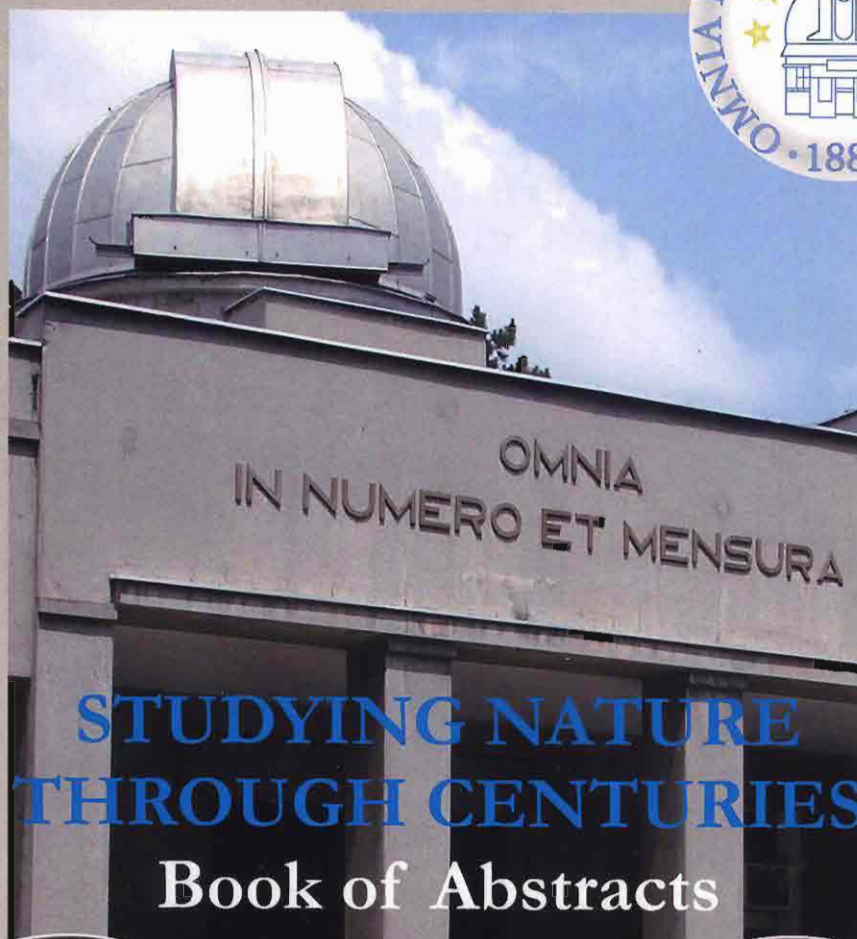


**ASTRONOMICAL OBSERVATORY**  
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**STUDYING NATURE  
THROUGH CENTURIES**

**Book of Abstracts**



**October 16 - 20, 2007**  
**Belgrade, Serbia**



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**BOOK OF ABSTRACTS**

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# PROGRAMME OF THE MEETING

Tuesday, October 16

- 9:30 Registration  
10:00 Opening ceremony

Cocktail

11:00 - 13:00 **INVITED REVIEWS**

Chairperson: P. Grujić

- 11:00 - 12:00 Jelena Milogradov-Turin: *Development of Astronomy and Astrophysics in Serbia*  
12:00 - 13:00 Helge Kragh: *The Origin and Early History of Big-Bang Cosmology*

Lunch

15:00 - 18:20 **SECTION I: HISTORY AND PHILOSOPHY OF PHYSICS AND ASTRONOMY**

Chairperson: A.D. Chernin

- 15:00 - 15:40 Ivan Aničin: *Nuclear Phenomena in the Universe (invited)*  
15:40 - 16:00 Zoran Stokić: *What is the Contribution of Galileo and Kepler to the Epistemology of Physics*

16:00 - 16:30 **Coffee Break**

- 16:30 - 16:50 Radomir Đorđević, Slobodan Ninković: *Studies of Ampère's Natural Philosophy done by Borislav Lorenc*  
16:50 - 17:10 Bojan Novaković: *Ancient Egyptian Astronomers: Senenmut*  
17:10 - 17:30 Stojan Obradović, Slobodan Ninković: *On Heuristic Function of Mathematics in Physics and Astronomy*  
17:30 - 17:50 Pavle I. Premović: *Laboratory for Geochemistry, Cosmochemistry and Astrochemistry (University of Niš, Niš, Serbia) marks thirty years of Scientific Research*  
17:50 - 18:20 Milutin Tadić: *Sundials - Silent Voice of Time*

Wednesday, October 17

10:00 - 12:40 **SECTION II: MULTIDISCIPLINARY STUDIES**

Chairperson: R. Dordević

10:00 - 10:40 Svetozar Sindelić: *The Old and New Philosophy of Science* (invited)

10:40 - 11:20 Aleksej Tarasjev: *Studying Life through Centuries and Ages How to Reconstruct Evolutionary Histories* (invited)

11:20 - 11:50 **Coffee Break**

11:50 - 12:10 Milan Ćirković: *Catastrophism, Fine-Tuning and Changing Views of Extraterrestrial Life and Intelligence*

12:10 - 12:40 Petar Grujić: *Cosmology and Ontology*

**Lunch**

15:00 - 17:00 **SECTION III: ARCHAEOASTRONOMY**

Chairperson: D. Kolev

15:00 - 15:40 Veselina Koleva: *Wooden Calendars from Central Rhodopes* (invited)

15:40 - 16:00 Gjore Cenev: *Kokino Calendar*

16:00 - 16:20 Ana Raduncheva, Stefanka Ivanova: *Prehistoric Rock Sanctuaries and Astronomical Observatories in the Eastern Rhodopes in Bulgaria*

16:20 - 16:40 Emina Zečević, Vesna Mijatović, Slobodan Ninković: *Cosmic Symbols on the Mediaeval Jewellery*

16:40 - 17:00 Edi Bon, Milan Ćirković: *Coherent Catastrophism in Archaeoastronomy: A Missing Link*

17:00 - 17:30 **Coffee Break**

17:30 - 18:50 **SECTION IV : ETHNOASTRONOMY**

Chairperson: S. Delčev

17:30 - 18:10 Gjore Cenev: *Folk Constellations in Macedonia* (invited)

18:10 - 18:30 Nikola Božić: *Ethnoastronomical Researches in Serbia*

18:30 - 18:50 Nikola Božić: *Importance of Ethnoastronomical Research*

Thursday, October 18

10:00 - 12:30 **SECTION V: GEOSCIENCES AND MATHEMATICS**

Chairperson: Ž. Mijajlović

10:00 - 10:40 Vidojko Jović: *Development of Geology in Serbia (invited)*

10:40 - 11:00 Jelena Milogradov-Turin: *Serbian Role in Meteoritics*

11:00 - 11:30 **Coffee Break**

11:30 - 12:10 Larisa I. Brylevskaya: *Lobachevsky's Geometry and Research of Geometry of the Universe (invited)*

12:10 - 12:30 Mileva Prvanović: *A History of Non-Euclidean Geometry*

**Lunch**

15:00 - 16:40 **SECTION VI: COSMOLOGY**

Chairperson: O. Atanacković-Vukmanović

15:00 - 15:40 Artur D. Chernin: *Dark Energy around us (invited)*

15:40 - 16:00 Arpad Kovacs: *Isidore of Seville, Cosmology and Science*

16:00 - 16:20 Milan Bogosavljević: *The Nature of Objects Producing the Ionizing Radiation Field at  $\approx 3$*

16:20 - 16:40 Miroslav Ivanović: *Philosophical Roots of Cosmology*

**Visiting the Belgrade Astronomical Observatory**

Friday, October 19

10:00 - 12:50 **SECTION VII: HISTORY OF ASTRONOMY**

Chairperson: J. Milogradov-Turin

10:00 - 10:40 Dimitar Kolev: *The Bulgarian National Astronomical Observatory (invited)*

10:40 - 11:00 Siniša Delčev, Jelena Gučević, Vukan Ogrizović, Violeta Vasilić: *Historical Review of Astro-Geodetic Observations in Serbia*

11:00 - 11:20 Veselka Trajkovska, Vojislava Protić-Benišek, Sofija Sadžakov: *Large Meridian Circle of Belgrade Observatory: Four Decades of Activity and Existence*

11:20 - 11:50 **Coffee Break**

- 11:50 - 12:10 Veselka Trajkovska, Slobodan Ninković: *On a Resolution Concept concerning the Calendar Reform submitted to the Pan-Orthodox Congress in Constantinople in 1923*
- 12:10 - 12:30 Veselka Trajkovska: *An Evaluation of the Contributions of Maksim Trpković and Milutin Milanković to the Calendar Reform*
- 12:30 - 12:50 Svetlana Mirčov: *Sreten M. Adžić: Author of the Textbook "Kroz Vasionu"*

### Lunch

### 15:00 - 19:10 SECTION VIII: SCIENCE AND SOCIETY

Chairperson: M. Ćirković

- 15:00 - 15:20 Larisa Jovanović: *The Impact of International Scientific Teams - on Investigations of Yugoslav Meteorites*
- 15:20 - 15:40 Ljiljana Dobrosavljević-Grujić: *Women Astronomers through History*
- 15:40 - 16:00 Božidar Jovanović: *Solar Influence on Terrestrial Phenomena*
- 16:00 - 16:20 Ljiljana Dobrosavljević-Grujić: *Galileo, Astronomer and Courtier*
- 16:20 - 16:50 **Coffee Break**
- 16:50 - 17:30 Vladimir Janković, Marija Šešić: *'Milošević' vs. Solar Eclipse; Serbian Politics, Astronomy and the Media in August 1999 (invited)*
- 17:30 - 17:50 Nataša Stanić: *Modernization of Planetarium in Belgrade and its Social Importance*
- 17:50 - 18:10 Nikola Božić: *25 years of Petnica Science Center*
- 18:10 - 18:30 Mirko Nagl: *Gymnasium Reform in Serbia*
- 18:30 - 18:50 Nikola Božić: *Science Popularization in Amateur Organizations*
- 18:50 - 19:10 Nataša Stanić: *Astronomy. Inspiration. Art - Artworks inspired by Astronomy*

### Closing Ceremony

### Conference Dinner

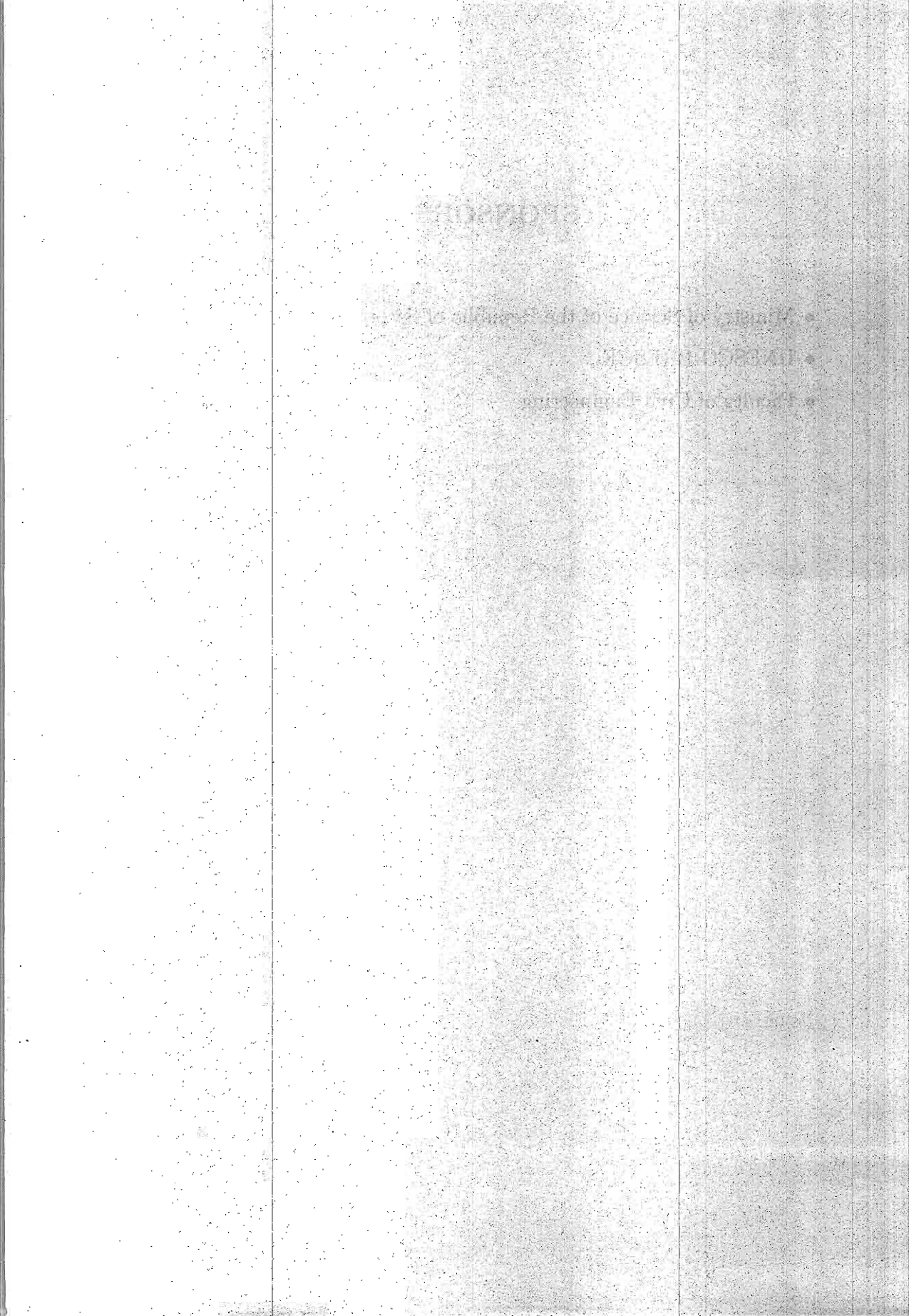
Saturday, October 20

### Excursion

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# ABSTRACTS

## DEVELOPMENT OF ASTRONOMY AND ASTROPHYSICS IN SERBIA

Jelena Milogradov-Turin

*Department of Astronomy, Faculty of Mathematics, University of Belgrade, Serbia*  
*E-mail: jelenam@matf.bg.ac.yu*

Although celestial bodies were subjects of interest in medieval Serbia, this trend could not continue under the Turkish occupation so that serious contributions to science could be given only by the Serbs abroad. Development of sciences in Serbia closely follows the process of liberation of Serbian lands from Turks (1804-1878). At the beginning, education and popularization were major orientations. Astronomy topics were taught mainly within the frames of physics, and partly in geography, at the highest level school of that epoch. The first telescope in Serbia was acquired in 1847 and the first book on astronomy appeared in 1850. Full independence of Serbia (1878) gave a steep rise of sciences as many young men were sent to study abroad. Among them, Milan Nedeljković specialized in astronomy and meteorology, and Đorđe Stanojević in astrophysics, both in leading European centres. After returning back Milan Nedeljković became the first professor of Astronomy at the Great School in Belgrade (1884) and founded the Astronomical and Meteorological Observatory in Belgrade (1887). The solar research by Đorđe Stanojević in Meudon (1886-1887) represents the first astrophysical work among Serbs. Theoretical astronomy advanced somewhat later due to Milutin Milanković, professor at the University of Belgrade since 1909. His theory of climate became known world wide. Observational astronomy in Serbia got a serious boost when, on initiative of Milan Nedeljković, modern instruments were acquired as part of reparation programme after the World War I. Constructions of a new observatory building and mounting of the instruments were lead by Vojislav Mišković, who became the director of the Astronomical Observatory and a professor of astronomy at the University of Belgrade in 1925. The majority of instruments were mounted by 1932. Regular observations started a few years later. The Observatory was attached to the University and astronomy became a separate study group in 1925/26. During the World War II the Observatory was badly damaged and some instruments were taken away by the occupators. The Observatory got separated from the University in 1948 and became an independent institution in 1955. The Department of Astronomy became a separate unit within the Faculty of Sciences of the University of Belgrade in 1962. Although the observational activities were mainly carried out at the Observatory, and the theoretical work mainly at the University, there were some opposite instances: the Department of Astronomy built a solar radio interferometer in 1961, and a group in the Observatory initiated theoretical research of spectral lines in early eighties. The rotation of the Earth and the minor planets were studied at both institutions. The best observational results were achieved in the search for minor planets, double and variable stars, solar phenomena and star catalogues. Present research in Serbia is mainly based on data from foreign sources. Thus, the models of close binaries, star systems and radio supernova systems were recently developed. A new observational facility on the mountain Vidojevica near Prokuplje is nearing the first tests.

**THE ORIGIN AND EARLY HISTORY OF BIG-BANG COSMOLOGY****Helge Kragh***History of Science Department, University of Aarhus, Denmark**E-mail: helge.kragh@si.au.dk*

Last year the idea of a big-bang universe could celebrate its 75-year anniversary. How did this momentous idea come into being? What were the main developments in early 20th-century physics and astronomy that led to the formulation of the first suggestion of a violent beginning of the universe? From the 1910's to the late 1920s, cosmology essentially evolved along two tracks with little connection, one being observational and the other theoretical, based on Einsteinian relativity. The highlights of this period will be discussed with special emphasis on the works of Hubble and Friedmann. However, the key figure in my story is Georges Lemaître, who more than anyone else was the architect of modern cosmological theory. His important work of 1927 counts as the true beginning of the expanding universe (including the "Hubble relation") and in 1931 he proposed what he called the primeval atom hypothesis. Although his idea differed in some respects from the later big-bang idea, essentially it was the beginning of big-bang cosmology. What were Lemaître's motives for his hypothesis? Was it related to his religious views (as a Catholic priest)? How was the hypothesis received by contemporary astronomers and physicists?

INVITED LECTURE

## NUCLEAR PHENOMENA IN THE UNIVERSE

Ivan Aničin

*Faculty of Physics, University of Belgrade, Serbia**E-mail: anicin@ff.bg.ac.yu*

In this (unconventional) overview we discuss the roles of nuclear processes in the evolution of matter in the Universe. These comprise the origin and abundances of the elements and their isotopes, the provision of extremely long-term stability of conditions needed for the evolution of life, and the possibility to completely exhaust the energy contents of the Universe.

STUDIES OF AMPÈRE'S NATURAL PHILOSOPHY  
DONE BY BORISLAV LORENCRadomir Đorđević<sup>1</sup>, Slobodan Ninković<sup>2</sup><sup>1</sup> *Faculty of Physics, Beograd, Serbia*<sup>2</sup> *Astronomical Observatory, Belgrade, Serbia**E-mail: pule@net.yu*

Borislav Lorenc (1883 - 1975), Serbian philosopher, psychologist and theologian had a very ample area of interest in science and philosophy. As a well educated person, knowing several languages of world importance, he could find his interest in different fields. Among others he studied the system of natural philosophy proposed and developed by famous French physicist A. M. Ampère (1775 - 1836) which was the topic of his PhD thesis defended in 1908. The authors of this contribution want to consider Lorenc's study from the points of view of modern philosophy of science, physics and astronomy.

**ANCIENT EGYPTIAN ASTRONOMERS: SENENMUT****Bojan Novaković***Astronomical Observatory Belgrade, Serbia**E-mail: bnovakovic@aob.bg.ac.yu*

The celestial phenomena have always been a source of wonder and interest to people, even as long ago as the ancient Egyptians. While the ancient Egyptians did not know all the things about astronomy that we do now, they had a good understanding of some celestial phenomena. The achievements in astronomy of ancient Egyptians are relatively well known, but we know very little about the people who made these achievements. The goal of this paper is to bring some light on the life of Senenmut, the chief architect and astronomer during the reign of Queen Hatchepsut.

**ON HEURISTIC FUNCTION OF MATHEMATICS  
IN PHYSICS AND ASTRONOMY****Stojan Obradović<sup>1</sup>, Slobodan Ninković<sup>2</sup>**<sup>1</sup> *Viša škola za obrazovanje vaspitača, Aleksinac, Serbia*<sup>2</sup> *Astronomical Observatory Belgrade, Serbia**E-mail: stojano@ptt.yu*

The paper considers the role of mathematics in the process of acquiring new knowledge in physics and astronomy. The basic forms of representing the heuristic function of mathematics at theoretical and empirical levels of knowledge are studied: deducing consequences from the axiomatic system of theory, the method of mathematical hypothesis, "pure" proofs for existence of objects and processes, mathematical modelling, formation of mathematics on internal mathematical principles and the mathematical theory of experiment.

LABORATORY FOR GEOCHEMISTRY, COSMOCHEMISTRY  
AND ASTROCHEMISTRY (UNIVERSITY OF NIŠ, NIŠ, SERBIA)  
MARKS THIRTY YEARS OF SCIENTIFIC RESEARCH

Pavle I. Premović

*University of Niš, Niš, Serbia*  
*E-mail: asteroid.pavle@yahoo.com*

The Laboratory for Geochemistry, Cosmochemistry and Astrochemistry (University of Niš) was established on September 18th, 1978 and to its title Cosmochemistry was added during 1986 when we initiated a study of geochemical problems related to the asteroid/cometary impacts of the Earth's surface during its geologic history. Astrochemistry (as a part of the Laboratory title) was attached during 2001 when we instigated an investigation related to the thermochemistry in the Sun Nebula. A number of competent scientific institutions and individuals in Europe consider the Laboratory as one of the most fruitful in Southern/southeastern Europe. The most of our research papers were published in highly respected journals for geochemistry and cosmochemistry such as *Geochimica et Cosmochimica Acta*. It is worth emphasizing that the Laboratory even in rather extremely difficult circumstances is still maintaining a high quality profile in its research. Of course, such research achievements have been noticed by the international scientific community and a number of highly respected researchers cited our papers in various scientific publications.

SUNDIALS - SILENT VOICE OF TIME

Milutin Tadić

*Geografski fakultet, Beograd, Serbia*  
*E-mail: tadjija3@gmail.com*

Compared to other countries in western and southern Europe, Serbia preserved only a small number of older sundials. They were, however, sufficient in order to make a presentation of the history of gnomonics through half-hour scientific educational film "Sundials - the silent voice of time". The organizer is Branislava Nikolić, the film was directed by Violeta Nedanovski, the screenplay was written by Milutin Tadić and it was produced by the RTS2 channel of Radio Television of Serbia.

INVITED LECTURE

## THE OLD AND NEW PHILOSOPHY OF SCIENCE

Svetozar Sindelić

*Faculty of Philosophy, Belgrade, Serbia**E-mail: svetozar@bitsyu.net*

The aim of this article is to point at *essential* differences in understanding of character of scientific knowledge within the old and new philosophy of science. The old philosophy of science is founded on doctrines of *observationism* and *inductivism* and centered on the *cumulativistic* picture of the growth of scientific knowledge. More or less, *scientific theories are conceived as true descriptions of relevant experience*. This picture is completely changed under influence of the methodological analysis of scientific revolutions. It appeared that it is impossible to derive theories from experience in inductive way. - That *pure* experience does not exist -namely, facts (experience) are always interpreted (organized) by some (partly *conventional* or *a priori*) referential framework. - That possibility of proof in empirical sciences is *illusory* just as the *conclusive* falsification of scientific statements. - That same facts can be explained by *different* (mutually inconsistent or incommensurable) theories. - That scientific change often is of *revolutionary* character, and so on. These methodological facts are main points of the new philosophy of science. And every approach (among different ones) within that philosophy explains these facts in its own way. But, looking globally, *scientific theories are today conceived much more as constructions of human reason* (although strictly dictated by demand for their predictive success) *then truths about world, pictures of experience (or reality), true descriptions of relevant facts, etc.*

INVITED LECTURE

STUDYING LIFE THROUGH CENTURIES AND AGES:  
HOW TO RECONSTRUCT EVOLUTIONARY HISTORIES

Aleksej Tarasjev

*Institute for Biological Research, University of Belgrade, Serbia**E-mail: tarasjev@ibiss.bg.ac.yu*

Question of knowability of historical events is important for many scientific disciplines that aim to reconstruct events from distant past (cosmology, biology, anthropology and linguistics, among others). These disciplines are often faced with similar epistemological and methodological challenges, including questions raised by various forms of skepticism, questions about justification of parsimony principle, estimation of information preserving vs. information destroying processes impact, difference between deterministic and probabilistic process outcomes, to name just a few. Therefore, survey of ways in which we reconstruct evolutionary genealogies and try to solve problems of phylogenetic inference in biology can be valuable for other scientific disciplines that also include reconstruction of past events.



## CATASTROPHISM, FINE-TUNING AND CHANGING VIEWS OF EXTRATERRESTRIAL LIFE AND INTELLIGENCE

Milan M. Ćirković

*Astronomical Observatory Belgrade, Serbia*

*E-mail: mcirkovic@aob.bg.ac.yu*

We consider the impact of recent developments in astrobiology on changing our historical perspective of extraterrestrial life and intelligence. In particular, we focus upon the re-emergence of catastrophism in Earth and planetary sciences, which is no more - in sharp distinction to the historical experience of 19<sup>th</sup> and the first half of 20<sup>th</sup> century - associated with the terrestrial exclusivist and the belief in uniqueness of human intelligence. On the contrary, several recent astrobiological hypotheses emphasize the complete inversion of this perspective in looking at global catastrophic mechanisms as keys for understanding biological evolution on the widest spatial and temporal scales of the Milky Way. Shifting perspective of the physical and chemical preconditions for emergence of life and intelligence and reducing the controversial "fine tuning" of the universe for life to a set of observation-selection effects has significantly contributed to the development of this set of ideas.

**Key words:** astrobiology - catastrophism - extraterrestrial intelligence - history and philosophy of astronomy - selection effects

## COSMOLOGY AND ONTOLOGY

Petar Grujić

*Institute of Physics, Zemun, Serbia*

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Cosmos poses unique problems to its investigations, both from the epistemological and ontological aspects. We analyze modern cosmology as science of the totality of the material reality, with emphasis on the physical content of the principal entities involved in describing the Universe as we perceive. In particular we examine the concept of creation and annihilation and argue that these notions, if relevant, are devoid of meaningful content. If applicable, the notion of evolution refers to transition from physical field entities towards inert matter components. We discuss the meaning of the existential quantifier and show that the cosmology is essentially a historical science. Finally, we consider an interplay between the epistemological and phenomenological aspects, arguing that in cosmology it is the former one may rely on.

## WOODEN CALENDARS FROM THE CENTRAL RHODOPES

Vesselina Koleva

*Institute of Astronomy, NAO Rozhen, Smolyan, Bulgaria**E-mail: ves\_koleva@abv.bg*

The ethnographic research of the Bulgarian wooden calendars began after the Liberation of the country from the Ottoman rule in 1878. The first calendar was registered in the collection of the National Museum in Plovdiv at the end of the 19th c. (1883). The southern part of the country, however, where the Rhodope Mountains (the Rhodopes) are located, was liberated only in 1912. As a result of regional and national ethnographic expeditions a lot of calendars from the Central Rhodopes were collected during the second half of the 20th c. At present, they compose the most numerous group of about 20 sticks among the Bulgarian wooden calendars. Our study presents 6 unpublished calendars from the Smolyan region. The shape and size, the kind of the signs and structure of the calendar record correspond to the characteristic look of the rest of the Bulgarian wooden calendars. They are four-sided sticks, 50 to 100 cm long and around 3 cm wide. Some of them have short, well-shaped handles. All of the calendars represent the year of the Julian (solar) calendar. The day notches marking the end of one month and the beginning of the next one are incised at a greater distance from one another. On four of the examined calendars the 365 or 366 day notches of the year are divided into two groups of 6 months incised on two opposite or neighbour edges of the stick. The warm season includes the months from May to October, and the cold one from November to April. The other two calendar sticks (one is a replica of the other) make an exception among the Bulgarian wooden calendars. They are around 50 cm long and 3 cm wide. The months, grouped by seasons, are marked on each of the four edges of the stick. The year begins on 1 January like some wooden calendars from Western Europe, which is the only case among all known Bulgarian wooden calendars. We know of only one more calendar with a similar structure - whose day notches are incised on all four sides, and it is from the Burgas region. However, the year begins on 1 September on the latter calendar. According to the beginning date of the calendar record the Bulgarian calendars are grouped into three types - September, April/May (or October/November) and January type.

- 1 September is the beginning of the Church year;
- 23 April and 26 October divide the year in the folk calendar in summer and winter parts and were very popular among the shepherds in the Rhodope Mountains;
- In the case of 1 January as a beginning date, a Western European calendar influence can be supposed.

**KOKINO CALENDAR****Gjore Cenev***MKC - Planetarium, Skopje, Republic of Macedonia**E-mail: mkc@mt.net.mk*

In 2001, in the north-east part of Macedonia a site of impressive dimensions and with remarkable contents was discovered. Archaeological excavations in the following years have shown that the site represents a huge mountain sanctuary with enormous amount of artefacts dated from XIX century B.C. In the same time, performed archaeo-astronomical analysis exposed the fact that this site encompasses all characteristics of an ancient observatory built 3900 years ago, and due to this the site was named Megalithic Observatory Kokino. Like any similar observatory, Megalithic Observatory Kokino was used for development of a calendar, by utilization of which, life in the community of ancient farmers was organized. By the end of 2006 and at the beginning of 2007, specially crafted stone markers for measurement of lunar month were discovered. This has revealed that people of that time living on the area of Central Balkan Peninsula were familiar with the 19 years lunar cycle, according to which they prepared lunar calendar, today known as Kokino Calendar.

**PREHISTORIC ROCK SANCTUARIES AND ASTRONOMICAL OBSERVATORIES IN THE EASTERN RHODOPES IN BULGARIA****Ana Raduncheva, Stefanka Ivanova***National Institute of Archaeology and Museum, Bulgarian Academy of Sciences**E-mail: a\_raduncheva@dir.bg*

The work presents some less known rock sanctuaries in the Eastern Rhodopes (Bulgaria), which are located in the region of the town of Kardzhali, not far from the town of Momchilgrad. A characteristic feature is the orientation of some major details towards points of astronomical importance. The archaeological data date these sanctuaries to the Eneolith around 4000 BC, i.e. they are 1000 years older than the pyramids of ancient Egypt and the Mesopotamian civilization. The early pre-historical sanctuaries in Eastern Europe are a product of a civilization possessing astonishing knowledge - a civilizations that was able to manufacture the oldest known gold objects in the world, and to create lunar and solar calendars as a result of long observations of the sky. Therefore it is necessary to re-assess our notions about the knowledge and skills of the people from this epoch. The present work draws attention also to the factors that destroy such unique monuments in Bulgaria, to the enormous difficulties and obstacles that researchers face, as well as to the consequences of the monuments' destruction.

**COSMIC SYMBOLS ON THE MEDIAEVAL JEWELLERY****Emina Zečević<sup>1</sup>, Vesna Mijatović<sup>2</sup>, Slobodan Ninković<sup>2</sup>**<sup>1</sup> *National Museum, Beograd, Serbia*<sup>2</sup> *Astronomical Observatory, Beograd, Serbia**E-mail: pr@narodnimuzej.org.yu*

Jewellery is a kind of product of an artisan's and artist's work where the shape and ornaments appear as good indicators of the social position of its owner, as well as of both cultural and artistic determinations. By analyzing the shape and symbols applied on the mediaeval jewellery from the territory of the central Balkans we want to show to what degree they reflect the treatment of nature and natural phenomena, the real and the mystical because except personal symbols some forms of jewellery, its application and motifs, contain a general archetype and out-of-time symbols following the spiritual and religious concepts of life and the world around us.

**COHERENT CATASTROPHISM AND ARCHAEOASTRONOMY:  
A MISSING LINK?****Edi Bon, Milan M. Ćirković***Astronomical Observatory, Belgrade, Serbia**E-mail: ebon@aob.bg.ac.yu*

We critically investigate the hypothesis of coherent catastrophism put forward in recent years by Clube, Bailey, Napier and others from both historical, culturological and astrobiological points of view. The conventional idea that the quasi-periodic break-up of large cometary bodies and other events of astronomical origin strongly influence terrestrial conditions can today be placed in both wider (astrobiological) and deeper (culturological) context. The emphasis is placed on the role of selection effects in both the conclusion related to the frequency of catastrophic events and, on the level of cultural history, influencing our perspective of such events. The style of punctuational change is the only way of reconciling several distinct puzzles ranging from the classical Fermi's paradox to the origin of world religions and civilizations centered on the Mediterranean basin. We argue that this perspective is present in the crucial oldest myths of all major world religions and traditions. As a case study of this influence we discuss the link between the Neolithic history of astronomy, classical astronomy of Plato's time, and the origin of Mithraism. We speculate that the main icon of Mithraic religion could represent an event that happened around 4000 BC, when the spring equinox entered the constellation of Taurus. We outline some of the open issues which can only be answered by future archaeoastronomical research.

## INVITED LECTURE

## FOLK CONSTELLATIONS IN MACEDONIA

Gjore Cenev

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Ethno-astronomical researches started to be performed on the territory of Republic of Macedonia in 1982 and since then they are constantly carried out. Information gathered directly from the elderly inhabitants of around 130 villages all over the country, enlighten the folk presentation of sky, division of the starts and constellations, but also provided vast scope of myths, believes and rituals linked to the sky, starts, and constellations. More in-depth analyze of the gathered data lead to the reconstruction of the ancient stars' map of Macedonian people. Due to the fact that in the past people recognized only two seasons, most of the starts and constellations are presented on the so called winter and summer sky. People were also familiar with the part of the sky around the Polaris and knew about the constellations that did not raise and set, but are special part of the folk sky map. The mentioned study provides comparative analysis of the folk constellations known among Macedonian people and folk constellations known among the others, mostly neighbouring peoples living on the Balkan Peninsula.

## ETHNOASTRONOMICAL RESEARCHES IN SERBIA

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In this paper are presented the main research in the field of ethnoastronomy in Serbia in last few decades.

## IMPORTANCE OF ETHNOASTRONOMICAL RESEARCH

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In this paper are presented views on importance of ethnoastronomical research for the science. There are few examples for these views from Serbia.

## DEVELOPMENT OF GEOLOGY IN SERBIA

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Geology began to develop in the first half of the 19th century in Serbia mainly for two reasons: the endeavours of Prince Miloš to expand the national economy (including mining) and the interest shown by European scientists for an unknown country. Invited by Prince Miloš, a Saxon geological and mining expert Baron Herder travelled over Serbia in 1835. His researches indicated a great geological variety of Serbia and its mining potentials which requested expert treatment and some capital. A year later Ami Boué came into Serbia and for the three years studied not only its territory, but also the whole Balkan peninsula. His geological findings are much more detailed and systematic than those of Herder, and for a long time presented a good foundation for further research. In 1840 Boué published his famous work *European Turkey I-IV*, one part of which is concerned with the geology of the Balkan peninsula. Herder brought from Germany a collection of minerals, rocks and ores as a present to Prince Miloš. As he travelled along Serbia he collected a significant number of geological items thereby increasing the Prince's collection. A turnover in the development of geology in Serbia is marked by the arrival of Josif Pančić in 1853 who became the Professor of Sciences (including mineralogy and geology) at the Lyceum in Belgrade.

In 1880 Jovan Žujović became the professor of geology and mineralogy at the High School in Belgrade as the first Serbian geologist who studied in Belgrade and Paris. He brought from Paris the first polarizing microscope for the mineralogical and petrographical studies. Between 1880 and 1900 Žujović made the first geological map of Serbia, wrote basic textbooks, published articles in international and domestic journals, founded Geological Institute in Belgrade (1889), the first geological journal on Balkan peninsula "Geological Annals of Balkan Peninsula" (1889), the Serbian Geological Society (1892), published famous monograph "Geology of Serbia I-II" (1893, 1900).

Žujović's successors: Sava Urošević (mineralogy, petrology), Svetolik Radovanović (palaeontology), Petar Pavlović (palaeontology), Vladimir Petković (regional geology), Jelenko Mihailović (seismology) and others continued geological investigations in Serbia.

## SERBIAN ROLE IN METEORITICS

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Atanasije Stojković, a Serb who spent most of his active life in Russia, became a very important figure in Russian meteoritics. He wrote the first book on meteorites (1807) and spread the interest for air stones. Therefore, the Russian scientist L.A. Kulik who investigated the impact site of the Tunguska body, named the central hill Stojkovic (1928). All the surrounding hills bear names of famous meteorite investigators. Serbian naturalists who investigated the first meteorites fallen in Serbia were unaware of significance of his work in meteoritics. The connection between Stojkovic and the hill was unknown in Serbia till recently. Serbian scientists have contributed to meteoritics mainly by investigation of the meteorites which fell in Serbia. The first two meteorites seen to fall in Serbia, near the spa Sokobanja (1877) and on the mountain Jelica (1889), turned to be interesting objects. Exchange of samples of the Sokobanja and the Jelica meteorites with museums abroad (London, Paris, Budapest, Washington, Prague etc.), enriched the Museum of Natural History in Belgrade, and gave foreign scientist an opportunity to study Serbian meteorites. Thus G. T. Prior noticed that the stony meteorite fallen near Sokobanja is specific and introduced a separate class of meteorites the main representative of which is the meteorite from Sokobanja. His *Catalogue of meteorites* (1923) contains this class. The terms Soko-Banja type specimens and Soko-Banja like chondrites can be found on the Internet. In 1964 H. Craig proposed a name based on the word Sokobanja to the meteorites from Sokobanja and from Jelica together with other amphitrites. The other Serbian meteorites did not attract such attention. The stony meteorites fallen near Guča and Čačak were lost and since the samples unfortunately were not cut, no subsequent investigations were possible. The object escavated near Dimitrovgrad is the only iron meteorite found in Serbia but being of a standard structure, did not become a representative of any new class.

INVITED LECTURE

**LOBACHEVSKY GEOMETRY AND RESEARCH  
OF GEOMETRY OF THE UNIVERSE**

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For the first time N.I. Lobachevsky gave a talk on the new geometry in 1826; three years after he published a work "On the fundamentals of geometry" containing all fundamental theorems and methods of non-Euclidean geometry. Small part of this article was devoted to the study of geometry of the Universe. The interpretation of geometrical concepts in pure empirical way was typical for mathematicians at the beginning of XIX century. In this connection it was important for the scientist to find application of his geometry that differed from Euclidean geometry so much and shocked his contemporaries. Having the purpose to determine experimentally the properties of real physical Space, Lobachevsky decided to calculate the sum of angles in a huge triangle with two vertexes in the opposite points of the terrestrial orbit and the third - on the remote star. Investigating the possibilities of solution of the set task, Lobachevsky faced the difficulties of theoretical, technical and methodological character. The calculations of stellar parallaxes had always been based on the Euclidean geometry. To avoid the problems connected with the use of these results, Lobachevsky developed a special technique of reasoning. At the beginning of XIX century the infrequent attempts to measure parallaxes were not very successful, their values were overestimated. Nevertheless, the principles of choice of a parallax for the solution of the problem raise some questions. More detailed research of different aspects of the problem led Lobachevsky to the comprehension of impossibility to obtain the values required for goal achievement, and he called his geometry an imaginary geometry.

**A HISTORY OF NON-EUCLIDEAN GEOMETRY**

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We shall present the discovery of Lobachevsky and Bolyai of the first non-Euclidean geometry which gave rise to many geometries previously reported as the only conceivable possibility. On the other hand Riemann introduced the notion of an  $n$ -1py extended manifold and the curvature of the space. Riemann's investigations were continued by many mathematicians to get the manifolds endowed with different structures useful for the various applications.



## STATISTICAL PHYSICS FOR COSMIC STRUCTURES

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The recent observations of a dark matter complex (clumpy) distribution have provided a new element to the debate on the correlations and possible crossover to homogeneity of the visible matter. The strong clumpiness characterizing galaxy structures seems to be present in the overall mass distribution and its relation to the highly isotropic Cosmic Microwave Background Radiation (CMBR) represents a fundamental problem. In contemporary cosmological models the structures observed today at large scales in the distribution of galaxies are explained by the dynamical evolution of purely self-gravitating matter (dark matter) from an initial state with low amplitude density fluctuations. The extension of structures, the formation of power-law correlations characterizing the strongly clustered regime and the relation between dark and visible matter are the key problems both from an observational and a theoretical point of view. In this puzzle Statistical Physics plays an important role in various ways :

1. The complete characterization of the correlations of visible and dark matter.
2. The analysis of the very small anisotropies of the CMBR and their Implications on the initial fluctuations which recall the super-homogeneous properties similar to plasmas and glasses.
3. The dynamical processes and theories for the formation of complex structures from a very smooth initial distribution and in a relatively short time.

In the next two the complete SDSS project will provide with samples large enough to clarify correlation properties of galaxy structures on large scale adding new important information to this debate together with the new observations of dark matter.

I discuss the use of methods and concepts of modern statistical physics which allow one to study cosmic structures from a new and broader point of view, focusing on the observational determination of the extension of the power-law correlations in galaxy distributions and on the theoretical approaches to their formation in the framework of many-body gravitational dynamics.

1. R. Massey et al., "Dark matter maps reveal cosmic scaffolding", *Nature* 445, 286 (2007)
2. A. Gabrielli, Sylos Labini, F., M. Joyce and L. Pietronero. "Statistical Physics for Cosmic Structures" Springer, (2005)
3. M. Joyce, B. Marcos, A. Gabrielli, T. Baertschiger, F. Sylos Labini "Gravitational evolution of a perturbed lattice and its fluid limit" *Phys. Rev. Lett.* 95, 011304 (2005)
4. A. Gabrielli, B. Jancovici, M. Joyce, J. Lebowitz, L. Pietronero and F. Sylos Labini "Generation of primordial fluctuations from Statistical Mechanical models" *Phys.Rev.* D67, 043406-043513 (2003)
5. F. Sylos Labini, N. L. Vasilyev, Y.V. Baryshev "Power law correlations in galaxy distribution and finite volume effects from the Sloan Digital Sky Survey Data Release Four" *Astron.Astrophys.* 465 (2007) 23-33

INVITED LECTURE

**DARK ENERGY AROUND US****Artur D. Chernin***Sternberg Astronomical Institute, Moscow, Russia**E-mail: chernin@sai.msu.ru*

Dark energy is a mysterious form of cosmic stuff which contributes 70-80% the total energy of the Universe. It accelerates the global cosmological expansion and also controls the local Hubble flow at a few Mpc distance from the Milky Way.

**ISIDORE OF SEVILLE, COSMOLOGY AND SCIENCE****Arpad Kovacs***University of Oulu, Hailuoto Finland**E-mail: arpad.kovacs@hailuoto.fi*

The cosmology of Isidore of Seville was for decades underestimated as poor science. In reality, the schoolmaster of the middle ages presented in his writings a coherent cosmology, of which atomism was a part. Although based on authorities, ideas were carefully evaluated and presented, often with alternatives. In his approach to cosmology one can perceive the beginnings of scientific systematization within the available framework. Compared to later writers (for example Rabanus Maurus), Isidore exhibits healthy scientific spirit and resorts to theological data only when other information is not available or the alternative explanation would involve superstition. His cosmology is also interesting for the fact that he perceived the cosmos to be of certain age, something very much in common with modern cosmologists. Recent interest in the anthropic principle also justifies interest in older cosmologies, particularly that of Isidore of Seville. Some solutions of "Isidorean" cosmology are certainly more elegant and conform common sense more than later Aristotelian-Scholastic models.

## THE NATURE OF OBJECTS PRODUCING THE IONIZING RADIATION FIELD AT $z \approx 3$

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We report on observations of escaping Lyman continuum radiation from a large sample of rest-UV selected galaxies at  $z \approx 3$ . The fraction of UV photons which manage to escape from galaxies at high redshift is a key parameter required for our understanding of re-ionization and the physical conditions in the IGM at  $z > 2$ , but the relationship between this escape fraction and galaxy properties is unknown. To address this question, we have obtained very deep Keck LRIS-B spectroscopy in the restframe UV for a sample of  $\approx 50$  galaxies at  $z \approx 3$ . This spectroscopic sample in conjunction with optical and near-IR imaging allows us to characterize how properties such as star formation rate, stellar mass and UV morphology of galaxies relate to measurements of flux in the Lyman continuum.

## PHILOSOPHICAL ROOTS OF COSMOLOGY

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We shall consider the philosophical roots of cosmology in earlier Greek philosophy. Our goal is to answer the question: Are earlier Greek theories of pure philosophical-mythological character, as often philosophers cited it, or they have scientific character. On the bases of methodological criteria, we shall contend that the latter is the case. In order to answer the question about contemporary situation of relation philosophy-cosmology, we shall consider the following question: Is contemporary cosmology completely independent of philosophical conjunctures? The answer desires consideration of methodological character about scientific status of contemporary cosmology. We also consider some aspects of relation contemporary philosophy-cosmology.

## INVITED LECTURE

THE BULGARIAN NATIONAL ASTRONOMICAL OBSERVATORY  
"ROZHEN" - HISTORY AND PERSPECTIVES

Dimitar Kolev

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Professional astronomy in Bulgaria is less than 150 years old. The first Bulgarian observatory was that of the Sofia University established in 1894 by Prof. Marin Bachevarov. Originally equipped with the small personal telescope-refractor of Dr. Petar Beron, the observatory then obtained a modern 16-cm refractor "Grubb" in 1897 and another, 11-cm refractor in 1913. Until the mid-1960's these were the only astronomical instruments in Bulgaria. In the 1940's and 1950's Prof. Nikola Bonev developed plans for a relatively large university-class observatory with a 1-m reflector, but these dreams remained unrealized. Evidently, astronomical research was not among the priorities of Bulgarian science. The situation changed in the late 1950's when the first man-made Earth satellite was launched. The great public interest resulted in the establishing of dozen of Public Astronomical Observatories across Bulgaria (Stara Zagora, Varna, Smolyan, Yambol, Gabrovo, Dimitrovgrad, etc.) some of them equipped with planetariums (Stara Zagora, Varna, Smolyan, Yambol). A broad net for optical observations of satellites was organized in these centers of astronomical education and skill. Since 1965 the main telescope of Bulgaria was the 60-cm Zeiss reflector in Belogradchik Observatory (650 m above sea level), which was soon transferred under the care of the Bulgarian Academy of Sciences (BAS). Meanwhile, in the established in 1952 Department of Astronomy in BAS Prof. N. Bonev continued to lobby for an even larger telescope in Bulgaria. The dream started coming true after the Bulgarian Council of Ministers' Decision Nr. 203/06.05.1967 to build a National Astronomical Observatory (BNAO, NAO) with a 1-m reflector under the care of BAS. Simultaneously the local government of Smolyan district decided to build another 1-m telescope in the Rhodope Mountains. Finally, both projects were joined together, the Rozhen locality near Smolyan was chosen for NAO and in 1970 a contract for a 2-m telescope of Ritchey-Cretien design was signed with Carl Zeiss, Jena from former DDR. The observatory was officially opened on March 13, 1981 during the celebration of the 1300th anniversary of the Bulgarian State, but the 2-m RCC telescope has been in regular use since the end of 1980. The location of the Bulgarian National Astronomical Observatory - a latitude of  $41^{\circ} 41.5'N$  - gives opportunities to investigate more than 80% of the celestial sphere. The observatory's altitude of 1750 m lies within the altitudinal zone where most observatories are located (1500-2500m). However, the microclimate (mean seeing  $\approx 2''$  and 35 - 40% clear sky time) is worse than that of the best observatories in the world and corresponds to the average for continental South Europe. The light pollution near NAO is still the lowest among the Balkan sites but some problems arise from the illumination of the expanding winter resort Pamporovo and the towns of Smolyan and Chepelare.

## HISTORICAL REVIEW OF ASTRO-GEODETTIC OBSERVATIONS IN SERBIA

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Astro-geodetic determinations of vertical deflections in Serbia began during the first years of 20th century. The first field works were led by S. Bošković. After the 2nd World War, Military Geographic Institute, Department of Geodesy from the Faculty of Civil Engineering, and Federal Geodetic Directorate continued the determinations, needed for reductions of terrestrial geodetic measurements and the astro-geodetic geoid determination. Last years improvements of the astro-geodetic methods are carried out in the area of implementing modern measurement equipment and technologies.

## LARGE MERIDIAN CIRCLE OF THE BELGRADE OBSERVATORY: FOUR DECADES OF ACTIVITY AND EXISTENCE

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The present authors find that the three important Jubilees, 120 years since the foundation of the Observatory, 75 years of the presence and work at the present location and 150 years from the birth of its founder and first Director Milan Nedeljković (1857-1950), appear as a special occasion to present some less known, or till this moment completely unknown, facts concerning one of the three important instruments for fundamental astrometry, Large Meridian Circle, which marked crucial moments during the four decades of its use. For the first time photographs of this instrument belonging to a private photodocumentation, as well as a complete bibliography of papers concerning all the phases of its existence, are presented.

**ON A RESOLUTION CONCEPT CONCERNING THE CALENDAR  
REFORM SUBMITTED TO THE PAN-ORTHODOX CONGRESS  
IN CONSTANTINOPLE IN 1923**

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In the paper a resolution concept concerning the calendar reform sent for the purpose of consideration to the Congress of Orthodox Churches in Constantinople in 1923 is presented. The document was written in German using Gothic letters and the author's name is Gustav Baron Bedeus from Hermannstadt (today Sibiu, Romania). Independently of the proposal he considers that the task of calendar regulating belongs to a state and for this reason a world conference gathering all states and churches aimed at calendar reform could be organized.

**AN EVALUATION OF THE CONTRIBUTIONS  
OF MAKSIM TRPKOVIĆ AND MILUTIN MILANKOVIĆ  
TO THE CALENDAR REFORM**

**Veselka Trajkovska**

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An evaluation of the works of Maksim Trpković (1864 - 1924) and Milutin Milanković (1879-1958) which concerns the calendar reform is given. Using a complex system of evaluation for the scientific contribution, involving also the principles of professional ethics, the present author's position is that an important social recognition for one of the greatest calendariographers in Serbia - Maksim Trpković - is necessary. Such a recognition has been unjustifiably omitted since it has been in the shadow of renowned scientist Milutin Milanković.

**SRETEN M. ADŽIĆ AUTHOR OF TEXTBOOK "KROZ VASIONU"**

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Sreten M. Adžić, a pedagogue, teacher and writer, is one of the most important personalities in the history of our education system. He was born on October 15, 1856 at Mala Sugubina near Rekovac, died in Belgrade on December 9, 1933. He studied pedagogy in Vienna and Leipzig and after taking degree he was teacher and director in several schools in Belgrade, Aleksinac and Jagodina, then regional education controller in Subotica, taught at Advanced School of Pedagogy in Belgrade and headmaster in the School for Teachers in Vršac. He was retired in 1924. He was active in many journals and magazines and published 14 books and textbooks. He translated textbooks and scientific papers from German and Esperanto. He wrote an astronomical textbook entitled "Kroz Vasionu" published in Jagodina in 1910.

## FROM ASTROLOGY AND ALCHEMY TO ASTRONOMY AND CHEMISTRY - WHEN SCIENCE MEETS THEOLOGY

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As we know, it's the astrology that has turned into astronomy and alchemy into chemistry but our days science tends to return to its origins becoming more and more magic. The paper makes a parallel between their evolution along the ages. The analysis is performed also taking into account the development of a relatively new discipline - Science & Theology.

## THE IMPACT OF INTERNATIONAL SCIENTIFIC TEAMS ON INVESTIGATIONS OF YUGOSLAV METEORITES

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Investigation of scientific heritage is very important for every country. It is important to emphasize scientific and cultural identity of Serbia and other republics of former Yugoslavia. It can be seen, as for the rest, in investigation of meteorites falling upon the territory of former Yugoslavia. Starting from the first discoveries of meteorites on this territory the investigations are carried out by outstanding international scientific teams. The samples of Yugoslav meteorites can be found in the biggest world museums of natural history (in Washington, Moscow, Vienna, Paris, Budapest, Berlin, Prague and London). In such a way, scientist engaged in area of meteoritics, cosmochemistry, cosmic mineralogy, astrochemistry, astrophysics and other multidisciplinary sciences have the possibility to investigate these meteorites. The huge impact on investigations of Yugoslav meteorites is given by international teams from Institute of Physics (Belgrade), Joint Institute for Nuclear Investigations (Dubna, Russia), Naturhistorisches Museum (Vienna, Austria), Institute of Geochemistry and Analytical Chemistry (Moscow, Russia) and Museum of Natural History (Belgrade).



## WOMEN ASTRONOMERS THROUGH HISTORY

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We review the contributions of women to astronomy starting from the Antique Greece and Alexandria, and mention briefly some works of non-scientists in the Middle Age, that are of interest only for keeping alive the spirit of inquiry during this dark-ages time. We discuss in more details important contributions coming after the Scientific Revolution and Enlightenment, made by women working within their families, as assistants to their brothers or husbands. We show that by the late 19th century the role of women in astronomy becomes more independent, with more women working not only as "computers" in the great observatories, but also making important discoveries which placed them in a very high position as scientists at the dawn of 20th century.

## SOLAR INFLUENCE ON TERRESTRIAL PHENOMENA

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A short history of solar influence investigations on terrestrial phenomena such as: river level, river flux, precipitations, crop, insect population, etc in our country is presented.

## GALILEO, ASTRONOMER AND COURTIER

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The aim of this article is not to discuss the contribution of Galileo to the modern science, of which he is regarded as one of the founders. We focus instead on the relationship between his astronomical discoveries and their cosmological consequences to the well established patronage system of his time. We show that this system, from one side, propelled him to the position of the Europe most glorious astronomer, and from the other side led to his "fall" and the tragic end.

**'MILOSEVIĆ' VS. SOLAR ECLIPSE: SERBIAN POLITICS,  
ASTRONOMY AND THE MEDIA IN AUGUST 1999**Vladimir Janković<sup>1</sup>, Marija Šešić<sup>2</sup>

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Using the events preceding the 1999 total Solar Eclipse in Central Europe, this paper addresses the relationship between science, society and politics in the context of post-civil wars Serbia. The 1999 Serbian eclipse of the sun illustrates how the similarities in the disquisition of power over things and subjects - this collusion of thinking and policing - have a common root in what may be described as a hegemony of expertise, and, more specifically, a hegemony of welfare medicine defined by the ethos of socialist positivism. That such a hegemony operated through the politicized media in a tense climate of post-Nato Serbia, did everything to make things messier. The outcome was a unique atmosphere of apprehension, revolt, and apathy absent in other countries affected by the phenomenon. In concluding remarks, we will use the episode to reflect on contemporary issues of science (medicine) and politics and support the notion that the traditional ethos of science, insisting on a separation between knowledge and power, has all but disappeared in the realm of everyday life.

**MODERNIZATION OF PLANETARIUM IN BELGRADE  
AND ITS SOCIAL IMPORTANCE**

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Social awareness about importance of popularization of science, especially in a developing country, should be much greater than now. Concerning the fact that astronomy isn't present at all in official school programs, most of schoolchildren and students in Serbia have the opportunity to get a basic astronomical knowledge only in planetarium. New technologies implemented in subsistent building of Planetarium (which will be restarted till the end of 2007, by donation of Municipality of Stari Grad) would be extremely attractive to visit for the young generation as well as general public. What kind of planetarium projector, laser and sound systems we need to realize this project, will be discussed in details in this presentation, as well as project impact on cultural and scientific renaissance of the region.

**25 YEARS OF PETNICA SCIENCE CENTER****Nikola Božić***Petnica Science Center, Valjevo, Serbia**E-mail: bozicn@eunet.yu*

In this paper are presented the main achievements of Petnica Science Center (with focus on Department of astronomy) in the first 25 years (1982. - 2007.).

**GYMNASIUM REFORM IN SERBIA****Mirko Nagl***Šabačka gimnazija, Šabac, Serbia**E-mail: mnagl@pttt.yu*

The Gymnasium of Šabac participated in the creation of the program of the Gymnasium for informatics. It also participated in the creation of the Conceptions of the reform of gymnasiums by the Gymnasium community and the Conceptions of the Reform educational circles as well as in the Directions of educational system by the Ministry of education in Serbia. The Gymnasium of Šabac in the school year 2007/2008 starts with inscription of the second generation of the students of informatics. From the viewpoint of astronomy, it is very important that astronomy is present as a mandatory subject, but the program of the optional subject should be conceived. This is where the Society of Astronomers of Serbia (DAS) should play the key role!

**SCIENCE POPULARIZATION IN AMATEUR ORGANIZATIONS****Nikola Božić***Petnica Science Center, Valjevo, Serbia**E-mail: bozicn@eunet.yu*

There are presented the different ways of science popularization in amateur astronomical organizations also in public (using the capacities of amateur organization).

ASTRONOMY. INSPIRATION.  
ART - ARTWORKS INSPIRED BY ASTRONOMY

Nataša Stanić

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This work is based on five interesting books written in different languages, a language of art and science, but talking about the same - the inspiration. Furthermore, those books tend to show how the inspiration, or better to say, author's creativity has evolved with broadening knowledge, versatility of art tools and new technologies through time. From that point of view, books of poetry "Orpheus in Dormitory", "On the Event Horizon" and "Multiverse of Love" are compared to books of popular astronomy "Starry Cities" and "AstroLIES". Other authors - well known Serbian writers, masters of art and multimedia art, as well as students, will be introduced as members of the INSAP (INSpiration by Astronomical Phenomena) Group, founded in December 2004 in Astronomical Society "Ruđer Bošković". In fact, this paper speculates how poetry and other kind of arts are tightly related to astronomy. Hence the connection between art and natural sciences in general will be discussed.

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