ANNUAL REPORTS
OF THE
ASTRONOMICAL INSTITUTES
OF GREECE
1980

PUBLISHED BY THE CREEK NATIONAL COMMITTEE
FOR ASTRONOMY

ATHENS
1981

CONTENTS

Annual Report for the year 1980 of the:

NATIONAL OBSERVATORY OF ATHENS

ASTRONOMICAL INSTITUTE

ANNUAL REPORT 1980

Staff: Mr. D. Dialetis continued his training at the Meudon Observatory in France till the end of April 1980.

Mr. P. Kannavos, who did the solar patrol observations, resigned in October 1980.

Researeh.

1. **Planets:** C. Banos continued his program of photographic observations of Jupiter and specially of the Red Spot with the 1.2m telescope.

2. **Stars and nebulae:** E. Sarris made photographic observations of star clusters with the 1.2 m telescope and investigated photographic material of star clusters.

P. Rovithis made observations and/or analysis of data of the eclipsing binaries DO Cas, BV Dra, BW Dra, 44i Boo, Stepanian's Star, U Peg, VW Cep, AB And with the 1.2 m telescope in collaboration with E. Rovithis - Livaniou. He also made observations of nebulae in the region of NGC 2024.

E. Kontizas carried out photographic observations of star clusters with the 1.2 m telescope in collaboration with M. Kontizas. He also carried out, in collaboration with Prof. Ch. Fehrenbach and M. Kontizas, a study on the radial velocities of early type supergiants. A paper was accepted for publication in Astronomy and Astrophysics Supplement Series. He continued also the dynamical study of star clusters in the Small Magellanic Cloud.

E. Kontizas worked at the Edinburgh Observatory on the star clusters of the Small Magellanic Cloud between 1 August and 15 September 1980 in collaboration with Drs. Cannon, Brück, and M. Kontizas.

D. Elias carried out the following observations: a) optical and photoelectric observations of variable stars (some of these observations appeared in the BBSAG Bulletin Nos 48, 49, 50, 51). b) occultations of stars. c) photographic observations of stellar regions around old novae. Reports of these observations are sent by B. Elias to the following centers:

1. Occultations of stars: U.S. Naval Observatory, Nautical Almanac Office, Royal Observatory (Greenwich), Tokyo Astronomical Observatory, and I.O.I.A.

2. Variable Stars: A.A.V.S.O.

3. Novae: Smithsonian Astrophysical Observatory.

M. Kontizas, P. Niarchos, H. Rovithis - Livaniou and E. Antonopoulou of the University of Athens carried out photoelectric photometry and infrared photometry using the equipment of the Astronomical Institute on the 1. 2 m telescope at Kryonerion.

3. **Sun:** During the months May-June and September - October 1980 a program of photographic solar observations was carried out under the supervision of Th. Prokakis, within the framework of the international solar programs SERF and SBS for the Solar Maximum Year. In this program participated: a) The National Observatory of Athens (Prokakis - Dialetis - Zacharopoulos - Kannavos - Matsopoulos). b) The research center for Astronomy and Applied Mathematics of the Academy of Athens (Dara - Zachariades). c)The Departments of Astronomy and Astrophysics of the University of Athens (Papathanasoglou - Deligiannis - Tsoga - Alyssandrakis - Mousas - Preka - Nikolaides). d) The Department of Astronomy of the University of Ioannina with financial support and material.

Th. Prokakis continued the study of radio data from the Pentele radio telescope in collaboration with E. Nikolaides and C. Alyssandrakis.

D. Dialetis carried out the following programs. a) Study of the flare of 10 July 1978 (in collaboration with Th. Prokakis, C. Alyssandrakis and P. Preka). b) Study of the evolution of a prominence (in collaboration with Th. Prokakis). c) Study of a sunspot penumbra based on photographic material taken at the Pic du Midi Observatory (in collaboration with C. Alyssandrakis). d) Analysis of observations of solar active regions taken at the Meudon Observatory, for the study of the field of velocities.

4. **Seeing:** Th. Prokakis carried out ΔT observations at Pentele and made polar star observations in collaboration with D. Dialetis for the study of seeing. He also made ΔT observations at Kryonerion for a comparison study of the two areas.

5. **Celestial Mechanics:** E. Sarris finished his study of the 3-dimensional elliptic restricted three body problem.

Routine Observations:

D. Elias continued his daily observations of sunspots.

N. Matsopoulos worked in the photographic laboratory. Reports of these observations are sent to the:

1. World Data Centers, «A» Boulder, «B» Moscow, and «C» Paris for flares and filaments.

2. Solar Division, AAVSO, World Data Centers «A» and «B», Zürich Observatory and Fraunhofer Institute for the sunspots.

Time Service routine work was carried out by D. Elias at Pentele and I. Zacharopoulos in Athens.

Workshop: Ch. Bourdas installed a new driving clock in the Newall telescope under the supervision of D. Elias. He also carried out the technical work of the Institute and its stations of Pentele and Kryonerion. A system for automatic photography in the Hα was constructed by Prokakis, Alyssandrakis and Daniel. A. Vouzas carried out technical work at Pentele. I. Zacharopoulos carried out all the electronic work of the 1.2 m telescope and made the alumination of the 1.2 m mirror.

Equipment: M. Kontizas in collaboration with E. Kontizas, P. Niarchos and E. Nikolaides have finished the construction of a UBV photometer for the 1.2 m telescope. Dr. Smyth and E. Kontizas supervised the construction of a photoelectric spectrum scanner built at the Royal Edinburgh Observatory for the Kryonerion Astronomical Station.

International Cooperation: Dr. P. Grosbol from ESO carried out photographic observations of nearby galaxies with the 1.2 m telescope.

Dr. P. Koubsky and Mr. J. Horn from the Ondrejov Observatory carried out UBV photometry on selected Be stars with the 1.2 m telescope.

Dr. A. Piccioni and Mr. A. Depergolas from the Bologna Astronomical Observatory visited the 1.2 telescope of the Kryonerion Astronomical Station and discussed with Dr. C. Banos the possibilities of a collaboration between the Bologna Astronomical Observatory and the Astronomical Institute of the National Observatory of Athens.

Dr. M. Smyth from the Edinburgh Observatory visited the Observatory of Athens and had a collaboration with E. Kontizas on the electronic parts of the photoelectric spectrum scanner.

Meetings - Lectures: C. Banos, Th. Prokakis, E. Sarris and E. Kontizas attended the 5th European Regional Meeting of the IAU held in Liège, Belgium from 28 July to 1 August 1980. P. Rovithis attended the NATO Advanced Study Institute on eclipsing binaries held at Maratea, Italy, in June 1980, in which he presented a paper under the title «The Stepanian's Star».

E. Kontizas attended a colloquium on the «Effects of mass loss on stellar evolution» from 15 to 22 September 1980, in Trieste, Italy and the IAU Summer School for young astronomers from 20 September to 10 October 1980, in Hvar, Yougoslavia. Th. Prokakis, E. Sarris, E. Kontizas and D. Dialetis participated in the 2nd meeting of the Greek Physicists' Union which took place in Mytilene in September 1980. In this meeting Th. Prokakis and D. Dialetis, in collaboration

with C. Alyssandrakis and P. Preka, presented a paper on «The solar flare of the 16th July 1978».

E. Sarris presented a paper on «Integrals of motion in the elliptic three dimensional restriced three body problem».

E. Kontizas presented a paper «Study of the radial velocities of the hydrogen lines (Hβ - H_{21}) in giants and supergiants of our Galaxy and of the Small Magellanic Cloud».

D. Dialetis gave a lecture in April 1980 at the Meudon Observatory on the Evershed effect P. Rovithis gave a series of lectures at the «free Universities» of Volos, Tripolis and Alexandroupolis.

Publications.

1. D. Dialetis and Th. Prokakis, «The determination of the external contact-time of solar eclipses by the use of common chords and related measurements of the annular eclipse of 20 May, 1966». **Praktika of the Academy of Athens 54,** 1979. (in Greek).

2. E. Kontizas and S. Theodossiou, «Empirical effective temperatures of B and early type stars», **Monthly Notices Roy. Astron. Soc. 192,** 745, 1980.

3. Th. Prokakis, D. Dialetis and C. Alyssandrakis, «The large flare and associated radio burst of September 19, 1977», in: Solar activity for the period September - November 1977, (Reports U.A.G. World Data Center A for Solar terrestrial physics).

4. Th. Prokakis and D. Dialetis, «A Method of quantitative determination of the quality of the astronomical observations based on ΔT measurements near the ground», Special volume dedicated to Prof. E. Mariolopoulos on his 80th birthday, 1980 (in Greek).

5. P. Rovithis, and H. Rovithis - Livaniou, «Photoelectric Minima of VW Cephei», **Inf. Bull. Var. Stars,** No 1736, 1980.

6. P. Rovithis, and H. Rovithis - Livaniou, «Photolectric Minima of Some Eclipsing Variables, **Inf. Bull. Var. Stars,** No 1777, 1980.

7. P. Rovithis, and H. Rovithis - Livaniou, «Two New Light Curves of the Eclipsing Variable u Her», **Astrophys. Space. 70,** 484, 1980.

8. P. Rovithis, «The Light Curve of Stepanian's Star», **Inf. Bull. Var. Stars.** No 1814, 1980.

9. P. Rovithis, and H. Rovithis - Livaniou, «Photoelectric Minima of AB Andromedae», **Inf. Bull. Var. Stars,** No 1823, 1980.

10. P. Rovithis, and H. Rovithis - Livaniou, «New Photoelectric Observations of VW Cephei». **Astrophys. Space Sci. 73,** 27, 1980.

11. P. Rovithis, «Nova V 1500 Cygni», Special volume dedicated to Prof. E. Mariolopoulos on his 80th birthday, 1980 (in Greek)

The Director of the Institute
Professor G. CONTOPOULOS

DEPARTMENT OF ASTRONOMY

UNIVERSITY OF ATHENS

ANNUAL REPORT 1980

Staff: Prof. G. Contopoulos was research associate of the European Southern Orbservatory during July - August 1980.

Miss E. Antonopoulou was on leave of absence at the Edinburgh Observatory for 4 months (July - October 1980). She also worked at the South African Astronomical Observatory during January 1980.

Drs. D. Vaiopoulos, E. Spithas and M. Zikides resigned during 1980.

Research:

I. Galactic Dynamics

1. G. Contopoulos worked on the problem of self-consistent bars. The main difficulties appear near the resonances. A comparison was made of the linear and non-linear aproaches of the problem near resonances and some numerical models were constructed. A paper on this subject was accepted for publication.

2. G. Contopoulos studied the effects of the higher order resonances near corotation. The properties of the resonant families of periodic orbits were found. A systematic study of non-periodic orbits was also made. When the periodic orbits become mostly unstable a large degree of ergodicity appears and most stars between corotation and the outer Lindblad resonance escape. This effect seems to limit all relatively strong bars at corotation. A paper on this subject was accepted for publication.

3. G. Contopoulos derived a new dispersion relation for open spirals. This is the opposite extreme from the Lin-Shu case of tight spirals. The new dispersion relation is the limit of the nonlinear self-consistence condition. A paper on this subject was published.

4. Th. Papayannopoulos studied the orbits in bars near the inner Lindblad resonance and near corotation. He studied also the self-consistent problem near both the inner Lindblad resonance and corotation.

II. General Dynamics

1. G. Contopoulos with L. Martinet and P. Magnenat continued theit study of resonant systems of three degrees of freedom. When the perturbations are small a good agreement was found between the empirical invariant surfaces and the theoretical results derived by the method of the «third integral».

2. G. Contopoulos studied the periodic orbits in a system of three degrees of freedom, by using the theoretical integrals of motion. A comparison with the numerical results was made.

3. G. Contopoulos studied the problem of successive bifurcations in Hamiltonian systems. He found some cases where the Feigenbaum ratio between successive bifurcations differs from the accepted «universal ratio». A note on this subject was accepted for publication.

4. G. Contopoulos and Ch. Varvoglis continued their study of the orbits and integrals of motion in the Astron machine for plasma confinement. A comparison between the theoretical and numerical results was made.

III. Celestial Mechanics

M. Zikides and A. Pinotsis studied several families of periodic orbits in the restricted three body problem for mass ratios μ close to 1.

IV. Stellar Evolution

P. Laskarides and A. Pinotsis continued their study of stellar evolution with variable G.

V. Spectroscopic and Photometric Observations

1. P. Niarchos made photoelectric observations and reduction of the data of the eclipsing variables V566 Oph and VW Cep at the Kryonerion Astronomical Station. He studied also the «proximity effects» in very close eclipsing binaries.

2. H. Rovithis-Livaniou, together with P. Rovithis, made photoelectric observations of the variables 44i Boo, DO Cas, U Peg, BV Dra and BW Dra at the Kryonerion Astronomical Station. They completed also the reduction of the data of the variables AB And, 44i Boo, u Her and VW Cep.

3. E. Theodossiou continued his analysis of spectroscopic observations of early type stars in order to derive their temperatures. He also made some photographic observations at the Kryonerion Astronomical Station.

4. P. Laskarides prepared a «User's Manual» for the Richardson spectrograph.

IV. Infrared Astronomy

E. Antonopoulou continued her infrared study of RS CVn type stars and Wolf-Rayet stars in Edinburgh, and at the South African Observatory and the Kryonerion Astronomical Station.

VII. Solar Observations

1. D. Papathanasoglou, J. Deligiannis and M. Stathopoulou-Tsoga started solar observations in white light with the Zeiss heliograph of the Laboratory of Astronomy. They started also Hα observations at the Penteli Astronomical Station.

2. D. Papathanasoglou, J. Deligiannis and M. Stathopoulou-Tsoga participated in the observational program of the maximum solar activity organized by the Observatory of Athens.

VIII. Instruments

P. Niarchos participated in the construction of a photoelectric photometer to be used with the 1.2 m telescope of the Kryonerion Astronomical Station.

Publications:

1) G. Contopoulos, «A dispersion relation for open spiral galaxies», **J. Astrophys. Astron. 1,** 79, 1980.

2) G. Contopoulos, «How far do bars extend?», **Astron. Astrophys. 81,** 198, 1980.

3) G. Contopoulos and Th. Papayannopoulos, «Orbits in weak and strong bars», **Astron. Astrophys. 92,** 33, 1980.

4) G. Contopoulos and M. Zikides, «Periodic orbits and ergodic components of a resonant dynamical system», **Astron. Astrophys. 90,** 198, 1980.

5) G. Contopoulos and P. Michaelidis, «Bifurcations of triple-periodic orbits», **Celestial Mechanics 22,** 403, 1980.

6) P. Michaelidis, «Orbits near a 2/3 resonance», **Astron. Astrophys. 91,** 165, 1980.

7) P. Laskarides and A.D. Vaiopoulos, «Stellar evolution with variable G as a cosmological criterion», **Bull. Astron. Inst. Czech. 31,** 84, 1980.

8) P. Laskarides and P. Niarchos, «Laboratory Exercises in Astronomy», Athens, 1980 (in Greek).

9) P. Niarchos, «Photoelectric light curves of VW Cephei», **Inf. Bull. Var. Stars,** No. 1729, 1980.

10) P. Rovithis and H. Rovithis-Livaniou, «Photoelectric minima of VW Cephei», **Inf. Bull. Var. Stars,** No 1736, 1980.

11) P. Rovithis and H. Rovithis-Livaniou, «Photoelectric minima of some eclipsing variables», **Inf. Bull. Var. Stars,** No 1777, 1980.

12) P. Rovithis and H. Rovithis-Livaniou, «Photoelectric minima of AB Andromedae», **Inf. Bull. Var. Stars,** No. 1823, 1980.

13) P. Rovithis and H. Rovithis-Livaniou, «Two new light curves of the eclipsing variable u Herculis, **Astrophys. Space. Sci. 70,** 48, 1980.

14) P. Rovithis and H. Rovithis-Livaniou, «New photoelectric observations of VW Cephei», **Astrophys. Space Sci. 73,** 27, 1980.

15) D. Papathanasoglou, J. Deliyannis and M. Stathopoulou-Tsoga, «Determination of the contact times of the annular solar eclipse of 29 April 1976», **Praktika Acad. Athens 55,** 336, 1980.

16) E. Antonopoulou and P.M. Williams, «Infrared photometry of the RS CVn binary HR 1099 (V711 Tau)», **Astrophys. Space Sci. 67,** 469, 1980.

17) E. Antonopoulou, «Infrared photometry of HR 1099 during late 1979», **Inf. Bull. Var. Stars,** No. 1816, 1980.

18) A. Pinotsis, «Isochrones of Open Clusters with Variable Gravitational Constant», Ph.D. Thesis, (in Greek), Univ. of Athens, 1979.

19) E. Kontizas and S. Theodossiou, «Empirical effective temperatures of B and ealry type stars», **Monthly Notices Roy. Astron. Soc. 192, 745, 1980.**

Meetings - Lectures

G. Contopoulos was an invited lecturer at the Workshop on «Orbits in Galaxies» organized by ESO (5-6 May 1980).

He presented a paper on «Escapes of stars from the corotation region of barred galaxies» at the Symposium «Structure and Evolution of Normal Galaxies», in Cambridge, England (4-15 August 1980).

He organized a workshop on «Bifurcations in Dynamical Systems» at ESO on 29 July 1980, with participants from USA, Italy, Switzerland and CERN, and he presented a paper on this subject.

Finally he attended Meetings of the Board of Directors of «Astronomy and Astrophysics», the Astronomy Committee of the European Science Foundation, etc.

P. Niarchos and H. Rovithis-Livaniou were invited speakers at the Summer School on Binary Stars in Maratea, Italy (1-14 June 1980). P. Niarchos spoke on the subjects «An analysis of the light curves of W UMa-type stars in the frequency domain» and «Photoelectric observations of close eclipsing binary systems at Kryonerion Observatory, Greece», and E. Rovithis-Livaniou spoke on «Photometric perturbations of close binaries in the frequency domainkarides and M. Stathopoulou-Tsoga attended the 5th European Regional Meeting in Liège (28th July - 1 August 1980).

M. Stathopoulou-Tsoga and E. Theodossiou attended the IAU School for young astronomers in Hvar, Jugoslavia.

A. Pinotsis attended the 2nd Panhellenic Physics Symposium in Mytilene on 18-9-80 and gave a talk on a «Check of the cosmological theory of Brans-Dicke through stellar evolution criteria».

The Head of the Depatment
Professor G. CONTOPOULOS

ASTRONOMY DEPARTMENT

UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1980

Staff: Dr. N. Spyrou was appointed «Dozent with teaching assignment» at the University of Thessaloniki in January.

Dr. B. Xanthopoulos visited the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass., U.S.A., for the month of April 1980.

Dr. B. Xanthopoulos was a visiting scholar in the Enrico Fermi Institute of the University of Chicago, Chicago, Ill., U.S.A., during July and August. He also visited NASA's Goddard Space Flight Center, Greenbelt, Maryland, U.S.A., for a week in early July.

Dr. H. Varvoglis received his Ph. D. degree in January. In October he left to the University of Maryland as a postdoctor with an one-year leave of absence from the University of Thessaloniki.

Mr. D. Papadopoulos continued as a postdoctor at the University of Cincinnati with a leave of absence from the University of Thessaloniki.

Mr. P. Fylactopoulos resigned in September.

Mrs. Ch. Mertzanides resigned in March.

Thus the staff of the Department at the end of 1980 was as follows:

1) Dr. B. Barbanis, professor, 2) Dr. S. Persides, assistant professor, 3) Dr. N. Spyrou, Dozent with teaching assignment, 4) Dr. Ch. Terzides and Dr. B. Xanthopoulos, chief assistants, 5) Dr. H. Varvoglis, Mr. D. Papadopoulos, Mr. N. Caranicolas and Mr. S. Aygoloupis, assistants, 6) Mrs. F. Papageorgiou and Mrs. K. Vassiliadis, secretaries, and 7) Mr. K. Papadopoulos, technician.

Research Programs:

I. Galactic Dynamics and Related Fields.

B. Barbanis continued his work on the behavior of adiabatic invariants near resonances.

Ch. Terzides worked on the density wave theory of the spiral structure. A paper on this subject has been accepted for publication in Astronomy and

Astrophysics and another one is going to appear in the Annals of the Faculty of Physics and Mathematics of the University of Thessaloniki.

Ch. Terzides worked on the determination of positions of OH maser sources. A joint paper with A. Winnberg and H. Matthews of the MPI für Radioastronomie, Bonn, West Germany, has been accepted for publication in the Astronomical Journal.

H. Varvoglis submitted his Ph. D. thesis on the motion of charged particles in the Astron thermonuclear reactor. The thesis was approved by the Faculty of Physics and Mathematics of the University of Thessaloniki, and H. Varvoglis received his Ph. D. degree in January.

N. Caranicolas continued his research work under the supervision of Prof. Barbanis on the form of the third integral of motion and periodic orbits in nearly axisymmetric stellar systems.

II. General Relativity - Relativistic Astrophysics

S. Persides continued his work on the structure of asymptotically flat spacetimes. In particular he studied how the interior of an asymptotically flat spacetime determines the structure of the boundary, and how physical fields from the interior register on the boundary. Two papers (one for timelike infinity and one for timelike, null and spatial infinity) have been accepted for publication in the Journal of Mathematical Physics.

S. Persides started recently a review study of phase space in classical mechanics from a relativistic point of view. This work is based on Cartan's fourdimentional formulation of classical mechanics. Its objective is to examine whether this formulation can improve our understanding of the structure of phase space and facilitate the study of the properties of physical systems in the framework of modern classical mechanics.

N. Spyrou continued his work on the approximate, relativistic dynamical description of realistic, bounded systems. He established the theoretical framework of post-Newtonian celestial mechanics, derived the generalized form of Kepler's laws, proved classically the spin-precession formula, and examined the observational significance of these results. Three papers (one with A. Caporali of MPI, Münich) have been accepted for publication in the Journal of General Relativity and Gravitation.

N. Spyrou continued his work on the physical interpreration of the exact Schwarzschild and Kerr solutions. Two papers have been accepted for publication in the Journal of General Relativity and Gravitation.

N. Spyrou and H. Varvoglis established the general theoretical framework for the determination of, and evaluated a «third» integral of motion in the post-Newtonian approximation of general relativity for realistic galactic systems, with axially symmetric and time-independent distributions of mass, velocities, pressure etc. A paper is ready for publication.

B. Xanthopoulos continued his studies of the methods which generate stationary and axisymmetric solutions of the Einstein equations, i.e., solutions which describe the spacetime of uniformly rotating stars. A paper has been accepted for publication in the Journal of Mathematical Physics.

B. Xanthopoulos continued his work on the study of the SU(3) self-dual Yang-Mills equations by using the theory of harmonic maps and developed a method for constructing Gribov vacua of certain gauge theories from solutions of the Einstein and the Einstein-Maxwell field equations. Two papers have been accepted for publication, in the Journal of Physics A and in the Physics Letters B, respectively.

B. Xanthopoulos continued his work on the metric perturbations of the Schwarzschild and the Reissner-Nordström black holes. Among the new results are a particular exact solution of the perturbation equations, the determination of the gravitational and electromagnetic perturbations in terms of the Zerilli-Moncrief functions and an alternative presentation of the perturbation theory which avoids the distinction into even and odd perturbations. A paper has been accepted for publication in the Proceedings of the Royal Society of London.

D. Papadopoulos continued his work on general relativity at the University of Cincinnati with Professors L. Witten and F.P. Esposito.

III. Observational Astronomy.

S. Avgoloupis continued his research concerning photoelectric observations of flare stars under the supervision of Prof. Mavridis. At the Stephanion Observatory he observed the flare stars EV Lac, BY Dra and Gliese 183-44. He also observed the galactic cepheids RR Lac and X Lac. Three papers containing the results of these observations are under preparation.

Publications:

1. B. Barbanis: «Adiabatic Invariants near Resonances» in Special Volume in Honorem I. Mariolopoulos, 211-223, Meteorologika, **69**, University of Thessaloniki, 1980 (in Greek).

2. S. Persides: «Structure of the Gravitational Field at Spatial Infinity. I. Asymptotically Euclidean Spaces», J. Math. Physics **21**, 135, 1980 = Contr. Astron. Dept. Univ. Thessaloniki, No 100.

3. S. Persides: «Structure of the Gravitational Field at Spatial Infinity. II. Asymptotically Minkowskian Space-Times», J. Math. Physics, **21**, 142, 1980 = Contr. Astron. Dept. Univ. Thessaloniki, No 101.

4. S. Persides and D. Papadopoulos: «A Covariant Formulation of the Landau-Lifshitz Complex», General Relativity and Gravitation, **11**, 233, 1979 = Contr. Astron. Dept. Univ. Thessaloniki, No 99.

5. S. Persides: «Physics, Astrophysics and Cosmology», Physics Review, September, 1980, (review article in Greek).

6. N. Spyrou: «Weighing the Energy of a Star», in Special Volume in Honorem I. Mariolopoulos, 327-334, Meteorologika, **69**, University of Thessaloniki, 1980 = Contr. Astron. Dept. Univ. of Thessaloniki, No 102.

7. N. Spyrou: «Aristarchus of Samos: Founder of Astronomy», Euclides B, **14** (2), 1, 1980 (review article in Greek).

8. B. Xanthopoulos: «Perturbations of Spherically Symmetric Black Holes», Phys. Lett. **77A**, 7, 1980.

9. S. Avgoloupis, L.N. Mavridis, P. Varvoglis: «Photoelectric Observations of the Flare Star UV Cet in 1978», Commission 27 of the IAU, Information Bulletin of Variable Stars No 1792, 1980.

10. S. Avgoloupis, P. Phylactopoulos, G. Kareklidis, L.N. Mavridis, P. Varvoglis: «Photoelectric Observations of the Flare Star EV Lac in 1978», Commission 27 of the IAU, Information Bulletin on Variable Stars No 1793, 1980.

Meetings:

N. Spyrou, B. Xanthopoulos, H. Varvoglis, N. Caranicolas and S. Avgoloupis participated in the Second Meeting of the Union of Greek Physicists held in Mytilini from 17 to 21 September, where they presented results of their recent work.

H. Varvoglis participated in the Workshop on Nonlinear Evolution Equations and Dynamical Systems held at the Orthodox Academy of Crete, Chania, Crete, from 9 to 23 July 1980.

Lectures:

N. Spyrou and N. Caranicolas gave lectures at the Center of Astronomy and Applied Mathematics of the Academy of Athens.

B. Xanthopoulos gave lectures at the Harvard-Smithsonian Center for Astrophysics, Goddard Space Flight Center (NASA), Enrico Fermi Institute, and Illinois Institute of Technology (Physics Department).

Seminars:

B. Xanthopoulos taught a two-hour weekly seminar on differential geometry and general relativity with the objective of formulating certain open problems in general relativity.

H. Varvoglis taught a two-hour weekly seminar on topics on theoretical mechanics.

Teaching:

B. Barbanis taught courses on Spherical Astronomy, Celestial Mechanics to the 3rd year students of Mathematics and Astrophysics and Cosmology to the 4th year students of Physics.

S. Persides taught courses on Spherical Astronomy, Celestial Mechanics, Astrophysics and Space Sciences to the 1st and 3rd year students of Physics.

N. Spyrou taught courses on Astrophysics and Cosmology to the 4th year students of Mathematics and on Numerical Analysis to the 3rd year students of Physics.

Ch. Terzides and N. Caranicolas held tutorial courses in Astronomy and Astrophysics, H. Varvoglis held tutorial courses in Numerical Analysis, and S. Avgoloupis held laboratory exercises in Astronomy.

The Head of the Department
Professor B. BARBANIS

DEPARTMENT OF ASTRONOMY

TECHNICAL UNIVERSITY OF ATHENS

ANNUAL REPORT 1980

Staff: During the year 1980 Mrs. K. Babilis retired from her post as Assistant of the Department. Thus the staff of the Department at the end of 1980 consisted of the following: 1) Professor Dr. J. Argyrakos, Chairman, 2) Miss E. Cheretis, Assistant, 3) Mrs. K. Loukidelis, Assistant and 4) Mr. G. Missas, Technician.

Teaching and Training: During the academic year 1979-1980, Professor J. Argyrakos, assisted by his Assistants, delivered courses on General, Spherical, Practical and Geodetical Astronomy. The courses were attended by 52 students of 9th six-month and 105 students of 6th six-month of the Rural and Survey Enginering School of the University.

Scientific Activities: During the academic year the Department continued his effort for acqusition computer's programs for automatically computation of Geodeticoastronomical observations.

The Head of the Department
Professor J. ARGYRAKOS

RESEARCH CENTER FOR ASTRONOMY

AND APPLIED MATHEMATICS

ACADEMY OF ATHENS

ANNUAL REPORT 1980

Staff: During 1980 there have been no changes in the staff of the Center. Thus the staff of the Center at the end of 1980 consisted of the following: 1) Dr. C.P. Poulakos, Chief Assistant, 2) Dr. B.P. Tritakis, Chief Assistant, 3) Mrs. H. C. Dara – Papamargariti, Assistant, 4) Mr. Th. G. Zachariadis, Assistant, 5) Dr. B.C. Petropoulos, Assistant, 6) Mr. M.C. Chondros, Secretary-Librarian, 7) Mr. E. St. Tsioros Technician, and 8) Mrs. E.G. Panousi-Kountourioti, Assistant of the Secretariat.

Research Programs: During the year 1980 the following programs were carried out:

1) Long Term Variation of the Annual Seismic Activity of the Earth, by Prof. J. Xanthakis.

2) Prediction of the Radio Emission Indices of the Sun in the Frequency Range 1000 MHz<F<3750 MHz, by Prof. J. Xanthakis and Dr. C. Poulakos.

3) Photometric Studies of New Galaxies from Plates Taken at the Haute-Provence Observatory with the Schmidt Telescope are pursued, by Prof. J. Xanthakis and Dr. C. Poulakos.

4) Study of the Mean Distribution of the Interplanetary Magnetic Field, by Prof. J. Xanthakis and Dr. B. Tritakis.

5) Solar Activity and Terrestrial Phenomena, by Prof. J. Xanthakis, Dr. B. Petropoulos and Mrs. H. Dara-Papamargariti.

6) Modulation of the Cosmic Ray Radiation and Study of the Intensity of Solar Spectral lines, by Prof. J. Xanthakis and Drs. B. Petropoulos and H. Mavromichalaki.

7) Stars with Strong Emission in the Ha Spectral Region, by Dr. C. Poulakos and Mr. Th. Zachariadis.

8) Study of the Dynamics of the Solar Surges, by Mrs. H. Dara-Papamargariti.

9) Study of the Structure of the Solar Chromosphere in Active Region, by Mr. Th. Zachariadis.

10) Photometric Study of the Solar Granulation, by Drs. C. Macris, C. Allisandrakis and Mr. Th. Zachariadis.

11) Study of the Atmosphere of the Sun and the Planets Mars, Venus, and Saturn, by Drs. C. Macris and B. Petropoulos.

12) Study of the Fine Structure of the Solar Photosphere, by Dr. C. Macris.

Publications: The following publications appeared in 1980 as Contributions, Series I, (Astronomy), from the Research Center for Astronomy and Applied Mathematics, Academy of Athens:

1) C. J. Macris and B. C. Petropoulos: Paramètres physiques de l' Atmosphère de Vénus basés sur les mesures de Pioneer. (C.R. Acad. Sci. Paris, t. 290, Serie B. pp. 35-37, 1980). Contribution No. 76.

2) F. Link, C. J. Macris, Th. G. Zachariadis: Sur les fluctuations de la Luminance du Ciel Diurne. (Ann. Geophys. t. 35, p. 197-198, 1979). Contribution No. 77.

3) H. Dara and C. J. Macris: Time Variations of the Chromospheric Network (B.A.C., vol. 31, pp. 364-368, 1980). Contribution No. 78.

4) J. Xanthakis, C. Zerefos, P. Sehra, C. Repapis, C. Poulakos: Influence of Solar Proton Event on Upper Stratospheric Temperatures. (Praktika of the Academy of Athens, tom 55, pp 362-371, 1980). Contribution No. 79.

5) J. Xanthakis, H. Mavromichalaki, B. Petropoulos: Cosmic Ray Intensity Related to Solar and Terrestrial Activity Indices in Solar Cycle No. 20 (Praktika of the Academy of Athens, tom 55, pp 395-418, 1980, and Astrophys. Spa. Sci., Vol. 74, pp 303-317, 1981) Contribution No. 80.

6) C. Macris, B. Petropoulos: Physical Parameters of the Upper Atmosphere of Venus Computed for Different Chemical Compositions of CO_2.CO½ (Praktika of the Academy of Athens, tom. 55, pp 322-335, 1980). Contribution No. 81.

7) Xanthakis, B. Petropoulos, H. Mavromichalaki: Effets du Champ Magnétique Solaire sur l'Intensité Semianuelle de la raie verte Coronale à 5303 Å. (CNES; Soleil et Climate, Toulouse, pp 101-112, 1980,). Contribution No. 82.

8) J. Xanthakis, B. Petropoulos, H. Mavromichalaki: The Evolution and the Secondary Maximum of the Corona line (5303 Å). (Solar Physics, vol. in press). Contribution No. 83.

9) J. Xanthakis, B. Tritakis and C. Zerefos: A Study of the Inferred I.J.F. Polarity Periodicities (J.I.C.R., vol. in press). Contribution No. 84.

10) X. Moussas and B. Tritakis: Latidudinal and Solar Cycle Variations of the I.M.F. Predominant Polarity. (Solar Physics, vol. in press). Contribution No. 85.

Library: 205 new volumes and 2.000 reprints, mostly from foreign Institutes on an exchange basis, were secured by the Library.

Meetings-Scientific Missions: Professor J. Xanthakis Participated in the following meetings:

1) Symposium on «Aristarchus of Samos» in honor of Aristarchus, held on the island of Samos, June 17-20, 1980. The Symposium was organized by the Ministry of Culture and Sciences and Prof. J. Xanthakis was the President of the L.O. Committee.

2) The 5th European Astronomical Meeting, held in Liège, Belgium, on 28 July - 2 August, 1980.

3) The «École d' Été» for Applied Mathematics, (sponsored by UNESCO, Balkan Union of Mathematics and Academy of Athens), held in Thessaloniki, Greece, August 2-12, 1980, where he presented a paper on «The Earth's Seismicity, during the 19th and 20th Century».

Dr. C. Poulakos, participated in the 5th European Astronomical Meeting, held in Liège, Belgium, and in the «École d'Été» for Applied Mathematics held in Thessaloniki Greece, where he gave a lecture on a relative subject.

Dr. B. Tritakis, from November 1979 till August 1980, worked, as an invited investigator, in the Space Research Laboratory, in Utrecht, the Netherlands. During his stay in Utrecht he participated in a research Program related to Low Energy Particles (L.E.P.) detected by the DFH instrument aboard the ISEE-C Spacecraft. His participation was supported by a fellowship awarded by the Ministry of Education and Culture of the Netherlands. Dr. B. Tritakis is going to continue working on the L.E.P. Subject thanks to DFH/ISEE-C data kindly offered by the Space Research Laboratory.

Dr. B. Tritakis, participated in the COSPAR 23rd Plenary Meeting, held in Budapest, Hungary, June 2-14, 1980, and in the 7th Interdisciplinary Cycle Research Symposium in Trier, W. Germany, July 5-11, 1980, where he presented a paper under the title «A study of the Inferred I.M.F. Polarity Periodicities» of J. Xanthakis B. Tritakis, and C. Zerefos.

Dr. B. Petropoulos, participated in the second Hellenique Meeting of Physicists on the island of Mitilini, Greece, September 18-21, 1980, where he presented a paper of Prof. J. Xanthakis, and Drs. H. Mavromichalaki and B. Petropoulos.

Dr. B. Petropoulos participated also in the International Colloquium «Soleil et Climat» of the CNES, held in Toulouse, France, September 30-October 3, 1980, where he presented a paper of Prof. J. Xanthakis, and Drs. H. Mavromichalaki and B. Petropoulos.

Mrs. H. Dara-Papamargariti, participated in the UNESCO's 11th «École d' Été» for young astronomers, held on the island of Hvar, Jugoslavia, from September 17 to October 8, 1980 where she lectured on Solar Prominences.

Mrs H. Dara-Papamargariti and Mr. Th. Zachariadis, participated in the joint Program of «Solar Maximum Year» of the Astronomical Institute of the National Observatory of Athens from May to October, 1980.

Dr. C. Poulakos and Mr. Th. Zachariadis spent 10 days (June 12-21, 1980) at the «Kryoneri Astronomical Station» where they worked on «Photographic Photometry».

National Scientific Committees: The Center continued offering secretarial facilities to the following Committees: 1) National Committee for Astronomy, 2) National Committee for Space Research, 3) National Committee for Mathematics. President of the first and second Committees is Professor J. Xanthakis, Head of the Center, and of the third one is the Academician Prof. Ph. Vassiliou. Secretary of the mentioned Committees is Mr. M. Chondros.

Miscellaneous: The Greek National Astronomical Committee continued the yearly Astronomical Seminars for the Greek astronomers. Chairman of the meetings was Professor J. Xanthakis, President of the Committee.

The Head of the Center
Professor J. N. XANTHAKIS
Member of the Academy of Athens.

DEPARTMENT OF GEODETIC ASTRONOMY

UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1980

Staff: The following new appointments were made: 1) Mr. I. Tziavos graduate in Rural and Surveying Engineering, was appointed Scientific Collaborator of the Department effective April 11, 1980, 2) Mr. J. Doukas graduate in Rural and Surveying Engineering, was appointed Scientific Collaborator of the Department effective September 12, 1980. Furthermore, Mr. D. Stavridis resigned from his post as Assistant of the Department, effective January 29, 1980.

Thus, the staff of the Department on December 31, 1980 consisted of the following: 1) Professor L.N. Mavridis, Head of the Department, 2) Dr. A.C. Tsioumis, Chief Assistant, 3) Dr. G. Asteriadis, Chief Assistant, 4) Dr. M.E. Contadakis, Chief Assistant, 5) Miss J. Karrinti, Assistant, 6) Dr. D. Arabelos, Assistant, 7) Dr. Ch. Kaltsikis, Assistant, 8) Mr. P. Savaidis, Scientific Collaborator, 9) Mr. I. Tziavos, Scientific Collaborator, 10) Mr. J. Doukas, Scientific Collaborator, 11) Mrs. P. Kyriakidou-Symeonidou, Secretary, 12) Mrs. M. Spyropoulou-Topatsi, Secretary, 13) Miss M. Stamatelou, Secretary, 14) Mr. C. Rizos, Secretary, 15) Mr. G. Mavrias, Secretary, 16) Mr. Ch. Papantoniou, Technician, and 17) Mr. P. Domvros, Driver.

Equipment: The following equipment was acquired in 1980: 1) one cesium beam frequency standard Hewlett-Packard, type 5061 A.

Research Programs: The following research programs were carried out during 1980:

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

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. Strömgren 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 Dr. G. Asteriadis and Messrs. P. Varvoglis and S. Avgoloupis). Photoelectric observations of the flare stars: 1) BY Dra, 2) EV Lac, and 3) Gliese 718 were carried out with the 30- inch reflector of the Department installed at the Stephanion Observatory. The results are being prepared for publication. Eight papers containing the results of the photoelectric observations of flare stars reported in previous years were published in the Commission No. 27 of the I.A.U., Information Bulletin on Variable Stars.

6) Photoelectric Observations of Suspected Flare Stars (Dr. G. Asteriadis). Photoelectric observations of the flare star candidates: Gliese 83.3, Gliese 157 B, Gliese 731, Gliese 805, and HZ Her were carried out with the 30-inch reflector of the Department installed at the Stephanion Observatory. The results are being prepared for publication.

7) Photoelectric Photometry of Galactic Cepheids (Professor L.N. Mavridis in collaboration with Dr. G. Asteriadis and Messrs. S. Avgoloupis and P. Varvoglis). A new series of photoelectric three-color (U, B, V) observations of the galactic Cepheids X Lac and RR Lac was initiated with the 30-inch reflector of the Department installed at the Stephanion Observatory. The results are being prepared for publication.

8) Photoelectric Observations of Fundamental Stars (Dr. A.C. Tsioumis). Photoelectric observations of fundamental FK4 stars were carried out with the 30-inch reflector of the Department installed at the Stephanion Observatory. The results are being prepared for publication.

9) Kinematics of Stellar Systems. The study of the kinematical behaviour of the G and K stars by Dr. A.C. Tsioumis reported last year, was continued.

10) Spectroscopic Observations of Close Binary Systems (Dr. M.E. Contadakis). Spectroscopic observations of the close binary systems: 1) HD 201416, 2) HD 163472, 3) 71 Dra, 4) V 389 Cyg, 5) τ^4 Ser, 6) V 986 Oph, and 7) BD +22° 3406 were carried out with the 30-inch reflector of the Department installed at the Stephanion Observatory, in an attempt to clarify peculiarities concerning these systems. The spectrograms are under discussion.

11) Spectroscopic Study of Long Period Variables (Dr. M.E. Contadakis in collaboration with Dr. J. Solf). A spectroscopic study of the S-type Mira variables is being carried out with the help of medium dispersion spectrograms obtained

with the 123 cm reflector of the Max-Planck Institut für Astronomie, Heidelberg installed at the Calar-Alto Observatory in Spain. Some of the results were included in a paper by M.E. Contadakis and J. Solf submitted for publication to Astronomy and Astrophysics.

12) Gravity and Magnetic Investigations in Greece (Professor L.N. Mavridis in collaboration with Dr. D. Arabelos, Miss J. Karrinti, and Mr. I. Tziavos). The discussion of the gravity and magnetic measurements carried out by the Department in various areas of Greece during the last years was continued. Some of the results were included in two papers by L.N. Mavridis, D. Arabelos, and J. Karrinti presented in the Academy of Athens by Professor J. Xanthakis.

13) Propagation of Optical Radiation and Microwaves through the Earth's Atmosphere. The study of lateral refraction in the area of Thrace reported last year, was continued (Professor L.N. Mavridis in collaboration with Mr. A. Gounaris). The study of the seasonal variation of the refractivity N of the air for microwaves in the area of Thessaloniki reported in previous years (Professor L.N. Mavridis in collaboration with Professor A. Badellas, Dr. A.C. Tsioumis, and Mr. P. Savaidis) was concluded. The results were included in a paper by A. Badellas, L.N. Mavridis, P. Savaidis, and A.C. Tsioumis published in the volume dedicated to Professor Elias Mariolopoulos. The study of the seasonal variation of the refractivity N of the air for microwaves in the areas of Athens, Thessaloniki, and Heraklion by Mr. P. Savaidis, reported last year, was continued.

14) Study of the Deviation of the Vertical in Northern Greece (Professor L.N. Mavridis in collaboration with Dr. A.C. Tsioumis and Messrs. P. Savaidis and I. Tziavos). The study of the deviation of the vertical in various areas of Northern Greece, reported last year, was continued.

15) Earthquake Prediction by Geodetic and Geophysical Methods (Professor L.N. Mavridis in collaboration with Professor A. Badellas and Mr. A. Gounaris). The repeated measurements of the high precision gravity and magnetic networks in the area of the lakes Ag. Vassiliou and Volvi, reported last year, were continued.

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 1980:

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

No 25: D.L. Crawford, L.N. Mavridis, B. Strömgren: Results of a Search for Population II Stars with V between 14^m and 16^m in High Galactic Latitudes. Vorträge gehalten auf dem Arbeitstreffen über «Aktuelle Anwendungen des Schmidt-Spiegels in der Astronomie» veranstaltet von der Astronomischen Gesellschaft und der Hamburger Sternwarte aus Anlass des 100. Geburtstages

von Bernhard Schmidt am 30.3.1979 (ed. by H. J. Wendker). Abhandlungen aus der Hamburger Sternwarte, Band X, Heft 2, S. 82-86, 1979.

No. 26: M.E. Contadakis, F. Mahmoud, L.N. Mavridis, D. Stavridis: Photoelectric Observations of the Flare Star EV Lac in 1975. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1784, 1980.

No. 27: S. Avgoloupis, L.N. Mavridis, P. Varvoglis: Photoelectric Observations of the Flare Star UV Cet in 1978. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1792, 1980.

No. 28: S. Avgoloupis, P. Phylactopoulos, G. Kareklidis, L.N. Mavridis, P. Varvoglis: Photoelectric Observations of the Flare Star EV Lac in 1978. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1793, 1980.

No. 29: F. Mahmoud, L.N. Mavridis, D. Stavridis, P. Varvoglis: Photoelectric Observations of the Flare Star BD+55° 1823 in 1975. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1799, 1980.

No. 30: G. Asteriadis, G. Kareklidis, L.N. Mavridis: Photoelectric Observations of the Flare Star YZ CMi in 1976. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1803, 1980.

No. 31: G. Asteriadis, G. Kareklidis, L.N. Mavridis, P.Varvoglis: Photoelectric Observations of the Flare Star UV Cet in 1976. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1804, 1980.

No. 32: G. Asteriadis, M.E. Contadakis, F. Mahmoud, L.N. Mavridis: Photoelectric Observations of the Flare Star UV Cet in 1975. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1806, 1980.

No. 33: M.E. Contadakis: UBV Photometry of the Nova Cygni 1975 in September 1975. A Photoelectric Lightcurve. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1818, 1980.

No. 34: L.N. Mavridis, P. Varvoglis: Photoelectric Observations of the Flare Star BY Dra in 1975. Commission 27 of the I.A.U., Information Bulletin on Variable Stars No. 1891, 1980.

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

No. 5: A. Badellas, L.N. Mavridis, P. Savaidis, and A. Tsioumis: A Study of the Refractivity N of the Air in the Area of Thessaloniki. Meteorologika, Publications of the Meteorological Institute of the University of Thessaloniki No. 69 (Volume Dedicated to Professor Elias Mariolopoulos), pp. 189-209, 1980.

III. Also the following publications:

1) D. Arabelos: Untersuchungen zur gravimetrischen Geoidbestimmung, dargestellet am Testgebiet Griechenland. Wissenschaftliche Arbeiten der Fachrichtung Vermessungswesen der Universität Hannover, Nr. 98, Hannover 1980. Dr-Ing. Dissertation, Universität Hannover.

2) Ch. Kaltsikis: Über bestangepasste Konforme Abbildungen. Ein Beitrag zur Ableitung eines Einheitlichen Landeskoordinatensystems für Griechenland. Dr.-Ing. Dissertation, Technische Universität München, 1980.

Teaching: Professor L.N. Mavridis delivered during the academic year 1979-80 courses in Geodetic Astronomy to the second-and third-year undergraduates and in Higher Geodesy to the fourth-year undergraduates of the Division of Rural and Surveying Engineering, Faculty of Engineering of the University. Chief Assistant Dr. A.C. Tsioumis delivered during the same academic year courses in Geodetic Astronomy to the fifth-year undergraduates of the same Division. Chief Assistant Dr. G. Asteriadis also delivered during the same academic year courses in Higher Geodesy to the fifth-year undergraduates of the same Division.

Visitors: Professor G. Brankov, Vice-President, Bulgarian Academy of Sciences and Professor S. Sachanski, Geophysical Institute, Bulgarian Academy of Sciences visited the Department in March 1980. Drs. M.K. Tsvetkov and K. Panov, Department of Astronomy, Bulgarian Academy of Sciences visited the Stephanion Observatory in March 1980. Prof. Dr.-Ing. E. Kuntz, Geodätisches Institute, Universität Karlsruhe visited the Department in October 1980 and delivered two colloquium lectures. Dr. Farouk Mahmoud, Helwan Observatory, works again in the Department since December 1980 on the basis of a contract with the National Hellenic Research Foundation.

Miscellaneous: Professor L.N. Mavridis was the Chief of the Greek Delegation in the following meetings:

1) In the Preparatory Meeting for the Establishment of the Coordinating Committee of the UNESCO/UNDP Regional Program on «Earthquake Risk Reduction in the Balkan Region» held in Istanbul Turkey, September 8-13, 1980.

2) In the First Session of the Coordinating Committee of the UNESCO/UNDP Regional Program on «Earthquake Risk Reduction in the Balkan Region» held in Titograd, Jugoslavia, December 8-11, 1980.

3) In the Meeting of the Romano-Hellenic Division United Nations Group of Experts on Geographical Names held in Paris, October 21-23, 1980.

Professor L.N. Mavridis participated in the «UNESCO Seminar on Mathematics and Informatics for Socio-Economical Development» held in Thessaloniki, August 2-12, 1980 and presented a paper under the title «A Study of the Refractivity N of the Air in the Area of Thessaloniki» (in collaboration with A. Badellas, P. Savaidis, and A.C. Tsioumis).

Professor L. N. Mavridis participated in the «Symposium on Aristarchos of Samos» held in Samos, Greece, June 17-19,1980.

Professor L.N. Mavridis visited the Department of Astronomy and the Geophysical Institute, Bulgarian Academy of Sciences between April 7-14, 1980 following an invitation by Professor G. Brankov, Vice-President of the Academy. During his stay in Sofia he gave a lecture on «Variable Stars Studies at the Stephanion Observatory» in the Colloquium of the Department of Astronomy, Bulgarian Academy of Sciences.

Professor L.N. Mavridis and Dr. G. Asteriadis visited the National Observatory, Bulgarian Academy of Sciences at Rozen in September 1980 and carried out photoelectric observations of the Flare Star EV Lac with the 60 cm reflector of this Observatory. The visit was made in the framework of the Program for Scientific and Technical Cooperation between Greece and Bulgaria.

Dr. M.E. Contadakis visited the Max-Planck Institut für Astronomie, Heidelberg in October 1980 and worked together with Dr. J. Solf on their joint research program on «Spectroscopic Study of Long Period Variables». Dr. M.E. Contadakis participated also in the second General Assembly of the Greek Physicists Union, held in Mytilini, Greece September 17-21, 1980 and presented the following papers (in Greek): a) Photoelectric Study of Nova Cygni 1975 and b) Spectral Classification of S-Type Stars.

Mr. Ch. Kaltsikis received his Dr.-Ing. degree from the Fakultät für Bauingenieur – und Vermessungswesen der Technischen Universität München in July 1980.

Mr. D. Arabelos returned from his two-years leave of absence at the Institut für Theoretische Geodäsie, Universität Hannover and assumed again his duties in the Department effective October 1, 1980. He also received his Dr.-Ing. degree from the Fachbereich Bauingenieur-und Vermessungswesen, Universität Hannover in November 1980.

The Head of the Department
Professor L. N. MAVRIDIS

DEPARTMENT OF ASTRONOMY

UNIVERSITY OF IOANNINA

ANNUAL REPORT 1980

Staff: The staff of the Department on December 31, 1980 consisted of the following persons: 1) Professor G. Banos, head of the Department, 2) Dr. V. Tsikoudi, chief assistant, 3) Mr. Ph. Krommydas, assistant, 4) Mrs. H. Dimou-Drosou, secretary, 5) Mr. Chr. Nakas, technician.

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

Dr. V. Tsikoudi held tutorial courses and exercises in Astronomy to the same students.

Research: Prof. G. Banos worked on solar activity and related phenomena. He also participated in the International Campaign of the «Solar Maximum Year»: a special program of solar observations has been organised and performed in collaboration with the Astronomical Institute of the National Observatory of Athens and the Laboratory of Astrophysics of the University of Athens.

Mrs H. Dara continued her work on the solar prominences, under the supervision of Prof. Banos.

Dr. V. Tsikoudi spent six months in the United Stated where she visited several observational and research facilities. In May she did photoelectric observations of flare stars and RS CVn stars, using the 36″ reflector at McDonald Observatory, Texas. Analysis of the observations and further study of these stars is in progress. She spent five months at Goddard Space Flight Center, Maryland, where she did research of flare stars and SO galaxies using the X-ray observations of HEAO 1 of the Laboratory for High Energy Astrophysics, NASA. The results of this study are currently being prepared for publication.

Mr. Ph. Kormmydas continued his work on statistical analysis of radio observations of galaxies in cooperation with the University of Innsbruck, Austria.

Miscellaneous: Professor G. Banos continued his duties as rector of the University of Ioannina (until August 31, 1980).

Dr. V. Tsikoudi attended the NATO Advanced study Institute of Galaxies, held at Cambridge England during August 1-15, 1980.

All members of the Department spent time working on the Dourouti Astronomical Station and on the 24″ telescope.

Publications: 1) Banos, G.: Astronomy and Astrophysics, Textbook (in Greek), Ioannina 1980. 2) Tsikoudi, V.: «Photometry and Structure of Lenticular Galaxies. II. NGC 4111 and NGC 4762», Ap. J. Suppl. **43**, 365, 1980.

The Head of the Department
Professor G. BANOS

DEPARTMENT OF ASTRONOMY

UNIVERSITY OF PATRAS

ANNUAL REPORT 1980

Staff: Dr. E. Evangelidis resigned from his post as chief assistant, effective March 16, 1980. Dr. V. Geroyannis was appointed chief assistant of the Department effective November 19, 1980. Mr. B. Zafiropoulos returned from his leave of absence on the 11th of December 1980. He attended post graduate studies at the University of Manchester, the Dept. of Astronomy under Prof. Koral's supervision. Prof. Gr. Antonacopoulos continued as temporary Head of the Department.

Thus the staff of the Department at the end of 1980 was as follows: 1) Prof. Gr. Antonacopoulos, head of the Department, 2) Dr. V. Geroyannis, chief assistant, 3) Mrs C. Flogaiti-Giannoulatou, assistant, 4) Mr. B. Zafiropoulos, assistant, 5) Mrs D. Galanaki, secretary, 6) Mr. G. Sotiropoulos, technician.

Teaching: Prof. G. Antonacopoulos held courses in General Astronomy, Dynamical Astronomy, Astrophysics and Cosmology to the third and fourth year students of Physics and Mathematics. Dr. V. Geroyannis held tutorial courses and exercises in Dynamical Astronomy. Mrs C. Flogaiti-Giannoulatou and Mr. B. ZAfiropoulos held tutorials in Astronomy and Astrophysics, whereas the former held tutorials also in Cosmology.

Research Program:

1) Dr. G. Antonacopoulos worked on some subjects on the post-Newtonian approximation of General Relativity. Also on the problem of «Differentially Rotating Gaseous Polytropes».

2) Dr. V.S. Geroyannis investigated, during 1980, «Differential Rotation in Solar-type Stars», «Polytropic models of Rotating Solar-type Stars» and treated numerically «Certain magnetohydrodynamic models of Astrophysical interest».

3) B. Zafiropoulos continued his work on the perturbations in close binary systems. He is now writting his Ph. D. thesis, with title «Periodic perturbations in close binary systems». Meanwhile he has been awarded his M. Sc. at the same university of Manchester on «Flare star observations at two frequencies».

Publications: 1) V.S. Geroyannis and G.A. Antonacopoulos: 1980, «Differentially Rotating Gaseous Polytropes: Construction of a Solar Model with Constant Mass» Astrophysics Space Sci. **70,** 161. 2) M.A. Drymonitou, V.S. Geroyannis and C. L. Goudas: 1980: «Numerical treatment of the Unsteady Hydromagnetic Thermal Boundary Layer Problem» Astrophysics Space Sci. **71,** 87. 3) V.S. Geroyannis: 1980 «Rotational Dynamics of a Deformable Medium: Further Generalization» Astrophysics Space Sci. **73,** 453.

The Head of the Department
Professor GR. ANTONACOPOULOS

DEPARTMENT OF ASTROPHYSICS

UNIVERSITY OF ATHENS

ANNUAL REPORT 1980

Staff: Dr. M. Arzoglou-Kontiza worked at the Royal Observatory of Edinburgh in Scotland, from August 1st to September 15th. Dr. C. Alissandrakis was visiting research associate at the Astronomy Program, University of Maryland, U.S.A., from August to October. Dr. X. Moussas worked as a visiting Research Fellow for a period of 3 1/2 months at the Cosmic Rays and Space Physics group of the Blackett Laboratory, Imperial College of Science and Technology, University of London. Mrs P. Preka - Papadema and Mr. E. Danezis continued to work as Scientific Assistants. Mr., Danezis visited Haute Provence Observatory during October. Mrs V. Sarrou - Vaiopoulos continued to work as a Laboratory Technician and Mr. E. Nicolaides as assistant supported by a grant from the Hellenic Research Foundation. Mr. N. Papastamatiou started since December working on a voluntary basis assisting in space research projects, in December. Miss. G. Tsiropoulou started working on a voluntary basis in November.

Teaching: Prof. S.N. Svolopoulos held courses on Astrophysics for the fourth-year undergraduate students of Physics as well as courses on Space Physics to the third year undergraduates of Physics. Dr. Moussas gave lectures on Space Physics for the third year undergraduate students in Physics. About 15 students worked their Thesis on Astrophysics for obtaining B. Sc. in Physics, under the supervision of Prof. Svolopoulos, Drs Arzoglou - Kontiza, Alissandrakis and Moussas, Mrs. Preka and Mr. Danezis.

I. Stars and Stellar Systems

1. Prof. S.N. Svolopoulos continued his studies on the spectra of Be stars. Under his direction Mr. E. Danezis started a research program on Be stars. He obtained spectra of several Be stars with the 152-telescope of the Haute Provence Observatory.

2. Dr. M. Arzoglou - Kontiza continued her work on the Radial velocities of the early supergiants in collaboration with Prof. Ch. Fehrenbach.

3. Dr. M. Arzoglou - Kontiza in collaboration with Dr. E. Kontizas of the National Observatory and Mr. E. Danezis completed their study of observational dynamical parameters for twenty stellar clusters of the Small Magellanic Cloud.

4. Dr. Arzoglou - Kontiza in collaboration with Dr. E. Sarris, of the National Observatory of Athens started a study of the Luminosity Function of the Stellar cluster 47 Tuc on plates loaned from the Royal Observatory of Edinburgh.

II. Solar Physics

1. C. Alissandrakis continued his computations on the effect of the structure of the magnetic field on the radio emission of unipolar spots at cm wavelengths. Both current-free and force-free configurations were studied. He also studied the properties of the solutions of the constant α force-free magnetic field problem.

2. During his stay at the University of Maryland C. Alissandrakis worked with Dr. M. Kundu on observations of solar active regions and bursts at 6 cm wavelength. These observations were obtained by Dr. Kundu with the Westerbork Synthesis Radio Telescope in May, June and September 1980, with spacial resolution of 3 by 10 arc sec and temporal resolution of 10s.

3. C. Alissandrakis, in collaboration with Dr. C. Macris and Mr. Th. Zachariades of the Research Center for Astronomy (Academy of Athens) completed a study of the contrast between photospheric granules and intergranular lanes.

4. C. Alissandrakis and E. Nicolaides completed a statistical study of the decay time of solar radio bursts using partol observations obtained at Penteli at 1415, 2695, 4995, and 8800 MHz.

5. C. Alissandrakis and Th. Zachariades started a study of the time evolution of bright structures in solar active regions from photographs obtained in Hα at the observatory of Pic du Midi.

6. P. Preka continued her study of solar bursts at the cm wavelengths under the supervision of C. Alissandrakis.

III. Space Physics

1. X. Moussas in collaboration with Dr. J.J. Quenby and Mr. J.F. Valdes - Galicia of the Imperial College of Science and Technology, studied the interaction and propagation of energetic particles in the interplanetary medium. For this study they used high resolution data of the interplanetary magnetic field and the solar wind velocity measured by Pioneer 10 and 11 at large heliocentric distances and at different parts of corotating interaction. He estimated various propagation parameters such as the diffusion coefficient in space, the diffusion coefficient of the pitch angle, the diffusion in energy space and the mean free path. He also

calculated the drift velocity of energetic particles due to gradients in the magnetic field of the interplanetary medium. This project was undertaken in preparation for the Energetic Particle Composition experiment, accepted for the ESA spacecraft of the International Solar Polar Mission.

2. X. Moussas, P. Kakaletris and D. Psarros studied the structure of the interplanetary medium during the 1st STIP interval (September-October 1975).

3. X. Moussas and N. Papastamatiou started working on the North-South Solar Anisotropies and their influence to the interplanetary medium.

IV. Solar Terrestrial Relations

1. X. Moussas and B. Tritakis studied the dependance of the dominant polarity of the interplanetary magnetic field upon heliographic latitude (Rosenberg Coleman effect) in different phases of the solar cycle for the time period 1957-1977, using geomagnetic and spacecraft data.

Publications

1. S.N. Svolopoulos: «Lectures on Astrophysics» (Textbook for University Courses) Published by the University of Athens, 1980. (in Greek).

2. M. Kontizas, 1980: «Preliminary Colour Magnitude Diagrams of 20 Star Clusters and Their Adjoining Fields in the Small Magellanic Clouds.» Astr. and Astrophys. Suppl. **40,** 151.

3. Alissandrakis, C.E., Kundu, M.R. and Lantos, P. 1980: «A Model for Sunspot Associated Emission at 6 cm Wavelength», Astron. Astrophys. **82,** 30.

4. Alissandrakis, C.E., 1980: «Active Region Magnetic Fields and cm-λ Emission» in «Radio Physics of the Sun», (Kundu, M.R. and Gergely, T. ed.), D. Reidel, Dordercht, Holland.

5. Alissandrakis, C.E., 1980: «Physical Process in the Solar Atmosphere» in «Foundations of Science», Gutenberg publications, Athens, Greece (in Greek).

6. X. Moussas, 1980. «Particle Trapping and Acceleration during the August 1972 Event», Solar Physics, **67,** 163-180.

7. S. Cecchini, X. Moussas and J.J. Quenby, 1980. «The Effect of Interplanetary Acceleration on the Propagation of Energetic Solar Particles in Prompt Events», Astrophysics and Space Sci. **69,** 425-438.

8. X. Moussas, J.J. Quenby and J.F. Valdes-Galicia: 1980. «Numerical Determination of Energetic Particle Transport Coefficient between 1AU and 5 AU Using Pioneer 10 and 11 Data», in Abstracts of 23rd COSPAR Plenary Meeting, Budapest, p. 64.

9. M. Moutsoulas and P. Preka, 1980: «Morphological characteristics of lunar craters with small depth/diameter ratio, II» The Moon and the Planets, **23,** 113-126.

Meetings

Prof. Svolopoulos participated in the Symposium «Aristarchos of Samos» in Samos in June and in the 2nd Physics Conference of the Hellenic Physical Society in Mytilini in September.

Dr. M. Kontiza and Mr. E. Danezis participated in the 5th European Meeting of IAU in Liege, in July. Dr. M. Kontiza attended the Colloquium on «Effects of Mass Loss on Stellar Evolution» in Trieste in September and the Summer School on Astronomy of IAU and UNESCO at Hvar Yugoslavia from September 19 October 10.

A paper by Prof. Fehrenbach, Dr. E. Kontizas and Dr. M. Kontiza on the radial velocities of early supergiants was presented in the Strassburg Meeting on Supergiant Stars in January 1980.

A paper by Dr. M. Kontiza and Dr. E. Kontizas on «A study of Radial velocities of Hydrogen lines in Supergiants and Giants in our Galaxy and the Large Magellanic Cloud was presented in the 2nd Physics Conference in Mytilini.

Dr. Moussas participated in the 2nd Physics Conference and presented the following papers:

1. X. Moussas, J.J. Quenby and J.F. Valdes-Galicia, «Study of Energetic Particles with Pioneer 10 and 11», and

2. X. Moussas and B. Tritakis, «Study of the Interplanetary Magnetic Field and its Relation with the heliolatitude».

In the same Conference C. Alissandrakis, T. Prokakis, D. Dialetis and P. Preka presented a paper on «The Solar Flare of July 10, 1978».

Lectures

Dr. Kontiza gave the following lectures in Hvar during the Summer School on Astronomy:

1. Importance of U, B, V-photometry for the study of the age of stellar systems.

2. Stellar clusters in the Small Magellanic Cloud.

Dr. Alissandrakis gave a lecture in the Solar Physics Seminar at the University of Maryland.

Drs Kontiza, Alissandrakis and Moussas gave lectures in the weekly seminars organized by the National Astronomical Committee of Greece.

Dr. Moussas gave a lecture in the series «Foundations of Science» organized by the Department of Physics.

Drs. Moussas, Kontiza and Alissandrakis gave lectures in the seminars of the Laboratory of Astronomy, University of Athens.

Dr. D. Spicer from the Naval Research Laboratory and the University of Maryland visited the Department in October and gave a lecture on the mechanisms of energy release in solar flares.

Miscellaneous

X. Moussas continued as a part time supervisor of Mr. J.F. Valdes-Galicia PhD. thesis at the Imperial College of Science and Technology, University of London.

Dr. Alissandrakis, Dr. Moussas, Mrs Preka and Mr. Nikolaides participated in the observations of solar activity which were carried out at the National Observatory of Athens, for the Solar Maximum Year (SMY) project.

Dr. Alissandrakis participated in the working group for the preparation of the SMY observations at the National Observatory of Athens.

Mr. Danezis visited the Konkoly Observatory and the Observatory of Matra, in Budapest as well as the Laboratoire d'Astronomie Spatial in Marseille.

Dr. Alissandrakis was a member of the Editorial Board of the «Review of Physics» and Dr. Moussas was a member of the Editorial Board of the «Physical World»; both journals are published by the Hellenic Physical Society.

The Head of the Department,
Professor S.N. SVOLOPOULOS