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ASTRONOMICAL INSTITUTE

NATIONAL OBSERVATORY OF ATHENS

Staff: Dr. G. Contopoulos, full professor of the Astronomy in the University of Athens, took over the directorship of the Institute on 19/6/1975, replacing assistant professor Dr. M. Moutsoulas who had been acting director since 5/4/75 till 18/6/75.

Dr. G. Banos chief assistant of the Institute, was elected full professor of Astronomy in the University of Ioannina and resigned from the Institute on 22/8/75.

Dr. C. Banos, chief assistant of the Astronomical Station of Pentele was appointed as chief assistant of the Institute, on 6/11/75.

Dr. Th. Prokakis, assistant of the Institute, was appointed as chief assistant in the Astronomical Station of Pentele, on 6/12/75.

Mr. E. Kontizas spent nine months at the Edinburgh University and the Royal Observatory of Edinburgh, working on his PhD thesis.

Mr. J. Zacharopoulos was appointed as technician of the Institute on 6/9/75.

Mr. D. Dialetis, graduate of Mathematics was appointed as scientific collaborator of the Institute on 13/12/75.

Buildings and Equipment: The construction of the building for the 120 cm. telescope in the Astronomical Station of Kryonerion was completed in September 1975. The installation of the dome and the telescope was completed in September, 1975.

The finances for the development of the new Station were provided partly by the Ministry of Education and partly by the Korgialenion Fund. Prof. D. Kotsakis former director of the Institute, helped considerably in establishing this station as chairman of the Korgialenion Fund Committee.

A new 30 cm. telescope was installed in the Astronomical Station of Pentele.

Workshop: Messrs E. Sigalas, A. Vouzas and Ch. Bourdas participated in the installation of the dome and the 120 cm. telescope in the

Astronomical Station of Kryonerion in collaboration with the engineers of Grubb Parsons Company.

Mr. J. Zacharopoulos participated also in the erection of the 120 cm. telescope and especially of its electronic system.

Mr. Zacharopoulos and Miss E. Philippakou carried out the photographic work of the Institute.

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

Observations:

1. Sun: The Razdow flare patrol telescope was in continuous operation at the Pentele Station. H α filtergrams were continuously obtained during the whole year.

Visual observations of chromospheric events and sunspots were made daily. Radio monitoring of the sun was carried in 1415, 2695, 5005 and 8800 Mhz.

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

Mr. Elias continued almost daily observations of sunspots in Athens for the determination of their position, number and type.

He also observed the partial eclipse of the sun on 11/5/75.

2. Planets: Following a proposal of the Planetary Data Center of the Lowell Observatory, the Institute participated in the International Planetary Patrol for Mars and Jupiter since September 1975 under the responsibility of Dr. C. Banos. The observations were made by Dr. Rovithis and Mr. Sarris.

3. Comets: Mr. Elias continued his observations of positions and brightness of various comets.

4. Stars: Prof. S. Plakidis, former Director of the Institute (now 82 years old) discovered on 30/8/75 independently Nova Cygni 1975. Spectrophotometric observations of Nova Cygni were made by Mr. Kontizas, while Dr. Rovithis and Mr. Elias made systematic photometric observations.

Mr. Elias continued his observations of eclipsing binaries.

Mr. Rovithis continued his observations of variable stars, flare stars and nova.

Mr. E. Kontizas carried out spectrophotometric observations of early type stars.

5. Site - Testing: Site testing observations in the Astronomical Station of Kryonerion were carried out by Dr. Prokakis, Dr. Rovithis, Mr. Sarris and Mr. Elias.

Research: Drs. G. Banos and Th. Prokakis studied various phenomena of the solar activity. Dr. C. Banos studied the relation between the activity of Jupiter and its radioemission.

Mr. E. Sarris continued his study of the restricted three-body problem. He also studied the atmospheric activity of Jupiter.

Dr. P. Rovithis completed his study of the differential rotation of the sun. Mr. E. Kontizas continued his study of the spectra of early type stars. Together with Dr. M. J. Smith he constructed a spectrophotometric scanner which has been used on the 25'' Newall refractor.

Mr. D. Elias continued his study of the influence of the solar wind on the absolute brightness of several comets. He also studied the seeing in Athens and Kryonerion during day time.

International Cooperation: Prof. Ch. Fehrenbach spent 3 days during January 1975 in the workshop of Grubb Parsons testing the 120 cm. doing the final tests of the instrument.

Drs. D. Kotsakis and C. Banos spent ten days in England participating in the tests of the 120 cm. telescope at the workshop of Grubb Parsons Company.

Meetings: A paper by Mr. E. Kontizas and Dr. K. Nandy was presented at the Third European Meeting under the auspices of the I.A.U. in Tbilisi USSR, July 1975.

Dr. Prokakis attended the annual meeting of JOSO in Florence, Italy, during February 1975. The scientific staff participated to the seminars on Astronomy held at the Research Center of the Academy of Athens.

Visitors: The members of the Executive Committee of the IAU visited the Kryonerion Station during September 1975.

The Station was also visited by the participants of the IAU Summer School for young Astronomers.

Publications:

1. Banos, C.: Relation between Jupiter's decametric emission and its activity in the equatorial area *Astroph. Letters* **16**, 97, 1975.
2. Banos, C.: Emission of radiation and radioemission of Jupiter. Special volume in memoriam D. Eginitis p. 251 (in Greek), 1975.
3. Banos, K.: Solar neutrinos. Special volume in memoriam D. Eginitis, p. 241 (in Greek), 1975.
4. Banos, G. and Prokakis, Th.: A comparative study of the sudden disappearance of two filaments with and without flare brightness, *Astron. Astrophys* **38**, 245, 1975.
5. Elias, D.: S. V. Tauri, IAU Circular 1751, 1975.
6. Elias, D.: Nova Cygni, I.A.U. Circular 2828, 1975.
7. Kontizas, E.: (in collaboration with K. Nandy, C. M. Humphries), Ultraviolet energy distribution of luminous early type stars from TDI Satellite Observatory *Astrophys J.* **195**, 111, 1975.
8. Kotsakis, D.: (editor, together with L. Carapiperis and C. Macris), Special volume in memoriam D. Eginitis (in Greek), 1975.
9. Kotsakis, D.: The Cosmology of Classical Greece, Special volume in memoriam D. Eginitis p. 173 (in Greek), 1975.
10. Plakidis, S.: Aristarchos of Samos, the former of Astronomy. Special volume in memoriam D. Eginitis p. 373 (in Greek), 1975.
11. Prokakis, Th.: Solar research in Europe. Site testing for solar observatory. Special volume in memoriam D. Eginitis, p. 387 (in Greek), 1975.
12. Rovithis, P.: Contribution to the differential rotation of the sun. Thesis (in Greek), 1975.
13. Sarris, E.: Study of the atmospheric activity of Jupiter during the years 1955-1973. *Astron Astrophys* **39**, 135, 1975.
14. Sarris, E. and Kotsakis, D.: The Pentele Astronomical Station. Special volume in memoriam D. Eginitis p. 393 (in Greek), 1975.

The activities of Dr. Contopoulos are described in the Reports of the Astronomical Department of the University of Thessaloniki and of the Department of Astronomy of the University of Athens.

The Director of the Institute
Professor G. Contopoulos

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF ATHENS

ANNUAL REPORT 1975

Staff: Professor G. Contopoulos was unanimously invited by the Faculty of Sciences to take over the Chair of Astronomy and the Directorship of the Department of Astronomy. He took over on 18/6/1975.

Mrs. M. Arzoglou - Kontiza, on leave of absence from this Department, continued her post-graduate studies at the Edinburgh University. Mr. P. Niarchos and Miss H. Livaniou left on 1/10/1975, for postgraduate studies (University of Manchester) and so did Miss E. Antonopoulou (Edinburgh University), all of them on leave of absence from this Department.

Mrs. M. Stathopoulou - Tsoga joined the Department as new assistant on 20/3/1975.

IAU: Dr. G. Contopoulos continued his functions as General Secretary of the IAU. The IAU Secretariat moved from Thessaloniki to Athens during the Summer of 1975. The Secretariat is partly supported by the Greek Ministry of Culture and Sciences.

A Meeting of the Executive Committee of the IAU was organized in Lagonissi, near Athens, from 9 to 11 September 1975.

Dr. Contopoulos attended the IAU Officers' Meetings in Geneva, Chicago and Lagonissi. He participated also in the Meeting of the General Committee of ICSU in Luxemburg, near Vienna, during September 1975. The preparations of the XVIth General Assembly in Grenoble are well under way.

During 1975 two IAU Information Bulletins were published by the General Secretary.

An IAU Summer School for Young Astronomers was organized in Athens from 8 to 27 September 1975. The scientific director of the school was Dr. M. Moutsoulas. Dr. M. Zikides was a member of the organizing committee of this school, which was attended also by Mrs D. Papathana-

soglou, D. Vaiopoulos, J. Deliyannis, A. Pinotsis, P. Niarchos, by Misses Livaniou and Antonopoulou and by Mrs. Stathopoulou - Tsoga.

Research: I. Galactic Dynamics and Related Fields:

1) Dr. Contopoulos continued his work on the non-linear theory of resonances in spiral galaxies, with emphasis on the non-linear response and the non-linear self-consistent problem.

2) Dr. Contopoulos and Dr. C. Mertzaniades (Thessaloniki) applied this theory to the inner Lindblad resonance. In particular a study of barred spirals has been made.

3) Mr. Th. Papagiannopoulos (Athens) and Mr. J. Colin (Besançon) worked, in collaboration with Dr. Contopoulos, on the non-linear theory of the particle resonance in galaxies.

4) Dr. Contopoulos and Dr. E. Athanassoula continued their study of the linear effects near the inner Lindblad resonance.

5) Mr. P. Grosbol (from Copenhagen) under the supervision of Dr. Contopoulos, completed his work on the places of origin of the stars of the solar neighbourhood. Various possible solutions for the angular velocity and amplitude of the spiral pattern were considered.

6) Dr. Contopoulos and Mr. Ch. Varvoglis studied the integrals of motion in resonant cases of a magnetic dipole and other magnetic confinement devices.

7) Dr. Contopoulos and Mr. P. Michaelidis studied the integrals of motion in various dynamical fields and applied the theory of Lie transforms to the study of periodic orbits.

II. Relativity:

1) Dr. Contopoulos and Dr. N. Spyrou worked on various post-Newtonian problems. A paper on the center of mass of a system of N extended bodies is in press in the *Astrophysical Journal*.

2) Dr. D. Dionysiou worked on the gravitational radiation from an isolated system of N bodies in higher multipole moments. A paper on this subject is currently under preparation.

III. Celestial Mechanics:

Dr. M. Zikides worked on the periodic orbits of the restricted three body problem as well as on the general three body problem.

IV. Stellar Evolution:

1) Dr. P. Laskarides, Mr. D. Vaiopoulos and Mr. A. Pinotsis worked on problems of stellar evolution with variable G .

2) Mr. Vaiopoulos visited the University of Thessaloniki during the Summer of 1975 and completed the numerical computations of five evolution tracks of a star from the main sequence, under different assumptions concerning the variability of G .

V. Variable Stars:

1) Dr. Laskarides worked on an atmospheric model, which can be applied to variable giant stars like the beta Cephei stars. He presented a summary of his work at the IAU Colloquium No. 29 on Multiple periodic variable stars.

2) Mrs. M. Kontiza completed the photometry of 20 star clusters in the Small Magellanic Cloud, involving 36,000 images on photographic plates. A short report of this work is included in: *Observatory* 95, 89, 1975.

3) Miss H. Livaniou and Mr. P. Niarchos continued their work on the Fourier analysis of the light curves of eclipsing binaries.

VI. Instruments and Seeing:

1) Mr. D. Papathanasoglou completed his study on the quality of the solar image.

2) Messrs Papathanasoglou, E. Kontizas and J. Deliyannis worked on the focal curve of the Newall refractor.

3) Mr. Papathanasoglou and Mr. Deliyannis studied also other parameters of the Newall refractor.

VII. Infrared Astronomy.

Miss E. Antonopoulou started working on Infrared Photometry at the University of Edinburgh.

Publications:

1) G. Contopoulos: Integrals of Motion (Invited Lecture), in A. Hayli (ed) *IAU Symposium 69*, Reidel, Dordrecht, 1975, p. 209.

2) G. Contopoulos: The Theory of Resonances in Spiral Galaxies (Invited Lecture), in L. Weliachew (ed), *La dynamique des Galaxies Spirales*, Editions du CNRS, Paris, 1975, p. 19.

3) G. Contopoulos: Inner Lindblad Resonance in Galaxies. Nonlinear Theory I, *Astrophys. J.* 201, 566, 1975.

4) G. Contopoulos and L. Vlachos: Integrals of Motion and Resonances in a Dipole Magnetic Field, *J. Mathematical Physics* 16, 1469, 1975.

5) G. Contopoulos: The Relativistic Restricted Three-Body Problem, Special Volume in Memoriam D. Eginitis, Athens, 1975, p. 159.

6) J. Deliyannis and D. Papathanasoglou: The effect of the Temperature on the Focal length of the Newall telescope of Pentele Observatory, *Technical Annals* (in Greek), March 1975.

7) D. Dionysiou: Flux of Momentum by Gravitational Waves, *Lettere al Nuovo Cimento* 13, 86, 1975.

8) D. Dionysiou: Gravitational Radiation Recoil on an N-Body System, *Gen. Relativity and Gravitation J.* 6, 319, 1975.

9) M. Kontizas and D. D. Cannon: The turn-of point of omega Centauri, *Monthly Notices of the R.A.S.* 167, 51, 1974.

10) P. Laskarides: An Atmospheric Model for the beta Cephei star nu Eridani, in W.S. Fitch (ed) *I.A.U. Colloquium 29*, Mitt. der Sternwarte Budapest, 1975.

11) P. Niarchos, Z. Kopal and V. Markellos: Fourier Analysis of the Light Curves of Eclipsing Variables VI. *Astrophys and Space Science* (in press).

12) M. Zikides: Solution of the Elliptic Restricted Problem in Regularized Plane with Recurrent Power Series, Special Volume in Memoriam D. Eginitis, Athens, 1975, p. 93.

Meetings:

Dr. Contopoulos gave an invited lecture at the Symposium «Theoretical Principles in Astrophysics and Relativity» honoring Dr. Chandrasekhar (Chicago), May 1975. The Proceedings are edited by Dr. Lebovitz.

He gave also an invited talk at the «Third European Meeting under the auspices of the IAU» in Tbilisi, U.S.S.R., in July 1975, under the title «The past positions of the Spiral arms of our Galaxy» (prepared in collaboration with Mr. Grosbol). The Proceedings are edited by Dr. Khazadze.

He gave, further, a series of Lectures at the Summer School «Long-term Prediction in Dynamics» in Cortina d'Ampezzo, Italy, in August 1975, on «Strongly Perturbed Dynamical Systems». The Proceedings are edited by Drs. Tapley and Szebehely.

Dr. Laskarides presented his current work on an atmospheric model of the beta Cephei star Nu Eridani at the IAU Colloquium 29 on «Multiple Periodic Variable Stars» held in Budapest, Hungary, in September 1975.

Dr. Dionysiou was a member of the Greek delegation in the «Balkaniad of Mathematics» held in Sofia, Bulgaria, in August 1975.

Messrs. Papathanasoglou and Deliyannis attended the First European Solar Meeting, held in Florence, Italy, in February 1975.

Lectures:

Dr. Contopoulos gave a lecture in Cornell University (June 1975). A weekly seminar was held at the Department of Astronomy since September 1975. Speakers in this seminars were members of the staff of this Department.

The Head of the Department
Professor G. Contopoulos

ASTRONOMY DEPARTMENT
UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1975

Staff: Dr. G. Contopoulos was appointed professor at the University of Athens and moved to Athens in June.

Dr. S. Persides took over temporarily as Head of the Department.

Dr. N. Spyrou was awarded a scholarship by the British Council. Since September he is at the University of Cambridge with a one-year leave of absence.

Dr. E. Spithas was appointed Chief Assistant in May. Mr. C. Mertzanides received his Ph.D. degree in December.

Mr. P. Fylactopoulos was appointed Assistant in February. Mr. S. Avgoloupis and H. Varvoglis were appointed Assistants in May. Mr. C. Terzides resigned in January. Mr. K. Papadopoulos was appointed Technician in February.

Thus the staff of the Department consisted of the following:

1) Dr. G. Contopoulos, professor. 2) Dr. S. Persides, assistant professor. 3) Drs. N. Spyrou and E. Spithas, Chief Assistants. 4) Dr. C. Mertzanides, assistant. 5) Miss B. Kessidou, Mr. C. Terzides, Mr. D. Papadopoulos, Mr. N. Caranicolas, Mr. P. Fylactopoulos, Mr. S. Avgoloupis and Mr. H. Varvoglis, assistants. 6) Mrs. F. Papageorgiou, Miss D. Mori and Mrs. C. Mertzanides, secretaries and 7) Mr. K. Papadopoulos, technician.

The following persons also worked in collaboration with the Department: Mr. I. Ioannides, Mr. M. Michalopoulos, Mr. A. Petrakis and Miss M. Petrou.

Mr. P. Grosbol from the Copenhagen Observatory spent a few months at the Department.

IAU: The IAU Secretariat moved to Athens during the summer of 1975, following the departure of the General Secretary, Dr. G. Contopoulos.

Research Programs:

I. Galactic Dynamics and Related Fields.

1) Dr. Contopoulos worked on various problems of galactic dynamics and related fields both alone and in collaboration with Drs. Spithas and Mertzanides and Messrs Grosbol, Varvoglis and Caranicolas.

He prepared a paper on the non-linear theory near the Inner Lindblad Resonance, which was published in the *Astrophysical Journal*.

2) Dr. Mertzanides completed his thesis, under Dr. Contopoulos, on the «Galactic Orbits near the Inner Lindblad Resonance». A paper containing the major points of this thesis was accepted for publication in *Astronomy and Astrophysics*.

3) Dr. Spithas worked on the quasilinear theory of density waves in spiral galaxies. Following the formulation of Kalnajs and Lynden-Bell in action-angle variables, he extended the treatment to the quasilinear regime. This work is near completion.

4) Mr. Varvoglis started working on particle orbits in various magnetic field configurations, using the methods of Lie transforms.

5) Mr. Caranicolas completed his work on the third integral in nearly spherical systems. A paper on this subject was published.

6) Mr. Grosbol continued his work on the places of origin of the stars of our neighborhood. A paper with Dr. Contopoulos on this subject was presented at the «Third European Meeting under the auspices of the IAU» in Tbilisi, U.S.S.R.

II. General Relativity.

1) Dr. Persides continued his study of wave phenomena in black-hole space-times. A paper on global properties of radial wave functions was accepted for publication in the *Communications in Mathematical Physics*. Another paper was submitted to the same journal.

2) Dr. Persides and Mr. Ioannides completed their study of asymptotically flat Einstein - Maxwell fields. A paper will be published shortly.

3) Dr. Persides and Mr. Papadopoulos continued their work on the Newman - Penrose constants in asymptotically null - spherical coordinates.

4) Dr. Persides, Mr. Michalopoulos and Mr. Petrakis studied analytic-

ally and numerically the solutions of a differential equation satisfied by the radial factor of a perturbation of a Schwarzschild black hole.

5) Dr. Persides, Mr. Papadopoulos and Miss Petrou started a review of the recent research work which has been done on perturbations of black holes.

6) Mr. Papadopoulos started a study of the propagation of waves through the horizon of a Schwarzschild black hole.

7) Drs. Contopoulos and Spyrou continued their work on the problem of the center of mass of a system of N - bodies in the post-Newtonian approximation. A paper has been accepted for publication in the *Astrophysical Journal*.

8) Dr. Spyrou completed his work on the post-Galilean invariance of the post-Newtonian Eulerian equations of Hydrodynamics. A paper has been submitted for publication in the *Astrophysical Journal*.

III. Solar Physics.

Mr. Fylactopoulos and Mr. Avgoloupis started observations of various solar phenomena both optically and photographically.

Publications.

1) G. Contopoulos: Inner Lindblad Resonance in Galaxies, Nonlinear Theory. I, *Astrophys. J.* 201, 566, 1975 = *Contr. Astron. Dept. Univ. Thessaloniki*, No. 79.

2) G. Contopoulos: The Theory of Resonances in Spiral Galaxies, *Centre Nationale de la Recherche Scientifique*, p. 19, 1975 = *Contr. Astron. Dept. Univ. Thessaloniki*, No. 78.

3) G. Contopoulos and L. Vlahos: Integrals of Motion and Resonances in a Dipole Magnetic Field, *J. Math. Phys.* 16, 1469, 1975 = *Contr. Astron. Dept. Univ. Thessaloniki*, No. 76.

4) G. Contopoulos: Integrals of Motion, in «Dynamics of Stellar Systems», Hayli (ed.), p. 209, 1975 = *Contr. Astron. Dept. Univ. Thessaloniki*, No. 77.

5) S. Persides: A New Differential Equation in Mathematical Physics, L. Karapiperis, D. Kotsakis, C. Macris (eds). In *Memoriam D. Eginitis*, Athens, 1975 = *Contr. Astron. Dept. Univ. Thessaloniki*, No. 80.

6) S. Persides and G. Bozis: *Elements of Spherical Astronomy and Celestial Mechanics* Thessaloniki, 1975 (textbook in Greek).

7) N. Spyrou: The N -body Problem in General Relativity, *Astrophys. J.* 197, 725, 1975 = *Contr. Astron. Dept. Univ. Thessaloniki*, No. 75.

8) N. Spyrou: The Center of Mass of a System of N Extended Bodies in General Relativity, in L. Karapiperis, D. Kotsakis, K. Macris (eds). In *Memoriam D. Eginitis*, Athens, 1975 = *Contr. Astron. Dept. Univ. Thessaloniki*, No. 82.

9) C. Mertzaniades: Galactic Orbits near the Inner Lindblad Resonance, Ph. D. Thesis, University of Thessaloniki, 1975 (in Greek).

10) N. Caranicolas: A Formal Integral of Motion in a Nearly Spherical Galaxy, in L. Karapiperis, D. Kotsakis, K. Macris (eds). In *Memoriam D. Eginitis*, Athens, 1975 = *Contr. Astr. Dept. Univ. Thessaloniki*, No. 81.

Meetings:

Dr. Persides and Mr. Papadopoulos participated in the Marcel Grossmann Meeting on the recent progress of the fundamentals of General Relativity in Trieste, Italy from July 7 to July 12.

Dr. Mertzaniades participated in the Third European Astronomical Meeting in Tbilisi, U.S.S.R., from July 1 to July 5 and in the NATO Advanced Study Institute for Long-Time Prediction in Dynamics in Cortina d'Ampezzo, Italy, from August 3 to August 16.

Mr. Fylactopoulos and Mr. Avgoloupis participated in seminars for young Astronomers organized in Athens, Greece, under the auspices of the IAU from September 9 to October 4.

Lectures.

Dr. Persides gave a lecture in the Research Center for Astronomy and Applied Mathematics of the Academy of Athens.

The Head of the Department
Asst. Professor S. PERSIDES

DEPARTMENT OF ASTRONOMY
TECHNICAL UNIVERSITY OF ATHENS

ANNUAL REPORT 1975

Staff: In the course of 1975 Mr. Michel Kyriakopoulos, a physicist from the Department of Geodesy of the University joined the staff as Chief Assistant. The former Chief Assistant Dr. D. Vlachos, relinquished his functions having been elected Assistant Professor to the chair of Topography at the Technical University of Thessaloniki. Our staff thus consists of Chief Assistant Mr. M. Kyriakopoulos, and Assistants Mrs. K. Loukidelis, mathematician, K. Babilis, civil engineer and rural and survey engineer of this University, Mr. B. Kyriakou, civil engineer and rural and survey engineer, and Miss E. Cheretis rural and survey engineer of this University.

Teaching and Training: During the academic year 1975-1976 Prof. J. Argyrakos, Head of this Department assisted by his Chief Assistant Dr. D. Vlachos and his Assistants K. Loukidelis, V. Kyriakou, and E. Cheretis, delivered a course on General Spherical, Practical, and General Astronomy. A seminar was likewise held for the benefit of the last year graduates on special subjects. The courses were attended by 127+32 students of the third and fourth year respectively, belonging to the School of Rural and Survey engineers of this University. A course on Electronic Computers was initiated this year and was held by Professor J. Argyrakos, assisted by Assistant N. Karamolengou.

Scientific Activities: Efforts are being made to secure a library of computer programs in order to facilitate calculations, and several such programs have been prepared. Likewise a group of students supervised by Professor J. Argyrakos and his assistants are preparing a thesis for their diploma having as subject the use of equal altitude for determining the latitude.

The Head of the Department
Professor J. ARGYRAKOS

RESEARCH CENTER FOR ASTRONOMY
AND APPLIED MATHEMATICS

ACADEMY OF ATHENS

ANNUAL REPORT 1975

Staff: The Director of the Center, Dr. Macris, was appointed member of the administrative Council of the National Observatory of Athens. Dr. G. Poulakos, on a Max - Planck research - fellowship, continued his work in Heidelberg till the end of November 1975. On December 1975 he returned and assumed his duties at the Center. Mr. M. Chondros, secretary of the Center, besides his main duties also acted as librarian and was responsible for all the outside administrative activities of the Center. Moreover, he offered his services, acting as secretary of the following scientific committees which are under the auspices of the Academy of Athens: a) Greek National Committee for Astronomy, b) Greek National Committee on Space Research, c) Greek National Committee for Mathematics. Mr. E. Tsioros was appointed Technician at the Center effective 22/1/1975.

Research Programs:

During the year 1975 the following research programs were carried out:

- 1) Solar Activity and Terrestrial Phenomena by Professor John Xanthakis and Dr. B. Tritakis.
- 2) Photographic Study of Solar Corona with the help of photographs taken during total Solar Eclipses, by Dr. C. Macris and Mr. Th. Zachariadis.
- 3) Photometric Study on CaII,III Spectroheliograms, by Dr. C. Macris and Mrs. H. Papamargariti - Dara.
- 4) Research on the Atmosphere of the Planets Mars and Venus by Dr. C. Macris and Dr. B. Petropoulos. This program was financially supported by the Academy of Athens.
- 5) Preparation of a special program for the observation of the annular Eclipse of April 29, 1975 with the help of the LINK photometer.

6) A study of the HII Regions in the Infrared, by Dr. C. Poulakos.

Equipment:

In the course of 1975 the following equipment have been ordered:

- 1) Basic equipment for a photographic Laboratory.
- 2) Accessories for the HP No. 9820 computer.

The value of the instrumentation amounted to about 800.000 Drms was covered from the Public Investments.

Publications:

The following publications appeared in 1975 as contributions from the Research Center for Astronomy and Applied Mathematics, Academy of Athens, Series I (Astronomy):

- 1) Remarks on High Latitude Air Temperature Ranges and Solar Activity, by C. Zerefos and J. Xanthakis. *Praktika of the Academy of Athens*, vol. 50, pp. 118-129, 1975, (Contribution No. 39).
- 2) On the Difference Between the Intensity of the Chromospheric Background on the Polar and Equatorial Radii, by C. Macris, *Praktika of the Academy of Athens*, vol. 50, pp. 214-228, 1975, and *C.R. de l'Acad. des Sciences, France*, Tom. 280, No. 20, 1975. (Contribution No. 40).
- 3) Probable Periodical Variations in the Frequency of the Etesian Winds, by J. Xanthakis, in the special volume published in memoriam of «Demetrii Eginitis» pp. 304-317, 1975. (Contribution No. 41).
- 4) Comparison of the Flocculi Dimensions at Periods of Maximum and Minimums Solar Activity, by H. Dara, C. Macris and Th. Zachariadis. *Praktika of the Academy of Athens*, Vol. 50, pp. 391-398, 1975. (Contribution No. 42).
- 5) Solar Activity and a Global Survey of the Precipitation by J. Xanthakis, in the Series «Pragmatiai of the Academy of Athens» Vol. 37, 1975. (Contribution No. 43).
- 6) Power spectrum of the Zonal Mean Annual Excess Precipitation Total over the Southern Hemisphere, by B. Tritakis, *Praktika of the Academy of Athens*, Vol. 50, 1975. (Contribution No. 44).
- 7) Pressure and Temperature variations in the Atmosphere of Venus. Reprint from the volume in memoriam «Demetrii Aeginitis», Athens 1975. Serie «Dimossievmata» No. 6.

Library:

The Library has been enriched with 150 new volumes and 2.500 reprints, mostly from foreign institutions on an exchange basis.

Scientific Committees:

Secretarial assistance has been offered by the Research Center for Astronomy and Applied Mathematics to the following scientific committees, the president of which is Prof. J. Xanthakis.

- 1) Greek National Committee for Astronomy.
- 2) » » » on Space Research.
- 3) » » » for Mathematics.

The object of these committees is the coordination of research in Greece and maintaining contacts with the similar bodies abroad.

Meetings:

Prof. Xanthakis initiated the Unesco Seminar School (2nd part) held in the island Thera last September and attended the courses. Dr. C. Macris participated in the JOSO meeting and the European Meeting for Solar Physics held in Florence. The 71st IAU Symposium «Mechanisms of Solar Activity» held in Prague in August 1975 was attended by Dr. C. Macris, Dr. B. Tritakis and Mrs. H. Papamargariti - Dara. Mrs. H. Papamargariti - Dara also attended the Unesco School for young astronomers. Mr. M. Chondros through a scholarship from the British Council and the Ministry of Coordination went to University of Birmingham, U.K., and followed courses of the English language.

Cooperation with foreign Institutes:

The cooperation with the Meudon Observatory was continued this year. The Institute of Astrophysics of Paris has given to the Center observational material related with the June 30 Total Solar Eclipse, both from the ground and the Concord airplane.

Visits:

This year the following scientists have visited our center: Prof. S. K.

Runcorn, University of New-Castle-upon-Tyne of England, Prof. J. Bastin, Queen Mary College and Member of the Royal Astronomical Society of England, Prof. R. Shorthill, Utah University of U.S.A., Prof. J. Joseph, Tel-Aviv, Israel and Mandisson, U.S.A. Universities, Dr. K. Coughlin, Director of Martin Marietta Aerospace Programs, U.S.A., and Prof. J. Kleczek, of Ondřejov Observatory, Czechoslovakia.

All of them have delivered lectures on contemporary scientific problems during the Meetings annually organized by the National Astronomical Committee.

Miscellaneous:

The National Astronomical Committee has continued the organization of lectures - meetings on special subjects for the Greek astronomers. The Director of the Center has visited the Mendon Observatory and has chosen a series of photographic material concerning the sun to be used in a scientific program.

The Director of the Center

Dr. C. MACRIS

DEPARTMENT OF GEODETIC ASTRONOMY UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1975

Staff: The following new appointments were made: 1) Mr. Ch. Kaltsikis, graduate in Rural and Surveying Engineering, was appointed Assistant, effective October 20, 1975, 2) Mr. C. Siyioulzis, graduate in Rural and Surveying Engineering, was appointed Assistant, effective January 13, 1975, 3) Mr. P. Domvros was appointed driver, effective April 3, 1975. On the other hand the following staff members left the Department: 1) Mr. M. Kesoglidis, resigned from his post as Assistant of the Department, effective February 2, 1975, 2) Mr. C. Siyioulzis, resigned from his post as Assistant of the Department, effective October 10, 1975. Thus, the staff of the Department on December 31, 1975 consisted of the following: 1) Professor L. N. Mavridis, Chairman, 2) Dr. A. C. Tsioumis, Chief Assistant, 3) Dr. G. Asteriadis, Chief Assistant, 4) Mr. M. E. Contadakis, Assistant, 5) Mr. G. Kareklidis, Assistant, 6) Mr. D. Stavridis, Assistant, 7) Mrs. H. Zervaki-Zoirou, Assistant, 8) Miss J. Karrinti, Assistant, 9) Mr. D. Arabelos, Assistant, 10) Mr. Ch. Kaltsikis, Assistant, 11) Miss P. Kyriakidou, Secretary, 12) Mrs. M. Spyropoulou - Topatsi, Secretary, 13) Miss M. Stamatéou, Secretary, 14) Miss E. Pilidou, Secretary, 15) Mr. P. Kanakis, Secretary, 16) Mr. Ch. Papantoniou, Technician, 17) Mr. C. Rizos, Technician and 18) Mr. P. Domvros, driver.

Research Programs: The following research programs were carried out during 1975:

1) Photoelectric Photometry of Galactic Cepheids. The discussion of the photo-electric 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. The discussion of the three-color (U,B,V) observations of the five Cepheids GD 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 Cluster (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 (Professor 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 reported last year, was continued.

5) Photoelectric Observations of Flare Stars (Professor L. N. Mavridis in collaboration with Mrs. H. Zervaki-Zoirou and Messrs. M. E. Contadakis, D. Stavridis, G. Kareklidis, P. Varvoglis and Farouk Mahmoud). Photoelectric observations of the flare stars: 1) BD + 13°2618, 2) BD + 16°2708, 3) BD + 55°1823, 4) DO Cep, 5) EV Lac, 6) UV Cet and 7) YZ CMi were carried out with the 30-inch reflector of the Department of Geodetic Astronomy installed at the Stephanion Observatory. The results are being prepared for publication.

6) Period Changes of Galactic Cepheids (Professor L. N. Mavridis in collaboration with Dr. K. Bahner). The investigation of period changes in selected galactic cepheids reported last year, was continued.

7) Gravity and Magnetic Investigations in Greece. The gravity measurements reported last years were continued by the Department of Geodetic Astronomy. The results are being prepared for publication. The results of the gravity measurements carried out in 1974 by the Department of Geodetic Astronomy and the Institute für Theoretische Geodäsie der Technischen Universität Hannover were included in a paper presented by D. Arabellos and L. N. Mavridis (in collaboration with Professor W. Torge and Dr. H. Drewes) during the XVth General Assembly of the IUGG held in Grenoble, France, August 18 to September 5, 1975.

8) Propagation of Optical Radiation and Microwaves through the Earth's Atmosphere (Professor L. N. Mavridis in collaboration with Dr.

A. Bandellas). Some of the results obtained by A. Bandellas were included in his PhD. Thesis presented to the Faculty of Technology, University of Thessaloniki. Some other results were included in a paper presented by A. Bandellas during the XVth General Assembly of the IUGG held in Grenoble, France, August 18 to September 5, 1975.

9) Kinematics of Stellar Systems (Dr. A. Tsioumis in collaboration with Professor W. Fricke). A study of the Kinematics of the Gould Belt with the help of the Lesh O,B Stars was completed.

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 1975:

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

No. 12: M. E. Contadakis and L. N. Mavridis: Photoelectric Observations of the Star UV Cet in 1972, Commission 27 of the IAU Information Bulletin on Variable Stars No. 1020, 1975.

Publications (in Greek language) of the Department of Geodetic Astronomy, University of Thessaloniki:

No. 1: M. E. Contadakis and L. N. Mavridis: Photoelectric Observations of the Flare Star UV Cet, Proceedings, Academy of Athens, 48, 343, 1974.

No. 2: A. Bandellas and A. Tsioumis: Solution of the Two Fundamental Problems of Higher Geodesy With the Help of Tables, Bulletin Geographic Service of the Greek Army No. 107-108, 1975.

No. 3: A. Tsioumis: Preparation and Reduction of Photoelectric Observations With the Help of Electronic Computer, Volume Dedicated to the Memory of Demetrios Eginitis, p. 455, Athens, 1975.

Also the following publications:

1) W. Fricke & A. Tsioumis: Galactic Rotation and Local Irregularities Derived from Fundamental Proper Motions and Radial Velocities, Astronomy and Astrophysics 42, 449, 1975.

2) G. Asteriadis: Determination of Precession and Galactic Rotation from the Proper Motions of the AGK3, PhD. Thesis, Faculty of Sciences, University of Heidelberg 3+52 pp, 1975.

Teaching: Effective January 8, 1975 Professor L. N. Mavridis received a five-months leave of absence from the Department in order to devote himself more thoroughly to his duties as President of the Administrative Council, Democritus University of Thrace. Professor Ch. Frangakis was appointed by the Faculty of Technology to replace Professor L. N. Mavridis in the Chairmanship of the Department and in the teaching. In this capacity Professor Ch. Frangakis delivered during the academic year 1975-76 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. Chief Assistant Dr. A. Tsioumis was also appointed by the Faculty of Technology to carry out seminar referred to Geodetic Astronomy for the third year undergraduates of the same Division.

Visitors: Mr. Farouk Mahmoud, Helwan Observatory, worked at the Department during 1975.

Miscellaneous: Professor L. N. Mavridis continued acting as President of the Administrative Council, Democritus University of Thrace.

Professor L. N. Mavridis and Mr. D. Arabellos attended the XVth General Assembly of the IUGG held in Grenoble, France, August 18 to September 5, 1975 and presented a paper (in collaboration with Professor W. Torge and Dr. H. Drewes) on the «Establishment of a High Precision Gravity Network in the Eastern Mediterranean».

Dr. A. Tsioumis visited in August 1975 the Astronomisches Rechen - Institut, Heidelberg, West Germany and discussed scientific problems of common interest with Professor W. Fricke.

Dr. G. Asteriadis received his PhD degree from the Faculty of Sciences, University of Heidelberg, in July 1975. He returned from his two-years leave of absence in the Astronomisches Rechen-Institut, Heidelberg and assumed again his duties in the Department, effective August 1, 1975.

The Head of the Department
Professor L. N. MAVRIDIS

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF IOANNINA

ANNUAL REPORT 1975

Staff: Dr. George Banos was appointed Professor of Astronomy and Head of the Department of Astronomy, effective August 25, 1975.

Teaching: Prof. D. Miliotis and Prof. G. Banos held courses in Astronomy to the third-year undergraduate students of Physics and Mathematics.

Mr. Ph. Krommydas held tutorial classes in Astronomy to the same students.

Research: Mr. Ph. Krommydas continued his work on Ap stars.

The Head of the Department
Professor G. BANOS

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF PATRAS

ANNUAL REPORT 1975

Staff: Dr. E. Evangelidis was appointed Chief Assistant in January. Mr. B. Zafiroopoulos, graduate in Physics, was appointed Assistant in January. Thus the staff of the Department consisted of the following persons: 1) Professor B. Barbanis, 2) Associate Professor Gr. Antonacopoulos, 3) Dr. E. Evangelidis, Chief Assistant, 4) Mr. P. Antonopoulos, Assistant, 5) Mrs. C. Flogaitis - Giannoulatos, Assistant, 6) Mr. B. Zafiroopoulos, Assistant, 7) Mrs. D. Galanakis, Secretary and 8) Mr. G. Sotiropoulos, Technician.

Teaching: Dr. B. Barbanis held courses in General Astronomy, Stellar Dynamics and Cosmology to the third and fourth year 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 General Astronomy and Astrophysics to the third year undergraduate students in Mathematics and Physics. Dr. Evangelidis gave seminars on special topics on Astrophysics and was in charge of the exercise sessions on Astrophysics, Stellar Dynamics and Cosmology. Mr. Antonopoulos and Mr. Zafiroopoulos were responsible for the exercises in General Astronomy and Differential Equations and Mrs. Flogaitis was responsible for the exercises in General Astronomy and Astrophysics.

Equipment: The following instruments were acquired in 1975:

- 1) A Hewlett Packard X, Y Plotter (Model 9826A) and 429 Registers. (Model 11228A).
- 2) Two Sextants.
- 3) Two Theodolites, Wild T16.

Research Programs: a) Dr. B. Barbanis studied the density maxima formed near the particle resonance. A paper on this subject was accepted for

publication in Astronomy and Astrophysics. Dr. Barbanis continued his work on the behaviour of trapped orbits in a time-dependent hamiltonian. A paper on this subject was accepted for publication in Celestial Mechanics.

b) Dr. Gr. Antonacopoulos continued his work on the restricted three body problem.

c) Dr. E. Evangelidis continued working on Plasma Astrophysics.

d) Mr. P. Antonopoulos studied numerically orbits in a spiral galaxy and the trapping of particles in time-dependent hamiltonians under the supervision of Dr. Barbanis.

Publications: 1) B. Barbanis: Trapped Orbits in a Spiral Galaxy, In Memoriam D. Eginitis, p. 265-284 Athens 1975 (in Greek).

2) E. Evangelidis: Force - free in Plasma, In Memoriam D. Eginitis, p. 67 - 80 Athens, 1975.

Meetings: Dr. Evangelidis participated in the International School «E. Fermi» on «Physics and Astrophysics of Black Holes and Neutron Stars», Varenna, Italy, July 13 - 27, 1975.

The Head of the Department
Professor B. BARBANIS

CHAIR OF ASTROPHYSICS
UNIVERSITY OF ATHENS

ANNUAL REPORT 1975

Teaching: Prof. S. Svolopoulos held courses on Astrophysics to the fourth-year students, and on Space Physics to the third-year students of Physics.

Also 15 students worked on PhD., thesis on Astrophysics.

Research: Prof. Svolopoulos continued his studies on B stars from spectra taken at the Observatory of Haute Provence.

Under the direction of Prof. Svolopoulos Mr. P. Krommydas, Assistant at the Astronomical Department of the University of Ioannina studied spectra of the Ap stars taken at the Observatory of Haute Provence.

Publications: A spectrophotometric Study of the Be star HD 184279.
Astronomy and Astrophysics 41, 199, 1975.

The Head of the Chair
Professor S. SVOLOPOULOS