

ANNUAL REPORTS
OF THE
ASTRONOMICAL INSTITUTES
OF GREECE
1973

PUBLISHED BY THE GREEK NATIONAL COMMITTEE FOR ASTRONOMY

ATHENS
1974

C O N T E N T S

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ASTRONOMICAL INSTITUTE NATIONAL OBSERVATORY OF ATHENS

ANNUAL REPORT 1973

Staff. Prof. Dr. D. Kotsakis and Dr. C. Banos visited Grubb Parsons & Co, in England, and discussed the progress of the construction of the 48-inch reflector. They also visited Edwards & Co, in England, to inquire about the supply of an aluminizing plant for the mirrors of the 48-inch reflector.

Dr. C. Banos returned from France, where he worked for a year on a French Government grant.

Mr. E. Kontizas received a nine month leave of absence for a visit to the Edinburgh University.

Mr. P. Rovithis resigned from his post as technician and was appointed as Assistant.

Dr. C. Banos and Dr. Th. Prokakis were nominated Members of the IAU.

Equipment. An order was placed for the supply of a JOYCE-LOEBL microdensitometer, equipped with a magnetic tape recorder.

The following work has been carried out in the program for the installation of the 48-inch reflector:

a) A plot of land 65.000 m² approximately in area, was purchased near the village Kryonerion, 20 km south of Kiaton, in Peloponnisos (130 km from Athens).

b) A 6-inch refractor to study seeing, as well as meteorological equipment for the continuous recording of meteorological data, such as temperature, humidity, etc. were installed.

c) The water supply, the road construction and the drawings showing the enclosure of the property were approved officially.

d) The drawings for the building of the telescope were submitted to the Ministry of Education for final approval.

e) The supply of electricity was near completion at the end of the year.

f) A telephone line was installed and is now in operation.

Observations. a) **Sun.** The Razdow flare patrol telescope was installed at the Penteli station. $H\alpha$ filtergrams, on band, were obtained continuously during the whole year. In addition visual observations of chromospheric events and sunspots were made daily.

Radio-monitoring of the Sun was carried out on 1415 MHz, 2695 MHz, 4995 MHz and 8800 MHz.

The observations were made by observers of the AWS group under the supervision of Dr. Prokakis.

Mr. Elias continued routine observations of sunspots in Athens for the determination of their position, number and type. He also observed sunspots at the Kryonerion station for a comparative study of seeing conditions.

b) **Planets.** Dr. C. Banos continued observational work on Jupiter and specially on the Red Spot, with the Newall telescope, at Penteli.

c) **Comets.** Mr. D. Elias determined positions and magnitudes of comets.

d) **Moon.** Mr. D. Elias continued his photographic observations of the Moon.

e) **Stars.** Mr. D. Elias continued his observations of variable stars. He also observed several occultations.

Mr. P. Rovithis continued his observations of double stars.

Mr. E. Kontizas began observations in stellar photometry.

f) **Workshop.** Messrs. E. Sigalas, A. Vouzas, Ch. Bourdas and J. Zacharopoulos carried out technical work on the instruments, as well as their servicing.

g) **Dark room.** Mr. J. Zacharopoulos and Miss E. Philippakou carried out the photographic and related processings.

Research. Dr. G. Banos studied the sudden disappearance of a filament which occurred on June 9, 1971, as well as the great flare of July 29.

Dr. C. Banos studied problems of the interplanetary matter and the zodiacal light.

Dr. Th. Prokakis studied phenomena of the solar chromosphere.

Mr. E. Sarris studied families of periodical orbits in the restricted three-body problem and in a tridimensional continuum.

Mr. P. Rovithis completed his study on the differential rotation of the Sun.

Mr. D. Elias continued his work on the photometric parameters of comets, and the influence of the solar wind on the absolute brightness H_0 and the exponent c of comets. He also studied the seeing in Athens and at Kryonerion during the daytime.

Time Service. Routine work was carried out by Meers D. Elias, E. Kontizas, P. Rovithis, J. Zacharopoulos and Miss E. Philippakou.

International cooperation. Dr. G. Banos spent a week at Meudon Observatory.

Dr. C. Banos worked for 6 months at the Institut d'Astrophysique in Paris and six weeks at the Observatory of Saint Michel.

Dr. J. Meaburn, of the Manchester University, worked for a month at the Penteli Astronomical Station, observing interstellar matter.

Dr. E. Pohl, of the Nürnberg Observatory, spent two weeks at the Penteli Station.

Mr. H. Hauswirth and Mr. H. Voelker worked for a month at the Astronomical Institute with the 16-inch refractor.

Monthly reports on Solar activity were regularly sent to the IAU special centers. $H\alpha$ filtergrams were also sent to the Meudon Observatory for the preparation of the «Cartes Synoptiques de la Chromosphère Solaire».

Visits. The members of the Institute gave lectures for the Public and the students, explaining the operation of the instruments and the work done at the Observatory.

Meetings, Symposia. Dr. Th. Prokakis attended the annual meeting of the JOSO at Firenze, Italy. He also attended the 15th General Assembly of the IAU, in Sydney, as the 56 and 57 Symposia of the IAU.

Mr. E. Kontizas attended the 15th General Assembly of the IAU in Warsaw.

Dr. G. Banos and Dr. Th. Prokakis gave lecture at the Research Center for Astronomy of the Academy of Athens.

The Scientific Staff participated to the Seminars on Astronomy held at the same Center.

Publications. 1) Banos C.: Etude photométrique d'un renforcement diffus observé dans la lumière zodiacale à une distance de 100 R. du Soleil. Icarus, 20, 32 - 41, 1973.

2) Banos G.: Solar spicules observed through a K-filter. Solar Physics, V 32, No 2, p. 337, 1973.

3) Banos G.: The radiation transfer in stellar atmospheres. Publications on the National Observatory of Athens, 1973.

4) Banos G. and Elias D.: A photometric study of the solar corona during a total eclipse. Technika Chronika 1973, No 3, 253.

5) Elias D.: The comet Kohoutek, Athens 1973.

6) Kotsakis D.: «The Universe, Creation or Chance?», Athens 1973.

7) Prokakis, Th. et al: A U-like radio burst observed with high space-time resolution. *Astronomy and Astrophysics*, 23, 131, 1973.

8) Rovithis P.: A study of the Dollfus birefringent micrometer and measurements of the Venus polar diameter. *Technika Chronika*, No 9, 1973.

The Director
of the Institute
Professor D. KOTSAKIS

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF ATHENS

ANNUAL REPORT 1973

Staff : Mr. J. Deliyannis and Mr. A. Pinotsis, graduates in Physics were appointed Assistants in July 1973.

Miss E. Antonopoulou, a graduate in Physics, was appointed Assistant in October 1973.

Mr. M. Kourvaras was appointed Technician in October 1973.

Mr. D. Dionysiou was granted a Ph D from the University of London in October 1973.

Mrs. M. Arzoglou-Kontiza was given leave of absence from October 1973 for post-graduate work at Edinburgh, Scotland, on a Government Scholarship.

Equipment : The following instruments were acquired in 1973 :

1) A high-voltage power supply system with stabilizer (manufactured in the workshop of the N.R.C. «Democritos»). 2) Two low-voltage power supply systems with stabilizer (manufactured also in the N.R.C. «Democritos»). 3) An automatic photographic print dryer, model SII of F. C. Manufacturing Co. 4) A Continuous film run Camera (partly manufactured in this laboratory).

Teaching : Professor D. Kotsakis held a course in General Astronomy for the 3rd year students of Mathematics.

Professor M. Moutsoulas held a course in Dynamical Astronomy and Cosmology for the 4th year students of Mathematics.

The tutorial classes of the General Astronomy course were held by Drs. P. Laskarides and M. Zikides. The laboratory exercises of the course were supervised by Miss E. Antonopoulou and Messrs J. Deliyannis, P. Niarchos, D. Papathanasogiou, Th. Papayannopoulos, A. Pinotsis and D. Vaiopoulos.

The tutorial classes of the Dynamical Astronomy and Cosmology course were held by Dr. D. Dionysiou.

Observations by students with the instruments of the Penteli Station

of the National Observatory of Athens were supervised by Professor M. Moutsoulas.

Research : Professor D. Kotsakis supervised Messrs D. Papathanasoglou and J. Deliyannis in studies of the fine structure of the solar atmosphere.

Professor M. Moutsoulas worked at the NASA Manned Spacecraft Center and the Lunar Science Institute in Houston, Texas, on the development of algorithms connecting the instantaneous axis of lunar rotation, the ecliptic system of coordinates, the «Cassini» mean selenographic coordinates, the lunar principal axes of inertia and the invariable plane of the solar system. He also participated in the work of establishing a selenodetic control reference system and the evaluation of the Apollo laser altimetry data. Theoretical aspects of this work have been carried out in Athens with the assistance of Miss E. Antonopoulou.

Photometric studies of mutual eclipses and occultations of Jupiter's satellites were made by Professor M. Moutsoulas and Mr. P. Niarchos with the Newall Refractor and the photoelectric photometer of Penteli Observatory.

Dr. P. Laskarides worked on aspects of Cepheid variables. He also worked with Messrs D. Vaiopoulos and A. Pinotsis on problems of stellar evolution.

Dr. M. Zikides continued his work on families of periodic orbits in the restricted three-body problem.

Dr. D. Dionysiou completed his research on the N-body problem in the 2 and $2\frac{1}{2}$ post Newtonian approximation and submitted his Ph D thesis to the University of London.

Mr. D. Papathanasoglou and Mr. J. Deliyannis studied the solar «seeing» with the Newall Refractor at Penteli. They also studied for the Newall Refractor the variation of focal length with temperature,

Mr. Th. Papayannopoulos collaborated with Professor G. Contopoulos on problems of Galactic Dynamics.

Meetings : Prof. M. Moutsoulas participated in the following meetings:

a) COSPAR - IAU - LSI Colloquium on Lunar Dynamics and Observational Coordinate Systems, Houston, Texas, (January 15 - 17), where he presented a paper on Selenographic Control. He also edited the proceedings of the Colloquium.

b) Special Symposium organized by the Lunar Science Institute at Houston, Texas, in April 1973 on the occasion of Prof. H.C. Urey's 80th birthday, where he gave a lecture on the Calibration of Lunar Photographs.

c) COSPAR 13th Plenary Meeting, Constanz, Germany, (May 1973) where he presented a paper on the Apollo laser altimeter results.

d) IAU Symposium 61, Perth Australia (August 13-17) and IAU General Assembly, Sydney, Australia (August 21-30) where he presented to the Commission 17 a reference system for selenographic control.

Drs. P. Laskarides and M. Zikides and Mrs. M. Arzoglou-Kontiza attended the IAU Extraordinary General Assembly held in Poland (September 5-12). Namely, Symposium 62 was attended by Dr. M. Zikides, Symposium 65 by Dr. P. Laskarides and Mrs. M. Arzoglou-Kontiza, and Symposium 66 by Dr. P. Laskarides.

Mr. P. Niarchos and Mr. Th. Papayannopoulos attended the Computer Programmers' School, held at the N.R.C. «Democritos» (January-July).

Publications : 1) D. D. Dionysiou: «The N-body problem in the 2 and $2\frac{1}{2}$ -Post Newtonian approximation». Ph. D. Thesis, University of London.

2) D. D. Dionysiou: «Post Newtonian Integrals of Motion». *Astrophysical Journal*, 183, 265 with N. Spyrou.

3) M. Zikides: «Some families of Periodic Orbits in the Restricted Three-Body Problem». *Astronomy and Astrophysics*, 27, 23.

4) P. C. Laskarides: «The behaviour of the Hydrogen-line Profiles of the β Cephei star ν Eridani». *Astronomy and Astrophysics*, 26, 91.

5) P. C. Laskarides: «The evolution of a horizontal Branch, Pop II star of total mass 0,63M.» *Monthly Notices of the Royal Astronomical Society (MNRAS)* 164, 169.

6) M. Moutsoulas: «Calibrations of 35 Pic-du-Midi Photographs of the Moon». *The Moon*, Vol. 8, No 3, p. 392.

7) M. Moutsoulas: «Selenographic Control». *The Moon*, Vol. 8, 461.

8) M. Moutsoulas: (Ed.) «COSPAR-IAU-LSI Colloquium on Lunar Dynamics and Observational Coordinate Systems», NASA-CR-131263.

9) D. Papathanasoglou - M. Arzoglou-Kontiza: «Study of the «seeing» with the method of Photographic star trails». *Technical Annals*, September. (in Greek).

Other Publications : 1) D. Kotsakis: «The Astronomical Universe». (in Greek).

2) D. Kotsakis and D. Dionysiou: «Dynamical Astronomy». (in Greek).

3) P. G. Laskarides: «Stellar Atmospheres» (in Greek).

4) P. G. Laskarides: «Laboratory Exercises in Astronomy» (in Greek).

Miscellaneous: a) Professor M. Moutsoulas has served as the Associate Managing Editor of «The Moon», and as the Assistant Editor of «Astrophysics and Space Science»; he also co-edited the lunar bibliographic reviews which are prepared in collaboration with the Lunar Science Institute of Houston and the Air Force Cambridge Research Laboratories.

b) The staff of the Department has shown an active interest on the Development of observational facilities. Mr. J. Deliyannis, assisted by Mr. M. Kourvaras, performed at the Penteli Astronomical Station the installation of a new equatorial mounting which can carry several instruments.

The Head of the Department
Professor D. KOTSAKIS

ASTRONOMICAL DEPARTMENT UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1973

Staff. Dr. G. Contopoulos was elected General Secretary of the IAU during the XVth General Assembly in Sydney.

Dr. S. Persides was appointed Assistant Professor of the Department in February.

Dr. C. Papageorgiou resigned from the Department in June 1973.

Mr. N. Spyrou and Mrs. E. Georgala received their Ph.D. degrees.

Mr. C. Terzides and Mr. D. Papadopoulos were appointed Assistants in October.

Mrs. C. Mertzanidis was appointed secretary in April.

The scientific collaborators of the Department were: Mr. C. Terzides, Mr. D. Papadopoulos, Mr. J. Pascalis, Mr. N. Karanicolas, Mrs. E. Georgala, Mr. L. Vlachos, Mr. I. Ioannides, Mr. D. Kazanas, Mr. B. Xanthopoulos and Mr. M. Michalodemetrakis.

Since October 1973 Dr. A. Jappel and Mrs. J. Dankova, permanent staff of the IAU Secretariat, have moved into the Department. Miss A. Dorta has been hired as from September as Secretary of the IAU.

IAU. The XVth General Assembly of the IAU was held in Sydney, Australia, 21 - 30 August 1973. An Extraordinary General Assembly to commemorate the 500th anniversary of Copernicus was held in Poland 4 - 12 September 1973. The Proceedings and the Highlights of the General Assemblies are edited by G. Contopoulos.

Dr. Contopoulos was in charge of the IAU Symposia and Colloquia until his election as General Secretary.

Eleven IAU Symposia and one Colloquium were held in 1973.

Four Volumes of Proceeding of IAU Symposia were published during 1973 and three more were in press.

During 1973 there were two meetings of the Executive Committee of the IAU and three meetings of the Officers; one of them was held in Thessaloniki.

Dr. Contopoulos visited Moscow, Tbilisi and the Special Astrophysical

Observatory in Caucasus, invited by the USSR Academy of Sciences, in March 1973.

He participated also in the Meeting of the ICSU General Committee in Leningrad during September 1973.

Research Programs

I. Galactic Dynamics. 1) Dr. Contopoulos and Mrs. Georgala continued their work on a linear theory near the inner Lindblad resonance and near the center of a galaxy.

2) Dr. Contopoulos and Mr. Mertzaniadis worked on the linear theory of spiral structure near the particle resonance.

3) Dr. Contopoulos and Mr. Mertzaniadis studied various non-linear effects near the inner Lindblad resonance and the particle resonance.

4) Mrs. Georgala studied with Dr. Kalnajs the bar modes of uniformly rotating stellar disks. A paper on this subject is prepared.

5) Mr. Terzides worked under the supervision of Dr. Contopoulos on various problems of resonances in galaxies.

6) Dr. Contopoulos, Mr. Vlachos and Mr. Terzides worked on the resonances of the dipole field.

7) Mr. Karanicolas worked under the supervision of Dr. Contopoulos on the form of the «third integral» in nearly spherical systems.

II. General Relativity. 1) Dr. S. Persides continued his work on the behavior of test fields in Schwarzschild's black-hole spacetime. The scalar field created by a pointlike source has been studied using Fourier and Laplace transforms. Analytic properties of the field and properties of time-like curves have been used to prove that, as the source falls into the black-hole, the field goes to zero outside the horizon.

A paper on this subject has been accepted for publication in the *Journal of Mathematical Physics*.

2) Dr. S. Persides and Mr. I. Ioannides continued their study of the combined Einstein-Maxwell field in asymptotically flat spacetimes. The second approximation in an expansion of the metric tensor in powers of r^{-1} has been completed and the peeling theorem has been established in a more general coordinate system. The mass loss due to radiation is currently under study.

3) Dr. S. Persides and Mr. J. Pascalis completed their study of the electromagnetic two-body problem in special relativity. Expanding the electromagnetic field and the position vectors in powers of c^{-1} they have derived the field, the equations of motion and the conserved quantities in the first

three approximations. Some properties of the n th approximation have been studied. A paper has been submitted for publication.

4) Dr. Persides and Mr. Xanthopoulos continued their work on the behavior of a time-dependent electromagnetic field in Schwarzschild's spacetime. Some properties on the field and its final form after infinite time have been studied. This work is near completion.

5) Dr. Persides and Mr. Papadopoulos examined the possibility of deriving the Newman-Penrose constants in a more general coordinate system. This work is under progress.

6) Dr. Persides and Mr. Pascalis have started a study of the gravitational two-body problem in the space-time of a Schwarzschild black-hole.

7) Dr. N. Spyrou derived the form of the metric tensor in the 1st, 2nd and $2\frac{1}{2}$ Post-Newtonian approximations for a bounded system of N spherical, perfect-fluid bodies, with internal structure and rotation. He found also the form of the energy, linear momentum and angular momentum integrals in the 1st post-Newtonian approximation for the above system. Apart from the known terms characterizing point masses, new terms depending on the radius, structure and rotation of the bodies have been given.

8) Drs. Contopoulos and Spyrou started working on the problem of the center of mass in the first post-Newtonian approximation in the case of N bodies of finite dimensions.

A grant has been given to this Department by the Greek Office of Scientific Research and Development for research in galactic dynamics and general relativity.

Mr. Terzides, Mr. Pascalis and Mr. Karanicolas have been supported by this grant.

Publications. 1) G. Contopoulos: The Particle Resonance in Spiral Galaxies, *Nonlinear Effects, Astrophys. J.* 181, 657, 1973.

2) G. Contopoulos: Problems of Stellar Dynamic; in: V. Szebehely and B.D. Tapley (eds.) *Recent Advances in Dynamical Astronomy*, D. Reidel Publishing Co., Dordrecht, 1973 = *Contr. Astron. Dep. Univ. Thessaloniki*, No 65.

3) G. Contopoulos: The Theory of Spiral Structure. Resonances, in: B. Barbanis and J. Hadjidemetriou (eds). *Proceedings of the First European Astronomical Meeting*, Vol. 3, Springer Verlag, 1973 = *Contr. Astron. Dep. Univ. Thessaloniki*, No 66.

4) G. Contopoulos and M. Zikides: Periodic Orbits of the Restricted Problem for Various Values of the Mass-Ratio, in: L. Mavrides (ed.) *Proceedings of the First European Astronomical Meeting*, Vol 2, Springer Verlag, 1973 = *Contr. Astron. Dep. Univ. Thessaloniki*, No 67.

5) G. Contopoulos: The Density Wave Theory of Spiral Structure, in: L. Martinet and M. Mayor (eds.) *Dynamical Structure and Evolution of Stellar Systems*, Swiss Society of Astronomy and Astrophysics, Saas-Fee 1973.

6) G. Contopoulos: Topological Methods in Stellar Dynamics, in: L. Martinet and M. Mayor (eds.) *Dynamical Structure and Evolution of Stellar Systems*, Swiss Society of Astronomy and Astrophysics, Saas-Fee, 1973.

7) E. Athanassoula-Georgala: Contribution to the Study of the Spiral Structure of Galaxies, Ph. D. Thesis, University of Thessaloniki, 1973.

8) S. Persides: The Laplace and Poisson Equations in Schwarzschild's Space-time, *J. Math. Anal. Appl.* 43, 571, 1973 = *Contr. Astron. Dep. Univ. Thessaloniki*, No 63.

9) S. Persides: Classical Fields in the Vicinity of a Schwarzschild Black Hole, in: B. Barbanis and J. Hadjidemetriou (eds.) *Proceedings of the First European Astronomical Meeting*, Vol. 3, Springer Verlag, 1973 = *Contr. Astron. Dep. Univ. Thessaloniki*, No 68.

10) S. Persides: On the Radial Wave Equation in Schwarzschild's Space Time, *J. Math. Phys.* 14, 1017, 1973 = *Contr. Astron. Dep. Univ. Thessaloniki*, No 62.

11) S. Persides: Modern Problems in the General Theory of Relativity, *Technical Annals*, April 1973, Greece (in Greek).

12) N. Spyrou and D. Dionysiou: Post-Newtonian Integrals of Motion, *Astrophys. J.* 183, 265, 1973 = *Contr. Astron. Dep. Univ. Thessaloniki*, No 64.

13) N. Spyrou: The N-body Problem in General Relativity, Ph. D. Thesis, University of Thessaloniki, 1973.

Meetings. Dr. Contopoulos was a lecturer at the «Third Advanced Course» of the Swiss Society of Astronomy and Astrophysics, Saas-Fee, April 1973, under the title «Dynamical Structure and Evolution of Stellar Systems».

Dr. Contopoulos and Mrs. Georgala participated in the IAU Symposium No 58 «Formation and Dynamics of Galaxies», Canberra, Australia, August 1973. Dr. Contopoulos was a member of the Organizing Committee and he gave a paper under the title «Some Recent Developments in the Theory of Spiral Structure».

The Sydney General Assembly of the IAU was attended by Dr. Contopoulos and Mrs. Georgala. Two reports on the research of Mrs. Georgala and Mr. Michalodemetrakis were distributed.

The Extraordinary General Assembly in Warsaw was attended by Drs.

Contopoulos and Persides and Mr. Spyrou. Dr. Persides presented a paper under the title «Scalar Waves in the Exterior of a Schwarzschild Black Hole».

Lectures, Seminars. Dr. Contopoulos gave lectures at the Special Astrophysical Observatory, in Caucasus (site of the 6-meter telescope), the University of Tbilisi, the Saas-Fee «Advanced Course», and the Leiden Observatory.

Drs. Persides and Papageorgiou gave lectures at the Research Center for Astronomy and Applied Mathematics of the Academy of Athens.

A Seminar on various astronomical topics was held weekly with the collaboration of the Department of Geodetic Astronomy of the University of Thessaloniki.

Visitors. Professor E. R. Harrison, University of Massachusetts, and Professor A. Dragt, University of Maryland, gave lectures in our Department during May 1973.

Professor L. Goldberg, President of the International Astronomical Union, Professor Mrs. A. Masevich, Vice President of the USSR National Committee of Astronomy, and Professor J. Ford, University of Atlanta, Georgia, gave lectures during November 1973.

The Head of the Department
Professor G. CONTOPOULOS

DEPARTMENT OF ASTRONOMY
TECHNICAL UNIVERSITY OF ATHENS

ANNUAL REPORT 1973

Staff. The Chief Assistant of this Department, Dr. G. Katsiaris, resigned after having been appointed professor at the University of Patras. Assistant Mr. J. Tsoutras resigned to join the Department of Railways in this University.

Mr. B. Kyriakos was appointed Assistant in this Department. He is a qualified civil engineer and a rural and survey engineer as well. Mrs. C. Mabilis, graduate of Mathematics of the Athens University, joined this Department as Assistant. She had followed courses of Electronics and Telecommunications in the University of Athens.

The staff consists now of Chief Assistant Dr. D. Vlachos, master of Mathematics and a qualified rural and survey engineer, and possessor of a PhD of this University and of Assistants Mr. C. Loukidellis, master of Mathematics, Mr. B. Kyriakos, and Mrs. C. Mabilis.

Teaching and Training. During the academic year 1972 - 73 Professor J. Argyrakos, Head of this Department, assisted by this staff, held courses in General, Spherical, Practical, and Geodetic Astronomy. A seminar was also held for senior undergraduates on special subjects. The courses were attended by 102 + 93 students of the third and fourth year, respectively. These were students of Rural and Survey Engineering.

Scientific Activities. Chief Assistant Dr. D. Vlachos published a paper on the topography of shipyard constructions.

The Head of the Department
Prof. J. ARGYRAKOS

RESEARCH CENTER FOR ASTRONOMY
AND APPLIED MATHEMATICS
ACADEMY OF ATHENS

ANNUAL REPORT 1973

Staff. During this year there has been no change in the staff of this Center. Dr. C. Poulakos acted as Chief Assistant and Mr. M. Chondros, Secretary of the Center, devoted his time to his secretarial and other routine normal duties. He also acted as Librarian and offered secretarial services to the National Committee for Astronomy, the National Mathematical Committee and the National Committee for Space Research.

Research. The following research programs were carried out during 1973.

- a) Relation between Solar Activity and Terrestrial Phenomena by Prof. J. Xanthakis.
- b) Photometry of K-line spectroheliograms by Dr. C. Macris, assisted by Mrs. Helen Daras and Mr. Th. Zachariadis.
- c) Research on a New Model of the Atmosphere of Mars, by Dr. C. Macris and Mr. B. Petropoulos.
- d) Research on the Structure of the Galaxy by Dr. C. Poulakos.
- e) Statistics of the Solar Activity by Mr. B. Tritakis.

Equipment. In the course of 1973 an electronic calculator HEWLETT - PACKARD 9820 A was purchased from Government Funds.

A JOYCE - LOEBEL microphotometer and microdensitometer which was ordered last year, was delivered and installed.

A NIKON camera, minus some accessories, was delivered this year.

Publications. The following papers have been published during 1973 under the heading as CONTRIBUTIONS FROM THE RESEARCH CENTER FOR ASTRONOMY AND APPLIED MATHEMATICS, ACADEMY OF ATHENS, Series I (Astronomy):

- a) Solar Activity and Precipitation, by J. Xanthakis (Proceedings of the First European Astronomical Meeting, Athens Sept. 4-9, 1972. vol. 1, p. 20 - 48, 1973, Edit. Xanthakis).

b) A New Model for the Atmosphere of Mars, by C. Macris and B. Petropoulos (Proceedings of the First European Astronomical Meeting, Athens, Sept. 4-9, 1972, vol. 1 p. 140-149, 1973, Edit. Xanthakis).

c) A Study of the Areas Index, Ia, by C. Poulakos and B. Tritakis (Proceedings of the First European Astronomical Meeting, Athens, Sept. 4-9, 1972, vol. 1, p. 49-60, 1973, Edit. Xanthakis).

d) On a Comparison between the Observed and Predicted Values of the Different Indices of Solar Activity for the 20th Solar Cycle, by C. Poulakos. (Praktika of the Academy of Athens 1973, vol. 48, p. 186).

Furthermore, there have been submitted for publication:

a) Photometric Research for the $K_{2,3}$ Chromospheric Flocculi, by C. Macris, in the Praktika of the Academy of Athens, and

b) Distribution of Early Type stars in a Southern Milky Way Region, by C. Poulakos, in Astronomy and Astrophysics.

Library. The library of the Center has been fairly active this year. About 150 new volumes and 1.800 pamphlets have been received from various scientific institutes on an exchange basis.

Scientific Committees. Secretarial assistance has been proffered by this Center to the National Committee for Astronomy, the National Mathematical Committee and the National Committee for Space Research; it so happens that Prof. J. Xanthakis, Supervisor of this Center, is also chairman of these Committees. The object of these Committees is the coordination of research in this country and maintaining contacts with similar bodies in other countries.

Meetings. Prof. J. Xanthakis presided the meeting of a Symposium organized by the Hellenic Mathematical Society and held between the 3rd and 8th of September 1973 on the centenary of the birth of the Greek Mathematician Constantine Caratheodory.

Prof. J. Xanthakis and Dr. C. Macris attended with the rest of the staff a seminar organized by Prof. L. Carapiperis on the Physics of the Atmosphere. Prof. J. Xanthakis lectured on «Solar Activity and Rainfall», and Dr. C. Macris with the Assistant Mrs. H. Daras - Papamargaritis presented a lecture on the solar wind.

Dr. C. Macris attended a meeting on meteorological satellites held in Paris 21-24 May, 1973. He also attended the Extraordinary General Assembly of the IAU held in Poland 4th - 12nd Sept. 1973 for the anniversary of the 500 years of Copernicus' birth. He was accompanied by Mr. B. Tritakis and Mrs. Helen Daras — Papamargaritis.

Dr. C. Poulakos attended the NATO «Advanced Study Institute of the Interstellar Medium» held in Schliersee, W. Germany, 2 - 13 April 1973.

General Activities. A committee was formed by the Academy of Athens under the chairmanship of Prof. J. Xanthakis to honor the memory of Copernicus. An appropriate ceremony was held in the Eugenides Foundation premises and Dr. C. Macris delivered a memorial lecture. The Academy likewise honored Copernicus with a special session during which Prof. J. Xanthakis offered tribute to Copernicus and spoke on «Astronomy before and after Copernicus».

The National Committee for Astronomy of Poland presented Prof. J. Xanthakis, Prof. G. Contopoulos and Dr. C. Macris with commemorative medals of Copernicus.

During 1973 the National Committee for Astronomy has organized a series of seminars held by Greek astronomers on special subjects. These were held in the premises of this Center.

Contacts with other Institutions. In the course of 1973 this Center had several useful contacts with the Observatories of Arcetri and Meudon. A series of special plates were given by these observatories to the Center for study.

Miscellaneous. Prof. J. Xanthakis was the editor of the «Proceedings of the First European Astronomical meeting, vol. 1, «Solar Activity and Related Interplanetary and Terrestrial Phenomena», published by Springer-Verlag, W. Germany.

Dr. C. Macris visited Arcetri and Meudon and selected a first series of plates of solar phenomena for study.

Dr. C. Poulakos has benefited of a grant from the Max Planck Institut für Astronomie and is now in W. Germany.

The Director of the Institute
Assistant Professor
Dr. C. MACRIS

DEPARTMENT OF GEODETIC ASTRONOMY
UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1973

Staff. The following new appointments were made: 1) Mr. A. C. Tsioumis, Assistant of the Department, was appointed Chief Assistant, effective February 15, 1973, 2) Mr. G. Asteriadis, Assistant of the Department, was appointed Chief Assistant, effective November 27, 1973, 3) Mrs. H. Zervaki-Zoirou, graduate in Physics, was appointed Assistant, effective January 26, 1973. 4) Miss J. Karrinti, graduate in Physics, was appointed Assistant, effective April 12, 1973, 5) Mr. D. Arabelos, graduate in Mathematics, was appointed Assistant, effective April 12, 1973. 6) Miss M. Stamatelou was appointed Secretary, effective January 26, 1973, 7) Miss E. Pilidou was appointed Secretary, effective January 26, 1973, 8) Mr. P. Kanakis was appointed Secretary, effective October 30, 1973. In this way the staff of the Department on December 31, 1973 consisted of the following persons: 1) Professor L. N. Mavridis, Chairman, 2) Mr. A. C. Tsioumis, Chief Assistant, 3) Mr. G. Asteriadis, Chief Assistant, 4) Mr. M. E. Contadakis, Assistant, 5) Mr. M. Kessoglidis, Assistant, 6) Mr. D. Stavridis, Assistant, 7) Mr. G. Kareklidis, Assistant, 8) Mrs. H. Zervaki-Zoirou, Assistant, 9) Miss J. Karrinti, Assistant, 10) Mr. D. Arabelos, Assistant, 11) Miss P. Kyriakidou, Secretary, 12) Mrs. M. Spyropoulou-Topatsi, Secretary, 13) Miss M. Stamatelou, Secretary, 14) Miss E. Pilidou, Secretary and 15) Mr. P. Kanakis, Secretary.

Equipment. The following equipment was acquired in 1973: 1) one printer 004, one printer alfa rom 11211A and one statistics rom 11214A for the calculator Hewlett-Packard 9810A, 2) one off-plug-in E.D.M. calibration unit complete with pre-amplifier for Chronocord type 681, 3) one marine chronometer, Ulysse Nardin, 4) two operational amplifiers Tele-dyne Philbrick 1003/01, 5) six surveying altimeters Thommen, type 3B4, 6) three selected RCA photomultipliers 1P21, 7) two selected RCA photomultipliers 7102, 8) two image intensifiers I.T.T. type F-4708, 9) one image intensifier I.T.T. type F-4721, 10) one electronic stencil cutter Rex-Rotary,

type 2202 and 11) one magnification apparatus Ernst-Leitz, Focomat Hc-color.

Research Programs. The following research programs were carried out during 1973:

1) Photoelectric Photometry of Galactic Cepheids: The discussion of the photoelectric two-color (B, V) observations of the twelve galactic Cepheids RT, RX, SY Aur; RW Cam; SU Cas; VZ Cyg; V, Y, BG Lac; RS Ori; SV, AW Per observed by K. Bahner and L. N. Mavridis in 1956-59 with the 72-cm reflector of the Landessternwarte auf dem Königstuhl, Heidelberg was continued. Also the study of the light variation of the anomalous Cepheid TU Cas was continued. The discussion of the three-color (U, B, V) observations of the five Cepheids CD Cyg; X, Z, RR Lac; and U Vul carried out by L.N. Mavridis and A.C. Tsioumis in 1967-70 with the 38-cm reflector of the Hamburger Sternwarte installed at the Stephanion Observatory was completed. The first results were published, while some additional results are ready for publication.

2) Rotational Velocities of the Members of Selected Open Clusters (Professor L. N. Mavridis in collaboration with Professor R. Kraft). The study of the rotational velocities of 50 stars in the area of the open cluster NGC 6633 reported last year was continued.

3) Investigation of Problems of Star Formation (Professor L. N. Mavridis, in collaboration with Professors B. Strömngren and J. Xanthakis). The survey of the stars with ultraviolet excess contained in an area of 2.000 square degrees in high galactic latitudes reported last year was continued.

4) Distribution of the M-, S- and C-Type stars in Selected Areas of the Milky Way (Prof. L. N. Mavridis). The photographic photometry and the study of the space distribution of the M-, S- and C-type stars found in the four areas centered on the open clusters NGC 188, NGC 752, NGC 7790 and M25 was continued.

5) Photoelectric Observations of Flare Stars (Professor L.N. Mavridis in collaboration with Mrs. H. Zervaki-Zoirou and Messrs. G. Asteriadis, M.E. Contadakis, D. Stavridis, G. Kareklidis, D. Arabelos and Farouk Mahmoud). Photoelectric observations of the flare stars: 1) AD Leo, 2) BD+13°2618, 3) BD+16°2708, 4) BY Dra, 5) EV Lac and 6) UV Cet were carried out with the 30-inch reflector of the Department of Geodetic Astronomy installed at the Stephanion Observatory. The results concerning the star AD Leo were published while the results concerning the remaining five stars are ready for publication.

6) Period Changes in Galactic Cepheids (Professor L.N. Mavridis

in collaboration with Dr. K. Bahner). An investigation of period changes in selected galactic cepheids was initiated. A paper containing the first results concerning the six cepheids CD Cyg; V, X, Z, RR Lac; U Vul was presented at the IAU Symposium No. 59 on «Stellar Instability and Evolution» held in Canberra, A.C.T. between August 16 - 18, 1973.

7) Gravity and Magnetic Investigations in Greece. The gravity and magnetic (z-component) measurements carried out in different parts of Greece in collaboration with the Institut für die Physik des Erdkörpers der Universität Hamburg and the National Institute for Mining and Geological Research of Athens reported last year were continued. The first results were published while the additional results are being prepared for publication.

8) Propagation of Optical Radiation and Microwaves through the Earth's Atmosphere (Professor L.N. Mavridis in collaboration with Mr. A. Bandellas). New measurements were obtained in the area of Thessaloniki. Some earlier results found in collaboration with Professor A. Papademetriou were published. A paper containing some other results was presented at the International Seminar on «Electronic Distance Measurements» held at the University of Lagos, Lagos, Nigeria between March 25 - 30, 1973. The remaining results are being prepared for publication.

The research programs Nos. 3 and 4 were carried out in co-operation with the Research Center for Astronomy and Applied Mathematics, Academy of Athens.

Publications. The following publications appeared in 1973:

Contributions from the Department of Geodetic Astronomy, University of Thessaloniki:

No. 8: G. Asteriadis, L.N. Mavridis and D. Stavridis, Photoelectric Observations of the Flare Star EV Lac. Commission 27 of the IAU, Information Bulletin on Variable Stars No. 809, 1973.

No. 9: G. Asteriadis and L.N. Mavridis, Photoelectric Observations of the Flare Star AD Leo. Commission 27 of the IAU, Information Bulletin on Variable Stars No. 816, 1973.

Publications of the Department of Geodetic Astronomy, University of Thessaloniki:

No. 1: L.N. Mavridis and A. Papademetriou, Study of Terrestrial Refraction in the Area of Thessaloniki, Journal of Geophysical Research Vol. 78, 2679, 1973.

No. 2: J. Macris, L.N. Mavridis, H. Menzel, A. Stavrou and G. Veis. The Gravity Field of Attika, the Peloponnese and Kithira, Greece, Zeitschrift für Geophysik, Vol. 39, 929, 1973.

Teaching. During the academic year 1973 - 74 Professor L.N. Mavridis delivered courses in General and Spherical Astronomy to the second year undergraduates, in Geodetic Astronomy to the third year undergraduates and in Higher Geodesy to the third and fourth year undergraduates of the Faculty of Technology, Division of Rural and Surveying Engineering of the University.

Visitors. Professor L. W. Fredrick, Leander McCormick Observatory, Charlottesville, Virginia, visited the Department and gave two colloquium lectures on April 2 and 3, 1973.

Mr. Farouk Mahmoud Helwan Observatory, worked at the Department between April and August 1973.

Also Mr. E. Vardavas, Department of Applied Mathematics, University of Sydney, visited the Department and gave a colloquium lecture on December 5, 1973.

Miscellaneous. Professor L. N. Mavridis attended the following meetings: 1) The International Seminar on «Electronic Distance Measurements» held at the University of Lagos, Lagos, Nigeria between March 25 - 30, 1973 and presented a paper on «The Accuracy of Microwave Distance Measurements».

2) The International Astronomical Union Symposium No. 59 on «Stellar Instability and Evolution» held in Canberra, A.C.T. between August 16 - 18, 1973 and presented a paper (in collaboration with Dr. K. Bahner) on «Period Changes in Galactic Cepheids. I: The Six Cepheids CD Cyg; V, X, Z, RR Lac, and U Vul».

3) The XVth General Assembly of the International Astronomical Union held in Sydney between August 21 - 30, 1973.

4) The Extraordinary General Assembly of the International Astronomical Union held in Poland between September 4 - 12, 1973. This Extraordinary General Assembly was also attended by Mr. M. E. Contadakis.

Mr. A. C. Tsioumis returned from his two-years leave of absence in the Astronomisches Rechen-Institut, Heidelberg and assumed again his duties in the Department, effective September 1, 1973.

Mr. G. Asteriadis received, effective October 1, 1973 a one-year leave of absence from the Department and is working at the Astronomisches Rechen-Institut, Heidelberg.

The Head of the Department
Professor L.N. MAVRIDIS

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF IOANNINA

ANNUAL REPORT 1973

Staff. Prof. S.N. Svolopoulos, Head of the Department since its foundation in 1967, resigned from this post on June 25. Prof. S.N. Svolopoulos was elected full Professor of Astronophysics at the University of Athens and assumed his duties.

Prof. D. Miliotis, Professor of Applied Physics at the University of Ioannina is temporarily the acting Director of the Department.

Mr. D. Nakkas was appointed Laboratory technician in April 1973.

Teaching. Prof. Svolopoulos held courses in Astronomy to the third year undergraduate Students of Mathematics until his resignation. Since September 1973 Prof. Miliotis held courses of Astronomy to the third year undergraduate Students of Physics and Mathematics.

Laboratory training were carried out with the assistance of Mrs S. Kapanidis and P. Krommydas.

Equipment. A Front Swivel Truck Model 14S was purchased from «Astromechanics» in Austin, Texas in order to be used for removal and transportation of the 24-inch mirror of the Department's telescope during the aluminizing processes.

Research Program. Prof. Svolopoulos continued his spectrophotometric studies of B stars on plates taken at the Haute Provence Observatory.

Publications 1) S.N. Svolopoulos: Spectrum Variability of the Shell Star 88 Her., Bulletin of the Astronomical Institutes of Czechoslovakia 24, 167, 1973.

2) Copernic and his work, (in Greek), Memorial lecture, University of Ioannina, 1973.

The Head of the Department
Professor D. MILIOTIS

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF PATRAS

ANNUAL REPORT 1973

Staff. Dr. Gr. Antonacopoulos was appointed Associate Professor, effective February 1973. Miss C. Flogaitis, graduate in Mathematics was appointed Assistant, effective December 18, 1973. Mr. G. Sotiropoulos was appointed Laboratory technician, effective August 20, 1973. Miss H. Livaniou has obtained a ten months leave of absence in order to benefit from a NATO scholarship and left the Department in September 1973 for the University of Manchester. Miss H. Livaniou resigned from her post as Assistant of the Department, effective December 31, 1973, having been appointed Assistant of the Department of Astronomy, University of Athens. Thus the staff of the Department on December 31, 1973 consisted of the following persons: 1) Professor B. Barbanis 2) Associate Professor Gr. Antonacopoulos 3) Mr. P. Antonopoulos, Assistant 4) Miss C. Flogaitis, Assistant, 5) Mrs. D. Galanaki - Goldman, Secretary and 6) Mr. G. Sotiropoulos.

Teaching. Dr. B. Barbanis held courses in Astronomy to the third and fourth undergraduate students in Mathematics and Physics and courses in Differential Equations to the second year undergraduate students in Mathematics and Physics. Dr. Gr. Antonacopoulos held courses in Astronomy to the third year undergraduate students in Mathematics and Physics. Laboratory training of the students in Practical Astronomy was carried out by Assistant Miss H. Livaniou, Assistant Mr. P. Antonopoulos was responsible for the exercises in General Astronomy and Differential Equations.

Equipment. The following equipment was purchased during 1973: 1) A Hewlett Packard 9820A calculator and a pocket calculator 35A. 2) A 8-inch Heliostat, Carson. 3) A Screw Micrometer Eyepiece, Carl Zeiss. 4) A Diffraction Grating, Veb Carl Zeiss. 5) A Measuring Microscope, Veb Carl Zeiss. 6) One Holography System and a Modular Interferometer, Gaertner. 7) A 3-inch refractor, Nihon Seiko. 8) An Interferometer, Griffin and George. 9) A Discriptor-4, Leitz.

Research Program. Dr. B. Barbani continued working on the problem of the near the particle resonance. He also studied numerically the behaviour of a system of two nonlinear coupled harmonic oscillators under the influence of a sudden excitation.

Dr. Gr. Antonacopoulos continued working on the Secular Variations in the «Restricted» Problem.

Mr. P. Antonopoulos studied orbits in various spiral galactic models under the supervision of Dr. Barbani.

Publications. 1) B. Barbani: Lectures on General Astronomy (Text Book in Greek), Patras, 1973. 2) B. Barbani: Exercises on General Astronomy (in Greek), Patras, 1972.

Meetings. Dr. B. Barbani participated in the Extraordinary General Assembly of the IAU in Poland. In particular he attended the IAU Symposium 62 on «The Stability of the Solar System and of Stellar Systems» (Warsaw, September 5 - 8, 1973).

The Head of the Department
Professor B. BARBANIS

UNIVERSITY OF ATHENS NEW CHAIR OF ASTROPHYSICS

Following a proposal by the Faculty of Physics and Mathematics of the University of Athens a chair of Astrophysics was created under Government Decree at this University.

Prof. S. Svolopoulos, formerly professor of Astronomy at the University of Ioannina was elected to fill this chair as full professor of Astrophysics and has assumed his duties.

Necessary steps have been taken, accordingly, to organize a new Department for this chair; a library and a laboratory are being set up to allow facilities for undergraduate teaching and for postgraduate work in Astrophysics.

The Head of the Chair
Prof. S. SVOLOPOULOS