens)

3) Marisa FOUNTOPOULOU (NKU, Head of the Department of Philosophy, Pedagogy and Psychology)

4) Elsi BACONICOLA-YIAMA (NKU, Director of the Section of Philosophy)

5) Sotiris FOURNAROS (NKU, Athens)

6) Alexander HERDA (Humboldt University Berlin)

7) Robert HAHN (Southern Illinois University, Carbondale)

16:45-18:15
KEYNOTES

16:45-17:30
1) Andrew GREGORY (University College London)
Anaximander, Cosmology and the Poets

17:30-18:15
2) Alexander MOURELATOS (The University of Texas at Austin)
Xenophanes of Colophon and Heraclitus of Ephesos: the Two Earliest Foes of Anthropomorphism in Cosmological Thinking

18:15-20:00
RECEPTION

all 3 days: "Alkis Argyriadis"auditorium in university mainbuilding, Panepistimiou 30

9:00-10:30

SESSION A: Knowledge of Nature: Cosmology and Astronomy

chair: Andrew GREGORY

9:00-9:30

3) Xenophon MOUSSAS (NKU, Athens, Emeritus)

The Antikythera Mechanism, an Epitome of Pythagorean Philosophy

9:30-10:00

4) Dirk COUPRIE (University of West Bohemia, Pilsen)

Archetypal Images in Anaximander's Phenomenological Cosmology

10:00-10:30

5) Konstantinos KALACHANIS (NKU, Athens)

The Contribution of Anaxagoras in Astronomy and Astrophysics

10:30-11:00   Coffee break

11:00-13:00

SESSION B: Practical Wisdom and Applied Geometry:
                                     Astronomy, Geometry, Urbanism, and Building
                                     Temples

chair: Theodosios TASSIOS

11:00-11:30

6) Andrej LEBEDEV (University of Crete, Rethymno)

Placing the Ionian ΠΕΡΙ ΦΥΣΕΩΣ ΙΣΤΟΡΙΑ in Context: The Role of Seafaring, Navigation and Milesian Colonization in the Birth of Greek Science

11:30-12:00

7) Robert HAHN (Southern Illinois University, Carbondale)

Why Thales Knew the Pythagorean Theorem: Philosophy, Geometry, and Diagrams

12:00-12:30

8) Alexander HERDA (Humboldt University, Berlin)

How a Sage Would Build a City: Thales of Miletos and the Invention of Greek Urbanism

12:30-13:00

9) Thomas Noble HOWE (Southwestern University, Georgetown, TX)

Further Thoughts on the Arrival of the Greek Monumental Orders and the Autodidact Polymath architekton

| 13:00-14:30 | Lunch break |

14:30-16:00
SESSION C: Words of Knowledge: Literacy, Prose, and Poet-Politicians
chair: Joanne WAUGH

14:30-15:00
10) Rostislav ORESHKO (University of Warsaw/Center for Hellenic Studies)
Languages, Alphabets and Literacy in Archaic Western Anatolia

15:00-15:30
11) Elena MARTÍN GONZÁLEZ (National Hellenic Research Foundation, Athens)
Ex Ionia Prosa: Prose Composition in Archaic Ionian Science

15:30-16:00
12) Avgi-Anna MAGGEL (Hellenic Open University, Patras)
Wise Men and Poets in Archaic Greece: Pittacus and Alcaeus in the Politics of Mytilene

TUESDAY 13 DECEMBER:

9:00-10:30
SESSION D: Metallurgy, Earliest Coinage and Isonomia
chair: Alexander HERDA

9:00-9:30
13) Marek VERČÍK (Ludwig-Maximilians-Universität, Munich)
Early Iron Technology in the Aegean: Why do We Always Forget Ionia?

9:30-10:00
14) Ute WARTENBERG (American Numismatic Society, New York)
& Wolfgang FISCHER-BOSSERT (Austrian Academy of Sciences, Vienna)
Early Electrum Coinage – Innovation or Continuity?

10:00-10:30
15) Charlotte SCHUBERT (University of Leipzig)
The Emergence of isonomia *in Ionia*

| 10:30-11:00 | Coffee break |

11:00-12:30

SESSION E: Biology, Medicine, Technology and How to Teach Knowledge

chair: Dirk COUPRIE

11:00-11:30
16) Radim KOČANDRLE (University of West Bohemia, Pilsen)
Anaximander's Conception of Generation

11:30-12:00
17) Elisaveta SHERBAKOVA (Institute of Philosophy, Russian Academy of Sciences, Moscow)
Nature as a Physician: Interpreting a Technological Analogy in Heraclitus

12:00-12:30
18) Theodosios TASSIOS (National Technical University of Athens, Emeritus)
Technology as a Possible Contributor to Ionian Rationality

12:30-14:00 Lunch break

14:00-14:30
19) Ioanna TRIPOULA (NKU, Athens)
Teaching Methods of the Ionian Philosophers

14:30-16:00
POSTER PRESENTATIONS:
chair: Elena MARTÍN GONZÁLEZ

Each poster has max. 10 min to be presented, plus 5 min for questions from the audience

1) Dimitra MERMIGKI (National Technical University of Athens)
*Ornament (*Dia-kosmos*) Between Art Creation and Theory Under the Influence of the Pre-Socratic Worldviews*

2) Lampros PAPAGIANNIS (Aristotle University of Thessaloniki)
Wisdom, Insight and Knowledge in Heraclitus

3) Liliana Carolina SÁNCHEZ CASTRO (University of São Paulo)
Aristotle's Dialectical Procedure on the De Anima*. The Case of Thales of Miletus'* endoxon

4) Anja SLAWISCH (Marie-Curie-Fellow at the Classics Department, Cambridge/UK)
Figures in Motion: De-centring Athens from the Creation of the 'Severe Style'

5) Sebastian ŚPIEWAK (University of Silesia, Katowice)
Was Xenophanes a Polymath? Heraclitus About Xenophanean Notion of Knowledge

6) Eleni TSAMOU (University of Crete, Rethymno)
Heraclitus and Democritus on Free Will and Determinism

20:00-open
Dinner for speakers/posters
location: restaurant "Yiantes", Valtetsiou 44, 10681 Athens

<u>WEDNESDAY 14 DECEMBER</u>

9:00-10:30
SESSION F: Morals and the Philosophy of Man
chair: Avgi-Anna MAGGEL

9:00-9:30
20) William WIANS (Merrimack College, North Andover, MA)
Moral Knowledge in Homer, Hesiod, and Xenophanes

9:30-10:00
21) Michalis KATSIMITSIS (NKU, Athens)
The Subject of Knowledge: Man in Presocratic Philosophy

10:00-10:30
22) Yiorgo N. MANIATIS (Deree – The American College of Greece, Athens)
ΔΑΙΜΩΝ *in Heraclitus*

10:30-11:00   Coffee break

11:00-12:30
SESSION G: *Scientia Ionia* and its Afterlife I
chair: Xenophon MOUSSAS

11:00-11:30
23) Sotiris FOURNAROS (NKU, Athens)
A Modern Reading of Anaximander's Apeiron

11:30-12:00
24) George ILIOU (NKU, Athens)
Presocratics and Current Chaos Theories

12:00-12:30
25) Leonidas BARGELIOTES (NKU, Athens)

Criticism and Transformation of the Conceptions of Nature and Man of Presocratics by Plato and Aristotle

12:30-13:30   Lunch break

13:30-15:00
SESSION H: *Scientia Ionia* and its Afterlife II
chair: Sotiris FOURNAROS

13:30-14:00
26) Pavlos KLIMATSAKIS (NKU, Athens/University of Peloponnesus)
Emergence of Philosophy in Asia Minor– The Hegelian Interpretation

14:00-14:30
27) Apostolos STAVELAS (Academy of Athens)
The Reception of Ionian Philosophy in the Post-Byzantine Thought and During the Period of Neo-Hellenic Enlightenment

14:30-15:00
28) George N.VLAHAKIS (Hellenic Open University, Patras)
The Natural Philosophy of Pre-Socratics in the Framework of Modern Greek Enlightenment

15:00-15:30
29) Ilias VAVOURAS (Aristotle University, Thessaloniki)
Nietzsche and Castoriades's Anaximandrus

15:30-16:00
FINAL DISCUSSION
chairs: Sotiris FOURNAROS, Robert HAHN, Alexander HERDA

FAREWELL

ABSTRACTS

(A) CONFERENCE PARTICIPANTS

(in alphabetic order)

BARGELIOTES, LEONIDAS (National and Kapodistrian University, Athens)

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CRITICISM AND TRANSFORMATION OF THE CONCEPTIONS OF NATURE AND MAN

OF PRESOCRATICS BY PLATO AND ARISTOTLE

The history of Greek philosophy can be considered as a genealogy of the projected positions and counter positions in order to offer a reasonable and justified interpretation of the worlds of man and nature which could secure the coherence and continuity of the philosophical reasoning, on the one hand, and to formulate the necessary interpretative principles for an effective refutation of the opposing positions and arguments, on the other hand. Through out their philosophic approach, Presocratics repeat their steady efforts to give an answer to the opposition between the unity of the world and the multiplicity of phenomena. However, their answers they offered on the problem were diametrically opposite. This is quite evident in their conception Physis and Psyche (soul).
The Presocratics were the first, philosophically speaking, who sought to find some fundamental arche, principle, source, of all things, that is to say, that which is immanent in all and whereby things are what they are, and what they were seeking was the ultimate physis of things.
The continuity through criticism and transformation in reference to Presocratics, however, is achieved by the philosophers, Plato and Aristotle in spite of their different approach as a result of their own different schemata of thought. This can be clearly seen in Aristotle's open criticism of Plato and in the construction of his own answers to the old problems, that is, the coherent and continuous process of thought through criticism and refutation leading to his own alternative conception, better to the adjustment of his master's scheme of thought to his own - and yet to the indebtedness to that scheme at the same time.

COUPRIE, DIRK (University of West Bohemia, Pilsen)

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ARCHETYPAL IMAGES IN ANAXIMANDER'S PHENOMENOLOGICAL COSMOLOGY

Anaximander's cosmology is often described as a bizarre concoction of strange images that has nothing to do with observational data. In this paper I would like to make two different but intertwined points. In the first place, I will examine an underestimated aspect of Anaximander's thinking, namely some images he uses in his cosmogony and cosmology. I will show that these images are not the result of a bizarre fantasy. They are never arbitrarily chosen. On the one hand they refer to things from daily life, but on the other hand they reflect deeply rooted

archetypes. Additionally, I will show that he introduced the tilt of the celestial axis in ancient Greek cosmology. Secondly, I will show that Anaximander's account of the astronomical phenomena remains as close as possible to what we can observe directly in the heavens. This is why I would call it a phenomenological astronomy. More specifically, I will show that his interpretation of the phases of the Moon and solar and lunar eclipses, which is usually treated as weird, is a purely rational and stays as close as possible to direct observation.

1. images

1.1. cosmic tree
In the account of Anaximander's cosmogony, it is said that the fire grew around the air that was around the Earth like the bark around a tree. In the commentaries on this text almost always only the word 'bark' (φλοιός) is discussed because it returns in his account of the generation of animals. But we should not forget that the main image is that of a tree (δένδρον). I will argue that Anaximander's tree is the cosmic tree that we meet in several cultures as an image of the axis of the heavens (πόλος).

1.1.1 tilted tree
In other cultures, the heavenly tree is described just as standing upright, but in Anaximander's cosmogony it was broken off (ἀπορρήγνῡμι) and thus tilted. Since Anaximander, the tilt of the heavens in Presocratic cosmology is a returning topic. The cosmic tree is equivalent with the cosmic pillar. What remains after the tree was broken off is the tree stump, the Earth as a column drum (κίονι λίθος) on the one hand, and the heavenly wheels (see 1.2 and 1.3) on the other.

1.2. tamed fire
At the beginning of the cosmogony, the cosmic tree consists of three layers: fire (φλόξ, πῦρ) around the air (ἀήρ) that is around the Earth. In the course of the process of the generation of the world, a crucial event, of which the sources remain silent, must have consisted in a reversal of the relation between air and fire: from air around fire to fire inside airy wheels. The natural behavior of fire is to spread out and devour everything in its neighborhood, unless it is either extinguished or confined and thus tamed. The image of the captured and tamed fire is another archetype. The taming of fire, for instance in a candle or lamp, or in a fireplace or stove, lies at the cradle of human civilization. Similarly, the taming of the cosmological fire by getting contained within air marks the origin of the regulated cosmos as we see it. In its main image, Anaximander's cosmogony is analogous with the origin of civilization.

1.2.1. escaping fire
The essence of the taming of the fire is that its warmth or its light is allowed to escape gradually in a controlled way. This is what happens in a fireplace, an oven, a lamp. To explain this, Anaximander used two images: the mouth as the controlling instrument and lightning or scorching wind as the controlled escaping fire. The mouth is the instrument that controls the breath going in and out the human body. The openings in the heavenly wheels are called 'mouths' (στόμιον) and its working 'breezing out' (ἐκπνοή). Perhaps in Anaximander's time there existed already human fire spitters, using a kind of flammable liquid the ancients called 'naphtha' (νάφθα). What results is a controlled flow of fire, which means light and warmth, streaming out of these openings. Here Anaximander uses the same word he himself uses

elsewhere for 'scorching wind' (πρηστήρ) and the word Homer uses for 'flow' or 'stream' (αὐλός).

1.3. turning wheels
As a result of Anaximander's cosmogony the containers of the heavenly fire took the shapes of the rims (ἀψίς)of gigantic wheels (τροχός) of air that hide the fire inside. Usually, moving objects like falling or thrown stones or strolling animals, do not move in circles. The only kind of bodies that are forced to move accurately and permanently in circles are circular man-made objects like wheels. The image of the wheel is another archetypal image. The invention of the wheel, which forced the natural movement into circular motion, was another crucial step in the development of human civilization. Just like in the course of human civilization wheels were made to get circular motion, in Anaximander's cosmogony the power of nature imposed circular motion upon the heavenly bodies.

2. phenomenology

2.1. heavenly bodies
When we look at the heavens, we see the air and the heavenly bodies within it: the more or less bright stars and the bigger lights of the Moon and the Sun. The heavenly bodies look like fire that is somehow contained within air on specific, and from day to day predictable, locations. The steadily moving heavenly bodies do not travel at random above our heads. This does not only hold for the stars, whose position relative to each other remains always the same, but also for the Sun and the Moon (and the planets), whose position in relation to the stars and to each other changes every day in a regular way. Anaximander's images amount essentially to this: the heavenly bodies are just what we see: regularly orbiting fire contained within air. Anaximander's images convey a phenomenological cosmology.

2.2. phases and eclipses
According to Anaximander, the phases of the Moon and eclipses of the Sun and the Moon occur when the apertures in the heavenly wheels are partially or totally closed. At first sight, this theory is perhaps the weirdest part of his conception of the heavenly bodies. When we study more closely, I maintain, this theory is a consequent phenomenological interpretation of what we see. I will show that, given the available knowledge, Anaximander's explanation was at least as rational as the right interpretation, which is ascribed to Parmenides and Anaxagoras.

2.2.1. phases of the Moon
The problem with the right interpretation of the phases of the Moon as caused by the light of the Sun is that the visual phenomena of the Moon's phases are unlike what we usually see when the Sun shines on an object. The side of an object not lighted by the Sun does not disappear, as is the case with the dark part of the Moon, but remains visible. When the Moon is visible by day, its unlighted side looks blue, and when it is night, the unlighted side looks black, both times just like the surrounding air. This is not the case with any other object that is lighted by the Sun. But It is exactly what we could expect when a part of the air would slide before the aperture in the heavenly wheel, as in Anaximander's explanation.

2.2.2. eclipses of the Sun
At eclipses of the Sun, the missing part of the Sun has the same color as the surrounding air (usually blue). In Anaximander's explanation everything is clear: a part of the surrounding air of

the Sun wheel slides partially or totally before the fire inside, and that is why it has the same color as the surrounding sky. The true theory, on the contrary, which says that the Moon blocks the light of the Sun, cannot explain why the eclipsed part shows the color of the surrounding air.

2.2.3. eclipses of the Moon
The right explanation says that eclipses of the Moon are caused by the Earth's shadow. Normally, however, a shadow thrown on an object does not make that object invisible, but at a lunar eclipse the not eclipsed side of the Moon is usually invisible. In Anaximander's theory this is evident. Sometimes, a reddish Moon remains visible although it is fully eclipsed. Anaximander's explanation could simply have been that sometimes the airy slide is not fully opaque but of semi-transparent, like a cloud.

Originally, I had planned to say also something about the question, why Anaximander, who was skilled in using the gnomon and was acquainted with Thales' measurement of the height of a pyramid, was so wrong about the distances of the heavenly bodies. But not only is the time for this paper too short to go deeper into this subject, but also – in contradiction with my former ideas – I have come to doubt whether it is possible to give a meaningful account of the alleged role of numbers for the distances of the heavenly bodies in Anaximander's cosmology. Perhaps this is something for informal discussion.

FISCHER-BOSSERT, WOLFGANG (Austrian Academy of Sciences, Vienna)

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(with Ute Wartenberg)

EARLY ELECTRUM COINAGE – INNOVATION OR CONTINUITY?

The invention of coinage continues to be a highly controversial topic among numismatists and economic historians. While one group of scholars argues that coinage is a radically new invention, the more established view in recent decades among historians has been to interpret the earliest electrum coins as a continuation of Near Eastern practice where silver (or gold) is being weighed for monetary transactions. Much of this argument has been based on the notion that electrum, which is used for the earliest coins, was naturally available, but once gold could be refined on a more industrial scale under Kroisos of Lydia, electrum as a rather primitive metal was abandoned. Recent metallurgical studies undertaken at Sardis and North America have undermined the concept of electrum as a naturally occurring metal.
The paper will re-examine the question of innovation in the light of recent numismatic research in this field, including metallurgical analysis of a large number of electrum coins, as well as a few die-studies. One of the more vexing questions is whether one can indeed determine what roles the Lydians and the Greeks in Ionia played in the invention of the earliest coins. Technical observations about the manufacture of coins can throw some light on the issue of innovation and scientific knowledge about metal and metallurgy in a period when new scientific discoveries took hold in Western Turkey.

FOURNAROS, SOTIRIS (NKU, Athens)

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A MODERN READING OF ANAXIMANDER'S *APEIRON*

Anaximander's *Apeiron*, the so called "infinite", "unbounded", "unfinished", "boundless", "unlimited", has left us with an abstraction mainly elucidated as a divine nature with unlimited power, appearing in every existing and moving thing or state. It is well argued that it is "one divine boundless power of nature that shows itself in everything that exists and moves" (Couprie & Kočandrle, 2013: 88). Including such an obvious holistic and general view, this less abstracted conception cannot prevent a recent illumination of *Apeiron* from claiming a little different and worth-stressing part of its understanding. Entailing the universal view, the modern Greek philosopher's, Castoriadisis' (1922-1997), approach emphasizes *Apeiron* as an unformed potentiality of ceaseless creation, which becomes an actuality. We, thus, come up with an act of freedom, an unbounded power of human creativity of a meaningful, individual and collective, life.

The aforementioned elucidations are deeply intertwined, not only within their universal look on reality, but within their indirect, mutual reading of nature as cosmos or/and as part of the cosmos, prevalent in the ancient years. Aristotle, for instance, resulted in his *Physics* (Book 8) to argue on a universal unmoved mover, a supra-physical entity securing the existence of the physical-natural domain. In the end, Castoriadis's conception of Anaximander's *Apeiron* cannot but stress the natural power of anthropocentricity. Ergo, leaning concurrently on Popper's (1902-1994) assertion in his presidential address of the Aristotelian Society in 1958 "Back to the Pre-Socratics" (Popper, 1958-1959: 1), that "all science is cosmology, [and that] the interest of philosophy as well as of science lies solely in their bold attempt to add to our knowledge of the world, and to the theory of our knowledge of the world", we spot the Anaximandrian universality of *Apeiron* founding the anthropocentric additions to the creation of the meaning of the whole world, the cosmos.

References
•Couprie, Dirk L. & Kočandrle, Radim. 2013. Anaximander's 'Boundless Nature'. *Peitho / Examina Antiqua*, 1 (4), pp. 63-91.
•Popper, Karl. 1958-1959. Back to the Pre-Socratics: The Presidential Address. *Proceedings of the Aristotelian Society, New Series*, 59, pp.1-24.

GREGORY, ANDREW (University College London)

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ANAXIMANDER, COSMOLOGY, AND THE POETS

What were the roots of Anaximander's cosmology? I wish to argue three things. Firstly, that in this instance, the roots are not Oriental. The proposed similarities between Anaximander and Oriental cosmology are either too generic to establish any meaningful connection or can be explained as accidental in the sense that they are determined by other aspects of Anaximander's system. Secondly, I argue that while architectural practice and the political milieu were important influences on Anaximander's cosmology, they are not able to explain all aspects of it. Thirdly, I argue that if we do want a fuller understanding of Anaximander's cosmology we

must look at his relation to Hesiod, in particular *Theogony* 720-725, the falling anvil passage. This helps us understand not only with the spacing of the rings in Anaximander but also the nature of the earth as well. This is part of a broader strategy which attempts to further our understanding of Anaximander (and other early presocratics) by placing some fragments in the context of passages from the poets (mainly Hesiod, but also Homer, Terpander and Theognis) and seeing those fragments as conscious allusions to and transformations of those passages. The wider aim is to give a context for early Greek scientific/ philosophical knowledge, such that its emergence is neither an *ex nihilo* 'Greek miracle' nor part of a grand narrative '*muthos* to *logos*' transition but is at least in part rooted in active, individual attempts to transform the world view of the poets.

HAHN, ROBERT (Southern Illinois University, Carbondale)

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WHY THALES KNEW THE PYTHAGOREAN THEOREM: PHILOSOPHY, GEOMETRY, AND DIAGRAMS

Once we accept that Thales introduced geometry into Greece, having traveled to Egypt, as Proclus reports on the authority of Eudemus, who also credits Thales with a number of theorems, we understand that Thales was making geometrical diagrams. From where did he see such diagrams? Egypt is one place, having measured the height of a pyramid there. Diagrams that reflect measurements when the shadow was equal to its height, and un-equal but proportional – the doxography credits him with both techniques -- suggest that Thales understood similar triangles – ratios, proportions, and similarity.
We begin with the diagrams associated with the theorems, and place them next to the ones that reflect the measurements of the pyramid and distance of a ship at sea, Then, we introduce, on the authority of Aristotle, that Thales posited an *archê*, a principle, from which all things come, and back into which all things return upon dissolution – there is no change, only alteration – a big picture begins to form. Suppose, then, Thales investigated geometry, whether or not they started as practical exercises, as a way to solve the metaphysical problem of explaining HOW this one underlying unity could appear so divergently, modified but not changing? Geometry offered a way to find the basic figure into which all other figures resolve, that re-packed and re-combined, was the building block of all other appearances. We might see a lost narrative of the relation between philosophy and geometry. That narrative is preserved later by Plato at *Timaeus* 53C and following: the construction of the cosmos out of right triangles.
There are two proofs of the Pythagorean theorem, not one, preserved by Euclid. The one we learned in school, if we learned it at all, was I.47 that Proclus reports was Euclid's own invention. But, the *other* one, in book VI.31, by similar figures, by ratios and proportions, plausibly points back to Thales himself, perhaps taken up and perfected in proof by Pythagoras and the Pythagoreans. That proof shows that the right triangle is the fundamental geometrical figure, that expands or contracts in a pattern that came to be called continuous proportions. The argument that Thales knew the hypotenuse theorem is that, surprisingly, this was what he was looking for to explain HOW a single unity could appear so divergently, altering without changing. The plausibility rests on following the diagrams as evidence.

HERDA, ALEXANDER (Humboldt University Berlin)

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HOW A SAGE WOULD BUILD A CITY: THALES OF MILETOS AND THE INVENTION OF GREEK

URBANISM

The ancient city of Miletos in western Asia Minor, today's Turkey, was situated at the mouth of the Maeander river. From her beginning in the fourth millennium BCE onwards, she was always a turntable of travel and commerce as well as cultural exchange. In the late seventh century BCE, the harbour city had become the "ornament of Ionia" (Herodotus, *Histories* 5.28) and one of the leading centres of ancient Greek culture. Milesians started to found colonies from the Black Sea in the north to Egypt in the south. They got in direct contact with the high cultures of the Near East, like the kingdoms of the Phrygians and Lydians, and the Neo-Hittites of Cilicia and northern Syria, the empires of Assyria, Babylonia, and Egypt. This process resulted, besides others, in the birth of the Milesian school of Ionian natural philosophy, itself the nucleus of European philosophical thought. Its *spiritus rector*, Thales, the wisest of the Seven Sages (died in Olympiad 58, 548–545 BCE, see Sosikrates fr. 10 *FGH* IV 501 = Diogenes Laertius, *Lifes of Emminent Philosophers* 1.38 = Diels – Kranz 11 A 1)), is in the focus of this paper.

Crucially, in the lifetime of Thales in the second quarter of the sixth century, the settlement structure of Miletos underwent a clear rationalisation process when an orthogonal *insula*-street grid-system was planned. As Miletos was one of the largest Greek cities at that time (ca. 30,000–50,000 inhabitants) that had grown over the centuries, this grid-system was in the beginning only partly implemented. Significantly this affected first of all the city centre, the agora and the adjacent newly developed northern districts. The generous design was made possible by impressive artificial drainage of formerly marshy areas. This was detected by our geoarchaeological research, conducted since 2002. The enlargement of the agora as well as the city's endowment with representative public buildings reflect the emergence of a civic body of proud and wealthy citizens engaged in politics. After decades of civil strife the situation had been stabilised when in the mid sixth century a moderate oligarchy was installed. A reform of the main state cult of Apollo Delphinios followed. It incorporated everything vital for the city: government, citizenship and time-reckoning. These measures provide us with an important case study for the interrelation of political culture and philosophy in a Greek Archaic city. The rationalisation of town planning by giving it a σⵗμμⵗτρία (symmetry), combined with substantial hydraulic engineering measures in the agora area, exemplify the new spirit of Ionian natural philosophy that not only explained natural phenomena and developed geometry and astronomy, but also dealt with the social order of society and politics. The σοφός (sage) Thales is a perfect example. He is credited with "having given excellent advice on political matters" (Diogenes Laertius 1.25), and being in close contact with the ruling tyrant Thrasyboulos of Miletos (Diogenes Laertius, *Lifes of Emminent Philosophers* 1.27). Tradition also connected him with the construction of the Milesian agora (Plutarch, *Solon* 12) where his hero-cult was later installed – as if he was a ἥρως κτίστης, the heroic founder of the city. In all likelihood, Thales and probably also his most famous pupil, Anaximander, were responsible for the whole re-planning of Miletos in the earlier sixth century BCE. From the preserved *testimonia*, Anaximander can be imagined as an utopist who tried to translate his idea of the cosmic structure into the spatial and political structure of his hometown. As the earth formed the center of Anaximander's cosmos, surrounded by three fire rings (stars, moon, sun) and defined by simple mathematical ratios and definite geometrical proportions, the space of the agora formed the spatial and political center of the polis, whose society was divided in three classes of citizens (aristocrats,

middle class, poor), interacting according to the rule of oligarchic ἰσονομία, the equality of political rights (Aristotle, *de caelo* B 13.295b 10 = Diels – Kranz 12 A 26). Besides, insights from the newly established disciplines of meteorology and medicine were taken into consideration for how to orientate streets, houses and public buildings in the most appropriate manner. Even the places of the gods were integrated into the new system, when laying out the sanctuaries of Athena and Dionysos in accordance with the orthogonal grid. Furthermore, the sanctuary of Apollo Delphinios, situated by the agora, has exactly the size of one compact rectangular *insula* or house block. This is the module, or basic unit, of the whole plan. The sanctuary of Apollo Delphinios is also the place, where Thales is said to have dedicated the golden bowl or tripod, the trophy of his victory in the competition of the Seven Sages (Diogenes Laertius, *Lifes of Emminent Philosophers* 1.29).

The new way of systematising and rationalising town planning in Ionian Miletos had an impact on Greek town planning as a whole: From the mid 6th century BCE onwards, similar (re-)organisation of cities occur. The only example in mainland Greece is Halieis, while a consistent orthogonal system is more often detected in the Greek colonies in the west (Poseidonia, Metapontion, Gelas) as well as in one of the Milesian colonies in the Black Sea (Istros). As one reason for the introduction of this new system of town planning we may postulate the mass immigration of East Greek people, who fled the Persians when the latter had started to subdue the Ionian cities of western Asia Minor from 547 BCE. The integration of the new settlers made it necessary to rework the city plans of the older colonies, which had grown since their foundation from the late 8th/7th centuries BCE. That the settlers brought with them from Ionia the new ideas about town planning is likely: one only has to think of the Samian *σοφός* Pythagoras, who with the help of his pupils and admirers, gained great cultural as well as political influence in South-Italian Kroton, since his arrival in ca. 530 BCE.

These early dates force us to reconsider the role of the famous town planner Hippodamos of Miletos (Aristotle, *Politics* 1267b.22–1269a.28) in the process of the rebuilding of his home town, as well as other cities like the Piraeus of Athens (after 475 BCE) or Athens's pan-Hellenic colony Thurioi in Italy (after 444/3 BCE): he did not invent the *insula*-street grid-system, or the famous features of the "Hippodamian agora". Nor was the regular grid-system a democratic development, as is often believed without any ancient evidence. Instead, this kind of sophisticated town planning originated 100 years earlier, and was invented by the *σοφός* Thales, or one of his fellows, first of all Anaximander, in the oligarchic city of Miletos. Nevertheless, Hippodamos would have trained the τέχνη of a town planner during the rebuilding of Miletos after 478, when the city, heavily destroyed by the Persians, rose up again, this time completely 'orthogonalised'. With his acquired knowledge and reputation, he was subsequently hired by Athens to plan the city of Piraeus and other projects, where he applied his own ideas of the ideal socio-political model for a city-state with an aligned spatial conception. This Ἱπποδάμ[]ιος τρόπος, "Hippodamian method" (Aristotle, *Politics* 1330b.24 ff.), remained influential throughout the next centuries of Greek urbanism, easily recognisable in cities such as Rhodes, Priene or Alexandreia.

The dependency of the town planner Hippodamos on Thales becomes most evident in the *Birds* of Aristophanes of 414 BCE (lines 992–1010), where the astronomer-geometer Meton of Kolonos, planning the city of the birds, appears as a carricature of Hippodamos as well as – explicitely – Thales: he is labeled "This man is a Thales!" (ἄνθρωπος Θαλῆς).

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FURTHER THOUGHTS ON THE ARRIVAL OF GREEK MONUMENTAL ORDERS AND AUTODIDACT

POLYMATH *ARCHITEKTON*

This paper is presented as a re-examination of the author's dissertation (The *Invention of the Doric Order*, Harvard Diss., 1985, University Microfilms) and some responses it has engendered in the meantime, particularly Mark Wilson Jones' "Origins of Classical Architecture" (2014). Both of scholars are thinking on increasingly similar lines on a number of issues: we directly assert that we seek to define a creative process which produced a powerfully effective expression of tectonics; we assert that one can critically evaluate the innate coherence or incoherence of a design, which is something we are accustomed to do as design teachers; we follow J.J. Coulton in arguing that the creation was sudden in the case of Doric and more searching in the case of Ionic; we down-date many of the supposed "proto-Doric" or "proto-Ionic buildings of the seventh century; we assert that although there was clearly a search for monumental ornament in the later seventh century, no element of Doric appears before they all appear together; and finally, we point out that the appearance of the orders coincides with a tremendous increase in scale as well as of formal coherence.

This writer's dissertation argued that the Doric came about very suddenly c. 590 B.C., perhaps in a single project lead by a so-called a "hero architect." In human endeavors it is normally impossible to achieve a high level of coherence immediately in a clean-sheet innovation, but here, a high level of formal coherence was achieved quickly because it was an adaptive imitation of a long-noted Egyptian type of colonnade. One aspect of this writer's dissertation which others have not chosen to pursue is that I argued that one can critically define the aesthetic predilections—the "rose-colored glasses"—through which traveling Greeks would have looked at Egyptian arts and architecture, and given that, one can individuate certain types of colonnades and figural sculpture that clearly would have appealed to aesthetic predilections which were already developed in Greek culture in the early Archaic period.

This paper gives more depth to the concept of the "hero architect" in light of a study by Robert Hahn (*Anaximander and the Architects*, 2001), which points out the close similarity between the

activities of the first Milesian philosophers and the careers of the architects of the great Ionian dipteroi of c. 570-540 B.C. In light of these studies, the first architects and philosophers were essentially the same type of person: well-traveled, highly practical self-taught polymaths, probably propertied, who were intensely eager to use applied geometry (rule and compass) to discover an orderly structure in the world, and employ that knowledge in science, commerce and large building projects. From this it emerges that the Greek architect does not emerge from the building profession, but is imposed on it, from the point of view of a well-traveled polymath accustomed to large-project management, radically transforming architecture in terms of scale, formal vocabulary and technique with rule and compass. Monumental architecture is arguably the first (successful?) attempt by Greeks to use reason (Latin *"ratio"*) to control reality.

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PRESOCRATICS AND CURRENT CHAOS THEORY

1. Chaos theory

The term chaos was first mentioned in the Sumerian epic of Gilgamesh. In the *Theogony* of *Hesiod*, chaos meant a space or form of matter that had not yet formed. He considered that the order (i.e. the cosmos) emerged from chaos, which was also the beginning of time. In Presocratic encounter the roots of scientific concepts related to modern chaos theory as randomness, autocatalysis, nonlinear development, information, pattern, etc (Gündüz, 2012:357-358).

Chaos theory is the term developed during the 1970ties and referred to scientific research of simple mathematical systems that appear complex and show an unpredictable behavior (Keller 1998, 1373-1374).

According to Stephen Keller, «C*haos theory is the study of unpredictable behavior in simple, bounded, deterministic systems. Such behavior is extremely complicated because it never repeats, and it is unpredictable because of its celebrated sensitive dependence on initial conditions: even extremely small amounts of vagueness in specifying where the system starts render one utterly unable to predict where the system will end up»* (Keller 2008, 5-6) (Gleick 1987, 11–31).

As a subset of non-linear dynamics, chaos theory is especially known for its research on standards like 'strange attractors' which we find in seemingly random data sets. One of the most famous is the attractor of Lorenz, resulting from a highly simplified mathematical model which the meteorologist Edward Lorenz has developed for studying convection in the atmosphere. This shape, like all the strange attractors are abstract geometric entities that represent the long-term behavior of a system in visual form (Keller 2008, 6).

A cross-sectional view in a 'thin section' of a strange attractor can display a surprisingly complicate design in which each individual layer or level reveals the overall pattern on a smaller scale. This feature of the 'self-similarity' is characteristic of the odd geometries known as fractals (Keller 2008, 7).

The study of chaos is common in applied sciences such as astronomy, meteorology, biology, and economics (Smith 2007, 2). The views of its philosophical importance in relation to the general philosophy of science, is divided. Some philosophers such as Stephen Keller have argued that the theory of chaos requires the abandonment of the provision as a touchstone of science, a

new understanding of the nature of scientific explanation, and the end of reductionism. Others, such as Peter Smith, have argued that these conclusions are too extreme, and that chaos theory has brought our attention to philosophical problems which previously had been wrongly ignored (Stevens 2005, 133).

2. The Presocratic Philosophers
The Presocratics were the first western philosophers working in the sixth and fifth century B.C and focused on cosmogony and cosmology. With their work they developed the first 'conceptual tools' approach and qualitative methods for understanding the natural world such as, meter, rhythm, symmetry, proportion, arrangement, universal determinism, dynamic balance, mathematization of nature (Vamvakas 2009, 28) (Sedley 1998, 6841-6842).

According to Jonathan Barnes «*The Presocratic period itself divides into three parts. There was first a century of bold and innovatory thought. Then the early adventures were subject to stringent logical inspection: the dawn they had heralded seemed a false dawn—their discoveries chimerical and their hopes illusory. Finally, there were years of retrenchments and consolidation, in which thinkers of very different persuasions attempted each in his own way to reconcile the aspirations of the first thinkers with the criticisms of their successors*» (Barnes 1987, 10).

Phase A: The Milesians: The first phase of the 'bold and innovative thinking' is the philosophical process which was initiated by the Milesian Thales (ca. 624/1- 548/45 B.C.) and continued by his compatriots Anaximander (ca. 610-546 B.C) and Anaximenes (ca. 560-500 B.C).

The Milesians focused on trying to identify and describe the foundation or principle of reality, which is, the understandable, stable existence which stands behind a noticeable and volatile scene: Thales 'water', Anaximander's *apeiron*, Anaximenes 'air' (McCoy 2013, xii-xiv).

Phase B: The Rise of Parmenides (ca. 515-449/440 B.C.): The 'Parmenidean challenge' may be the alternative name for this second phase of Presocratic thought, his teacher Xenophanes (ca. 580/70- 490/80 B.C) and his followers Melissus (born early 5th century B.C.) and Zeno (born c.a. 490 B.C.). According to Parmenides only the present exists, indivisible and immutable. All conclusions are presented as a strictly logical outcome of a purely logical truth (McCoy 2013, xix -xx).

Phase C: Answers to Parmenides: In a sense, all the philosophers after Parmenides concentrate on different interpretations and answers as they noticed that the separation of Parmenides of appearance and being, and the rejection of affairs should be eliminated. Empedocles of Acragas (ca. 492–432 B.C.), Anaxagoras of Clazomenae (ca. 500–428 B.C.), and Democritus of Abdera (born ca. 460 B.C.) represent the upper limit of the third phase of the Presocratic philosophy and their side effect comparison reveals the course and direction of philosophical thought after Parmenides (McCoy 2013, xxii).

Pythagoras and Heraclitus: Heraclitus of Ephesus (ca. 540-480/470 B.C) and Pythagoras of Samos (ca. 570-490 B.C), are both difficult to digest in this tripartite system. Heraclitus is closest to the Milesians and somehow continues and modifies the flow of thought regarding the existence and the foundation of being, recognizing in it the 'fire'. Pythagoras represents a philosophical school-community in which they discern the sanctity of philosophy and learning, and the number representing a guiding principle of the world (McCoy 2013, xxii- xxvii).

3. Perspective of chaos theory in the minds of the Presocratics
Phase A: Milesians

Thales believes that water is the element of everything and also as something that all other things can be reduced to. He used to depict the water with a force that revives or move this. In other words, the drive and the driven are not separated but coexist on the same subject (Gündüz 2013, 358). The faith of a lawful order of the universe, the persistence of a causal investigation of natural phenomena, and the transcendence exceeded that attempted as part of empiricism, in order to achieve broad theoretical knowledge, identify its scientific thought (Vamvakas 2009, 33).

Anaximander was first to introduced in the history of philosophy and science, the concept of 'infinite', the 'opposite', the 'necessity', the 'symmetry' in time and space, the 'dynamic equilibrium' the 'relationship', the 'evolution' (Vamvakas 2009, 41). Actually he is the founder of a dynamic model of the universe with the assertion of a continuous production of new issues (Gündüz 2010, 359).

Anaximenes was the first, to use the «ratio» based on the similarities and relationships in order to expand his theory from known conditions and to draw conclusions about the cosmic phenomena (Vamvakas 2009, 48). In Anaximenes' cosmology, a sort of motion produces changes in the 'air' density, and therefore, the basic elements of the universe are generated. According to Anaximenes, the motion (i.e. force) which causes changes in the density of the air is also located in the air (Gündüz 2010, 359).

Phase B: Parmenides

The philosophy of Parmenides emphasizes on «being» and rejects the «dynamic change». «All» in the universe is unified and change is an illusion. Parmenides philosophy can be summarized as follows:

i) Nothing is lost, nothing comes from nothing.

ii) «Change» is the loss of someone's quality and benefits of another.

iii) «Quality» and «object» are indistinguishable.

These claims make 'change' in nature impossible. The first claim has become the keystone of all natural philosophers. The attempt to change the second argument led Anaxagoras to develop the concept of 'information' or 'Sperma' (Denkel 1987; Gündüz 2010, 361). The attempt to change the third argument yielded two new developments introduced by Empedocles and the Atomists.

Phase C: Anaxagoras, Empedocles, Democritus

According to Anaxagoras the mind is the cause of motion. Matter is infinitely divisible, each particle, whether animate or inorganic, consist of seeds containing infinite amounts of all other so that a given particle can be mutated to any other. In the chaos, the 'sperma' of Anaxagoras may correspond to microstructures formed in the system, or a chaotic attractor. In that respect the strange attractor is full of information and can give different results depending on which micro level dominates its interior. It also represents a kind of change from chaos to order (Gündüz 2010, 369; Vamvakas 2009, 198-203).

Empedocles considers that all changes happen by the drivers 'Love' and 'Strife' and the combination of the four elements, «earth», «water», «air», «fire», in different proportions (Gündüz 2010, 361-362; Kirk et al. 2001, 297). With Empedocles, not only the concept of autocatalysis is founded but also competition between species and their conversion to a specific type of situation (Gündüz 2010, 366). He considered that a system of laws governs the nature that supports the microcosm and is contained in the macrocosm (Vamvakas 2009, 184).

The individualism of Democritus seems to imply a rigid determinism, in case where all events are due to the mechanical movement and the interaction of people in a vacuum (Mc Kirahan 2010,

320). The finite number of individuals each one with its own identity (i.e, chemical potential) collide and react freely and randomly and change any quality (or property) dependings on the types of people that react. Atoms are infinite in number, each one having a different shape, randomly collide with each other to achieve the best fit of the figure and then combine it. The principles proposed by individualists are essentially the fundamental bases of the dynamics of chemical individuals in our times (Gündüz 2010, 362)

Heraclitus and Pythagoras
The dialectical thought of Heraclitus turned into two areas: a) the necessary 'union' and b) the endless 'becoming' of all things. Both union pluralism-and the course-process remain in a dynamic dialectical relationship (Logos) balance (Vamvakas 2009, 127).
The chaotic dynamics using numbers especially odd numbers. According to the Pythagorean School truth can only be sought by mathematical logic and the numbers can express the properties of all things. The fractal dimension is an irrational endless number, it is a kind of infinite in the sense of the Pythagorean School and is a property of our nature (Gündüz 2010, 371).

4. Determinism and Free will
A common feature in the theory of chaos and Presocratics was determinism. The question that arises is whether the concepts of determinism and free will is incompatible (Pećnjak 2012, 279).
The theory of chaos states that our universe is deterministic but not predictable. Despite the fact that we live in a deterministic universe will never be able to predict the future. The unpredictability of chaos theory, preserves free will and offers us an open future (Al-Khalili 2014, 227).
Regarding the spirit of the Presocratic Prigogine notes*: «Truly, the ancient Greeks bequeathed us two ideals which played a guiding role in our history: The first is the understanding of nature, the second is democracy, which presupposes human freedom, creativity, and responsibility. Certainly we are very far from fulfilling these two ideals; at least we are capable of concluding that they are not contradictor»* (Prigogine 1996).
Indeed, in the minds of the Presocratics there, is no such contradiction, since for them the laws of nature are not rigid. These are not solely dictated by 'measurable' sizes, as at it happens today, but out of 'proportion' 'measure' *and 'Logos' guided by* 'harmony'. Snell notes: «*Responsibility for defining due measure resides within the individual, in accord with cosmic order, of which man considers himself an inseparable part. In a unique moment, Presocratic thought provided a rational explanation of the universe, elevating at the same time man to the condition of a free being, exclusively responsible for his actions»* (Snell 1975, cited by Vamvakas 2009, 254).

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THE CONTRIBUTION OF ANAXAGORAS IN ASTRONOMY AND ASTROPHYSICS

Anaxagoras from Klazomenai in Minor Asia was one of the most significant thinkers of Ionia who explained the creation of the Universe by referring in the existence of fundament components of matter (*homeomerias*) along with Mind. The mechanical motion of *homeomerias* under the influence of the *Mind* contributes to the creation of the Earth, the Moon and stars. This means that the cosmological system of Anaxagoras includes a description of mechanical processes.

Just like most thinkers of his era, Anaxagoras was a keen observer of the sky and he claimed that the Moon shines because of the reflection of solar light on its surface. Moreover he identified the cause of eclipses saying that they are caused when the Moon passes through the shadow of the Earth (in case of a lunar eclipse). On the other side when the Moon moves in between the Sun and Earth then is caused a solar eclipse. These observations were very important since they contributed not only to the development of Astronomy, but also in the establishment of the idea that natural phenomena can be explained by the knowledge of natural laws.

It must be noted that in ancient Greece Astronomy was a science that studied the motion of Sun, stars and the Moon in order to help people with their daily activities, agricultural work and navigation. So it is obvious that Astronomy was usefull for practical reasons. Apart from that Astronomy was an activity exercised by philosophers who were trying to explain the creation of the Universe, establishing existential questions. Although in modern science we talk about Astrophysics which is the branch of astronomy that employs the principles of physics and chemistry to ascertain the nature of the heavenly bodies, rather than their positions or motions in space.

As we saw before, Anaxagoras explained the creation of celestial bodies by referring to mechanical processes. Accordingly, in modern Astrophysics it is known that mechanical movements of primary *nebulae* result in the creation of stars, solar systems and planets. Moreover, Anaxagoras argued that the nature of the stars is fiery, an argument that marks the passing from Astronomy to Astrophysics. It is obvious that instead of referring into deities and mythology, Anaxagoras tried to understand and explain the star formation nature without using mythological explanation and deities. His intuitive conclusions such as the formation of stars by

condensation of primal mater and its fiery nature are not inconsistent with modern scientific views.

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THE SUBJECT OF KNOWLEDGE: 'MAN' IN PRESOCRATIC PHILOSOPHY

That the Presocratics gave prominence to reason and did away with the mythical explanation of the world is common knowledge. However, having focused on their achievements, we have overlooked to examine them as seekers of truth, i.e. as subjects of knowledge. In other words: how did they seek and (believe they) found knowledge?

First, it is important to see how they regarded the "nature" of reality. For this determines the way to examine it, in order to reach the truth. For the Presocratics the cosmos is something steady and unalterable. No matter how they believed the world to be, i.e. a Parmenidian Being or a Heraclitean flux, the world remains the same. Neither the Being nor the Becoming will ever change. The river will never dry.

Therefore, what the subject of knowledge has to do is to find a way to unveil the reality of a "nature that loves to hide." This, however, is no average feat. To this, a remark by Aristotle drives the point home. In his *Metaphysics* (984a 4-5), he writes that Hippo of Samos cannot be considered as member of the group of philosophers (the Presocratics), because his intellect was inferior.

What must be noted is that the subject of knowledge is not just the philosopher; it is also the people to whom the philosopher offers his knowledge. Therefore, when we talk about the subject of knowledge, we primarily refer to the philosopher, and secondarily to the common folk. In any case, what the philosopher thinks about his fellow men or man in general forms part of his character as the subject of knowledge.

The steady inclusion of Thales among the Seven Sages, as well as the attribution to him of important inventions, discoveries or achievements (regardless of whether they are true or not) make him the ideal first philosopher. The attribution of all these things to Thales does not just endorse the accuracy of his philosophy, but also reveals him as a person with special intellectual abilities. The same applies to Anaximander. His connection with Thales (successor, student, relative, friend, fellow citizen) aims to establish a kind of continuity, as well as a kind of validation of his teaching and his intellectual abilities. The same goes to Anaximenes, who is said to have been student, friend and successor of Anaximander.

The scant information regarding the first three philosophers, combined with their travels makes it almost impossible to draw conclusions on how they tried to explore reality. However, we can

deduce that they didn't start their enquiry from scratch, but they had some already formed interpretations from which to choose according to their experiences and observations.

Furthermore, for the Ionians the philosopher, the seeker, does not stand outside the world, as Schrodinger suggests. A philosopher is part of the world he explores. For he does not explore the world for the sake of knowledge, but in order to solve some problem (we do not know what).

Finally, for the Ionians the world's other beings are not inferior to man, in any way. This is shown in Thales with his theory that everything has a soul. In addition, Anaximander's teaching on how man appeared on earth places him on the same side, while Anaximenes places the soul on the same level with the Spirit. Therefore, for the Ionians, the other people, the subjects of knowledge were regarded as equals among themselves and to nature, probably just as equal to understand their philosophy.

With Pythagoras and the Pythagoreans, knowledge and its subject acquire an intense and obvious transcendental character. The characteristics, knowledge and abilities that are attributed to Pythagoras show the immense difficulty man has in accessing knowledge. The subject of knowledge must have a mystical power, in order to penetrate the universe and discover its secrets that must not be disclosed to any ordinary man. Therefore, the subject of knowledge has a revelatory relation with knowledge.

The religious character of the Pythagorean community and its strict way of life show that not all people can become subjects of knowledge. This is also shown through the theory of reincarnation, which separates not only people from animals but one person from the other as well.

With Xenophanes the subject of knowledge loses its religious character but not its revelatory powers. His destructive criticism regarding gods and athletes takes him away from the Pythagorean perspective. In this case, the subject of knowledge, even though has not any religious attributes, has not yet turned to simple observation, in order to find knowledge. So despite his observations on nature, what characterize his philosophy are his philosophical theories, of revelatory character, regarding God and reality. This is clearly stated by Xenophanes himself, when he says that truth is something people cannot know. What people have is opinion. However, Xenophanes, as subject of knowledge, has a mystical access to knowledge, otherwise he couldn't and wouldn't have written about God. He surpassed the weakness of man and has achieved a total knowledge of the cosmos, God included.

Regarding the rest of the subjects of knowledge, Xenophanes is clearly negative concerning their abilities to know: "No man knows, nor will ever learn, the truth about Gods and everything I say." That's why Xenophanes reveals knowledge, and the people have to accept it.

Heraclitus radicalizes the subject of knowledge as a revelatory personality, that stands negatively towards the common folk. The philosopher from Ephesus gives primacy not to the observation and interpretation of nature but to a kind of esoteric, mystical knowledge, which is the true reality. Making Reason the preponderant element of reality, as well as presenting the continuous flux of things as the ultimate characteristic of reality, he becomes a subject of an almost mystical knowledge.

In terms of other people, Heraclitus not only scorns them, but he also wrote in an "obscure" way, so that to make his writings accessible only to few. Therefore, we can conclude that for him the other subjects of knowledge are unworthy of knowing the whole truth. He is even more radical than Pythagoras, since there is no Heraclitean community.

In Parmenides the revelatory characteristic remains, at least to some extent, even if we consider the beginning of his poem to be nothing else but a literary "ruse," since he seems to follow a certain poetical tradition. Because, even though he mentions judgment (when he talks about

the other mortals), it is not totally clear whether he relied solely on Reason or he was influenced by a mystic tradition, which would have freed him from any constraints posed by experience. Besides, the connection between the divine and intellect is something that has continuity in Greek philosophy (e.g. Plato stresses the divine character of inspiration). Regarding the rest of mankind, he thinks they are mentally challenged, but he wishes to reveal the truth to them.

Empedocles follows the same revelatory path. The various stories regarding his actions, whether true or not, show someone with special abilities. Besides, he has written that he has become a god. Therefore, he doesn't just follow Parmenides, he could be seen more clearly as a subject of knowledge with transcendental, mystical character. There is no other way to convincingly explain the choice of expression, unless we consider what he writes to be part of a lore, which is doubtful. He too denies the certainty of the sense's data. In order for sensory data to achieve something, it must be combined with Empedocles' instructions. So, the other subjects of knowledge must behave as followers of a religious group.

It is with Anaxagoras that for the first time the subject of knowledge escapes the transcendental character of his predecessors. Anaxagoras starts with them, he is influenced by them, but he goes one step further, without resorting to a revelatory approach to knowledge. Therefore, we could say that Anaxagoras is the first philosopher that more or less fits to our conception of how a philosopher should operate.

His occupation with philosophy results from the love of theory and his aversion for practical matters. He is considered as the one who returned philosophy to its roots, the Ionians, and rekindled their spirit. In other words, with him, the subject of knowledge returns to Earth, to his human dimensions, now freed from religious or mystical weight.

Quite the same must be the subject of knowledge in the case of the Atomists, Leucippus and Democritus. Since we lack relevant information, we have to rely on Aristotle's remark that Democritus tried to combine experience with the Eleatic metaphysics. Their reliance on sense data shows that the mystical approach of the world is past. What matters is to explore the world through reason. Furthermore, the fact that Democritus has written ethics shows his interest in man as an everyday being.

Therefore, we can conclude that the Presocratics, even though they freed themselves from the mythical tradition, used Reason through a mystical, or revelatory conception of the world.

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EMERGENCE OF PHILOSOPHY IN ASIA MINOR– THE HEGELIAN INTERPRETATION

In my speech I will maintain that the question of the emergence of Philosophy in Ionia can be addressed on the basis of Hegel's understanding of philosophy as free and self-conscious thinking. I will rely on passages from Hegel's lectures on the history of philosophy and the philosophy of history. These passages will connect some of the main Hegelian lines of thought with the question of the emergence of philosophy, understood as logical and critical thinking, in the region of Minor Asia, and specifically the Greek colonies. In reference to Hegel's lectures on the history of philosophy I will show, firstly, how Hegel understands the presuppositions of philosophizing in general; he asserts namely that philosophy is possible only inside free states. In reference to Hegel's lectures on the philosophy of history, I will show, secondly, how he understands the difference between the Greek and the oriental spirit, because the philosopher

on their attributes the emergence of free personality in the Greek world. Under these two presuppositions the question of the emergence of philosophy can be understood in Hegelian terms.

As far as the first presupposition is concerned, it must be noted that, according to Hegel, philosophy is based on free and critical thinking, the kind of thinking that can only arise in an environment of political independence. It is however important to realize what Hegel means by "free thinking" as a presupposition for the birth of philosophy, since he does not mean freedom of thought in an abstract sense; he rather means that freedom of thought has to do with thinking realizing itself, becoming conscious of itself. Thinking, the νοῦς, comes to itself when it grasps its proper object, which is universality (das Allgemeine). Furthermore, this happens when thinking transcends the particulars of the senses, when it goes beyond nature, as it is presented to knowledge immediately, and investigates the essence or the "inner" of nature. By elevating itself to universality, to the notion (Begriff, as Hegel would say), thinking comes to itself or becomes free. By reaching this level of universality, thinking has gone over religion as well. In religion an abstract concept of the Absolute may dwell, but it is not recognizable and understood as such. Hegel explains that only assertions like "the essence or the ἀρχή of things is water or fire" are philosophical and belong to free thinking.

The second presupposition, mentioned above, can be understood in reference to passages from Hegel's lectures on the philosophy of history; the crucial point here is how Hegel understands the succession of world-historic nations in the course of human history. World history, in the context of the Hegelian view of objective spirit, is conceived as a manifestation of the world-spirit or the Absolute. In this sense, great nations represent crucial moments in the course of the realization of the Absolute in the medium of human action and human societies. Nations bring forward and realize the Absolute in a specific but unilateral and confined way, and their one-sidedness is the main reason for their demise, which is brought about by the next great historical nation. Such a nation is the bearer of a deeper principle of the world-spirit, a principle that must now to come to fruition. The old and the new world-historic nations are destined to meet on the stage of history and fight against each other, till the new principle prevails (as was the case between the greek and the Persian nation). But, before this can happen, the new principle has to undergo a phase in which it gets to know and assimilate the old one, a process which results to the new principle becoming deeper and richer in content.

Now, as it is known, the Greek world overcame the oriental principle, according to Hegel, the principle of despotism, and brought about the new principle of freedom, in the sense of freedom of a citizen inside his state (πόλις). The stage of the first contact, where the oriental principle was absorbed and assimilated, was realized in Minor Asia. Minor Asia is namely a territory between the Greek or western and the oriental world, a place of immediate contact between civilizations. Being near to the oriental world the Ionian colonies came to understand better the difference between it and the Greek world. Furthermore, since the colonies were far from the mother-states began to develop a spirit of freedom and independence. The Ionians overcame the oriental spirit and brought to existence the Greek spirit, the spirit of λόγος. Avoiding despotism meant developing the ability to speak out one's ideas and beliefs to support one's position; the need to express one's ideas leads to the cultivation of reasoning, thinking about things. The concept of reason was consequently born in the Ionian colonies.

The Greek mentality, the mentality of reasoning is mirrored at best in the greek understanding of nature, which distinguishes itself greatly from the oriental understanding of it and of the relation of man to it. Reasoning, λόγος, means going beyond the appearance and searching for the essence of things. Objects of nature are given to our senses, which can be deceitful; reason demands seeking the universal in the world presented by the senses. The universal, however, is

thought itself; understanding nature means, therefore, presenting nature as expression of the human λόγος. Nature is no more a mystery; in the realm of the oriental spirit nature is understood through symbols, which means that the appearances of the senses are replaced by other sense appearances, which might well be more general (e.g. the shape of a triangle), but are not the universal itself. Only when the universal itself, the notion, becomes conscious to the human mind, then arises, for the first time in history, philosophy. This is the transition from μῦθος to λόγος. Thus, the first Greek philosophers see nature itself as independent from other realms of reality and as having value on its own. They study nature, and their books are usually πε?ρί φύσ?ως; nature becomes the object of philosophy per excellence. Taking, therefore, into account both the historical-political and the inherently logical presuppositions and conditions for the emergence of philosophy one can arrive to a Hegelian interpretation of the emergence of philosophy in Minor Asia.

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ANAXIMANDER'S CONCEPTION OF GENERATION

Aristotle describes Anaximander's conception of generation as a 'separation out of opposites' and implies that τὸ ἄπ?ιρον should be understood as a mixture. Simplicius, on the other hand, emphasises a 'separation of opposites' that was supposed to take place due to the eternal motion. Although this explanation represents a tendentious Peripatetic interpretation, it may have been a response to a conception proposed originally by Anaximander himself. In the following contribution, we try to reconstruct a likely form of Anaximander's own conception of generation based on both a description of his cosmogony and his ideas regarding the origin of life.

In connection with the issue of generation, Aristotle in his *Physics* speaks of two groups of natural philosophers. According to one, all things came into being from one basic element by its condensation and rarefaction. The other group believed that the opposites are separated out from the one, whereby 'the one' is understood as something akin to a mixture.[1] Anaximander, but also Empedocles and Anaxagoras, are listed in this latter group. Aristotle expresses a similar view in his *Metaphysics*, where he mentions the properties of the one and a mixture.[2] Similarly, Simplicius in his commentary on Aristotle's *Metaphysics* refers to Anaximander's description of generation in terms of 'the separation of opposites due to everlasting motion'.[3] Although it is, as noted above, a later interpretation, it is nonetheless likely that it reflects at least in broad terms the basic features of Anaximander's conception.

Crucial for gaining a better picture of Anaximander's explanation of generation is a description of cosmogony which Pseudo-Plutarch ascribes to him:

He says that that part of the everlasting which is generative (τὸ γόνιμον) of hot and cold separated off at the coming to be of the world-order. And from this a sort of sphere of flame grew around the air about the earth like bark around a tree. This subsequently broke off and was closed into individual circles to form the sun, the moon and the stars.[4]

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[1] Aristotle, *Physica* I,4,187a12–23 = *DK* 12 A 9 and *DK* 12 A 16.
[2] Aristotle, *Metaphysica* XII,2,1069b20–23 = *DK* 59 A 61.
[3] Simplicius, *In Aristotelis physicorum libros commentaria* 24,13–25 = *DK* 12 A 9.
[4] Pseudo-Plutarch, *Stromata* 2 = *DK* 12 A 10.

Reference to the opposites in the form of 'hot' and 'cold' clearly does not reflect the original archaic terminology. If the archaic text spoke of a 'sphere of flame' and 'the air', reference to 'hot' and 'cold' may well be a later insertion that was based on these concrete elements of the nascent universe.

While Aristotle uses for 'separating off' the term ἐκκρίν⬜σθαι and mentions a mixture, Pseudo-Plutarch uses the expression ἀποκριθῆναι, which also appears in Hippolytus.[5] Simplicius, meanwhile, uses both the verb ἀποκρίν⬜σθαι and ἐκκρίν⬜σθαι.[6] All these different verbs, however, most likely reflect later interpretations. What is crucial for our purposes now is an interpretation of the situation as a whole. While Aristotle seems to view generation in this context as a more or less mechanical separation of components from the primordial mixture, Pseudo-Plutarch could be interpreted as speaking of biological processes. If both of the verbs could be used in a biological sense as meaning 'expulsion' or 'ejection',[7] we could interpret the whole process of 'separation of opposites' analogically. In a cosmogonic context one would thus speak not of a separation of opposites which subsequently come to form the world, but of an expulsion or ejection of something that further generates.

Where Pseudo-Plutarch uses the term τὸ γόνιμον, one could assume that Anaximander used a more concrete expression, which in this context may have been a γόνος, a 'seed'. It is likely that when speaking of generation, Anaximander used terms with a biological connotation. If we then interpret the noun τὸ ἄπ⬜ιρον as a late Peripatetic replacement of Anaximander's original expression φύσις ἄπ⬜ρος, 'boundless nature', what we get is emphasis on an omnipresent force which engenders generation and growth.

If we interpret the passage on cosmogony from a biological perspective, Anaximander may have claimed that once upon a time the boundless power of nature led to the ejection of seed which then grew and developed into other shapes. This primordial separation can thus be interpreted as a discharge of seed due to activity of boundless nature. One need not, meanwhile, assume the existence of any originator of the seed who would have been situated outside the nascent world. Separation of the seed can be seen as a description of the primordial, original generation as such. 'Everlasting motion' can then be viewed as a later description of the unending activity of this boundless force.

Separation is the basis of differentiation which then leads to a delimitation or establishment of everything else. It is not, however, a separation from some sort of mixture but rather a mutual separation of one stuff from the same, or another, stuff. In its further development, the seed grows into a sphere of flame whose parts also separate. After the formation of heavenly bodies, separation of other regions follows. Drying of the primordial moisture leads to the appearance of dry land and establishment of an atmosphere. In this way, not only the earth and the heaven, but also the sea and dry land separate from each other and conditions are set for the development of life on land.

Separation refers not only to the stratification of particular regions of the world but also the formation of concrete phenomena. It is also closely linked to another relation between phenomena, namely to surrounding. For instance, while the sphere of flame grew around the air,[8] heavenly bodies are described as a circle of fire surrounded by air.[9] In the already

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[5] Hippolytus, *Refutatio Omnium Haeresium* I,6,4 Marcovich = *DK* 12 A 11.
[6] Simplicius, *In Aristotelis physicorum libros commentaria* 24,13 = *DK* 12 A 9; 150,22–24 = *DK* 12 A 9.
[7] *LSJ*, s. v. ἀποκρίνω and ἐκκρίνω.
[8] Pseudo-Plutarch, *Stromata* 2 = *DK* 12 A 10.
[9] Hippolytus, *Refutatio Omnium Haeresium Ref*. I,6,4 Marcovich = *DK* 12 A 11.

established universe, a lightning is due to wind surrounded by a thick cloud.[10] Even the first living beings are said to have been surrounded by a prickly bark.[11] Surrounding is thus a concept which applies to the structure and constitution of heavenly bodies, meteorological phenomena, and living beings. It is most likely an original description of organisation of the phenomenon in question and its temporary stability.

We can follow Anaximander's conception of generation also in his description of the origin of the first living beings, including humans. While Pseudo-Plutarch[12] and Plutarch[13] focus mainly on humans, Aetius,[14] Hippolytus,[15] and Censorinus[16] mention the conditions in which life could originate. Aetius locates the origin of the first living beings in moisture. Hippolytus mentions the crucial role of the Sun, whose effect on moisture leads to evaporation. Censorinus is then the only one to take note not only of warmed water, but also of earth. Generation thus relies on mutual relations between moisture, earth, and the effect of Sun's heat. What we find in Anaximander is a characterisation of conditions under which life could appear, an importantly re-evaluated description which is, nonetheless, based on an ancient tradition.

At the core of most of Anaximander's texts about the origin of life we find descriptions of the origin of humans. It is thus most likely that even Aetius, who seems to deal only with the origin of the first animals, actually touches upon the origin of humankind. It is probable that Aetius in his description refers to the origin of fish-like creatures from which humans evolved, and not to the origin of the first animals in general. One could assume, that the first humans matured inside these fish-like creatures. In this case, Anaximander's conception of the origin of humans would not, as sometimes thought, contain elements of an evolutionary view.

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PLACING THE IONIAN *ΠΕΡΙ ΦΥΣΕΩΣ ΙΣΤΟΡΙΑ* IN CONTEXT: THE ROLE OF SEAFARING,

NAVIGATION AND MILESIAN COLONIZATION IN THE BIRTH OF GREEK SCIENCE

(1) *Historia and seafaring*

As I have repeatedly stated since 1989 on different occasions, "Presocratics" is a misleading term of the modern historiography of Greek philosophy which is both historically incorrect (was Socrates "Presocratic"?) and philosophically meaningless. The ancients saw the truth: there were two, not one, beginnings of Greek philosophy. The Ionian tradition starting with Thales was a secular empirical science. The Italian tradition started by Pythagoras had a religious-ethical dimension and was educational in scope. These two traditions originated in totally diferrent sociocultural contexts and were different in their goals. The term φιλοσοφία comes from the Italian tradition, the Ionian word for the new science was ἱστορία, a word which is often associated with *travel* and collecting information. The birth of the Ionian tradition of ἡ

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[10] Aetius, *Placita* III,3,1 Diels–Kranz = *DK* 12 A 23.

[11] Aetius, *Placita* V,19,4 Diels–Kranz = *DK* 12 A 30.

[12] Pseudo-Plutarch, *Stromata* 2 = *DK* 12 A 10.

[13] Plutarch, *Quaestiones convivales* VIII,8,4,730e = *DK* 12 A 30.

[14] Aetius, *Placita* V,19,4 = *DK* 12 A 30.

[15] Hippolytus, *Refutatio Omnium Haeresium* I,6,6 = *DK* 12 A 11.

[16] Censorinus, *De die natali* 4,7 = *DK* 12 A 30.

περὶ φύσεως ἱστορία was triggered by the practical/economic needs of the Milesian polis, first of all by seafaring, sea trade and colonization (more that 90 colonies according to Plinius). Navigation requires knowledge of astronomy, geography and meteorology, three subjects that constitute the core of any Ionian treatise Περὶ φύσεως.

(2) *Thales and nautical astronomy*
The discovery of the *Phoenice* (*Polaris*) as a more precise navigational orienting point than Ursa Major.
– The *Nautical astronomy* ascribed to Thales (11 B 1-2 DK).
– The Etesian winds causing the flooding of Nile are relevant for the maritime meteorology as well.

(3) *Anaximander and colonization*
The testimony about Anaximander as the archeget of the *apoikia* of Apollonia Pontica (Sozopol) in Black Sea (12 A 3 DK) has been underestimated.
Colonization required not only knowledge of navigation, but also expertise in choosing appropriate location for the new polis, city planning, landscape engineering etc. It is no chance that the leading figure in city planning, Hippodamus, was of Milesian origin. Aristotle in his precepts on *teknopoiia* recommends to listen what *physikoi* say on different winds, περὶ τῶν πνευμάτων οἱ φσικοί (*Politeia* 1335b1). It is conceivable that Anaximander was chosen as archeget of the colonial expedition as an expert in geography and maps, as well as a *physikos* capable to find the best location for the new polis.

(4) *Apollo Didymeus*
The Milesian *physiologoi* may have been in some way connected with the Didymaion, e.g. as advisors to the Branchidai on matters of practical astronomy (calendar, cf. Anaximander's *gnomon*), geographical and ecological. Callimachus depicts Thales drawing geometrical figures in the Didymaion. Apollo Didymeus was the divine patron of the Milesian colonization: no new colony could be founded without his approving χρησμός. One such foundational oracle (early 5th century B.C.) with mention of Olbia was found on nearby Berezan island (SEG 36, 694). The Branchidai would be eager to ensure that the divine sanction approves the best possible geographical location of the new polis.

(5) *Some modern parallels*
Some modern parallels illustrate how the needs of navigation trigger the development of mathematics. The first educational institution in Russia in which mathematical sciences were taught was opened in 1701 by the decree of Peter the Great. Its name was «Navigational school» (*Navigatskaia shkola*), its graduates were marine officers as well as engineers, artillerists, architects, teachers etc.

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WISE MEN AND POETS IN ARCHAIC GREECE: PITTACUS AND ALCAEUS IN THE POLITICS OF

MYTILENE

The 7th and the 6th centuries BCE was an era of political change all over Archaic Greece. The aristocratic regime of the cities was challenged by inner conflict between aristocratic families or by individuals who were supported by the people of the city against their rulers. Usually, the tyrants benefited by a crisis in the Greek society and convinced the people that the traditional aristocracy was not able to defend their rights. In this case, the 'tyrant' positioned himself in opposition to the aristocracy and endeavored to replace them in their constitutional functions. Some 'tyrants' (like the Cypselids of Corinth or Polycrates of Samos) usurped power and imposed an arbitrative governance that justified their negative picture that the Classical period developed for tyranny in Greece. In general, the diversified meaning of a 'tyrant' is attributed to a single man who won the trust of the *demos* and ruled the city with unrestricted power. But their sophisticated aspect seems to be that a number of tyrants like Pittacus and Solon corresponded to the *tyrannos/sophos* profile who managed to obtain a permanent position in the list of the Seven Wise Men and a positive appraisal for their practical efficiency in politics. On the other side, Alcaeus, the poet of Lesbos, belonged to the elite class who contributed with his invectives against the bad fame of the tyrant Pittacos in Mytilene.

The present paper intends to explore the political knowledge in the poetry of Alcaeus in relation to the practical success of his opponent statesman Pittacus and to discuss the quality of wisdom which is attributed to the tyrant rather than the poet. In the Aeolic city of Mytilene the struggle between the aristocratic Penthilids and the Cleanactids eventually led to the rise of tyranny. The testimony of Alcaeus is valuable because he wrote several political poems renouncing the tyrant Melanchrus, who was overthrown by Pittacus and Alcaeus' brothers, and the tyrant Myrsilus with whom Pittacus allied and betrayed his allegiance with Alcaeus. The poet was twice exiled first after the failure of his plot against Myrsilos, and then when Pittacus chose to ally with Myrsilus. When Myrsilus died, the citizens of Lesbos entrusted Pittacus with despotic power for the purpose of protecting them against the exiled nobles at the head of whom were Alcaeus and his brother Antimenidas.

In historical terms it is doubtful whether Pittacus deserved so many reproaches against him written in the form of the monodic odes of Alcaeus. Was Alcaeus right to attack Pittacus as a tyrant who usurped power to the detriment of the citizens or his reproaches were not reflecting the real state of politics in Lesbos? And was Pittacus a typical tyrant (Alcaeus Z 24, Page), a monarch (Strabo xiii.617), a legislator like Solon of Athens, or a clever man who possessed the knowledge to rule efficiently his city and the wisdom to retire from power when he accomplished his duty? The picture of Pittacus that is transmitted by Alcaeus' poetry blurs the political action of Pittacus who later was included in the list of the Seven Sages of the Archaic Greece (Plato *Prot.* 343c). Pittacus, like Solon in Athens, gained the reputation of a wise man and his wisdom is attested by Herodotus (1.72.2) and Plutarch who includes both rulers in the *Dinner of the Seven Sages*. The popular election of Pittacus does not presuppose the 'struggle of the poor against the rich, or of the commons against the nobility' but it might allude to the fact that the populace recognized that Pittacus 'possessed the qualities of statesmanship' which granted him the labeling of 'a wise man and successful governor' (D.L.Page, *Sappho and Alcaeus*, 1979, p.176). At an earlier time, Pittacus in alliance with Alcaeus led the Mytileneans in a successful war for Sigeum against the Athenians, and the Mytileneans rewarded him for his services with the supreme power in the city (Diog. i.74). In the same war, Alcaeus dropped his arms and fled, and the Athenians hung them up in the temple of Athena, while in single combat Pittacus killed Phrynon, the Olympic victor sent by the Athenians (428V(a) Str.13.1.38, (b)Hdt.5.94-95).

According to Aristotle, Pittacus was a maker of laws and not a reformer of the constitutions (*νόμων δημιουργός, ἀλλ' οὐ πολιτείας*, Ar. *Pol*. 1274b 18). He was elected by the people in the

political position of *aisymnetes* to suppress the power of the aristocrats and make reforms to the laws in more equality (Arist. *Pol.*,1285a 30ff). It is unlikely that the people of Mytilene perceived Pittacus as a tyrant or regretted having made him *aisymnetes.* Alcaeus wrote against him like a man who feels betrayed and angered because Pittacus allied with his opponent Myrsilus breaking his oaths and deserting his comprades, 'a cardinal offense in the scheme of Homeric values' (Donlan, W. *The Aristocratic Ideal and Selected Papers,* 1999, p. 62, cf. G1, D12 Page, and MacGlew J.F. *Tyranny and Political Culture in Ancient Greece*, 1993, p.96). He labels Pittacus a 'tyrant' (X9, 1-9 Page, cf. Z 24 Page), a 'low-born' (κακοπατρίδας Z 24) and he warns the citizens that this man 'will soon turn the city upside down' (H 2 Page). However, the Mytileneans did not 'listen' to the poems of Alcaeus who exhorted them to overthrow the tyrant and they licensed him to govern for ten years from 590 to 580 BC. Pittacus laid down power leaving the city in peace and order (Diog. Laert. i.75). Alcaeus, the lyric poet, failed to be a political person and he was all the time on the loosers' side.

Though Pittacus is a lesser known lawgiver, he can be compared to Solon the lawgiver of Athens who was a moderate politician and his reforms paved the way to democracy. But unlike Solon who wrote his political beliefs in poetry and he remained famous for his elegies, Pittacus was known for his laconic apothegms in the mannerism of utterances of the Seven Sages. At that time of crisis, Pittacus demonstrated a leadership of political pragmatism over the idealism which conveyed the aristocratic values of the noble families to which Alcaeus himself belonged. It seems that Pittacus in the Aeolic Mytilene had the reputation of a wise politician, a *σοφός,* because he acted as a mediator to stabilize the political crisis of the city in a period when the progress from aristocracy to democracy experienced similar upheavals in the city-states of the Archaic world.

In the place of the wisdom of the poets like Homer or Hesiod who spoke by divine revelation, in the 'Age of Tyrants' the wisdom of worldly expertise was 'performed' by different kinds of wise men. These wise men, most of Asia Minor, possessed different skills from carpenters and engineers to statesmen including famous tyrants, or eventually they were intellectual thinkers like Thales of Miletus who also was one of the Seven Sages for his practical wisdom. It is assumed that the wise men of the Archaic Greece were a disparate group of individuals who 'operated in a social and political arena in which knowledge was demonstrated by a performer to an audience in a public or a private gathering' (Nightingale A.W. in (ed.) Taplin O., *Literature in Greek and Roman Worlds,* 2000, p.160). Their wisdom derives from the combination of practical action and utterances in maxims in the right time (καιρός), and they are different from the early 'philosophical' thinkers like Xenophanes, Parmenides or Embedokles who wrote hexameter poetry rivaling Homer and Hesiod. Instead, the genres of Greek poetry –recited or sung- were related to performance contexts like a symposium or a public event in the city. Likewise, the songs of Alcaeus were performed in the small sympotic group of his aristocratic companions in order to unite them against their political enemies and shape the politics for their own club (cp. 'the poetry of *hetaireia'*, Kurke L.,'The Strangeness of 'song culture': Archaic Greek poetry', in Taplin O. as above, p. 64 and 75).

Fränkel suggests that 'men should have awarded the garland of *σοφία* at that time to the politician rather than the poet'. He thinks that 'the individual speaker of poetry contributed to its own downfall because he was taking his subject matter from everyday life.' (*Early Greek Poetry and Philosophy*, 1975, p. 239). If this is true how we can account for the popularity of Alcaeus' songs during the classical period, and even more, the attempts of the Lesbians to preserve some of his songs in writing too? The reflections of Alcaeus' poetry should not probably be restricted in the social and political context of his time but rather to be extended

'on the vicissitudes of political life in the city-state for the audiences of the fifth century Greece' (cf. Yatromanolakis D., 'Alcaeus and Sappho', in Budelmann F. *Greek Lyric*, 2009, p. 214).

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ΔΑΙΜΩΝ IN HERACLITUS

In my talk, I examine the notion of δαίμων in Heraclitus, in an attempt to answer the crucial question: is he the universal god or anything divine outside the human being, is he man's destiny, or is he man's highest degree of Being? So far, most scholars have interpreted the Heraclitean δαίμων either as the universal god or something divine outside the human being, or as man's destiny. A different view sees Heraclitus' δαίμων as a vague force within man that shapes man's ἦθος, but it does not declare any further, clearly and distinctly, what kind of force this is specifically. Neither interpretation, I think, expresses the real meaning of Heraclitus' δαίμων, which in my view is anthropologically 'ontological', that is, it declares man's highest degree of Being.

In this talk, then, I maintain that when Heraclitus speaks about δαίμων in his two fragments DK 22 B 119 and DK 22 B 79, he means the deepest and highest nature of the human being, the ultimate ontological degree of the human Being. It is neither the universal god outside the human being, nor man's divine destiny, nor any vague force within man. I will attempt to show the difference between the two notions of god/θεός and δαίμων in the Heraclitean fragments, and why the notion of δαίμων cannot be interpreted as the universal god or the divine destiny outside the human being. I will then try to defend my new thesis: that Heraclitus was the first philosopher to use the notion of δαίμων differently from what the previous mythical and religious tradition had established, in order to express the superior Being within man, the highest feasible degree of human Being that man can ultimately reach.

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EX IONIA PROSA: PROSE COMPOSITION IN ARCHAIC IONIAN SCIENCE

The scientific and philosophical production in Ionia during the Archaic period stimulated a development of paramount importance in the Greek culture: the use of prose as a vehicle for scientific expression. Although only a reduced number of Archaic prose fragments have survived until our days through the philological tradition, they present distinctive stylistic features and constitute our basic source for understanding the origins and evolution of Greek literary prose.

In my paper I will describe the cultural background and the possible literary and epigraphic models which influenced the prose composition of the 6th century B.C. Ionian science. Especial attention will be devoted to the common points (and discordant features) between the early literary prose and the contemporaneous prose inscriptions from Ionia and the Ionian colonies, in order to contextualize the language and style of the first scientific works into the general frame of prose production in the Archaic period.

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XENOPHANES OF COLOPHON AND HERACLITUS OF EPHESOS: THE TWO EARLIEST FOES OF ANTHROPOMORPHISM IN COSMOLOGICAL THINKING

Anthropomorphism is rife in Hesiod's *Theogony* and in mythical narratives of world-origins. But elements of anthropomorphizing are still discernible in the Milesians (animism in Thales; a scheme of cosmic compensatory justice in Anaximander; analogy between cosmic air and human *psychē* in Anaximenes).

It was Xenophanes who was first in launching a radical critique of anthropomorphic religion, and on that basis developed not only a remarkably rarefied and heterodox conception of a single totally unmoving and unchanging deity but also a thoroughly naturalistic cosmology. I propose that the motivation for Xenophanes' anti-anthropomorphism is disapproval of self-indulgence and narcissism, an attitude shown in passages that have ethical tenor.

Heraclitus attacks traditional anthropomorphic religion in language that is more vehement than that used by Xenophanes. He dismisses the possibility of world creation by a god, judging it equal in absurdity to world-creation by a human being. And although he envisages a single world-principle, he refers to it with deliberate allusiveness as "god," "Zeus," "thunderbolt," "ever-living fire," "what is wise," "what is altogether apart" (*pantōn kechōrismenon*), and as "the *logos*"—so as to suggest that this world-principle cannot be captured by any single ordinary human intuition.

Examining the thought of these two sons of Ionia under the prism of anthropomorphism, allows and mediates comparative insights that might otherwise be missed. One important result is that anti-anthropomorphism masks a commitment to what might be called anthropognostic bias: in the case of Xenophanes, exploiting the intuitive familiarity of mental causation to make sense of God's action on the world; in Heraclitus's case, exploiting the intuitive familiarity with the structures and functions of *logos*, "discourse."

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THE ANTIKYTHERA MECHANISM, AN EPITOME OF PYTHAGOREAN PHILOSOPHY

The Antikythera Mechanism is the oldest known (dedicated astronomical) computer. It works with carefully designed and constructed bronze gears that perform the appropriate mathematical operations to predict celestial phenomena. Originally it was named tablet (PINAKIDION, tablet in Greek, or, when larger, PINAX, table). Made by a genius, a Greek philosopher that was also a very capable engineer, mechanic and astronomer with excellent knowledge of mathematics sometime between 150 and 100 BC, is a mechanical Cosmos, a clockwork Universe and, as it is argued, an astronomical clock with continuous motion. It is known that similar mechanisms have been constructed by Archimedes, almost a century before the Antikythera Mechanism called [mechanical celestial] *spheres*. The artefact has been found in

a huge shipwreck that sank sometime between 80 to 60 BC, full of Greek treasures taken to Rome from the Greek World. The new results that are expected with the present on going new archaeological underwater excavation in Antikythera, when they will find more parts of the Mechanism that will fill up gaps in this four dimensional puzzle.

The mechanism is an evolution and miniaturization of very large astronomical instruments starting from prehistoric times. Prehistoric megalithic Stonehenge-like structures with astronomical orientations and some astronomical functions become gradually instruments like the Antikythera Mechanism. With the development of science and civilization humans understand that they can predict natural phenomena using causality, the laws of physics, and mathematics. For the Antikythera Mechanism use as laws of physics the periodicities of events. For the lunar trajectory the mechanism uses a system of epicycles or a loose type Fourier series as we could describe it in modern terms of mathematics.

This mechanism is the most representative artefact of Greek philosophy; it is the epitome of Pythagorean philosophy, the compendium of Greek technology, an aspect of Greek civilization which is otherwise totally neglected. The study of the mechanism proves that humans more than 2100 years ago had the ability to create automata based on causality and the laws of physics, as they understand them at the time. The Antikythera Mechanism surpasses the descriptions of Heron and Proclus by far. The Antikythera mechanism is much more advanced that all automata described by Heron and others. The existence of this mechanism shows also that descriptions of automata in ancient texts, sometimes considered exaggerations or imaginary are in fact real machines, with whom the ancient reader was familiar with.

The mechanism has a user manual with astronomical knowledge and the text of the almost completely damaged mechanism, which has recently been read, in combination with the mathematics hidden in the teeth of the gears of the old computer, shows that the Greeks had mathematical and astronomical knowledge not known up to know. The manual deals extensively with astronomical knowledge. This includes extremely long periodicities of the planets, of the order of 5 centuries (for Venus and for Saturn) not mentioned elsewhere in the literature, Greek, Latin, Babylonian or other. Based in previous and the new results, the manual in combination with the mechanical construction and its functions and mathematics that are revealed from, shows that the construction of the mechanism proves that the Greeks conceived, designed and constructed this mechanism based on the Pythagorean doctrine that nature is described with numbers, i.e. the laws of physics. The notion of modelling based on the Pythagorean principle permits the scientific study of natural phenomena. This way humans understand and even predict natural phenomena with mathematics.

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LANGUAGES, ALPHABETS AND LITERACY IN ARCHAIC WESTERN ANATOLIA.

The paper will address three interconnected subjects bearing on the question of writing and literacy in the Archaic Ionia and adjacent regions, a question that underlies the complex issue of *written* transmission of knowledge, both between the Greeks and their eastern neighbours and within Greece.

1) The first one is the languages spoken in western Anatolia, the linguistic substratum of Ionia and the question of linguistic – and, though it, also possible conceptual – influences on the East Ionian dialect. I will first briefly touch upon the Late Bronze Age background of the Greek-Anatolian relationships, sketching the ethno-linguistic and political situation in the region as it can be glimpsed from the Hittite cuneiform and Hieroglyphic Luwian texts. Then, tracing the changes in the ethno-linguistic map of western Anatolia in the period between 1200 and 700 BC, I will discuss the relationships of the Ionian Greeks with three major ethnic groups present in the region in the Archaic Period: the immediate neighbours to the east and south-east, pugnacious and independent Carians, known first of all as 'inventors' of different military gadgets (as helmet crests and shield handles); more civilised, rich and powerful, but addicted to luxury Lydians to the north-east, famous as 'developers' of brothels, taverns and cosmetic products; and the Phrygians, inhabiting vast areas of western and central Anatolia, who, in the heyday of their political power in the 8th century BC (but probably also thereafter), had a certain impact on the Greeks in the domain of music and were, as it seems, one of the most important mediators between the Greeks and the 'Orient'.

2) The second point is the alphabets current in the region in the Archaic Period. In this section, I will give an overview of the writing cultures of the Carians, Lydians and Phrygians as reflected in epigraphical material, addressing the questions of source(s) of the Anatolian alphabets, chronology of their development and interrelationship between them. I will proceed then to the problem of development of the East Ionian alphabet, one of the most advanced system of writing in the Archaic Greece. This issue I will consider both form Greek and the Anatolian perspective.

3) The third point is the problem of the spread of literacy in western Anatolia, both in the Greek speaking community and among the indigenous peoples. Here I will combine literary and epigraphical evidence to attempt an answer to the question how deep was rooted literacy in the respective societies. Is it possible that, for example, the Lydians have made already in 7th or 6th century BC the step from writing brief dedicatory inscriptions to writing longer texts, such, for instance, royal edicts or religious regulations? Considerations on this problem will further let one to approach – albeit in a more speculative vein – the question of existence of literary or 'scientific' works in the indigenous Anatolian languages and of access to them of the Greeks. Finally, I will try, using this background, to give an answer on the question of the time and mode of fixation of the early Greek cosmological and philosophical writings.

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THE EMERGENCE OF *ISONOMIA* IN IONIA

If Ionia was considered the cradle of the sciences, for the political developments of the poleis on the Greek mainland Athens is regarded as the motor for the emergence of democracy. Although democracy had also developed incrementally in Athens, the overthrow of the Peisistratid tyranny and subsequent reform carried out by Cleisthenes is considered an initial moment. The development of democracy is defined starting from this phase of the Athenian history, characterized by some scholars of Ancient History as the 'Athenian Revolution'. Naturally this takes into account that this development took place incrementally and that even the establishment of representative structures, its execution and acceptance will have needed some time. Still this development is unsurprisingly viewed as a conceptual unit. Even the connected

formation of the concept, to be recognized in the terms of *isonomia* and *demokratia* or rather its adjective and verbal forms, is generally focused on Athens. In his work entitled 'The Greek discovery of Politics', Christian Meier already emphasized that this development can hardly be seen as limited to Athens and that 'Athens does not seem to have played a leading part' (Meier 1990, 51). Nevertheless, according to Christian Meier's opinion, the reports of early isonomies describe 'broad oligarchies' and only with Cleisthenes in Athens did the developmental process receive its specific direction towards democracy. The role of Ionia, which had been accentuated so emphatically by Jean-Pierre Vernant by referring to isonomia as the principle of a civil cosmos, which is arranged around a *meson*, a middle, like the cosmic model of Anaximander, has completely retreated into the background in course of this discussion, is even quite repressed. But this perspective, focused on Athens contrasts blatantly to the version presented by Herodotus in his historical work: it is well-known that he reports on a number of attempts of Ionian poleis to establish isonomies. As mentioned, Christian Meier viewed these as oligarchies, others presume a backward projection from the experience in Athens and yet others fictional stories invented by the narrator Herodotus. The question is how plausible Herodotus' depiction of the Ionian isonomies is and what exactly he meant by using the term *isonomia*. In regards to the concepts applied, Herodotus' depiction has a certain historicity. There are two contemporary witnesses, more or less simultaneous to the events in Ionia: the famous Athenian drinking song that awards Harmodios and Aristogeiton honor for having brought the *isonomia* to the Athenians (Athenaios XV 695 a) as well as the description of the physician and philosopher Alcmaeon, comparing tyranny (characterized as monarchy) and *isonomia* with illness and health (DK 24 B4).

Both texts stand in no relation to the events in Ionia, but still give a chronological point of reference for the use of the concept around 500 BCE. Here Herodotus offers an extensive and nuanced depiction. One could even say that *isonomia* in Ionia is one of the main characteristics of his narrative in the first six books of the history: he starts this depiction with the advice of Thales and Bias (1,170), continues it with the events in Samos following the overthrow of Polycrates (3,142) and makes it culminate at the beginning of the Ionia revolt (5,37) as well as after its conclusion (6,43). This continues as a theme throughout the entire 50-year history of Ionia, all the way to the reorganization after the defeat near Lade in 494 BCE.

Because in this context Herodotus also partially uses the term of democracy, which arose much later, for later readers it isn't always easy to recognize the specific historic context. In my opinion, the difficulty lies in the fact that the meaning of the concept of *isonomia* in light of its scope is underestimated because, and most importantly, one always has the development in Athens in mind.

In order to explain this, the very general meaning of *isonomia* should presented that is expressed in both of the earliest texts as well as by Herodotus should be highlighted here: *isonomia* means the shifting of power towards the civil assembly including every male, adult citizen with the same right to vote and this becomes part of the *nomos* supported by the political society. This is incompatible with any type of tyranny as well as individual prominence or individual decisions in political processes.

But this is not all. One must take the far-reaching consequences into account that the execution in political praxis brought along with it: the virtual establishment of the right to vote always presumed a new distribution of the citizenry in subgroups in order to realize this equal right to vote, just as the changes in the structures of offices and the reform of the council towards a representative composition. These are all infrastructures of a political organizational form that one is only familiar with in this depth from Athens and since the reforms of Cleisthenes.

However, this infrastructure is not to be considered *identical* with *isonomia*, but it is the immediate *consequence* of *isonomia* if the same participation contained in the concept is also to be *practically realized*. For that reason, one has to conclude, on the one hand, that *isonomia* is a very wide-ranging organizational concept that is markedly stronger than the concept of 'democracy' in its influencing intentions and commitments. On the other hand, even the sheer fact of the mention that *isonomia* has been introduced in a given polis must mean that precisely the infrastructures named were in fact *introduced* or at least *intended*, or there was *discussion* about their introduction in the respective polis.

The fact that this isn't farfetched for the 6th century is demonstrated by the famous inscription from Chios, which documents all of this long before Cleisthenes —in the desired depth of detail regarding political infrastructure, but without using the term '*isonomia*' (ML 8).

The inscription reveals a political form of organization with an assembly and the council as the representative organ made of sub-groups, i.e. precisely the infrastructural elements that are necessary for *practical* realization of *isonomia*.

If one rejects the conclusion that the introduction of an *isonomia* led to drastic changes in the political infrastructure, then *isonomia* remains a strangely bloodless wording and it would also be hardly understandable why the introduction of this *isonomia* is almost always tied to cases of political overthrows or dramatic changes. Then one must in fact allege that Herodotus, our main source for *isonomia* in Ionia, rewrote the entire political history of Ionia in retrospect, although he is the only Greek author from whom we have any early prose text of substantial scope for this time. However, such skepticism is not surprising in light of the distrust of Herodotus' methods that were widespread until recently.

A second, equally grave objection is derived from the variants in interpretive spectrum of *isonomia*: with the assumption that the understanding of *isonomia* arose out of a rejection of tyranny, according to which the origin would be closer tied to aristocratic ideas of politics, is implicitly connected to the assumption – picking up on the previous point and going far beyond – that it should be ruled out that the Ionian *isonomia* was tied to the infrastructural framework of political organization as described. This is further connected to the assumption that the Athenian *isonomia*, i.e. the reforms of Cleisthenes, was fundamentally something else than the Ionian *isonomia* mentioned by Herodotus. If, on the contrary, it is accepted that Herodotus' Ionian isonomies are historically plausible, then this results in a completely different possibility for contextualizing the development of democracy and *isonomia*: then it can be concluded that the political concept of *isonomia* arose in Ionia of the 6th century.

Thus, it is true: not only ex Ionia scientia, but also ex Ionia *isonomia*.

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NATURE AS A PHYSICIAN: INTERPRETING A TECHNOLOGICAL ANALOGY IN HERACLITUS

In my presentation I shall propose a reconstruction of a piece of Heraclitean thought. I shall attempt to demonstrate, firstly, that Heraclitus was one of the first to develop a mimetic concept of human τέχνη based on micro- macrocosmic parallelism, and, secondly, that he had an elaborate prescriptive theory of medical τέχνη, which can be reconstructed from independent doxographic sources.

In the pseudo-Hippocratic treatise *De victu*, which is heavily influenced by Heraclitus, the author states that there is a mimetic relationship between φύσις and τέχνη in the sense that both of them follow the same principle of the unity and periodic shift of opposites. The most interesting example he gives is medicine, because in this case the analogy is reversed: it is *nature* that acts like a physician not vice versa. According to the author just like medicine turns illness into its opposite – health, so does φύσις control the regular and timely shift of opposites in the cosmos. Curiously we find the same inversion of the φύσις-τέχνη analogy (also in the case of medicine) in another doxographic source, namely the pseudo-Heraclitean letters: nature, says pseudo-Heraclitus, medicates the cosmic μεγάλα σώματα by observing the regular interchange of opposites.

Now the similarity of the two texts clearly suggests a common source, but even more interestingly, this «nature-as-a-physician» analogy in both *De victu* and the Letters seems to be connected to a very specific dualistic fire-water physiology, which, if my reconstruction is correct, would indicate that Heraclitus had developed a kind of a philosophical therapeutic program.

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THE RECEPTION OF IONIAN PHILOSOPHY IN THE POST-BYZANTINE THOUGHT AND DURING THE

PERIOD OF NEO-HELLENIC ENLIGHTENMENT

The introduction of scientific thought and its initial elaboration by the Ionian philosophers of the archaic era could not be overlooked by the Greek scholars of the late post-Byzantine and early modern Greek thought. It is characteristic, that both the intellectual movement now acknowledged as Neo-Hellenic Enlightenment and its formative constituents of the pro-Enlightenment wing and of the anti-Enlightenment pedantic scholarship– propagated in their essence the idea of science as ἐπιστήμη and, by diverted pathways and with a dissimilar conception, attempted to reinstitute it in the Neo-Hellenic society and relate it with correct reasoning (ὀρθὸς λόγος) and with a diverse conception of the idea of progress.

A great number of references to the works of Ionian philosophers can be found in a series of treatises, published during the 17th and 18th centuries. Additionally, particular treatises, serving a wide range of subjects, were circulated in the unpublished form of manuscripts, the content of which was either related to, criticising or expanding notions, chiefly introduced by Ionian philosophers. In this paper I will attempt to trace and evaluate specific approaches to the works and tenets of the Ionian philosophers, in order to comprehend the way in which early modern Greek thought employed the archaic philosophy of Ionia. We will especially focus on the following works: the novel Φιλοθέου Πάρεργα ("The Leisures of Philotheus", Vienna, 1800) of Nikolaos Mavrokordatos, the essay Ἀπολογία ("Apology", Vienna, 1780) of Iosipos Moesiodax, and the treatises Λογικὴ ("Logic", Leipzig, 1766) and Τὰ ρέσκοντα τοῖς φιλοσόφοις (‟What Philosophers Prefer'', Vienna, 1805) of Eugenios Voulgaris.

Nikolaos Mavrocordatos (Constantinople, 1670 – Bucharest, 1730), Grand Dragoman to the Divan (1697), first Phanariote Hospodar of the Danubian Principalities, Prince of Moldavia, and Prince of Wallachia, polyglot and owner of one of the most treasured libraries of his time in Europe, was the author of two influential works, namely the Περὶ καθηκόντων βίβλος ("Liber de Officiis") and Φιλοθέου Πάρεργα ("The Leisures of Philotheus"), which is the first novel of the

Neo-Hellenic literature. In this book he devotes a whole chapter (pp.63-73) to Thales, accumulating what he thought of as the moral and political testimony of the Milesian philosopher and, mostly, endorsing it in the cultural, political and ideological context of the author's time.

The work entitled "What Philosophers Prefer" of Eugenios Voulgaris is a large volume, with material on cosmology and physics. In its third chapter the author refered to the primary elements (ἀρχαὶ or στοιχεῖα) natural bodies subsist of; also he refers to the three methodological tools related to these elements. One of these tools is relating the quest of primary elements with perception – a path which, amongst others, according to him, was followed by Thales, Anaximander and Heraclitus. Furthermore, E. Voulgaris classified Anaxagoras amongst those who preferred a different methodological approach to primary elements, by employing the means of imagination (φαντασία). His critique of the Ionian philosophers is actually so harsh, that G. B. Henderson was quite justified to note that Voulgaris should have present himself in mathematics, philosophy and history with the advanced style of a genuine essayist rather than that of the mere translator. Additionally, in his Logic a great number of references to the philosophers of the "Ionian heresy" are to be traced and assessed.

Finally, Ἰώσηπος Μοισιόδαξ (Iosipos/Josephus Moesiodax/Moisiodax, Cernavodă, 1725-1800), one of the most prominent disciples of Voulgaris and one of the greatest exponents of the modern Greek Enlightenment, was an 18th-century philosopher, professor and Director of the Princely Academy of Iaşi, a school in which he forwarded the scientific thought. His famous treatise *Apology* is considered as the first essay of Neo-Hellenic literature. Its importance resides in the concept of "sound philosophy" as introduced there. Moisiodax admired Descartes, Galilei, Wolff, Locke, but most of all he admired Newton. He thought that philosophical instruction must begin with the study of mathematics, and that good philosophy is mathematical philosophy. Although he banned the Aristotelian logic from the academic curricula, replacing it with the theory of knowledge, and proposed that the Ancient Greek should be replaced in classrooms by Modern Greek, in order to increase the clarity of the lessons taught, his whole approach to philosophy is identified as the Occidental natural philosophy, as opposed to the Corydalean Neo-Aristotelianism that was taught everywhere in the Greek-speaking world. For the enlightened advocates of the new era, the Ionian philosophers were the predecessors of the Scientific Revolution, primarily introduced in modern time with Isaac Newton's Philosophia Naturalis. As Iosipos Misiodax noted in his Apologia, "all those (philosophical) heresies that preceded the Sophists took into serious consideration the mathematical method".

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TECHNOLOGY AS A POSSIBLE CONTRIBUTOR TO IONIAN RATIONALITY

1) The scope of this paper is to examine the following probable steps towards rationality, realised in some Greek cities of free thinking settlers: Initially, some doubts about the validity of "traditional" knowledge were emerged. Next, criteria were sought regarding the effectiveness of technical knowledge in producing artificial goods. Subsequently, under the favourable influence of these changes, a twofold path was probably followed: First, the view on the creation of the Cosmos was perhaps conceived as a simulation of the *dēmiourgia* of technical

systems. And, second, inquiries about the validity of knowledge were expanded from the field of *technē* to the field of natural phenomena too.

2) Before the 6th cent. BCE, mythical thinking tended to supplement missing historical information. Thus according to Homer, Muses were the only source of historical truth, whereas Hesiod admitted that Muses occasionally "knew many lies to say similar to truth". I submit that this rather impious statement is not a moralistic criticism against poetry; it may rather reflect some first human doubts about the validity of traditional narratives. After all, during the 6th c. BCE, the Milesian historian Hekataios seems to confirm this view ("the histories told by the Greeks are completely absurd").

My introductory conclusion is that between the 8th and 6th centuries BCE, a broader concern seems to be traced back about checking the validity of knowledge in History. 3) If this constitutes a first change of minds, it is also reasonable to expect a similar change regarding other categories of knowledge: Technological knowledge is so intimately connected with everyday life, that it may explain basic mental attitudes of humans. Whenever a human Need cannot be satisfied by available natural means, artificial means are invented to this end, following a typical process, in order to invent the means to satisfy a particular Need: Knowledge of materials, Skills in manufacturing and using tools, Experience in making appropriate combinations. This is a complicated and delicate process which for hundreds of thousand of years ensured the survival and the progress of mankind, by means of small artifacts up to giant land-reclamation works. Thus, a complicated technical system was constructed each time by **Humans**, in addition to the existing objects in Nature – but **without any mythical** interference.

I submit that because of the similarity between some objects/systems in *physis*, and objects/systems in *technē*, it is reasonable to assume that certain technically minded people[17] were encouraged: (i) to liberate themselves from the myth and (ii) to imagine earth and cosmic objects/systems being created in a way **similar** to that of some functional technical products[18] – that is in a rational way. In other words, in the cosmic process (resembling to a technical production), there is no need for mythological interference; thus, another important step of rationalisation is made.

Note that such an "analogical" thinking was also used by Plato in *Gorgias* (503 E) where he evaluates the quality of the **soul** by means of a simulation with the production of a **technical** good.

4) Further rationalisation due to Technology may be justified via the invention and use of measurement instruments; they are so essential for more **objective** concepts of Nature, as well as for demonstrations of opinions, that they may be considered as "rationality instruments". Moreover, when empirical knowledge needed to solve a technical problem does not exist, humans proceed in search of it – but this is almost a scientific process.

Finally, Ancient Greeks by checking the "effectiveness" of specific technological knowledge, were perhaps encouraged to check also the repetitiveness of validity of natural knowledge, i.e. the so called "truth" of it.

5) A self-criticism follows on the demonstrative methods used in this paper. The absence of any contemporary written evidence explaining the "epistemic" turn in Ionia, renders inevitable the use of **weak** working hypotheses, and the application of the rather loose criterion of a mere "suitability" in testing these hypotheses.

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[17] In the paper, some evidence is submitted in this respect, especially for Thales, Anaximander (and perhaps Anaximenes). Similarly, the broader *technophilia* of the Greeks is also reminded.
[18] Prof. R. Hahn has successfully applied this analogy between celestial bodies and architectural members.

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TEACHING METHODS OF THE IONIAN PHILOSOPHERS

In the history of philosophy the concept of method is first identified in classical era. A closer look, however, at the "Ionic" – as is usually referred - philosophy, shows that there were originally some principles or values that constituted a very early form of teaching and at the same time researching model, that involves personal study, intention for research, observation, hypothesis formulation and argumentation.

In this paper we attempt to detect an essential element which unites philosophers who appeared in the pre-classical era into a form of school. We stand for the idea that this element could be detected in the way they were initiated into philosophy through teaching, but also via personal research and study. Therefore it seems to us that among these first philosophers there were some principles or values that constituted a premature teaching and at the same time research model, which is based on *logos*.

In pre-classical period each philosopher was developing his own unique and individual worldview system in which he had been driven by experiential initiation. This kind of initiation sources refer either that was attributed to an apprenticeship relationship or that was ascribed to some kind of self-education. In the first case, the young apprentice alongside another philosopher and was learning from him to ask questions, to dare responding relied on knowledge of other theories and on critical thought. In the second case the one who had philosophical concerns was studying questions and theories that had been expressed by previous philosophers and dared to propose their own point of views. The above cases suggest that there was a certain way of initiation in philosophy, which was based mainly on the oral tradition, but included distance studying and personal research involvement.

Philosophy developed by the Pre-Socratics is based on observation, on daring an hypothesis and examination of its value. Most philosophers were based on empirical observation and proceded to hypothetical applications and to universal judgments formulation. Thus it appears that a common ground among these philosophers is the hypothetical - proposals based on the data of empirical observation. On the other hand, none of them remained strictly attached to empirical findings, nor seemed to uncritically accept the sensory data as unique and undoubtful guarantees for knowledge. On the contrary, at most of them more or less obviously underlies the insight, the attempt to release from the limitations of senses and the ascent to a truth that goes beyond the everyday reality.

In conclusion we argue that the unifying element of the early philosophers is an innovative study and learning model that is not based on the infertile reproduction of knowledge, but proposes a new way of thinking, based on experiential observation, hypothetical applications, critical review, argument, persuasion and conciliation between positions and proposals with ultimate aim the conquest of truth.

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NIETZSCHE AND CASTORIADES'S ANAXIMANDRUS

In this study the only surviving fragment of the philosopher Anaximander (B1 DK), as it is interpreted in the works of Friedrich Nietzsche (Philosophy in the Tragic Age of the Greeks, Anaximander) and Cornelius Castoriades (Ce qui fait la Grèce v. 1. D' Homère à Héraclite. Séminaires 1982-1983. La Création humaine II, v.1, X), is investigated. This fragment has a protean alternation of its interpretation in absolute analogy to the philosophical subject who defines its meaning. Nietzsche and Castoriades analyze this text aiming at their own philosophical interest. Finally, the text of Anaximander suggests an extreme philosophical nihilism, suggests the inevitability of the tragedy of human existence (Nietzsche) or it is the foundation of the political theory of human autonomy (Castoriades)? These proposals of the later philosophers are correct or result in a basic misinterpretation? Are there within the text of Anaximander terms and signs, which "escaped" the attention of the later philosophers or deliberately ignored, so that the text could be used as a theoretical basis to their own philosophical purpose? If this hypothesis is true, what is the correct meaning of this Pre-Socratic fragment?

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THE NATURAL PHILOSOPHY OF PRE-SOCRATICS IN THE FRAMEWORK OF MODERN GREEK

ENLIGHTENMENT

The natural philosophy of the pre-Socratics remained important and vivid for centuries despite the attack they faced not only in the antiquity but also during the Middle Ages and after. Nevertheless, as it has been proved by important scholars of the field this philosophy was neither unique in its content nor acceptable in all its forms by later thinkers.

In our study we aim to examine the way Greek scholars of the 18th century received and assimilated this natural philosophy and how it has been used as an argument either for the support of new scientific thought or for its rejection by more "orthodox" theological circles.

The emphasis will be given on the structure of matter but we shall discuss also issues like the generation and destruction of cosmos, the existence or non-existence of void and the properties of space and time.

It would be interesting to see the multiple readings and interpretations from scholars who though are active in the same wider cultural movement followed different paths according the relationship between science and religion.

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EARLY IRON TECHNOLOGY IN THE AEGEAN: WHY DO WE ALWAYS FORGET IONIA?

Iron is one of the most significant metal commodities and its discovery had a decisive impact on the development of human history. From the late second millennium BC on, iron virtually permeated all spheres of ancient life, either as a material for weapons and tools, or jewellery and currency, and as a construction material used in architecture. The introduction of iron

technology at the dusk of the Bronze Age has traditionally been seen as originating in Hittite Anatolia and reaching the Aegean via the Eastern Mediterranean. To understand the increasing visibility of iron artefacts in the archaeological records from Greece and western Turkey, several explanation models were developed in the past.

A three-phase scheme by A. Snodgrass (1980) is widely acknowledged, whereby in the eleventh and tenth century BC cooper and tin, together with scrap bronze, were short in supply. This straightforward economic factor led to the adoption of iron, and is in keeping with the historical accounts of the troubled time in the Eastern Mediterranean after 1200 BC. Others, most notably I. Morris (1989), contended that the supply and demand of bronze were not the issue, but rather that iron had suddenly acquired a new prestige that made it the metal of choice for deposition in graves; this in turn, gave rise to the "deposition model". Although, there are some differences, all scholars assumed that:

- The new technology was introduced in the Aegean from Cyprus, an island which maintained close links with central and southern Greece throughout this period.

- Certain regions such as Attica, Argolis or Crete, where an early circulation and deposition of iron objects is traceable, prevailed in this process.

- The diffusion of the iron technology from the core-regions within the Aegean was not completed until the end of the Geometric Period.

However, the understanding of the role of iron in the Aegean *koiné* and society by means of these models is seriously restricted. Selective documentary evidence, fragmented archaeological finds, and the limited amount of analysed material from archaeological contexts in the region have led to a series of misunderstandings. Hence, from the dawn of the first iron here up to the Classical period – the study of this metal in the later Hellenistic and Roman period was not even conducted until now – the technological development has been viewed exclusively according to the centre-periphery model. Over the past few years, a couple of authors such as Maria Kostoglou (2008) or Alexander Mazarakis (2007) have criticised the misleading interpretations of certain ancient polis and regions as foci of civilisation and technological knowledge as compared to their peripheries, and overall as a civilised Greek world versus the indigenous people. Moreover, such assumptions imply cultural uniformity and a straightforward technological development, exclude the variability and reversibility within this process, and appear inadequate for accommodating environmental, cultural, political or social diversity and a deliberate local development. Therefore, a more complex approach has gradually been adopted in the last decade, based on anthropological studies. They emphasise technology as a socially generated activity that can be understood in terms of cultural choices, which depend on social, economic and ideological settings. These studies also stem the suggestion that the dynamics of social and technological developments can be better understood if studied on a micro-scale time and place context – it was suggested already some 50 years ago by Radomír Pleiner (1969), but unfortunately without response.

With regard to these challenges, it is apparent that the previous models didn't emphasise the "iron" innovation on the eastern Aegean coast, in particular in the Ionia; a region which was a historical bridge between Anatolia and Greece. Moreover, the further development of the iron technology within this specific cultural and social context was neglected, even though according to the written sources the Ionians were well conscious of the highly developed metallurgy of the neighbouring regions of Phrygia, Lydia and other regions in nowadays Turkey. At first the

mythological tradition refers to two Phrygian Dactyls called Damnameneus and Celmis, who first started to smelt iron. Likewise, ancient authors such as Strabo pointed to the Chalybes, the renowned smelters and steel-producers of northern Anatolia. Another story is to be found in Herodotus, who names Claucus of Chios as a master who was credited with the invention of iron welding, and made a splendid silver bowl with an iron stand on the order of the Lydian king Alyattes. Therefore it is not surprising that bronzes of Phrygian origin as well as Greek works based on Phrygian forms and dated to the early 7th ct. BC were excavated on a large-scale in Ionian sanctuaries of Samos, Chios or Miletus. A similar technology transfer can be observed in the distribution of Lydian and Lydian-Greek works on silver some 50 years later in Temple of Artemis in Ephesus or Smyrna.

It is therefore the main aim of this paper to revisit the traditional view on the spread of iron technology and its further development on the basis of new evidence from Ionia. Furthermore it will be analysed to which extent the technological knowledge was based on early scientific thoughts, and/or on a transfer of ideas between Anatolia and the Aegean. The study is based on the data gathered from the latest excavations of metal-working installations in Clazomenae, Nif/Olympos and Phocaea, and on the archaeological and archaeo-metallurgical analysis of the iron findings from the *chora* of Milet, in particular the Apollo sanctuary in Didyma, the Athena Assesia sanctuary in Assesos, and the city as well as cultic contexts in Miletus. Together with the revision of the role of smithies within the ancient Greek society, this study can not only provide a fresh insight into the discussion about the development of iron metallurgy and its requirements or implications in the pre-Classical era, but also start a new discussion about an appropriate model of continuity and transition in the technological development – with regard to the iron – between the (prehistorical) Bronze Age and the (historic) Iron Age in the Aegean.

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EARLY ELECTRUM COINAGE – INNOVATION OR CONTINUITY?

The invention of coinage continues to be a highly controversial topic among numismatists and economic historians. While one group of scholars argues that coinage is a radically new invention, the more established view in recent decades among historians has been to interpret the earliest electrum coins as a continuation of Near Eastern practice where silver (or gold) is being weighed for monetary transactions. Much of this argument has been based on the notion that electrum, which is used for the earliest coins, was naturally available, but once gold could

be refined on a more industrial scale under Kroisos of Lydia, electrum as a rather primitive metal was abandoned. Recent metallurgical studies undertaken at Sardis and North America have undermined the concept of electrum as a naturally occurring metal.

The paper will re-examine the question of innovation in the light of recent numismatic research in this field, including metallurgical analysis of a large number of electrum coins, as well as a few die-studies. One of the more vexing questions is whether one can indeed determine what roles the Lydians and the Greeks in Ionia played in the invention of the earliest coins. Technical observations about the manufacture of coins can throw some light on the issue of innovation and scientific knowledge about metal and metallurgy in a period when new scientific discoveries took hold in Western Turkey.

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MORAL KNOWLEDGE IN HOMER, HESIOD, AND XENOPHANES

Xenophanes is probably the earliest of the Ionian thinkers to explicitly set himself up as a critic and rival to Homer and Hesiod. Yet going back at least as far as Aristotle, he has been subject to neglect or outright dismissal as a significant thinker. Against a minority of defenders like Barnes, who calls him "one of Greece's earliest philosophical geniuses" (Barnes 1979), many commentators see Xenophanes as not really, or not entirely, a philosopher. So, for instance, Hussey accuses him of employing two quite different methods, one for his "theology" and one for his speculations about nature (Hussey 1990). And though he offers some fairly remarkable observations of natural phenomena (e.g., about fossils), he retains the poetic form abandoned by indisputable philosophers like Anaximander and Anaxagoras, who chose to write in prose. This is an inconsistency a more systematic philosopher would avoid, earning Algra's ambivalent label "the enigmatic poet-philosopher" (Algra 1999).

In this paper I will examine Xenophanes' attitude toward the pursuit of knowledge, focusing in particular on the place in his thought of what we would call scientific knowledge. I shall argue for the consistency between the two parts of his thought sometimes said to be at odds: his theology and his interest in natural phenomena. Xenophanes develops a conception of a divinity which, because it moves all things by mind alone, is not jealous of our pursuit of knowledge. His interest in natural philosophy is motivated, I shall argue, by the single conviction that the clear truth of the cosmic order, whether moral or scientific, may be discovered by patient effort over time. Indeed, a proper understanding of nature will reinforce the rejection of the possibility of a god's jealous or immoral actions. For Xenophanes, a knowledge of nature and its workings become part of the moral knowledge he seeks to impart as a poet.

B) POSTER PRESENTATIONS

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ORNAMENT (DIA-KOSMOS) BETWEEN ART CREATION AND THEORY UNDER THE INFLUENCE OF

THE PRESOCRATIC WORLDVIEWS

The purpose of this paper is to present the concept of ornament as an aesthetic phenomenon that has shaped its conceptual transformations through Pre-Socratic Worldviews and Theories in interrelation with the perception of the world, (Cosmos or Kosmos), in art creation.

Under this light, ornament appears as an autonomous entity that applies to aesthetic creations related to the world vies.

Dia-kosmos, (Greek translation ornamentation), is made up of the word "dia" which means "through" and word "kosmos" (Greek for World) which means "class", "arrangement". Cosmos (*Kosmisis*) is a Homeric word which originally meant order but also means ornamentation (Homer, *Iliad* 2.476). The specification of the world as finite and hierarchically arranged deterministic identification of the structure of nature system (Lalande 1960, 389, 862, 389), forms the conceptual matrix of ornament recognized as Dia – Kosmos.

The conceptual ornament's background could be including in the concept of class and adjacent worldview, (Cosmogonies), with the first "dialectical"[19] reference between poetic of pre-Socrates philosophy in relation to the interpretation of the world and art creation. Cosmos and Genesis, are closely linked, concerning the self-determination of human with the unbroken law of the order of things. The word "Cosmos" (Lalande 1960, 862, etc.) as we come across it, in the pre-Socratic philosopher Heraclitus, means and corresponds to exactly the same concepts as stated in the modern perception and everyday experience. Pythagoras gives to the Cosmos the meaning of the whole of the region or the order of the universe. Therefore the ornament of something, of a building or of a space in general, was familiar with the concept of order that dominates the world in the universe: Ornamentation is a reflection of the universe into the structured space.

The same concept is found in modern everyday experience. "Our world, as the three Milesians (Pre-Socratic) saw, was our house ... in this house there was movement, there was a change ... The words 'cosmos', diacosmos, [...] indicate that notions of human everyday life are transferred or at least used for the description and explanation of the universe" states K. Popper commending on the pre-Socratic philosopher Heraclitus (Popper 2002, 19). Plato presents a conceptual version of the world, commenting on the Pre-Socratics in his dialogue *Phaedo* (97c), referring to Anaxagoras. He credits him that mind is the one that puts everything in order and has the responsibility for everything, placing each part in the best possible way, (″νοῦς ἐστιν ὁ διακοσμῶν τ⬜ καὶ πάντων αἴτιος … το⬜θ´οὗτος ἔχ⬜ι, τόν γ⬜ νοῦν κοσμοῦντα πάντα κοσμ⬜ιν″). Therefore, the pre-Socratic world was conceived as finite and hierarchically arranged system and structure of nature.

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[19] The Pre-Socratic did not use the term dialectics. Here with a very broad sense, as they escape from the myths and put nature or natural phenomena in their worldviews as successions or repetitions.

This concept, through the Greek speech and Greek writing contributed to create an integrated philosophical thought and laid the foundations for the first sciences, such as mathematics, etc. It is probably primary discrimination of these fields that originates from the four, continuous, principles of Pythagoras (Arithmetic, Music, Geometry, Astronomy); or perhaps it is manifested through other Pre-Socratic theories. "Mikros" or "Megas Diakosmos" of Democritus, (or of Leucippus), or "Pythagorian Sympan", (Cosmos), are only a few of the examples of such worldviews. These correlations are included in the first programmatic display of ancient gnoseological Greek triptych: "Philosophy, Science, Art". The arts within such a cultural phenomenon, are evaluated as circular through their theory – act – practice. Attempting a formulation how display these first endorsements about the world; perhaps these first endorsements of the world are reflected in Greek ancient architecture and the arts through the ornament. Under this light the Ancient Greek Ornament could be a scientific representational mediator between epistemology, theory and artistic fields; This leads us to think that the Ancient Greek ornament contains data are subject under the umbrella of a scientific supervisor and includes ideas for math and social structures. Note that the Pre-Socratic Philosophers are the first who established theory in science, especially in mathematics. The fact that they visited neighboring areas that had a knowledge of a practical side of mathematics or astronomy does not prove that these philosophers imitated, copied or encoded a similar epistemic theoretical backgrounds. On the contrary they put the base of pure theoretical thinking and defined the limits of science within it. Burnet (Burnet 1978, 26-35) goes along with this view, with the appropriate arguments, dating and interpretation of the scientific sources. On the other hand we have a deferent reading by D. Lindberg (Lindberg 1997, 19). In line with the arts, Burnet opinion supported by Mpouras is that Greeks in the Doric and Ionic order used abstract geometric elements, and did not copy forms from nature as the Egyptians did, except maybe in some early Ionic monuments (Mpouras 1990, 157). Respectively – assuming that ornamentation represents the worldviews within their cultural context – the Greek decorative elements and archetypes developed linearly and in zones [(e.g. maeander) see: Mpouras 1990, 160] describing the Greek world. Unlike respective decorative elements of eastern origin developed on the surface.

Initially the research leads to the archaic period. The philosophers of this era – Thales, Anaximander and Anaximenes of Miletus (6th century BC)[20], Pythagoras of Samos (570 BC) and his contemporary Xenophanes of Colophon – are dealing mainly with the beginning of Cosmos. The fifth century has seen a shift to a more structural domain of philosophical thinking: Parmenides and Zenon (in Magna Grecia), Heraclitus of Ephesus, Empedocles from Agrigento, Leucippus and Democritus (460 BC) from Abdera (Thrace), and others establish the search for the structure of that Cosmos. The emergence of theories, the questioning and acceptance of tradition, the interpretation of physical phenomena and myths, formed the great mental leaps that these first thinkers provided (Kalogerakos, Thanasas 2000, 37). Note that the Pre-Socratic philosophy received a balance tradition between the myths of the Homeric poems and Hesiodic perception of the world. Myth was basically interwoven with the divine, with a wide range of narrative tradition coming mainly from the collective knowledge (Veggeti 2000, 25).These narratives that were expressing and gnostic level, presented guiding repetitive patterns (Leitmotive), constituting ornament in a sense. Different narrative versions and their patterns, formed a complex landscape from uncontrolled competing beliefs that entrenched rituals shapes. It should be mentioned the intense population movements during the Archaic period,

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[20] The most ancient school of scientific cosmology placed in Miletus one of the two largest centers of pre-Socratic philosophy (Burnet 1978, 36).

(and in the previous periods), and the change in the way of political governance (aristocracy), supplement the Archaic world. The development of the theory from some of the Pre-Socratics (Pythagoras, Democritus) replaced the myth. Also assists in a course of crushing with the "primitive ternary rite", [see "primitive ternary rite": Movement - Diction – Melos (melody or song), (Lekkas 2003, 45)], which provided the means of maintaining the old world of myths and of Genesis. Also assist in a process of transition and renegotiation of "primitive ternary rite": Movement - Diction – Melos, in distinct arts. The examination of mathematics and geometry through theory, combined with the existing practices in the arts, will formulate decorative elements and establish decorative archetypical standards that they will progress up to the classical period.

The theocratic concept is now displayed in a corresponding diverse philosophical environment: Some consider the dominant One and the perception of "unique" only God or more through natural elements (Thales, Anaximenes, Heraclitus). Other thinkers confer divine qualities in more metaphysical and spiritual processes (Parmenides, Anaximander, Anaxagoras, etc.). Democritus launches first the demystification of the gods with his materialistic atomic theory (see Democritus, (Vegetti 2000, 110). Thales will propose a whole group of deities dominated by water: the world is full of gods (Kalogerakos 2000, 39). Anaximander places the divine at the beginning of infinity (Anaximander 2000, 99). Anaximenes respectively places as the beginning of all air and innumerable worlds that mold the image of the Divine. (Burnet 1978, 73). The Pythagorean Divine, mainly of Orphic origins, that are evolving and reshaping, (Vegetti 2000, 82), is the number - law identified in the minds of the Pythagoreans with the divine order and the prescribed plan. The sacred character of numbers and functions, and the ten pairs that they developed, are an unprecedented interpretation of the function of human nature and of God. The fire and the circular path are in the beginning of the philosophical identity of Heraclitus. The Word in double meaning, as speech and respect - ratio, defines the act of Gods and that of men, in an uninterrupted flow. Beliefs such as those of Heraclitus on one and only god have lots in common with those of Anaximander and Xenophanes, (Burnet 1978, 65).

The above theories create a dominant grid of dialectical interrelations of situations and innovations developed during the archaic period. Particularly in the arts, they appear innovative – such as Kore and Kouros in sculpture or the Ionian order (formed in the 7th century BC.), or the various motifs such as the Ionian egg-and-dart *kymation* in architecture – and their variations. It is noted this kind of motifs are creations of the archaic period, as the classical era in architecture developed only the Corinthian column capital. The ornament even though gradually becomes a member of the overall form, however, retains its autonomy since it is a complete form: The Ionian ornament is part of the Ionian ancient column which is an extract of the Ionian temple etc. Ornamental autonomy is especially observed in the Archaic period. Heterogeneity elements appear within a specific projects. The ornament's variations progressively are integrated in a structural approach to the entire tripartite anthropomorphical architecture (legs – trunk – crown) in proportion to the tripartite scheme that the artwork follows in the classical era. However, the above are expressed in the archaic temple, that it is usually devoted to the one and only God. The tributes and the dedications to this God (statues and columns), were uneven and there were not the exact repetition of a pattern but they were more versions of ornamentation. The practice of different typological models combined with different sponsorships forced to a diversity of columns and capitals. Thus, different versions or facets of an archaic column provide as with a more general decorative conceptual background: the ornament is an apparent adornment in order or else the instrument of making an object beautiful in appearance. This ornamental feast is intellectually consistent with the multidimensional pre-Socratic interpretation of the world. For example, the sculptural

ornamentation of the archaic pediments usually refers to myths and generally in respect with the divine element and the main subject is the god to whom the temple is dedicated, projecting the early theocratic archaic beliefs. The ornament is rich but lacks the harmony in terms of proportions. Gradually increasing harmonized shapes are formed that have a consistent relationship between primary – secondary order.

These issues are presented through the relationship of Being – Seeming in the mature of pre-Socratic thought. For example Parmenides highlights the distinction between truth and appearances in two parts of the relevant poetic work (for the Truth and for the Appearances). Democritus is working on a theory of relativity and subjectivity of secondary qualities as opposed to the properties of atoms (Beardsley 1989, 20).

Such considerations reflect the thought, the social context and the system that is supported through them. So the ornament is a micro-cosmos that is the work of man and has consistent regulation rules and organization. Normally it provides a summary of the large to the small, with the corresponding orders and harmony laws. According to the Pythagoreans, Harmony is a mathematical regularity associated with the idea that the principles of mathematics should be the beginning of everything. In Heraclitus the fairest harmony is resulting from the combination of contrasts. All these show the first conceptual connection of ornamentation as coherent and independent figure with the artwork. These raw aesthetic judgments related to decoration and artwork will be determined a few years later, in the Aristotelian Poetics. The complete distinction of the ornamentation will lid the future researches at the examination of *diakosmos* as one of the six elements of the Greek tragedy ("ὄψις"/ *ópsis*), (Aristotle 1999, 52-53).

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WISDOM, INSIGHT, AND KNOWLEDGE IN HERACLITUS

This article attempts to investigate the notion of knowledge and its aspects in Heraclitus. Firstly we must wonder whether knowledge is to be considered as an objective and universally acceptable method of knowing and understanding or whether it is rather a type of opinion and personal perception of the world according to the Ephesian thinker. Moreover we shall explore the notion of ἐδιζησάμην ἐμεωυτόν (I seek myself) as a different version of the Delphian rule "Know yourself" (γνῶθι σαυτόν). And in this case may we speak of a perfect knowledge or is it not more than an adequate perception? In other words what is it that led Heraclitus to strongly and impolitely disapprove of Homer, Hesiod and Archilochus?

The role of the senses, mainly sight and hearing, will also be put under investigation, since Heraclitus seems to be taking them very seriously in account. However the main question regarding his "philosophical system" remains: How can knowledge be associated with determining oneself and how is it helpful so as for man to find his place within the society? In other words does knowledge have any sort of connection to ethics?

In addition, Heraclitus's views on the difference between the human and the divine (as far as the aspect of knowledge is concerned) is another significant factor that cannot be left unexamined.

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ARISTOTLE'S DIALECTICAL PROCEDURE ON THE *DE ANIMA* THE CASE OF THALES OF MILETUS'

ENDOXON

The dialectical procedure of Aristotle's De Anima Book 1 has been often neglected, because it is considered a simple état de l'art or, worst, a tendentious interpretation of the Presocratics. However, the doxographic books hide some interesting features concerning how Aristotle actually conceived dialectic as an heuristic, on one side, and an hermeneutical tool, on the other, in order to include the intellectual background he inherited.

In the following presentation I want to argue in favor of the thesis that the dialectical feature of the scientific inquiry in the De Anima is a necessary condition in order to pursue the psychological investigation. In order to do that, I propose to evaluate the case of the endoxon of Thales that Aristotle uses in his characterization of the soul by the help of his predecessors. For doing so, I am going to provide, first, a reconstruction of what I think is the hermeneutical process Aristotle did over the endoxon of Thales by the aid of dialectic, in order to provide an argument of how the dialectic works in the case of the De Anima as a "sifting device" in order to produce the conceptual elements, aporiai or premises. If my procedure is correct, then, we will understand Aristotle's hermeneutical effort on Thales' opinion and, so, we can apply the same device for the Aristotelian testimonies on other Presocratics.

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It can hardly be doubted that the testimony on Thales in the De Anima has had a role of sufficient scope as to be considered the initiator of an interpretive tradition. The scarcity of direct references to the intellectual production of this thinker makes practically necessary to consider all the available sources as relevant, or all of them as doubtful. Scholars have been especially suspicious in relation to Thales' dicta, because the material available consists almost entirely of doxographical testimonies. Exegesis in this case involves the establishment and management of two different citation contexts.

From Thales anecdotes we can imagine a very special figure. For example, one of the most widespread notices reports that he was counted among the Group of Seven Sages of Greece: Aristotle, in fact, makes him the "initiator of a certain philosophy"21. The particularity of the activity of thought that Aristotle attributes to Thales is nothing more and nothing less than natural philosophy, materialistic, projected into an etiology explaining all existing phenomena.

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[21] Aristoteles, *Metaphysica*, 983b6-8 y 18-25 [11A12]: "–τῶν δὴ πρώτων φιλοσοφησάντων οἱ πλεῖστοι τὰς ἐν ὕλης εἴδει μόνας ᾠήθησαν ἀρχὰς εἶναι πάντων· […] τὸ μέντοι πλῆθος καὶ τὸ εἶδος τῆς τοιαύτης ἀρχῆς οὐ τὸ αὐτὸ πάντες λέγουσιν, ἀλλὰ Θαλῆς μὲν ὁ τῆς τοιαύτης ἀρχηγὸς φιλοσοφίας ὕδωρ φησὶν εἶναι (διὸ καὶ τὴν γῆν ἐφ' ὕδατος ἀπεφήνατο εἶναι), λαβὼν ἴσως τὴν ὑπόληψιν ταύτην ἐκ τοῦ πάντων ὁρᾶν τὴν τροφὴν ὑγρὰν οὖσαν καὶ αὐτὸ τὸ θερμὸν ἐκ τούτου γιγνόμενον καὶ τούτῳ ζῶν (τὸ δ' ἐξ οὗ γίγνεται, τοῦτ' ἐστὶν ἀρχὴ πάντων)–"; «Among the first men who philosophize, the most thought that the only principles of every thing are material […] However, they all not say the same in account to quantity and kind of such a principles, but Thales, the beginner of this philosophy, said that it was water (hence he stated that the earth is over the water), taking maybe that idea from the observation that the food of all beings is wet, and the hot itself is generated from it and lives for it (that from which all things are generated, that is the principle)».

The Milesian is, then, the father of science in which the De Anima's project is inscribed, and around which gravitated all the thinkers listed in the endoxographic procedure of the first book. Aristotle in the De Anima speaks twice of Thales. The first occasion has, as in the case of the testimony of other thinkers, an expository character. Alternatively, the second opportunity is due to a more complex procedure, by which the Stagirite seeks to provide an explanation by deductive reasoning. For now I will focus on the first occurrence reporting the idea of 'soul' that, according to Aristotle, had Thales [DK 11 A22]:

ἔοικ δὲ καὶ Θαλῆς ἐξ ὧν ἀπομνημον ύο σι κινητικόν τι τὴν ψ χὴν ὑπολαβ ῖν, ἴπ ρ τὴν λίθον ἔφη ψ χὴν ἔχ ιν, ὅτι τὸν σίδηρον κιν ῖ·
(De Anima, 405a19-21)

It also seem that Thales –from which we remember from him- held that the soul is a motor, if he really that the magnet has a soul because it moves iron.

Thales must be counted among the kinetists because his explanation implies a connection between movement and life. The intervention of the magnets in the explanation constitutes the point for establishing the comparison. For this reason the image is central: is the element that allows inferring that the Milesian believed that the soul was a motor. So far, in my view, there is no major problem. We are facing some lines about a thinker who, according to Aristotle, was on the right path when trying to distinguish between living and non-living beings, only that his criterion made the boundary between the two, rather, a revolving door: nonliving things like magnets fall into the category of living, and living beings as sea sponges would be relegated to the inert realm for the absence of dynamism (cf. De Anima 410b20; Ross 1961, 207). The error is not really important for the dialectical procedure. A little more interesting may be the potential scopes of such an idea, which only becomes apparent in examining the view. The idea of the soul as a motor is the frame of the De Anima's reference to Thales, and this opinion plays a key role in dialectic research.

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In the last chapter of the De Anima I, Aristotle address objections to all the views discussed together in the same group. The particularity of this stage of the process is the formulation of difficulties that would underlie the research from now on: at this stage of the argument, the proper name references are not the norm and, rather, he addresses to 'all those who think X' by using the starting classification. However, as an exception we count a new reference to the Milesian [DK 11 A2]:

καὶ ἐν τῷ ὅλῳ δή τιν ς αὐτὴν μ μῖχθαί φασιν, ὅθ ν ἴσως καὶ Θαλῆς ᾠήθη πάντα πλήρη θε ῶν ἶναι.
(De Anima 411a7-8)

There are others who say that the soul is mixed with the whole universe, whence maybe Thales thought that everything is full of gods.

This endoxon was probably very popular: world and nature are animated. To report this idea can be important for Aristotle, because under such a perspective there is, strictly speaking, a difference between living and non-living beings. The psychological approach, of course, would

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be a superior alternative to the belief that is unable to explain certain processes that are distinctive features between natural beings. Back to Aristotle's reasoning in the De Anima, the last step (iv) does not use a metaphor but a metonymy (even if the are similar): one of the 'divine beings' is taken as representative of the group. The procedure is a common dialectical tool: in this case makes understandable Thales' dictum.

However, the status of the view remains doubtful: it is not a particular study of Thales' statement, but of the association Aristotle did. The problem is the connection to the Milesian. Giorgio Colli said that Thales himself sees an identity between the terms 'god' and 'soul' (1978, 287). I think the textual evidence shows that the link between the two concepts can be the product of Aristotelian exegesis. The connection with the magnet can be set as follows: if the soul encompasses the entire universe (there's a part of divinity in everything, hence there is a constant movement), then all things are partakers of soul and, therefore, it can be said of them that they are alive. Here is the reason why the opinion of Thales in the dialectical research is relevant: since the soul is postulated as the sine qua non trait of a living thing, the distinction between living and nonliving things is erased with an animist or, better, hylozoist position (Guthrie 1962, 64), and that is what Aristotle needs to sift from Thales' view in order to work with his idea in a certain positive way.

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FIGURES IN MOTION: DE-CENTERING ATHENS FROM THE CREATION OF THE 'SEVERE STYLE'

This paper aims to examine the complex and ambiguous evidence for the location of and processes behind the 'invention' of the so-called Severe Style, looking at the evidence of sculpture, terracotta and coinage from Ionia.

The general perception of the economic and cultural success of Ionia in Archaic and Hellenistic times is well supported by substantial epigraphic and archaeological evidence. This is starkly confronted, however, by our lack of knowledge and understanding of the Classical period.

It is well known that the Ionian cities were conquered by the Persians in 546/5 BCE which led, among other things, to the obligation to pay levies to and provide soldiers for the Persian state. Researchers of ancient history have argued extensively whether or not the outbreak of the Ionian revolt in 498 BCE can be attributed to an economic decline of Ionia under the Persian reign [and high taxation]. However, it seems certain, at least, that the Ionian revolt, and in particular the defeat of the Ionian cities in 494 BCE, marked a decisive event for everyday life, cult worship and political- and administrative organization in the entire region. Therefore two general questions arise:

How can we use the meagre archaeological evidence to understand the consequences of the Ionian Revolt, the extent of 'continuity' in the Ionian landscape and therefore the dual physical and psychological processes of urban destruction and renewal in the ancient world?

To what extent are archaeological categories prejudiced by the Atheno-centric lens of surviving historical sources, and can a close examination of the archaeological data from Ionia lead us to alternative reconstructions of Aegean artistic, political and economic history?

Both the Ionian revolt and the later victory of the Milesians at the battle of Mykale in 479 BCE have often formed the basis for the dating of sculptural evidence. The historical events have been used to characterise particular material as either the last exponents of Archaic prosperity, or else the proof for a quick resettlement after liberty.

Similarly, it is at about the same time that the transition from the Archaic to the Classical style is attributed. The end of the old period and the beginning of the new is generally dated around 480 BCE when the Persians sacked and burned down the Athenian Acropolis. Traditionally in art history, the suggestion has been that the new Classical style was invented by Athenian artists after the Persian invasion, and as a response to the trauma caused. Doubts about this interpretation have been common, particularly after J. M. Hurwit showed that the context of the Kritios Boy and the so-called Blond Head could not be described as safe and thus could not be taken as fixed points, or as the first representatives of a new tradition[22]. In a number of articles Andrew Stewart re-dates the beginning of the Classical Style down to 477/6 BC suggesting that the 2nd group of Tyrannicides, those by Kritios and Nesiotes, inaugurated the shift in style, and that the Greek victories of 480 and 479 BCE somehow inspired it[23].

For our purposes the dating of the earliest Classical Sculpture, the so-called "Severe Style", is of considerable importance because of three sculptures found in Miletos that have been interpreted on stylistic grounds as examples of Early Classical sculpture, and therefore suggested as having been made immediately after 479 BCE when Miletos was freed from the Persians. Given the questions of continuity or disruption in the region, it is very important to know whether monumental sculptures of such high quality were made before or after the Ionian revolt, in order to place the whole 5th century in context.

A starting point for exploring this question is an article published in 2002 by V. M. Strocka on the statue of Apollon Didymeus, a monumental sculpture made by Kanachos, and through which the dating of the beginning of the Severe Style in Greek sculpture may be foregrounded[24]. This sculpture is known only from written sources, and as K. Tuchelt aptly quipped "Sie verdankt ihren Ruhm ihrem Schicksal" -This work owes its fame to its curious biography: originally manufactured for the Didymaion by a famous bronze caster from the Peloponnese, Kanachos from Sikyon, it was robbed by the Persians and given back to the Milesians by Seleukos I. Nicator. Based on the notes of Herodotos, the plunder and pillage of the sanctuary of Apollon Didymeus and with it the robbery of the Kanachos-Apollon is generally dated to the year 494 BCE, a date which gives us at the same time a terminus ante quem for the deposition of the statue into the sanctuary at Didyma/Branchidai.

Beside these examples, Ionia offers a number of original sculptures, terracottas and coins, which are – on stylistical grounds – assigned to the 'Severe Style'. It is the aim of the paper to present an overview over the existing material by discussing not only their dating but also their importance for the wider question of the artistic development during the late 6th and the first half of the 5th century BCE.

The re-assessment of the dating of the Ionian evidence makes a strong case for the idea that both technical skills and the knowledge of the human body necessary to create the Severe Style were developed independently and primarily in Ionia and not, as is conventionally argued, in Athens.

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[24] V. M. Strocka, Der Apollon des Kanachos in Didyma und der Beginn des Strengen Stils, JdI 117, 2002, 81–125.

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WAS XENOPHANES A POLYMATH? HERACLITUS ABOUT XENOPHANEAN NOTION OF

KNOWLEDGE

The oldest available testimony concerning intellectual activity of Xenophanes of Colophon is fragment 22 B 40 (Diels-Kranz) by Heraclitus of Ephesus. The name of Xenophanes is connected there with those of Hesiod, Pythagoras, and Hecataeus and occurs in the context of severe, Heraclitean critique of *polymathy* (πολ⬚μαθίη) as it is opposed to cognition of νόος type. It is not however precisely clear how the concept of *polymathy* should be understood, especially because of the fact that it appears here for the first time in history. There are two primary ways of understanding this Heraclitean notion nowadays, depending on what part of this word is concerned. Accordingly, *polymathy* may mean either a knowledge of many things (the emphasis put on πολ⬚-; therefore it would be so-called erudition), or the knowledge achieved in an indirect manner, "second-hand" learning (the meaning focused on μανθάνω part). Hence it is worth to consider the question, whether it is really possible to ascribe the *polymathy* such understood to Xenophanes' poetical thought, as Heraclitus did, and what does it mean, that Xenophanes, one of the most prominent representative of Ionian enlightenment, is, in the opinion of Heraclitus, a polymath? The Heraclitean record of fragment B 40, conceived in the broader context of his philosophy of *logos*, can thereby bear important, although often neglected, testimony to the problem of knowledge and cognition in the philosophy of Xenophanes of Colophon.

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HERACLITUS AND DEOMCRITUS ON FREE WILL AND DETERMINISM

Do people have free will? Are they responsible for their actions? Is free will compatible with determinism? While it is common to look at philosophy from a modern perspective, in order to understand the history and development of modern philosophical theories, it is valuable to examine the roots of these theories and how early philosophers have influenced modern philosophical thought.

PreSocratic thinkers Heraclitus and Democritus are key examples of the roots of various modern philosophical theories as they are considered to be cornerstone of the modern debates over free will and determinism. While Heraclitus viewed the world as constantly changing and fundamentally believed in free will, Democritus stated that there are laws that govern and explain all phenomena including human beings and their actions ; this is a cornerstone of the modern debate on determinism versus free will.

These two viewpoints had various subpoints and conclusions, which have acted as a framework for many modern philosophical debates. This presentation aims to explore the core concepts of them in order to highlight - by demonstrating their contrast- the extent of their thought and influence not only on later philosophers but also on modern context of inquiry of free will.

"Ex Ionia Scientia" – PARTICIPANTS

(A) Talks/Chairs (in alphabetic order)

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CRITICISM AND TRANSFORMATION OF THE CONCEPTIONS OF NATURE AND MAN
OF PRESOCRATICS BY PLATO AND ARISTOTLE

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ARCHETYPAL IMAGES IN ANAXIMANDER'S PHENOMENOLOGICAL COSMOLOGY

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EARLY ELECTRUM COINAGE – INNOVATION OR CONTINUITY? (with Ute Wartenberg)

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A MODERN READING OF ANAXIMANDER'S *APEIRON*

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EX IONIA PROSA: PROSE COMPOSITION IN ARCHAIC IONIAN SCIENCE

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ANAXIMANDER, COSMOLOGY, AND THE POETS

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WHY THALES KNEW THE PYTHAGOREAN THEOREM: PHILOSOPHY, GEOMETRY, AND DIAGRAMS

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HOW A SAGE WOULD BUILD A CITY: THALES OF MILETOS AND THE INVENTION OF GREEK
URBANISM

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FURTHER THOUGHTS ON THE ARRIVAL OF GREEK MONUMENTAL ORDERS AND AUTODIDACT
POLYMATH *ARCHITEKTON*

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PRESOCRATICS AND CURRENT CHAOS THEORY

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THE CONTRIBUTION OF ANAXAGORAS IN ASTRONOMY AND ASTROPHYSICS

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THE SUBJECT OF KNOWLEDGE: 'MAN' IN PRESOCRATIC PHILOSOPHY

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ANAXIMANDER'S CONCEPTION OF GENERATION

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PLACING THE IONIAN *ΠΕΡΙ ΦΥΣΕΩΣ ΙΣΤΟΡΙΑ* IN CONTEXT: THE ROLE OF SEAFARING, NAVIGATION AND MILESIAN COLONIZATION IN THE BIRTH OF GREEK SCIENCE

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WISE MEN AND POETS IN ARCHAIC GREECE: PITTACUS AND ALCAEUS IN THE POLITICS OF MYTILENE

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ΔΑΙΜΩΝ IN HERACLITUS

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EX IONIA PROSA: PROSE COMPOSITION IN ARCHAIC IONIAN SCIENCE

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XENOPHANES OF COLOPHON AND HERACLITUS OF EPHESOS: THE TWO EARLIEST FOES OF ANTHROPOMORPHISM IN COSMOLOGICAL THINKING

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THE ANTIKYTHERA MECHANISM, AN EPITOME OF PYTHAGOREAN PHILOSOPHY

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LANGUAGES, ALPHABETS AND LITERACY IN ARCHAIC WESTERN ANATOLIA.

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THE EMERGENCE OF *ISONOMIA* IN IONIA

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NATURE AS A PHYSICIAN: INTERPRETING A TECHNOLOGICAL ANALOGY IN HERACLITUS

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THE RECEPTION OF IONIAN PHILOSOPHY IN THE POST-BYZANTINE THOUGHT AND DURING THE
PERIOD OF NEO-HELLENIC ENLIGHTENMENT

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TECHNOLOGY AS A POSSIBLE CONTRIBUTOR TO IONIAN RATIONALITY

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TEACHING METHODS OF THE IONIAN PHILOSOPHERS

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NIETZSCHE AND CASTORIADES'S ANAXIMANDRUS

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EARLY IRON TECHNOLOGY IN THE AEGEAN: WHY DO WE ALWAYS FORGET IONIA?

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THE NATURAL PHILOSOPHY OF PRE-SOCRATICS IN THE FRAMEWORK OF MODERN GREEK
ENLIGHTENMENT

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EARLY ELECTRUM COINAGE – INNOVATION OR CONTINUITY? (with Wolfgang Fischer-Bossert)

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MORAL KNOWLEDGE IN HOMER, HESIOD, AND XENOPHANES

B) POSTER PRESENTATIONS

(in alphabetic order)

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ORNAMENT (DIA-KOSMOS) BETWEEN ART CREATION AND THEORY UNDER THE INFLUENCE OF THE PRESOCRATIC WORLDVIEWS

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WISDOM, INSIGHT, AND KNOWLEDGE IN HERACLITUS

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ARISTOTLE'S DIALECTICAL PROCEDURE ON THE *DE ANIMA* THE CASE OF THALES OF MILETUS' *ENDOXON*

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FIGURES IN MOTION: DE-CENTERING ATHENS FROM THE CREATION OF THE 'SEVERE STYLE'

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WAS XENOPHANES A POLYMATH? HERACLITUS ABOUT XENOPHANEAN NOTION OF KNOWLEDGE

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HERACLITUS AND DEMOCRITUS ON FREE WILL AND DETERMINISM