Hipparchos

The Hellenic Astronomical Society Newsletter

Volume 1, Issue 6, Year 3 **March 1999**

Message from the President

On behalf of the new Council of the Hellenic Astronomical Society, elected last June, I would like to wish everybody "A a happy and prosperous New Year". In particular, I would like to thank the previous Council and its President, academician Contopoulos, for a very successful term in Office. Our Society was a dream for some of us, only a few years ago. Now it has become the primary astronomical organization in Greece. The outgoing Council played an instrumental role to this development, the new Council will try to meet the expectations and challenges of our environment, our epoch and all members of our Society

With 1999 we are coming closer to the New Millenium, a landmark in the evolution of humanity, a milestone in the development of Astronomy. The dark ages of the past are gone. The last 1000 years have seen man and woman break the bars of isolation and inequality, increase their standard of life and health and promote the relations between nations on a global scale. Astronomy has become the driving force at the cutting edge of Science. New mathematical notions and physical laws have been discovered through astronomical research. Our view of the Cosmos has expanded from a narrow, Earth-centered environment to a far reaching Universe, covering an unimaginable space-time. The pace of Science is fast. Its growth exponential. I wonder what Astronomy of the years 2000+ has in store for us ...

Looking back to the last four years since the establishment of the Hellenic Astronomical Society, I feel that the largest achievement of the Society, during this interval, is the improvement of communication between its members. We seem now to start knowing each other and co-operation has expanded. This has been achieved mainly through the organization of two large Conferences (the 2nd Hellenic Astronomical Conference and JENAM-97) and the means of propagating information through "Hipparchos" and the monthly "Electronic Newsletter". I would like to express my sincere thanks to Prof. X. Moussas, the editor of Hipparchos, and to Prof. H. Varvoglis and Dr. V. Charmandaris, the editors of the Electronic Newsletter, for their efforts to communicate recent news and activities to our members.

It is obvious that Astronomy in Greece is developing rapidly. A new 2.3 m robotic, optical telescope is under construction by Zeiss on behalf of the National Observatory of Athens. The Greek delegation to the Joint European and Czech National Meeting in Prague, last September, was noted to be very strong and flattering comments for Greek astronomy were heard during the meeting. The recently held "Astronomy 2000+: Greek perspectives for the 21st century" workshop at Penteli, attracted about 100 astronomers from all over the world, including the U.S.A. and Australia. Suggestions to join ESO and to build large instruments (e.g. a large, high frequency radio telescope) and smaller ones were among the principal aims suggested during the workshop.

Last but not least among the financial matters is the decision by the Council of Hel.A.S. to establish an award for "The Best Ph.D. Thesis of the Year". The decision has attracted very favourable comments. Supervisors and Ph.D. students alike are in alert!

Finally, the Council of Hel.A.S. is currently working towards the next Hellenic Astronomical Conference to be held in the island of Samos in September 1999. I hope that we may all meet there to discuss our work, exchange ideas and establish new collaborations

The President of Hel.A.S.,
I.H. Seiradakis

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Astronomy 2000+: The Greek Perspectives for the 21st Century

November 12-13, 1998
Mt. Pendeli, Greece

As most of you know already, the "ASTRONOMY 2000+" Workshop took place on the 12th and 13th of November 1998 at the premises of the National Observatory of Athens at Penteli.

The need for such a meeting was evident to the Greek National Committee for Astronomy (GNCA) long ago and preliminary work on organising it was going on for the last two years. A major decision of the GNCA was the appointment of an External Advisory Committee, with the task of reporting on the possible directions of Astronomy in Greece in the 21st century. In addition, great effort was put in order to contact all Greek astronomers and instill them with the idea of the meeting and our expectations from it.

ASTRONOMY 2000+ EXTERNAL ADVISORY COMMITTEE

Yervant Terzian, Cornell University, USA (Committee Chair)
Menas Kafatos, George Mason University, USA (Committee Secretary)
Lia Athanassoula, Observatoire de Marseille, France
Demos Kazanas, NASA Goddard Space Flight Center, USA
Stamatis Krimigis, Johns Hopkins, Applied Physics Laboratory, USA

The final number of participants, who were able to attend the Work-

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Editor
Xenophon Moussas
University of Athens
Department of Physics
Section of Astrophysics,
Astronomy & Mechanics
GR-158 83 Zografos
Greece
Tel. +30 1 7235122
Fax +30 1 7238413

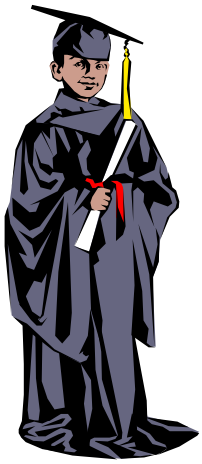
E-mail: xmoussas@cc.uoa.gr

Hellenic
Astronomical Society

University of Athens
Department of Physics
Section of Astrophysics,
Astronomy & Mechanics
GR-158 83 Zografos
Greece

President: **J.H. Seiradakis**
VicePresident: **N. Kylafis**
Secretary: **H. Varvoglis**
Treasurer: **P. Niarchos**
Counsilors: **E. Kontizas**
E. Livaniou-Rovithis
X. Moussas

The Hellenic Astronomical Society establishes a Prize for the best Ph.D. of the year



The Council of Hel.A.S., in its meeting on November 13, decided to establish a **HELLENIC ASTRONOMICAL SOCIETY PRIZE for the best PhD of the year**. This prize confirms the Council's policy to encourage young graduate students to engage actively in astronomical research. It is foreseen to be granted annually and cover one calendar year. The prize will be awarded to active members of the *Society,* which have successfully defended their PhD thesis during the calendar year of the award. For 1998, the Council of *Hel.A.S.* has decided to offer the sum of 100.000 drachmas. The recipient will be selected by the Council. All members of the *Society* and other colleagues (PhD supervisors in particular) are strongly encouraged to bring to the attention of the Council of *Hel.A.S.* any candidates of this year's prize, by sending details to the Secretary of *Hel.A.S.*, Dr. H. Varvoglis, at the address Physics Department, University of Thessaloniki, GR-54006 Thessaloniki, Greece (E-Mail: varvogli@astro.auth.gr).

Harry Varvoglis
Secretary of Hel.A.S.

Travel assistance to young astronomers

The, up to now, policy of *Hel.A.S.* was to finance participation of its members in Conferences sponsored by either *Hel.A.S.* or *E.A.S.* In a recent meeting, the Council decided to widen the range of Conferences where the participation of Junior members could be financed, by including all conferences held in Greece. The amount granted will be the sole responsibility of the Council and will depend on the current finances of the Society.

Within the framework of the new decision, the Council decided to award one or more grants totalling 30.000 drachmas to *Hel.A.S.* members, preferably Junior members, to help them participate in the one-day workshop on "*Accretion processes in astrophysical environments*", that was held in Athens on January 15, 1999, and one for the Conference on the "*Large scale structure in the X-ray Universe*" to be held in Santorini between September 20 and 22, 1999. Responsible for the distribution of the grants is the corresponding Local Organizing Committees.

We are aware that the amount offered is small. However, it reflects the rich visions of the Society rather than its lean assets, which, at the moment, depend entirely on its members fees. We hope that, as our *Society* grows, it may become larger.

Harry Varvoglis
Secretary of Hel.A.S.

Are you a Member of Hel.A.S.? Have you paid your annual subscription?

4th Hellenic Astronomical Conference
16 - 18 September 1999, Samos, Greece

Scientific Organizing Committee

G. Antonakopoulos (University of Patras)
E. Kontizas (National Observatory of Athens)
N. Kylafis (University of Crete)
E. Livaniou-Rovithis (University of Athens)
X. Moussas (University of Athens)
P. Niarhos (University of Athens)
J. Seimenis (University of the Aegean)
J.H. Seiradakis (University of Thessaloniki - Chairman)
K. Tritakis (Academy of Athens)
V. Tsikoudi (University of Ioannina)
H. Varvoglis (University of Thessaloniki)

Local Organizing Committee

J. Seimenis (Chairman)
I. Lyritzis
P. Niarhos
X. Moussas
N. Soulakellis

The **4th Hellenic Astronomical Meeting** will be held at the island of Samos, Greece, between Thursday September 16 and Saturday, September 18, 1999. The Conference will cover the basic fields of Astronomy and Astrophysics and is open to all astronomers who would like to interact and exchange their scientific expertise with their colleagues.

Besides its beauty and rich history, the island of Samos has played an important role in the evolution of modern philosophical and scientific ideas. Among the ancient Ionian philosophers, Aristarchus of Samos was first to realise the true motions in our solar system, proposing the *Heliocentric* rather than the *Geocentric* theory. About two millenia later, this idea was revived by Nicolaus Copernicus.

The *Organizing Commitees* and the *Main Scientific Objectives* of the Conference are shown in the accompanying Tables.

The scientific discussions will be spread over 10 intervals, each lasting between 1 and 2 hours. During these intervals there will be 5-6 invited reviews, at plenary sessions, and about seventy 15-minute talks spread over ten parallel sessions. The parallel sessions will be organised and chaired by a two-to-three-persons coordinating committee. The coordinating committees will referee and accept the contributed papers

Finally, poster sessions are expected to play an important role in this Conference, addressing recent results, which, in general, cannot be included in the detailed plan of the scheduled sessions.

The Local Organizing Committee, chaired by John Seimenis from the University of Aigean, is anticipating publication of the contributions.

The general registration fee will be 20000.- drachmas (65.- EURO). Participants aged 35 or less can register for 10000.- drachmas (32.- EURO). Members of the Hellenic Astronomical Society are entitled a 50% reduction. The first announcement will be available shortly.

For further details, please check the web-pages of the Conference at **http://www.astro.auth.gr/~helasyn**

Main Scientific Objectives

Dynamical Astronomy and Celestial Mechanics
Solar, Planetary and Space Physics
Stellar Astrophysics
Our Galaxy and other galaxies
High Energy Astrophysics
Cosmology and Relativity
History and infrastructure of Astronomy in Greece

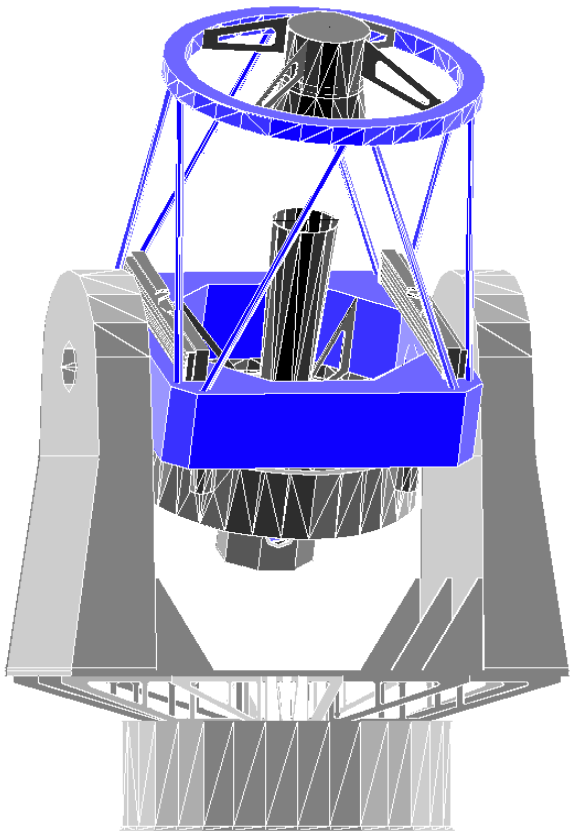
THE NEW 2.3-m TELESCOPE OF THE NATIONAL OBSERVATORY OF ATHENS

P. Hantzios and E. Kontizas
Astronomical Institute, National Observatory of Athens

1. Introduction

The National Observatory of Athens (N.O.A.), which is the primary observational astronomical establishment in Greece, is moving forward towards the installation of a new advanced technology 2.3-m telescope in Greece. The project is funded from E.U. funds through the General Secretariat of Research and Technology of the Ministry of Development. The total budget of the project, including the building and the dome, is 1,545 billions Drachmas. The telescope construction was awarded to the company CARL ZEISS JENA GmbH, following an international tender which took place at the premises of N.O.A. on the 18th of February 1998. The contracts between N.O.A. and ZEISS were signed on the 31st of July 1998. According to the time schedule, the first light of the new telescope is expected during 2001.

The new telescope will be of altazimuth type and will have Ritchey - Chretien optics which will give a corrected field of view of 1.04°. It will also be automated, advance programmed and remotely controlled through the network. For the installation of the new telescope we are considering various locations in Southern Greece. The initial instrumentation of the telescope will consist of a high efficiency CCD camera, a CCD spectrograph and a CCD mosaic. This equipment will support a great variety of observational programmes based on direct imaging, spectroscopy and photometry of faint objects. The wide field of the telescope will make it suitable for observations of extended objects such as stellar clusters, galaxies and clusters of galaxies. With the new 2.3-m telescope our aim is not only to advance Greek observational astronomy, but also to promote a wider astronomical collaboration which could include the Balkan countries, East European and Black Sea countries, as well as the Arab countries and Israel. This goal is realistic and feasible, especially now that efforts to organise a Mediterranean astronomical collaboration have been undertaken by the Southern European countries. In this collaboration Greece can play a significant role since the new 2.3-m telescope will be the largest telescope in the East Mediterranean.



The new 2.3 m telescope
of the National Observatory of Athens

2. Specifications of the telescope

The specifications of the telescope, as determined by the scientific goals, the observing conditions and, of course, the budget, are shown in Tables I-V.

Table I: FEATURES OF THE TELESCOPE (without instrumentation)

- Height (telescope in vertical direction): 9000 mm
- Weight of moving parts: < 29000 kg
- Total weight (with substructure): < 34000 kg
- Mounting system: Altazimuth with 6 drives per axis
- Encoding system: 2 tape encoders per axis with a resolution of 0.02 arcsec

(Continued on page 5)

Table II: PERFORMANCE OF THE TELESCOPE

- Maximum rate of movement on each axis: 2 degrees/sec
- Accuracy of pointing: < 4 arcsec, up to z = 70^o
- Accuracy of tracking in 10 minutes: < 0.25 arcsec
- Accuracy of tracking in 1 hour: < 0.5 arcsec
- Operating temperature range: -10^o to $+35^o$
- Operating humidity range: up to 80% R.H.
- Resistance against wind in operation: up to 15 m/sec
- Resistance against earthquakes: accelerations up to 2 m/s^2 in any direction
- Weight capacity at Cassegrain: up to 300 kg of instrumentation
- Balance: Automatic telescope balancing system

Table III: CONTROL SYSTEM

- Manual mode
- Automatic mode (including advance activity scheduling)
- Remote control mode (including planetarium mode)
- Three levels of safety (software limits, signal limits and hardware limits) including monitors for weather conditions

Table IV: OPTICS

- Primary mirror diameter: 2.28 m
- Optical system: Ritchey - Chretien
- Final focal ratio: f/8
- Field of view: 1.04 degrees
- Image quality: < 0.35 arcsec (80% encircled energy) on axis, from 350 nm to 1000 nm

(Continued from page 4)

3. The telescope site

For the installation of the new telescope we are considering various locations in Southern Greece which in general has very good weather and optical properties. In order to evaluate these locations, for the last two years N.O.A. is carrying out site tests and seeing measurements. The aim is to select the best location in Greece suitable for such an instrument. The criteria for the site selection will be the accessibility, infrastructure, weather statistics, sky darkness, seeing, temperature ranges, humidity and winds. An optimum combination of these characteristics will guarantee the best utilization of telescope time. The site evaluation will be concluded in 1999.

4. Observational capabilities of the 2.3-m telescope

The new 2.3-m telescope of the Astronomical Institute of the National Observatory of Athens will be the major astronomical observing instrument of Greece in the beginning of the next century. It will expand significantly the observational horizons of Greek astronomy, since it will be able to go down to ~24 mag for imaging and photometry and to ~ 18 mag for spectroscopy. The initial instrumentation will consist of a high quantum efficiency CCD camera and, shortly afterwards, it will be enriched with a CCD spectrograph and a CCD mosaic in order to exploit the large field of view of the telescope. It will also make the new telescope suitable for wide field imaging surveys (link to large ground based telescopes) and simultaneous observations with space based observatories at different spectral ranges (IR, X-rays, etc.) and/or follow-ups.

The 2.3-m telescope with its equipment will be able to support a great variety of observational programmes. A list of potential targets (far from complete) is presented in Table VI.

Through the remote control mode, the new telescope will be controlled from the home institutes of Greek astronomers and this will facilitate significantly the execution of astronomical observations in Greece. Last but not the least, the new telescope will be able to be linked to Schools, Universities, planetaria, etc., for education and training purposes.

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Table V: EQUIPMENT

- Acquisition and guidance unit with off-axis autoguider and 5 ports for instruments
- CCD camera with high Q.E., cryogenic cooling and format 1024x1024 24ì square pixels
- Filter wheel for the CCD camera with 8 filters
- Observatory enclosure, lightweight steelframe, double skin insulated and fully opened with windscreen
- Optics alignment tools and lifting tackles

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In conclusion, Hellenic astronomy will benefit enormously from this project since the new 2.3-m telescope will:

- ☞ Allow Greek astronomers to perform high quality observations without having to travel abroad
- ☞ Maximize observing time/Greek astronomer
- ☞ Attract international collaborations
- ☞ Be linked to major ground based observatories and space based observatories
- ☞ Serve for education and training purposes

Table VI:
POTENTIAL TARGETS

- N.E.O. (Near Earth Objects)
- Search for new planetary systems
- Young stellar objects
- Monitoring Novae and related stars
- Studies of black hole X-ray transients
- Interacting binary stars, cataclysmic variables
- Stellar clusters and associations
- Monitoring gravitational lenses
- Studies of galaxies
- A.G.N. (Active Galactic Nuclei)
- Clusters of galaxies
- Observational cosmology

Astronomy 2000+: The Greek Perspectives for the 21st Century
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shop, is 98 (not including a few that came without registering!) That number covers the entire Greek Astronomical Community all over the world.

Now we are one!

This historic meeting has proved that "Greek astronomers can work together, can discuss together, can plan together, can dream together" as Prof. Y.Terzian reminded.

Many thanks to the External Advisory Committee for their excellent report and their contribution to unify Greek Astronomers.

Many thanks to all participants for their contributions.

Many thanks to all speakers for their visions and plans.

Finally, I was happy to realize that the Committee's recommendations covered entirely all the plans presented by the participants of the meeting.

Thanks to all of you for your contribution and I hope to see you in three years time to discuss the progress report.

Dr. E. Kontizas
President of GNCA

RECOMMENDATIONS
PRESENTED BY THE EXTERNAL ADVISORY COMMITTEE

Having examined the current status of astronomy in Greece and the international perspective on observational astronomy, the committee proposes two sets of recommendations, one that would involve new funding and one to strengthen the overall conduct of astronomical sciences in Greece.

PRIMARY RECOMMENDATIONS REQUIRING MAJOR RESOURCES IN ORDER OF PRIORITY:

A. Join ESO
B. Strengthen observational/instrumental astronomy
C. Provide for merit based usage of any large national facilities and allocate resources for their use
D. Provide small optical telescopes
E. Join ESA

RECOMMENDATIONS TO STRENGTHEN THE CONDUCT OF ASTRONOMICAL AND SPACE SCIENCES:

1. Foster national and international collaboration
2. Enhance space-based science and technology programs
3. Broaden the scope of training graduate students to improve employment opportunities
4. Utilize existing astrophysical and space data
5. Maintain a strong theoretical astrophysics program
6. Make major upgrades in computing facilities
7. Strengthen the astronomical sciences at the major Greek universities

ASTRONOMY, ENVIRONMENT AND MANKIND'S NEAR-EARTH ACTIVITIES

Znamya 2.5 (banner) is a Russian experimental project to test large thin film deployable structures and reflector technology for use as the basic component of future solar sailing and space illumination systems. According to the initial plans and hopes, the Znamya test would lead to whole constellations of space mirrors orbiting at 1500-4500 Km height. With a diameter of 200 m, each satellite could beam down a disk of light as wide as a city and a hundred times the Moon's brightness.

Recently, cosmonauts inside the **MIR space station** tried, unsuccessfully, to command the circular, 25-meter reflector of Znamya to be unfurled from the **Progress M-40 spacecraft**. Their objective was to use then the giant mirror to direct reflected sunlight onto the darkened Earth below them. Due to the above failure the experiment was abandoned, and the control center near Moscow commanded the Progress and its partially-unfurled reflector to reenter the Earth's atmosphere over the Pacific Ocean.

It is more than obvious that such an armada of giant space mirrors hardly comes as a delight to astronomers. Having to battle against light sources on the ground, it is very disheartening to deal with light from the sky as well.

Here, I grasp the opportunity to point out that, up to now, we are used and accept to identify the notion **environment** with simply the subatmospheric environment of our Earth. However, it is hardly denied anymore than mankind's activities in space during the last forty years force us to extend the notion of environment, so as to include in it also the **over-atmospheric environment**, generally the Earth's astronomical environment and more specifically the **near-Earth space**.

Space has been proposed as the venue for solar reflectors, for advertising and for sources of illumination for lighting the ground (like the Znamya 2.5 project as well as a number of other unworthy pro-

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Exploring the web with Hipparchos

This new section of *Hipparchos* has as a goal to point out some of the many electronic resources which may be of interest to both professional and amateur astronomers. The references which we will suggest can be accessed by anyone who has an internet connection and a World Wide Web browser.

It's obviously an understatement that this section will merely skim the wealth of the information currently available. Dozens of satellites and ground based observatories store data which are becoming public for scientific analysis with an amazing pace, while programmers all over the world create lists which cross reference the datasets to beautiful images and published articles. A very small collection with links to such internet sites is maintained in the web page of the Hellenic Astronomical Society at:

http://www.astro.auth.gr/elaset/news.html

In this issue we will present a list of four web sites which may help you find a missing reference, an old colleague, or an interesting article. Here they are:

http://www.stsci.edu/astroweb/astronomy.html

It is one of the most complete searchable master lists with links to almost everything related to astronomy. If you are looking for an astronomy related subject and don't know where to start from, this is your best bet.

http://physicsweb.org/TIPTOP/

A similar project but not focused to just the areas of astronomy and astrophysics. A variety of categories, search options and possibility to contribute your own information are available.

http://adswww.harvard.edu/abstract_service.html

The Astrophysics Data System (ADS) of NASA has a collection of more than a million abstracts and full scanned articles published in most major astronomical journal. One can easily search the database using several keywords (author's name, object, etc)

http://xxx.lanl.gov/form/astro-ph

The astrophysics e-print archive is a project originally developed at SISSA (Italy) but it is currently maintained at Los Alamos National Laborstory (USA). It gives the opportunity to researchers to search, retrieve and, more importantly, submit preprints of their work. This is the fastest and least expensive way to make your work known to a large number of people. The astrophysics section of the archive has more than 3000 people who receive a daily notification with the text of all abstracts submitted to the archive the previous day. Several other categories covering most areas of physics and mathematics are also available.

Vassilis Charmandaris
(v.charmandaris@obspm.fr)

Meetings of interest to Hel.A.S. Members
(Up to August 1999)

19-23 April 1999: "*Extrasolar Planets Session at the European Geophysical Society General Assembly*". The Hague, Netherland. Contact: Dr. Alan J. Penny, Rutherford Appleton Laboratory, Chilton, DIDCOT, Oxon, OX11 0QX, UK. http://www.copernicus.org/EGS/egsga/denhaag99/denhaag99.htm E-mail: ajp@ast.star.rl.ac.uk

19-20 May 1999: "*Magnetic Activity in Stars, Discs and Quasars*". Royal Society, London. Contact: D. Lynden-Bell, Institute of Astronomy, The Observatories,Madingley Road,Cambridge. CB3 0HA. E-mail: dlb@ast.cam.ac.uk

7-18 June 1999: "*The Neutron Star-Black Hole Connection, NATO ASI*". Elounda, Crete, Greece. Contact: Dr. Fotis Mavromatakis, University of Crete , Voutes, Heraklion, 71003. http://www.mitos.com.gr/conf/n_starASI99 E-mail: fotis@physics.uch.gr

13-18 June 1999: "I*AU Colloquium 174: Small Galaxy Groups*". Turku, Finland. Contact: Mauri Valtonen, Chris Flynn, Tuorla Observatory, Vaisalantie 20, Piikkio, Finland, FIN-21500. http://oj287.astro.utu.fi/sgg E-mail: sgg@astro.utu.fi

22-25 June 1999: "*8th SOHO Workshop Plasma Dynamics and Diagnostics in the Solar Transition Region and the Corona, 8th SOHO Workshop*". Paris, France. Contact: Jean-Claude Vial, Institut d' astrophysique Spatiale, Bat. 121 Universite Paris XI, Orsay, France, 91405 Cedex. http://soho8www.medoc-ias.u-psud.fr E-mail: vial@medoc-ias.u-psud.fr

27 June - 2 July 1999: "S*atellite Galaxies*". Ringberg Castle, Tegernsee, Germany. Contact: Andi Burkert, Max-Planck-Institute for Astronomy, Koenigstuhl 17, Heidelberg, Germany D-69117. http://www.rzg.mpg.de/ringberg-castle/ E-mail: burkert@mpia-hd.mpg.de)

28 June - 2 July 1999: "*Black Holes and Gravitational Waves-New Eyes in the 21st Century, Yukawa International Seminar*". Kyoto, Japan. Contact: Secretariat of YKS99, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto 606-8502, Japan. http://www2.yukawa.kyoto-u.ac.jp/~ykis99 E-mail: YKIS99@yukawa.kyoto-u.ac.jp)

8-13 July 1999: "Galaxy Dynamics: From the Early Universe to the Present", Pariss, France. Contact: F. Combes, DEMIRM, Observatoire de ParisAvenue de l'Observatoire, F-75014, Paris, France. http://www.iap.fr/iapmtg99 E-mail: fransoise.combes@obspm.fr

14-18 August 1999: "*XXXIst Young European Radio Astronomers' Conference (YERAC)*" Jodrell Bank, U.K. Contact: N Jackson, A. Richards, E. Xanthopoulos, NRAL, Jodrell Bank, Macclesfield, Cheshire SK11 9DL, U.K. http://www.jb.man.ac.uk/cis/news/events/yerac/ E-mail: yerac@jb.man.ac.uk

16-18 August 1999: "*Back to the Future: A Bridge between generations of variable star researchers...*" Kecskeme't, Hungary. Contact: A. Horvarth, Baja Astronomical Observatory, 6500 Baja, Szegedi ut, PF 766, Hungary. http://www.bajaobs.hu/cski/phdconf.html E-mail: hori@asterope.bahaobs.hu

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posals). As a consequence, we astronomers, should be aware and sensitive about projects like the Znamya 2.5, that endanger the preservation of the near-Earth environment (NEE) for future generations. Especially, we should be aware of the man-made pollution of and subsequent threats for NEE, and vice-versa, namely, the threats for mankind from NEE.

Astronomy, depending entirely on data coming from the Earth's astronomical environment, is a **typical environmental science** as regards its relation to everyday life, its roots, its research methods and its research areas. At the same time Astronomy is exposed to many adverse impacts, being in itself a science devoted to the detection of the weakest signals in an environment naturally hostile to such endeavors. It is unfortunate that **Astronomy enjoys no protection conditions** in law or by convention against the consequences of such a degradation of observation**. Urgent remedial action is needed** on the time scale of years rather than the decades more usual to reach such agreements.

Since national political leaders usually take a short-range view, hardly ever extending beyond the next change of government, and since astronomers measure time in millions and billions of years, we must concentrate our efforts to **educate the general public** to think with at least the intermediate perspective of centuries and millennia about the environmental degradation that our increasingly powerful technology is causing on and near our beautiful but fragile planet. Being an optimistic by nature, I believe that such a challenge can really be met, given the creative inspiration that has driven the best astronomical endeavours over the millennia.

Nicholas K. Spyrou