

**TE X N H .**  
**THEORETICAL FOUNDATIONS OF ARTS,**  
**SCIENCES AND TECHNOLOGY**  
**IN THE GRECO-ROMAN WORLD**

**ORGANIZED BY**  
**THE CENTRE FOR ANCIENT PHILOSOPHY AND THE CLASSICAL TRADITION**  
**NOVOSIBIRSK STATE UNIVERSITY**  
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**Spring Session**  
**August 4–15, 2011**

**OUTLINE OF THE COURSES AND RECOMMENDED READINGS**

August 5-10

Leonid Zhmud (St. Petersburg)

**GREEK MEDICINE OF THE CLASSICAL PERIOD**

**IN ITS RELATION TO PHILOSOPHY AND THE LIFE SCIENCES**

Greek medicine was not scientific even at the peak of its development, in the third century BC. The establishment of scientific medicine, which reached completion only in the nineteenth century, was prepared on the one hand by the research and discoveries of many generations of physicians, and on the other by the changed social and cultural climate, the vigorous growth of natural and life sciences, the invention of the microscope, the discovery of cells, micro-organisms, and the like. A comparable social and cultural upheaval in Ancient Greece gave rise to philosophy and science, and at the turn of the fifth century BC led to the birth of *rational* medicine, which sought to explain illnesses by relying on experience. In the treatises of the Hippocratic Corpus, mostly written by the physicians of Cos and Cnidus between the years 430 and 350, the rationalism and empiricism of the new medicine assumed its final shape. Unlike the medical texts of the Egyptians and Babylonians, which combined rational practical advice with appeals to the gods and magic formulae, the Hippocratic treatises contain no more than a few isolated examples of that nature.

Although Hippocratic medicine had a mainly empirical orientation, its experience and knowledge were still too restricted to explain most diseases and offer treatments for them. Life sciences were also at the stage of conception and could not provide doctors with sound knowledge of nature or the human body. In the effort to compensate for these shortcomings, doctors often turned to the teachings of natural philosophers, and many Presocratics, in their turn, showed great interest in problems of medicine and life sciences. On the whole the interplay between medicine and natural philosophy enriched both, though the extent and particularly the degree of the influence of philosophy on medicine should not be overestimated, as is often the case. The traditional approach to philosophy as a *scientia universalis*, a fundamental source of new ideas, methods and cognitive instruments, assumes that all other sciences, including medicine, depend on it. But Tertullian's formulation, 'medicine is the sister of philosophy' (*De an.* 2), seems greatly preferable. Such important treatises of the Hippocratic Corpus as *On the Nature of Man* and *Ancient Medicine* contain sallies against 'philosophical' medicine. Both doctors and philosophers frequently relied on traditional premises, so the significant role played by even and odd numbers, for example, in the Hippocratic Corpus, is no evidence of the influence of Pythagoreanism. Nor does the

similarity between the views of the Presocratics and Hippocratics on particular questions of physiology, embryology, or anatomy mean that philosophy was the source. It is much more natural to view this as the influence of medicine. It is even more erroneous to suppose that Presocratic philosophy was the source of the rationalism and empiricism of Greek medicine. These properties are a consequence of the general process of secularization, which deeply affected the most varied aspects of Greek life and set its seal on philosophy and medicine alike.

In my course I would like to focus on several interrelated topics.

- 1) Pre-hippocratic medicine in its relation to religion and natural philosophy. Alcmaeon, Empedocles, Hippon, Diogenes of Apollonia.
- 2) The Hippocratic Corpus and the formation of Greek rational and empirical medicine.
- 3) The Hippocratic treatise «On Ancient medicine»: Rational dietetics and its history.
- 4) A debt of Greek philosophy to Greek medicine. The Presocratics, Plato, Aristotle.

#### **Literature:**

*Hippocrates: Texts and translations in LCL; Гиппократ. Сочинения.* Пер. с греч. проф. В. И. Руднева. Т. 1-3. М.-Л. 1936-1941.

Edelstein L. *Ancient Medicine. Selected Papers.* O. & L. Temkin, eds. Baltimore, 1967.

Jones W. H. S. *Philosophy and Medicine in Ancient Greece.* Baltimore, 1961.

Jouanna J. *Hippocrate.* Paris, 1992 (Russian transl.: Жуанна Ж. *Гиппократ.* М., 1997).

Lloyd G. E. R. *Methods and problems in Greek science,* Cambridge 1991.

Lloyd G. E. R. *In the Grip of Disease.* Oxford, 2003

Longrigg J. *Greek Rational Medicine: Philosophy and Medicine from Alcmaeon to the Alexandrians.* London, 1993.

Nutton V. *Ancient Medicine.* London, 2004.

Schiefsky M. *Hippocrates. On Ancient Medicine.* Leiden, 2005

Hankinson, R. J., *The Cambridge Companion to Galen.* Cambridge UP, 2008

August 7-10

Andrey Rodin (Moscow/Paris)

#### **THEORETICAL FOUNDATIONS OF ANCIENT MATHEMATICS**

The course will discuss Euclid and Modern Mathematics. We critically review the modern notion of axiomatic method stemming from Hilbert's work on foundations of mathematics against Euclid's traditional mode of mathematical reasoning and his way of theory-building. We reconsider the popular argument according to which the discovery of non-Euclidean geometries in the 19th century made Euclid's mode of reasoning irrelevant to modern mathematics, and show that Modern mathematics owes to Euclid "Elements" much more than it may seem. In particular, we argue that the issue of objecthood stressed by Kant on the basis of the Euclidean geometry but later largely abandoned in the philosophy of mathematics of the 20<sup>th</sup> century, in fact remains essential in today's mathematics. In this context we make a theoretical proposal concerning the future of axiomatic method in mathematics and elsewhere.

Texts

Euclid, The Elements

A new ET by Richard Fitzpatrick: <http://farside.ph.utexas.edu/euclid.html>

Heath's ET and the Greek text in the Perseus:

Greek: <http://www.perseus.tufts.edu/hopper/text?doc=Perseus%3atext%3a1999.01.0085>

English: <http://www.perseus.tufts.edu/hopper/text?doc=Perseus%3atext%3a1999.01.0086>

Russian: Евклид. Начала. Пер. и комм. Мордухай-Болотовского (Москва, 1948–1950)

Proclus, Commentary on the First Book of Euclid's Elements

The Greek text: <http://www.archive.org/details/proclidiadochiin00procuoft>  
A partial Russian translation by A. Shetnikov (Definitions and Axioms):  
<http://www.nsu.ru/classics/schole/2/2-2-proclus.pdf>  
Cf. also a Russian translation of Proclus' Introduction to the Commentary to the First Book of Euclid's Elements by Yu. Shichalin (Moscow, 1997)

#### Studies:

Rodin A. Renewing Foundations. Past and future of foundations of mathematics (a chapter of the book in progress): <http://canoe.ens.fr/~rodin/spip/spip.php?article118>  
А.В. Родин, Делать и доказывать: <http://canoe.ens.fr/~rodin/spip/spip.php?article129>  
А.В. Родин, Математика Евклида в свете философии Платона и Аристотеля. М., 2003.  
Afonasin E. V., ed. The Neopythagoreans (A collection of Late Pythagorean writings in a Russian translation), ΣΧΟΛΗ 3.1 (Novosibirsk, 2009).  
Gilbet D. The Foundations of Geometry A Russian Translation online:  
[http://ilib.mirror1.mccme.ru/djvu/geometry/osn\\_geom.htm](http://ilib.mirror1.mccme.ru/djvu/geometry/osn_geom.htm)  
Jaakko Hintikka and Unto Remes, The Method of Analysis. Its Geometrical Origin and Its General Significance, Dordrecht- Boston, D. Reidel, 1974  
Gardies, Jean-Louis. L'organisation des mathématiques grecques de Théétète à Archimède. Paris, 1997  
Heath T.L. A History of Greek Mathematics, in two vols. Oxford, 1921.  
Thomas I. Greek Mathematical Works, in two vols. Cambridge, MA, 1980;  
Cuomo, S., Ancient Mathematics. London/New York: Routledge, 2001, 2005

#### Additional:

Cuomo S. Pappus of Alexandria and the Mathematics of Late Antiquity. Cambridge, 2000.  
Klein Jacob. Greek Mathematical Thought and the Origin of Algebra. Translated from German by Eva Brann. Dover, NY 1968.  
William F. Richardson, Numbering and Measuring in the Classical World. Bristol: Bristol Phoenix Press, 2004.  
Barker A. Greek Musical Writings, in two vols. Cambridge, 1984–89;  
Ван дер Варден Б.Л. Пробуждающаяся наука. Математика Древнего Египта, Вавилона и Греции (Москва, 1959, 2007)

August 12-14

Eugene Afonasin

#### **STRANGE SCIENCE: SCIENTIFIC ACHIEVEMENTS AND POPULAR BELIEFS**

The purpose of these classes is to illustrate the ways scientific discoveries penetrated everyday life and formed popular beliefs. The subjects discussed include natural cosmology, some elements of the exact sciences and natural sciences, including medicine. The texts to be discussed form a variety of philosophical, literary, and theological extracts from Greek and Latin works ranged from the classical period to Late Antiquity. I plan a discussion rather than lectures and presentations, therefore the participants are asked to look for relevant examples and contribute to the discussion.

#### Suggested reading

Афонасин Е. В., пер. (2008) Папирус из Дервени, ΣΧΟΛΗ 2.2 (2008)  
<http://www.nsu.ru/classics/schole/2/2-2-pderveni.pdf>  
Афонасин Е. В. (2009) «Диоген из Аполлонии», ΣΧΟΛΗ 3.2  
<http://www.nsu.ru/classics/schole/3/3-2-diogen.pdf>  
Gnosticism (esp. the so called Hippolytus' Gnostics, chapters 12–15): Афонасин Е. В. Гносис. Фрагменты и свидетельства. СПб., 2007.

- Bernabé A., ed. (2007) *Poetarum Epicorum Graecorum Testimonia et Fragmenta*, pars II: Orphicorum et Orphicis similium testimonia et fragmenta, fasc. 1–2 (Stuttgart–Leipzig), fasc. 2: 183–269
- Betegh G. (2004) *The Derveni Papyrus: Cosmology, Theology, and Interpretation* (Cambridge) 4–55
- Janko R. (2001) “The Derveni Papyrus (Diagoras of Melos, *Apopyrgizontes logoi?*): a new translation”, *Classical Philology* 96, 1–32
- Graham D. (2006) *Explaining the Cosmos. The Ionian Tradition of Scientific Philosophy* (Princeton and Oxford)
- Kirk G. S., Raven J. E., Schofield M. (1983) *The Presocratic Philosophers* (Cambridge)
- Kouremenos Th., Parássoglou G. M., Tsantsanoglou K., eds. (2006) *The Derveni Papyrus* (Florence)
- Laks A., Most G., eds. (1997) *Studies in the Derveni Papyrus* (Oxford) 9–22
- Laks A. (2007) *Histoire, doxographie, vérité. Etudes sur Aristote, Théophraste et la philosophie présocratique* (Louvain)
- Laks A. (2008) *Diogène d'Apollonie*. Edition, traduction et commentaire des fragments et témoignages (Sankt Augustin)
- Sider D. (2005) *The Fragments of Anaxagoras* (Sankt Augustin)
- Van Der Eijk, P. (2005) *Medicine and Philosophy in Classical Antiquity*. Cambridge
- Walzer, R., Frede, M., ed. (1985) *Galen, Three Treatises on the Nature of Science*, translated by R. Walzer and M. Frede, with an introduction by M. Frede, Indianapolis, 1985

August 10-14

Andrei Shetnikov (Novosibirsk)

#### **THEORETICAL FOUNDATIONS OF ANCIENT MUSICAL THEORY**

The course will be based on the following texts:

##### **NICOMACHUS OF GERASA**

###### **Manual of Harmonics**

Andrey Shetnikov

Introduction, Russian translation and notes

ΣΧΟΛΗ 2.1 (2008) 75-89

An annotated translation of the Manual of Harmonics by Nicomachus of Gerasa (the first century A. D.), a short treatise, important for the history of ancient mathematics and musical theory. Cf. also <http://www.nsu.ru/classics/schole/3/3-1-nicomach-3.pdf> (L. Alexandrova and T. Myakin's translation)

##### **THEON OF SMYRNA**

###### **Mathematics useful for understanding Plato**

Andrey Shetnikov

Introduction, Russian translation and notes

ΣΧΟΛΗ 3.2 (2009) 466–558

The introductory manual by Theon of Smyrna (ca. 70–ca. 135), a Greek mathematician, strongly influenced by the Neo-Pythagorean school of thought, is now translated into the Russian for the first time. The purpose of Theon is to provide the reader interested in Plato with necessary aids, useful for understanding scientific background of Pythagorean and Platonic philosophy. In its present form the treatise deals with arithmetic and numerology (book I, section 1), musical theory (book I, section 2), and astronomy (book II). For other Neo-Pythagorean works in a new Russian translation (esp. these by Nicomachus of Gerasa) see the previous issue of ΣΧΟΛΗ, especially dedicated to the subject.

**BALTER BURKERT. ASTRONOMY AND PYTHAGOREANISM** (a section on the Harmony of spheres)

ΣΧΟΛΗ 5.2 (2011) 234–311

A Russian translation of a chapter on astronomy from the famous book of Prof. Walter Burkert. The chapter treats the structure of the world and planetary system; the theory of planetary movements; the cosmos of Philolaus; harmony of the spheres and astral immortality. Original publication: *Weisheit und Wissenschaft: Studien zu Pythagoras, Philolaos und Platon* (Nürnberg, 1962); prepared on the basis of the revised English edition: *Lore and Science in Ancient Pythagoreanism*, tr. by E. Minar (Cambridge, MA, 1972).

#### Bibliography

Barker A. (1989) *Greek Musical Writings*, vol. II: Harmonic and Acoustic Theory (Cambridge)

Barker A. (2007) *The Science of Harmonics in Classical Greece* (Cambridge)

Levin F. R. (1975) *The Harmonics of Nicomachus and the Pythagorean Tradition* (Pennsylvania: American Philological Association)

Levin F. R., tr. (1994) *Nicomachus of Gerasa, The Manual of Harmonics* (Grand Rapids)

Neugebauer O. (1957) *The Exact Sciences in Antiquity* (Providence) // Нейгебаур О. (1968) *Точные науки в древности*. Пер. Е. В. Гохман (Москва)

Theon of Smyrna. *Mathematics useful for understanding Plato*. Transl. by R. and D. Lawlor. San Diego: Wizards Bookshelf, 1978.

Thomas I., ed. (1993) *Greek Mathematics*, vols. 1-2, Harvard UP, 1993, vol. 2, pp. 18ff

Ван дер Варден Б. Л. (1959) Пифагорейское учение о гармонии (пер. с англ. И. Н. Веселовского), Пробуждающаяся наука (Москва) 395–434

Цыпин В. Г. (1998) *Аристоксен: Начало науки о музыке* (Москва)

Цыпин В. Г., пер. (1997) *Аристоксен, Элементы гармоник* (Москва)

August 11-14

Marc Lachièze Rey (Paris)

#### **THE INFLUENCE OF THE GREEK TRADITION ON THE PAST AND PRESENT COSMOLOGY AND THEORETICAL PHYSICS**

*To be supplied soon*

Some materials are available at

<http://marclrey.free.fr/presentations/>

Cf. also: History of Astronomy archive: <http://naturalhistory.virtbox.ru/>