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ASTRONOMICAL INSTITUTE NATIONAL OBSERVATORY OF ATHENS ANNUAL REPORT 1971

The activities of this Institute during 1971 may be summarised as follows :

Staff. Assistant Professor Dr. C. Macris has relinquished his post as Chief Assistant; he was appointed Director of the Research Center for Astronomy and Applied Mathematics of the Academy of Athens.

Dr. G. Banos has been appointed Chief Assistant and is responsible on all matters pertaining to Solar Physics.

Dr. G. Antonopoulos was transferred from the post of Chief Assistant of the Department of Astronomy, University of Athens, to that of Chief Assistant of the Pendeli Station.

Mr. E. Sarris was transferred from the Department of Astronomy, University of Athens, to the post of Assistant at the Pendeli Station.

Mr. P. Rovithis was appointed Junior Assistant in this Institute.

Dr. G. Banos benefited of a three month Government scholarship and went to France on a three month leave.

Dr. Th. Prokakis, benefited of a one year scholarship of the French Government and left on annual leave.

Instruments. Equipment. An important Government grant to this Institute amounting to twelve million drachmae will be used for the acquisition of a telescope of 120 cm aperture.

For this purpose Prof. D. Kotsakis visited several firms, such as Jenoptik in Jena, East Germany, Carl Zeiss at Oberkochen, West Germany, Crubb and Parsons at Newcastle, England. He likewise, together with Chief Assistant Dr. G. Banos, visited the Observatory of Tel-Aviv, where a large telescope has been recently installed by Boller & Chivens, U. S. A.

At the Pendeli station the construction of a building was begun. This is destined to house solar instruments such as a heliograph and a radiotelescope.

Construction of the main building at the Pendeli station have been completed. This is destined to house the equipment and the personnel. Assistant Mr. E. Sarris supervised this work.

Observations. a) Sun. The Razdow solar telescope was constantly in operation the year round for visual and movie film registrations of the chromosphere in H α . Observations were carried out by members of the AWS group under the supervision of Mr. Prokakis and the responsibility of Dr. G. Banos.

Radio monitoring of the Sun was also pursued on frequencies 1415 MHz, 3695 MHz and 8800 MHz. This was likewise done by the AWS group under the supervision and responsibility of the same, respectively.

Mr. D. Elias continued routine visual observations of sunspots for securing Wolf numbers and other statistical data. He likewise made a careful study of seeing conditions.

b) Planets. Dr. C. Banos pursued his work in photographing the major planets with the Newall telescope of Pendeli Station.

c) Comets. Mr. D. Elias observed comet 1971a and his observations were published in the IAU Circulars.

d) Moon. Mr. E. Sarris photographed libration effects of the Moon. Mr. D. Elias photographed the total lunar eclipse of August 6.

e) Stars. Mr. D. Elias continued observations of variable stars. He likewise observed novae and occultations.

f) Workshop. Constructions and technicalities were taken care of by Mr. E. Sigalas, Mr. A. Vouzas, Mr. Ch. Bourdas and Mr. J. Zacharopoulos both at this Institute and at the Pendeli Station.

g) Lab and darkroom work. All relevant work was carried out by Mr. J. Zacharopoulos and Miss A. Philippakou.

Research. Dr. G. Banos devoted his time to the study of spicules at the limb in the K line. Observations were made at Pic-du-Midi Observatory with a k monochromatic filter. He also made photometric measurements of the solar eclipse of 15.2.1961.

Dr. C. Banos studied the jovian atmosphere and Dr. Th. Prokakis studied various radio solar effects.

Mr. E. Sarris studied the elliptical problem and the determination of periodical orbits. Mr. Rovithis studied the differential rotation of the Sun.

Mr. D. Elias studied photometric parameters of comets and the influence of the solar wind on their absolute magnitude. He likewise made the photometry of the 15.2.1961 solar eclipse.

Time Service. Routine work was done by Dr. C. Banos, Dr. Th. Prokakis, Mr. D. Elias and Mr. P. Rovithis.

International Cooperation. Dr. G. Banos worked for a month and a half at the Pic-du-Midi Observatory and for a month and a half at Meudon.

Dr. Th. Prokakis worked for nine months at Meudon.

We have resumed sending monthly reports on the solar activity to the various IAU centers. Likewise filtergrams are being sent regularly for the drawing of chromospheric maps.

Visits. This Institute has been visited by Colleges, High Schools, and the Public, and its facilities were made available for public demonstrations.

Meetings. Symposia Prof. D. Kotsakis, Mr. E. Sarris and Mr. D. Elias participated to the NATO Summer School on Lunar Studies, held in Patras.

Publications.

1) Banos C.: Results in Ultra Violet for the Planet Jupiter; Memoirs of the National Observatory of Athens. Series I. Astronomy No 16, 1971.

2) Banos C.: Contribution to the study of Jupiter's Atmosphere; Icaros, vol. 15, No 1, 1971.

3) Banos C.: Isodensitometry of Jupiter's Red Spot and of Jupiter; Astronomy and Astrophysics, vol. 15, No 3, 1971.

4) Elias D.: Observations of Comets, preliminary photometry of comet parameters, and precise position of novae. IAU Circulars No 2314, 2315, 2321, 2324, 2356, 2365.

5) Kotsakis D.: Structure of the Universe, Athens 1971.

6) Kotsakis D.: Johannes Kepler (1571-1971), Athens 1971.

The Director of the Institute

Prof. D. Kotsakis

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF ATHENS
ANNUAL REPORT 1971

The activities of the Department of Astronomy, University of Athens, during the year 1971 were as follows.

Staff. a) Dr. Michael D. Papayiannis, Professor of Astronomy and Space Physics of the University of Boston, spent the year as a visiting Professor at the University of Athens where he taught Astrophysics and Space Physics to the senior students of Physics.

b) Chief Assistant Dr. Gr. Antonacopoulos was transferred to the National Observatory of Athens as Chief Assistant of the Pendeli Astronomical Station, on December 16th, 1971.

c) Assistant Mr. E. Sarris was transferred to the National Observatory of Athens as Assistant at the Pendeli Astronomical Station on February 2nd, 1971.

d) On December 30th, 1971 Mr. Th. Papayiannopoulos, graduate in Mathematics, was appointed Assistant to this Department.

Teaching. a) Professor D. Kotsakis delivered courses of Mathematical Astronomy and Astrophysics to the senior students of Mathematics and Astrophysics and Astronomy to the senior students of Physics; after the introduction in the University of the new curriculum for the academic year 1971-1972, he lectured on General Astronomy to the junior students of Mathematics; he likewise lectured to the senior students on Mathematics, Astrodynamics and Cosmology.

b) Professor Michael D. Papayiannis gave two courses of Space Physics and Astrophysics to the senior students of Physics. Moreover in the two months prior to the beginning of the first semester, he gave an intensive course on Astrophysics (six hours per week) for the Staff of the department of Astronomy and other relevant departments.

c) Chief Assistant Dr. Gr. Antonacopoulos lectured on special topics of Mathematical Astronomy to the senior and junior students of Mathematics.

d) Assistant Mr. M. Zikides carried out the tutorial sections of Astrophysics and Astronomy for the senior students of Physics and the tutorial sections of general Astronomy for the junior students of Mathematics.

e) Assistant Mr. D. Dionysiou carried out the tutorial sections of Astrodynamics and Cosmology for the senior students of Mathematics.

f) Laboratory exercises for 337 senior and 750 junior students of Mathematics were carried out in the Department of Astronomy of the University of Athens at the National Observatory of Athens and the Pendeli Astronomical station. The exercises were supervised by: Mr. Dionysiou, Mr. E. Sarris, Mr. D. Papathanasoglou, Mr. D. Vaiopoulos, Mr. P. Niarchos, Mrs. M. Macri-Antonacopoulos, Mrs. M. Arzoglou and Mr. C. Goutis.

g) Seniors in Physics were given topics for their required special assignment by: Dr. G. Antonacopoulos, Mr. M. Zikides, Mr. D. Papathanasoglou, Mr. D. Dionysiou, and Mrs. M. Macris-Antonacopoulos, who also supervised their work.

Instruments. The following instruments were purchased by this Department:

- a) Transmission densitometer MACBETH TD-102.
- 2) A BRONICA Camera (complete system).
- 3) Air conditioning MONTCO.
- 4) A set of tanks for plate developing.
- 5) Marine receiver SAIT 745 E (modified) with a complete set of spare parts.
- 6) Laboratory equipment and furniture.

Publications. a) Dr. Gr. Antonacopoulos: A numerical investigation of secular terms of the Planetary disturbing function Astrophysics and Space Science, in press.

b) Dr. D. Kotsakis: The Structure of the Universe, Textbook, (in Greek), p. 80. Athens 1971.

c) D. Papathanasoglou: Observations of filamentary structure in sunspot umbrae. Solar Physics, **21**, 113, 1971.

b) Dr. D. Kotsakis: Johannes Kepler, 400th anniversary, 1571-1971. National Committee for Astronomy, Athens 1971.

Research Visiting Professor M. D. Papayiannis worked on active longitudes on the Sun in collaboration with Mrs. M. Macris-Antonacopoulos and on seeing conditions used the Newall Refractor with a disk with 3 holes, in collaboration with Mr. D. Papathanasoglou; He likewise investigated the directivity of solar radio bursts in collaboration with Mr. P. Niarchos, Mr. D. Vaiopoulos and Mr. Th. Papayiannopoulos.

Chief Assistant Dr. Gregory Antonacopoulos and Assistant Mr. M. Zikides worked on topics of Celestial Mechanics under the supervision of Professor G. Contopoulos of the University of Thessaloniki.

In particular, Dr. G. Antonacopoulos worked on collision periodic orbits in the restricted 3-body problem and on the theory of Planetary Perturbations, while Mr. M. Zikides completed his PhD

Thesis on Families of periodic orbits in the restricted 3-body problem.

Assistant Mr. D. Papathanasoglou observed sunspot phenomena, using the Pendeli Newall Refractor. He continued the investigations of seing and he is now working on the subject with Professor M. D. Papayiannis.

Assistant Mr. D. Dionysiou worked on his PhD Thesis in a theoretical subject of General Relativity supervised by Professor G. Contopoulos.

Assistant Mrs. M. Macris - Antonacopoulos worked on a topic of Solar activity under the guidance of Professor M. D. Papayiannis.

The Assistant Mrs. M. Arzoglou worked on optical polarimetry and the photography of planets.

The assistants Mr. P. Niarchos and D. Vaiopoulos worked first in Astrometry and later, under the guidance of Professor M. D. Papayiannis, on solar radioastronomy.

Attendance to Meetings. The staff of the Department attended a NATO advanced Study Institute on Lunar Studies held in Patras in September 1971.

Visits. Professor D. Kotsakis visited the Karl Zeiss - Jena factories as well as the Tel-Aviv Observatory where a telescope by Boller and Chivens was recently installed, for the purpose of investigating the possibilities of buying a large reflector for the National Observatory of Athens.

Dr. G. Antonacopoulos, Mr. M. Zikides and Mr. D. Dionysiou went to Thessaloniki in order to collaborate with Professor G. Contopoulos and the staff of the Department of Astronomy of the University of Thessaloniki on various scientific projects.

Mrs. Arzoglou worked on subjects of optical and photoelectric polarimetry as well as on the photography of planets at Meudon Observatory, Paris.

Mr. D. Dionysiou visited London where he collaborated with Professor W. Bonnor of London University, who is supervising his PhD Thesis.

The Head of the Department
D. Kotsakis

ASTRONOMICAL DEPARTMENT UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1971

Staff. Dr. G. Contopoulos was a visiting professor at the University of Maryland for 1 1/2 months during the summer of 1971, lecturing on the Dynamics of Spiral Structure. He spent also 2 months at the NASA Goddard Space Flight Center as Senior Research Associate.

Dr. S. Persides has been appointed Chief Assistant, effective December, 1971.

Mr. C. Catsonis received a scholarship of the French Government and left the Department during October 1971 for the University of Orsay.

Among the collaborators of the Astronomical Department were: Mrs. E. Georgala of the Nuclear Research Center «Democritus», Dr. G. Antonakopoulos, Chief Assistant of the Astronomical Department of the University of Athens, Mr. M. Zikides and Mr. D. Dionysiou of the same Department, and Mr. M. Mihalodimitrakis, of the Department of Theoretical Mechanics of the University of Thessaloniki.

IAU During 1971 there was one meeting of the Executive Committee of the IAU and three Officers' Meetings, one of them in Thessaloniki. D. Contopoulos is in charge of IAU Symposia and Colloquia. He supervised the publication of six Proceedings volumes of IAU Symposia. Three more volumes are in press. Four Symposia (Nos 47-50) and five Colloquia (Nos 12-16) took place during 1971. Fifteen more IAU Symposia and seven Colloquia are prepared for 1972-73.

Scientific Work during 1971. Dr. G. Contopoulos worked on the following subjects.

a) Dynamics of Spiral Galaxies.

1) Linear and nonlinear effects near the particle resonance have been considered. As it was realized that Lin's dispersion relation is not valid near the particle resonance a more accurate dispersion relation was derived.

A theoretical study of the orbits near the particle resonance was made using nonlinear theory. The theory has some resemblance

with the theory of the Trojan orbits in the restricted three-body problem. Short and long period orbits were found. The boundaries of trapped orbits were calculated. As a further step the effects of the trapped mass itself on the orbits was calculated.

2) A detailed examination of the assumptions underlying Lin's dispersion relation was made. Some cases where this theory is not applicable have been considered in collaboration with Mrs. E. Georgala: (i) Near the center of a galaxy and (ii) near the inner Lindblad resonance under the assumption that both k (wave number) and ω (i.e. frequency) are complex.

3) Some results concerning density waves in barred spirals were derived. A study of orbits in barred spirals has started by Mr. M. Mihalodimitrakis.

Some of the above results are included in the Lectures Notes on «The Dynamics of Spiral Structure» to be issued in mimeographed form by the Astronomy Program of the University of Maryland.

b) Resonance Cases in Adiabatic Invariants: The usual adiabatic invariants fail in resonance cases. A study has started aiming at deriving the forms of the invariants in such resonance cases. Applications were made in some axisymmetric fields like the dipole field.

Dr. G. Bozis with Dr. G. Antonopoulos continued their study of Collision Periodic Orbits in the restricted three-body problem starting at an angle $\varphi \neq 0$ with the line joining the primaries. A paper under the title «Collision Periodic Orbits of a New Type», has been submitted for publication in Astronomy and Astrophysics.

Mr. M. Zikides, under the supervision of Dr. G. Contopoulos, continued his work on periodic orbits in the restricted three-body problem.

Dr. S. Persides worked on the following subjects:

- a) Gravitational Radiation from a bounded source.
- b) Feedback effects on a source of gravitational waves.
- c) Physical interpretation of the Newman-Penrose constants.
- d) Classical test fields in Schwarzschild's spacetime.

Research under (a) and (b) produced three published papers (see publications). Research under (c) and (d) is still in progress.

Mr. N. Spyrou is working on the $2\frac{1}{2}$ Post-Newtonian N-Body Problem, considered as a limit of a system of N perfect fluid spherical masses, where the masses are considered to have internal structure.

Mr. D. Dionysiou, under the supervision of Dr. G. Contopoulos, continued his work on the N-body problem in the 2nd and $2\frac{1}{2}$ Post-Newtonian Approximation.

Mr. N. Spyrou and Mr. D. Dionysiou derived the integrals of

motion of an infinitesimal body moving inside or outside an axially symmetric perfect fluid mass.

Mr. C. Papageorgiou continued his study of the behavior of chromospheric phenomena visible in the $H\alpha$ line and in white light. Some cases of filaments followed by flares were recorded.

Publications

G. Contopoulos: Gravitational N-Body Problem, Earth and Extraterrestrial Sciences **I**, 185, 1971 = Contr. Astron. Dep. Univ. Thessaloniki, No. 56.

G. Bozis: On the Problem of Consecutive Collision Periodic Orbits, Astronomy and Astrophysics **11**, 320, 1971 = Contr. Astron. Dep. Univ. Thessaloniki, No. 57.

G. Contopoulos: Preference of Trailing Spiral Waves, Astrophysical Journal **163**, 181, 1971.

G. Contopoulos: Orbits in Highly Perturbed Dynamic Systems III. Non Periodic Orbits, Astronomical Journal **76**, 147, 1971.

G. Contopoulos: Collisionless Stellar Dynamics, Astrophysics and Space Science **13**, 377, 1971 = Contr. Astron. Dep. Univ. Thessaloniki, No. 59.

S. Persides: A New Approximation Method for Wave Theories, Journal of Mathematical Physics **12**, 2355, 1971 = Contr. Astron. Dep. Univ. Thessaloniki, No. 60.

S. Persides: News Function of a Bounded Source of Perfect Fluid, Physics Letters **37A**, 343, 1971.

S. Persides: The Gravitational Field of a Bounded Source in General Relativity, Astrophysical Journal **479**, 170, 1971 = Contr. Astron. Dep. Univ. Thessaloniki, No. 61.

G. Contopoulos: Interactions Between Astronomy and Physics, Technical Annals, March 1971 (in Greek).

Meetings. Dr. G. Contopoulos attended the Amherst Meeting of the American Astronomical Society (August 1971).

Lectures, Seminars. Dr. G. Contopoulos gave seminars at the Nice Observatory, the University of Chicago and the University of Knoxville.

Dr. Persides gave several lectures at the University of Texas, the California Institute of Technology and the University of Maryland.

Visitors. Prof. B. Strömberg, President of the IAU, and Prof. W. H. McCrea, of the University of Sussex, gave lectures at the University of Thessaloniki.

The Head of the Department

Prof. G. Contopoulos

DEPARTMENT OF ASTRONOMY
TECHNICAL UNIVERSITY OF ATHENS
ANNUAL REPORT 1971

Staff. This consists of Chief Assistants Dr. D. Vlachos and Dr. Katsiaris; both are graduates in Mathematics, qualified Rural and Survey Engineers, and have obtained their PhD in this University. Likewise of Assistants J. Tsoutras, qualified Rural and Survey Engineer, and Miss C. Loukidelis, graduate in Mathematics.

Teaching and Training. During the 1970-1971 academic year Prof. J. Argyrakos, Head of this Department, held courses in General, Spherical and Geodetic Astronomy. He was assisted by his Chief Assistants Dr. D. Vlachos and Dr. G. Katsiaris and his Assistants J. Tsoutras and Miss Loukidelis. Seminars on special subjects were also held for the benefit of last year undergraduates. Courses were attended by 92 + 104 students of the third and fourth year, respectively, of the School of Rural and Survey Engineers.

Scientific Activities. Chief Assistant Dr. D. Vlachos returned from France in April, having benefited of an extensive educational leave. Chief Assistant Dr. G. Katsiaris has received a similar leave, effective October 1971, and is now in England.

The Head of the Department
Prof. J. Argyrakos

RESEARCH CENTER FOR ASTRONOMY
AND APPLIED MATHEMATICS
ACADEMY OF ATHENS
ANNUAL REPORT 1971

Staff. Dr. Constantine Macris, Assistant - Professor of the University of Athens, has assumed the direction of the Research Center for Astronomy and Applied Mathematics since February 19th 1971; he was transferred from the National Observatory of Athens where he worked until that date. Dr. Constantine Poulakos was appointed Chief Assistant of the Center in May 1971 after resigning from his position as Assistant of the same Center. Mr. Basil Tritakis worked during the entire year as Research Assistant of the Center and was paid from funds made available through the National Research Foundation. Professor L. N. Mavridis continued offering his services as scientific collaborator of the Center jointly with his duties as Chairman of the Department of Geodetic Astronomy, University of Thessaloniki. Mr. M. C. Chondros continued offering his services as Secretary of the Center and carried out secretarial work jointly with his duties as Librarian of the Center. He also continued acting as Assistant Secretary of the following committees: 1) of the Greek National Committee for Astronomy, 2) of the Greek National Committee for Mathematics and 3) of the Greek National Committee on Space Research.

Research Programs. During the year 1971 the following research programs were carried out: 1) Statistical Study of Solar Activity (Prof. Dr. J. Xanthakis). The analytical study of the variation of the different indices of solar activity within each sunspot cycle and from cycle to cycle reported last year was continued. 2) Investigation of Problems of Star Formation (Professors Drs. J. Xanthakis and L. N. Mavridis in collaboration with Professor B. Strömgren). 3) Distribution of the M-, S-, and C- Type Stars in Selected Areas of the Milky Way (Professor L. N. Mavridis). 4) Research on the fine structure of the solar chromosphere in the H α line. The study of the fine structure of the solar chromosphere has been based on plates taken by the director of the Center Dr. C. J. Macris with the LYOT filter mounted on the 40 cm telescope of the National Observatory of Athens and concerns the spicules constituting the basic component of chromospheric structures. 5) Photometric research on spectroheliograms taken with the K line of the ionized calcium. Likewise research which was begun in

the past by Dr. C. J. Macris was continued. 6) Study of the high atmosphere and the meteoroid clusters with the Link photometer. In 1967 the Link photometer was given to Dr. C. J. Macris through a NATO grant; Dr. Macris collaborates with NATO since 1960. The research programs Nos. 2 and 3 were carried out jointly with the Department of Geodetic Astronomy, University of Thessaloniki to the annual report of which we refer for further details.

Publications The following publications appeared in 1971: Contributions from the Research Center for Astronomy and Applied Mathematics, Academy of Athens, Series I (Astronomy):

1) No. 24. The Surges, by C. J. Macris (C. J. Macris, Editor, Physics of the Solar Corona. Astrophysics and Space Science Library, vol. 27, p. 168. D. Reidel Publishing Company, Holland).

2) No. 25. Relations Between the Areas index and different Phenomena in the Chromosphere, the Corona, and the interplanetary Space, by J. Xanthakis). In C. J. Macris, Editor, Physics of the Solar Corona, 1971. Astrophysics and Space Science Library, vol. 27, p. 179. D. Reidel Publishing Company, Holland).

3) No. 26. On the Relationships Between Bright Mottles and Spicules of the Solar Chromosphere. By C. E. Alissandrakis and C. J. Macris. (Praktika de l'Academie d'Athènes, vol. 46, p. 107).

4) No. 27. A Study of the Fine Structure of the Solar Chromosphere at the Limb. by C. E. Alissandrakis and C. J. Macris. (Solar Physics, vol. 20, p. 47).

5) No. 28. Observations in the Wing of the H α Line and Identification of the Spicular Structure near the Solar Limb. by S. Koutchmy and C. J. Macris. (Solar Physics, vol. 20, p. 295).

Forthcoming Publications (1972).

1) Isophotometry of the Chromospheric Bright and Dark Mottles on the Solar Disc. by C. E. Alissandrakis and C. J. Macris. (In Astrophysical Letters).

2) A Study of Galactic Structure in a Region of Cassiopeia with the Help of the M- and C- Type Stars. by C. P. Poulakos. (In Memorie della Società Astronomica Italiana).

3) Analysis of some Aspects of 26 Chromospheric Events. Reduction of the Optical Data. By R. Falciani, C. J. Macris and M. Rigutti. (In Practika de l'Academie d'Athènes).

Instruments. In the course of 1971 the following equipment was purchased:

- 1) One Memory Extender / Hewlett - Packard Type 9101 - A
- 2) One Calculator Buffer / Hewlett - Packard Type 9202 - A

Visitors. In 1971 the following foreign scientists visited the

Research Center for Astronomy and Applied Mathematics of the Academy of Athens:

1) Professor F. Link of the Institut d'Astrophysique, Paris. He remained in Athens from the 9th to the 14th September 1971. He collaborated with the director of the Center who has organized special program of research which is to be carried out with the Link photoelectric photometer.

2) Professor Harold Zirin of the Technological Institute of California. Dr. H. Zirin gave a lecture in the Center under the title: Fine Structure of the Magnetic Field of the Sun.

International Cooperation. Special endeavours was made to enlarge the collaboration of the Center with related institutions in Italy, France, U.S.A. and elsewhere, for the purpose of exchanging information, for securing personal contacts, particularly for concentrating observational material to be processed in this Center. A similar collaboration already exists between this Center and the Observatory of Capodimonte in Napoli as well as with the Institut d'Astrophysique in Paris. This may be appreciated by the joint work already published.

Dr. C. J. Macris was invited by the Observatory of Meudon and the Institut d'Astrophysique of Paris and visited Paris to investigate the possibility of Greece's participating to the expedition for the total eclipse of the sun of 30th June 1973.

Meeting, Symposia etc. Prof. Dr. J. Xanthakis, as Chairman of the Hellenic Mathematical Society, participated to the Panhellenic Mathematical Meeting which took place in Patras from 15 - 17 of May 1971 under the auspices of this Society. Professor J. Xanthakis attended the Advanced Study Institute Lunar Studies held under the auspices of the Science Committee North Atlantic Treaty Organization in Patras - Greece, September 14 - 25 1971. The same Institute was also attended by Dr. C. P. Poulakos.

The Director of the Center

Dr. C. J. MACRIS

DEPARTMENT OF GEODETIC ASTRONOMY
UNIVERSITY OF THESSALONIKI
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Staff. The following new appointments were made: 1) Mr. Th. Mylonas graduate in Rural and Surveying Engineering has been appointed Assistant, effective January 4, 1971, 2) Mr. M. Kontadakis, graduate in Physics, has been appointed Assistant, effective December 2, 1971, 3) Miss E. Tavlikou, graduate in English Literature, has been appointed Secretary, effective September 27, 1971. On the other hand Mr. P. Elektris resigned from his position as Assistant of the Department, effective September 1, 1971, to join the Control Data Corporation. Also Miss M. Chalkiopolou resigned from her position as Assistant of the Department, effective September 28, 1971 to assume an Assistantship at the Department of Meteorology and Climatology of the University. Thus the staff of the Department on December 31, 1971 included the following persons: 1) Professor L. N. Mavridis, Chairman, 2) Mr. A. C. Tsioumis, Assistant, 3) Miss Ch. Papanikolaou, Assistant, 4) Mr. G. Asteriadis, Assistant, 5) Mr. C. Tsakis, Assistant, 6) Mr. Th. Mylonas, Assistant, 7) Mr. M. Kontadakis, Assistant, as well as 8) Miss P. Kyriakidou, Secretary and 9) Miss E. Tavlikou, Secretary.

Equipment. The following equipment was acquired in 1971: 1) one 30-inch Cassegrain reflector with asymmetric mount (focal ratio $f/3$ for the primary hyperbolic mirror and $f/13.5$ for the Cassegrain focus) constructed by Astro Mechanics, 2) one Johnson dual channel photoelectric photometer with offset guider unit, including one RCA 1P21 and one RCA 7102 refrigerated photomultipliers, constructed by Astro Mechanics, 3) one Meinel plane grating spectrograph with flat-field folded Schmidt camera $f/2$ focal ratio, constructed by Astro Mechanics, 4) two torsion magnetometers, Askania, model Gfz M, 5) two precision aneroid barometers, Fuess, Barolux No. 15Y, 6) two aspiration pycnometers 32/60, Assmann, Fuess, 7) two levels Carl Zeiss, Oberkochen, Ni 2 with astrolab, 8) three transmitters/receivers, Racal model TRA. 922, COMCAL 20w, H.F. S.S B., 9) one theodolite WILD T2.

Research Programs. The following research programs were carried out during 1971:

1) Photoelectric Photometry of Galactic Cepheids. The discussion of the two-color (B, V) photoelectric observations of the five cepheids X Lac, RR Lac, U Vul, Z Lac and CD Cyg carried out

by K. Bahner and L. N. Mavridis in 1956-1959 with the 72-cm reflector of the Landessternwarte auf dem Königstuhl, Heidelberg, has been completed and the results were published. A preliminary discussion of the three-color (U, B, V) photoelectric observations of the same cepheids carried out by L. N. Mavridis and A. C. Tsioumis in 1967-1970 with the 38-cm reflector of the Hamburger Sternwarte installed at the Stephanion Astronomical Station has been also completed and the results were published. K. Bahner and L. N. Mavridis published also the two-color (B, V) photoelectric observations of the anomalous cepheid TU Cas carried out by them in 1956-1959 with the 72-cm reflector of the Landessternwarte auf dem Königstuhl, Heidelberg. The discussion of the photoelectric two-color observations of the remaining twelve cepheids observed by K. Bahner and L. N. Mavridis in 1956-1959 with the 72-cm reflector of the Landessternwarte auf dem Königstuhl, Heidelberg was continued. New photoelectric three-color (U, B, V) observations of some of these cepheids have been carried out with the 30-inch reflector of the Department of Geodetic Astronomy installed at the Stephanion Astronomical Station. Also the study of the light variation of the anomalous cepheid TU Cas 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. Strömberg 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 partly in collaboration with Mr. A. C. Tsioumis). The photographic photometry and the study of the space distribution of the M-, S- and C-type stars found in the five areas centered on the open clusters NGC 188, NGC 752, NGC 7789, NGC 7790 and M 25 was continued. The results concerning the area centered on the galactic cluster NGC 7789 are ready for publication by A. C. Tsioumis. A discussion of the space distribution of the late-type stars in the Galaxy has been published by L. N. Mavridis.

5) Photoelectric Observations of Flare Stars. (Professor L. N. Mavridis in collaboration with Messrs. G. Asteriadis and M. E. Kontadakis). Photoelectric observations of the flare stars UV Cet and EV Lac have been carried out with the 30-inch reflector of the Department of Geodetic Astronomy installed at the Stephanion Astronomical Station during the periods of cooperative optical observations of these stars proposed, by the International

Astronomical Union Working Group on Flare Stars. The results are ready for publication.

6) Gravity and Magnetic Investigations in Greece. Gravity and magnetic (Z-component) measurements have been carried out in Peloponnese in collaboration with the Institut für die Physik des Erdkörpers der Universität Hamburg, the Department of Topography, National Technical University of Athens and the Institute of Geology and Subsurface Research of Athens. The results are ready for publication.

7) Propagation of Optical Radiations and Microwaves through the Earth's Atmosphere. (Professor L. N. Mavridis partly in collaboration with Dr. A. Papadimitriou). A study of terrestrial refraction in the area of Thessaloniki has been completed and the results were published.

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

Publications. The following publications appeared in 1971:

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

No. 2: L. N. Mavridis, Space Distribution of the Late-Type Stars, in L. N. Mavridis (Editor), Structure and Evolution of the Galaxy, D. Reidel, Dordrecht-Holland, pp. 110-134, 1971.

No. 3: K. Bahner and L. N. Mavridis, Photoelectric Photometry of Selected Galactic Cepheids I: Two-Color Observations of 6 Cepheid-Variables. Annals, Faculty of Technology, University of Thessaloniki Vol. 5, pp. 65-79, 1971.

No. 4: L. N. Mavridis and A. Tsioumis, Lichtelektrische Dreifarbenphotometrie Galaktischer Cepheiden, Mitteilungen der Astronomischen Gesellschaft, Nr. 30, S. 92, 1971.

II. L. N. Mavridis (Editor): Structure and Evolution of the Galaxy. Proceedings of the NATO Advanced Study Institute held in Athens, September 8-19, 1969, D. Reidel, Dordrecht-Holland, V+312 pp., 1971 = Astrophysics and Space Science Library No. 22.

III. L. N. Mavridis and A. L. Papadimitriou, A Study of Terrestrial Refraction in the Area of Thessaloniki, paper presented to the XVth General Assembly of the International Union of Geodesy and Geophysics, Moscow July 30 - August 14, 1971.

Teaching. Professor L. N. Mavridis gave during the academic year 1971 - 72 courses in General and Spherical Astronomy for the 2nd year undergraduates, in Geodetic Astronomy for the 3rd year undergraduates and in Higher Geodesy for the 4th year undergraduates of the Faculty of Technology, Division of Rural and Surveying Engineering of the University.

Miscellaneous. Professor L. N. Mavridis attended the following scientific meetings: 1) the Wissenschaftliche Tagung der Astronomischen Gesellschaft, Oberkochen (Württ.), April 13-16, 1971 and presented the paper: L. N. Mavridis and A. Tsioumis, Lichtelektrische Dreifarbenphotometrie galaktischer Cepheiden, 2) the XVth General Assembly of the International Union of Geodesy and Geophysics, Moscow, July 30 - August 14, 1971 and presented the paper: L. N. Mavridis and A. L. Papadimitriou, A Study of Terrestrial Refraction in the Area of Thessaloniki, 3) the International Astronomical Union Colloquium No. 15 on New Directions and New Frontiers in Variable Star Research = Fifth Colloquium on Variable Stars, Bamberg, August 31 - September 3, 1971, 4) the 52. Ordentliche Versammlung der Astronomischen Gesellschaft, Bonn, September 13 - 18, 1971, 5) the Regional Fulbright Conference on Educational Exchanges, New Dehli, November 19 - 22, 1971, 6) the Kepler Symposium organized at the University Observatory of Istanbul by the University of Istanbul and the National Research Council of Turkey, December 27 - 29 1971 and presented the paper: L. N. Mavridis, The Stephanion Astronomical Station: A New Astrophysical Observatory in Greece.

Professor L. N. Mavridis visited on the basis of an invitation by the Deutscher Akademischer Austauschdienst the following scientific institutions: 1) the Astronomisches Rechen-Institut, Heidelberg, 2) the Max-Planck Institut für Astronomie, Heidelberg, 3) the Landessternwarte auf dem Königstuhl, Heidelberg, 4) the Institut für Theoretische Geodäsie der Universität Bonn, 5) the Geodätisches Institut der Universität Bonn, 6) the Institut für Theoretische Geodäsie der Technischen Universität Hannover, 7) the Geodätisches Institut der Technischen Universität Hannover, 8) the Institut für die Physik der Erdkörpers der Universität Hamburg, 9) the Geodätisches Institut der Technischen Universität Karlsruhe, 10) the Institut für Angewandte Geodäsie, Frankfurt a.M. 11) the Geodätisches Institut der Technischen Universität München and discussed problems of mutual interest.

Mr. A. Tsioumis received, effective September 1, 1971, a one-year leave of absence from the Department and is working at the Astronomisches Rechen-Institut Heidelberg.

The Chairman of the Department
Professor L. N. Mavridis

DEPARTMENT OF ASTRONOMY
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Teaching. Prof. S. Svolopoulos gave courses in Astronomy to the third and fourth year undergraduate students of Mathematics.

Laboratory Training of the Students was carried out with the assistance of Miss M. Alexandropoulos.

Equipment. A temporary housing with a sliding roof was constructed for the 24-inch reflector on the hills of Dourouti, situated about 6 kilometers from Ioannina. The 24-inch telescope constructed by «Astromechanics» in Texas was installed under the supervision of Mr. Guyer, Engineer of Astromechanics, who was at Ioannina from 15th to 21st. of June.

A building for the future installation of an aluminizing chamber was constructed in the vicinity of the telescope.

Also the following equipment was purchased during 1971:

- 1) A Boller and Chivens 3 $\frac{1}{4}$ × 4 $\frac{1}{4}$ inches Telescope Camera.
- 2) A Boller and Chivens 4 × 5 inches Telescope Camera.

Research Programs. Prof. Svolopoulos pursued spectrophotometric studies of Be-stars from plates taken at Merate Observatory by Dr. L. Pasinetti. Also Prof. Svolopoulos observed similar stars at the Haute Provence Observatory from 10 to 16 July 1971 with the spectrograph attached to the 152 cm telescope.

Attendance to Seminars. Prof. Svolopoulos attended the NATO Advanced Study Institute on Lunar Studies held in Patras, Greece, September 14 - 25, 1971.

Publications. 1) General Astronomy, (Text Book in Greek), Second Volume, mimeograph Edition, pages 145, 1971. 2) The Origin of Matter and the Evolution of Chemical Elements (in Greek), Chimika Chronika, 36, 198, 1971.

Visitors. Prof. M. Papayiannis of Boston University visited this Department during November 1971 and gave two lectures on Space Astronomy.

The Head of the Department
Prof. S. N. Svolopoulos

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF PATRAS
ANNUAL REPORT 1971

Staff. Mr. P. Antonopoulos, B. Sc. in Mathematics, was appointed assistant in September 1971.

Teaching. Dr. B. Barbanis gave courses in Astronomy to the third and fourth year undergraduate students of Mathematics and Physics. He held also a course on Physics of the Atmosphere to the second year students of Mathematics and Physics. Miss H. Livaniou was responsible for the exercises in Practical Astronomy.

Equipment. The following equipment was acquired during 1971: 1) Two marine chronometers, Ulysse Nardin, 2) A recorder G-4010, Varian, 3) A photometric telescope coupler and 4) A photometer, both from the Pacific Photometric Instruments, 5) A solar observation device, Carl Zeiss, 6) A 15 cm reflector, Veb Carl Zeiss Jena and 7) a 10 cm refractor.

Research Program. Dr. B. Barbanis worked on resonance phenomena in spiral galaxies.

Miss H. Livaniou is now testing an iris photometer, model W. Becker, in view of initiating a program of photographic photometry in Selected Areas of the Milky way.

Visitors. Professor William H. McCrea FRS, Research Professor of theoretical Astronomy, University of Sussex, visited this Department and gave a lecture on March 17, 1971.

Meetings. Dr. B. Barbanis participated in the following meetings: 1) The fourth meeting of the Greek Mathematical Society, in Patras, 23-27 May, 1971. He gave a lecture on Fundamental Stellar Families. 2) The first meeting of the Greek Astronomical Society in Kefallinia, 18-21 August, 1971. He gave a lecture on the Investigation of the Galactic Spiral Structure. 3) The NATO Advanced Studies Institute on Lunar Studies, in Patras, 14-25 September, 1971.

Miss H. Livaniou attended the following meetings: 1) The first meeting of the Greek Astronomical Society. 2) The NATO Advanced Studies Institute on Lunar Studies. The same Institute was also attended by Mr. P. Antonopoulos.

The Head of the Department
Prof. B. Barbanis