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RESEARCH CENTER FOR ASTRONOMY AND APPLIED MATHEMATICS
1971

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ASTRONOMICAL INSTITUTE NATIONAL OBSERVATORY OF ATHENS ANNUAL REPORT 1970

The activities of the Astronomical Institute and the Pentele Astronomical Station of the National Observatory, Athens, may be summarized as follows :

Staff. Dr. G. Banos became member of the IAU during the XIV meeting, in Brighton, England.

Mr. C. Banos obtained his Ph.D with honors on submission to the University of Athens of a thesis on the jovian atmosphere.

Mr. Th. Prokakis likewise obtained his Ph.D with honors on submission to the University of Athens of a thesis on the «Study of the Wilson effect in sunspots».

USAF Captain D. Newell was transferred from his post as Head of the AWS group of the Observatory. He was replaced by USAF major C. McDonald.

Assistance on a voluntary basis was offered by the graduate students of the School of Physics and Mathematics, Athens University, C. Alyssandrakis and D. Dialetis.

Instruments and Equipment. A solar radio telescope of 2,5 metres diameter was installed at the Pentele Station under the supervision of Dr. G. Banos in collaboration with the AWS group. The frequencies are: 1415 MHz, 2695 MHz, and 8800 MHz.

Observations. a) Sun. Registration of solar noise on the above frequencies were begun by observers of the AWS group lead by Dr. Th. Prokakis under the supervision of Dr. G. Banos.

The Razdow solar telescope was used to monitor the chromosphere in H α both visually and on movie film. Observations were carried out by the observers of the AWS group lead by Drs G. Banos and Th. Prokakis under the supervision of the Assistant Professor C. Macris.

Dr. C. Macris continued photometric observations of chromospheric formations on the disk and on the limb; Drs. G. Banos and Th. Prokakis likewise observed H α flares in correlation with the radio telescope registrations.

Dr. D. Elias carried out routine statistical observations of sunspots and determined Wolf R numbers.

b) Planets. Dr. C. Banos photographed Jupiter and Saturn with the Newall telescope at Pentele. He obtained one thousand pictures on seventy plates. He likewise collaborated with the French Astronomical Mission in observing the transit of Mercury. He determined graphically the color-variations of the focus of the Doridis telescope.

Mr. D. Elias observed photographically the transit of Mercury.

c) Comets. Mr. D. Elias observed comets 1969g, 1969i, 1970 g, and 1970 m. These observations were published in the IAU Circulars.

d) Stars. Mr. D. Elias continued observations of variable stars, occultations, and novae. He likewise observed the lunar partial eclipse of 17/8/1970.

e) Workshop. Technical work at the Institute and at the Pentele Station was carried out by technicians E. Sigalas, A. Vouzas, Ch. Bourdas, and I. Zacharopoulos.

f) Laboratory activity. All relevant work, (photographic, etc.) was carried out by Miss A. Philippakos and Mr. I. Zacharopoulos.

Research. Dr. C. Macris continued his observations on the dynamics of the chromosphere and studied the fine structure on the disk and the limb, with emphasis on the lifetime of mottles.

Dr. G. Banos studied dark and luminous arches of the chromosphere and the spicules.

Dr. C. Banos studied the jovian atmosphere in the ultra violet.

Dr. Th. Prokakis completed his work on the Wilson effect in sunspots.

Mr. D. Elias determined photometric parameters of comets and the influence of the solar wind on comet brightness.

Time Service. Routine work was carried out by Drs. G. Banos, C. Banos, Th. Prokakis and D. Elias.

International Cooperation. Prof. J. Rösch, Director of the Pic-du-Midi Observatory and his assistant Mr. E. Chauveau carried out photoelectric measurements of the transit of Mercury of 9/5/1970. The results were presented at the XIV General Assembly of the IAU in Brighton, England. Dr. C. Banos cooperated with the French mission.

Prof. D. Kotsakis with Prof. J. Rösch visited the island of Syros to investigate the possibility of carrying out preliminary observations for installing a solar observatory within the framework of the JOSO program.

Within the framework of this same JOSO program Mr. Th. Prokakis and Mr. Rossbach visited the islands of Kythera, Syros and Zakynthos in July and August and carried out measurements. Results were presented to Board of JOSO. Financial support was granted by the Technical Chamber of Greece.

Prof. D. Kotsakis participated as representative of this country to the fifth meeting of the JOSO Board, in Paris, in November 1970. Greece became a member of this Board, in the course of this meeting.

Prof. Z. Kopal of Manchester University visited the Observatory of Athens in December. He was accompanied by Dr. M. Moutsoulas and discussed the possibility of cooperation on lunar programs, and on a program of parallax measurements. They also discussed the construction, by the Astronomical Department of Manchester University, of a photoelectric photometer for this Institute.

Dr. C. Macris participated, in April 4th to the meeting of the JOSO Board, in Utrecht, Holland.

Visits. In the course of the year several University, and High School students visited this Institute. The public was also admitted.

Ten graduate students of the School of Physics of the Athens University worked in the Institute on subjects pertaining to the preparation of the degrees.

Meetings, Symposia, etc. Prof. D. Kotsakis, Dr. C. Macris, Dr. G. Banos and Dr. Th. Prokakis attended the XIV General Assembly of the IAU, in Brighton, England.

Prof. D. Kotsakis, Drs. G. Banos and Th. Prokakis, participated to the No 45 Symposium of the IAU on the solar magnetic fields, held, in Paris.

Dr. C. Macris organised and directed a NATO Summer School on the Physics of the Solar Corona, held in Cavouri, near Athens. This Symposium was attended by the entire staff of this Institute.

Publications.

- a) Banos, G. & Macris, C. : New Observational Results for the Solar Chromosphere, Solar Physics, vol. 12, p. 106, 1970.
- b) Kotsakis, D. : Is there Life on the Other Planets? Third revised edition, Athens 1970.
- c) Kotsakis, D. : Introduction to Astrophysics, Parts A and B, Second edition, Athens 1970.
- d) Macris, C. & Alyssandrakis, C. : Life-time of the Dark and Bright Mottles of the Solar Chromosphere, Solar Physics, vol. II p. 59, 1970.
- e) Macris, C. & Alyssandrakis, C. : Description of the Flares of November 1,2,4,1968, World Data Center A, Upper Atmosphere - Geophysics Data on Solar - Geophysical Activity, October 24, November 6, 1968 to March 1970, pp. 54, 64.
- f) Prokakis, Th. : Study of the Wilson Effect of Sunspots, PhD thesis, Athens, 1970.

The Director of the Institute
Prof. D. Kotsakis

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF ATHENS
ANNUAL REPORT 1970

Staff. In the course of 1970 there have been certain changes in the staff of this Department. Mr. D. Dionysiou, graduate in Mathematics, Miss Maria Arzoglou, same, Mr. P. Niarchos, same, Mr. D. Vaopoulos, same, and Mr. G. Goutis, graduate in Physics, were appointed assistants.

Mr. P. Laskaridis, resigned to pursue studies in Canada.

Teaching. Prof. D. Kotsakis held courses on Mathematical Astronomy and Astrophysics to the fourth year students in Mathematics, and on Astrophysics to the fourth year students in Physics.

Chief Assistant Dr. G. Antonacopoulos gave lectures on special subjects of Mathematical Astronomy to the fourth year students in Mathematics on approval by the Faculty.

The students, divided into six sections, followed courses in Practical Astronomy and attended seminars at the University, the Observatory, and the Pentele Station. Exercises were made by Dr. Antonacopoulos, Mr. E. Sarris, Mr. M. Zikidis, and Mrs. Maria Makri - Antonacopoulou. The number of students attained 476 of the Mathematical Section and 206 of the Physics section.

Prof. J. Rösch, on the occasion of his visit for the transit of Mercury, gave a lecture for the benefit of the fourth year students of the Mathematical and Physics sections, on the influence of the atmosphere on stellar images.

Special subjects of Astrophysics and Mathematical Astronomy were given to fourth year students in Physics for research under the supervision of Dr. Antonacopoulos, M. Zikidis, E. Sarris, and A. Papathanasoglou.

Instruments. During 1970 the following equipment was purchased by this Department:

- a) A portable tape recorder Philips EL-3302
- b) A perforator for computer cards, I.B.M. - 029 Model A 22.
- c) A.E.G. equipment for work on wood and metal.

Attendance to Seminars and Meetings. Prof. D. Kotsakis, Head of this Department, Chief Assistant Dr. Antonacopoulos, and assistants M. Zikidis, E. Sarris, and M. Macri - Antonacopoulou attended the meetings of the IAU in Brighton, England, 18-27 August 1970. The Head of this Department represented this country to the JOSO meeting held in Paris, in November 1970. The object of this meeting was to establish a European Solar Observatory.

Dr. G. Antonacopoulos attended the Advanced Study Seminar on Stellar Evolution and Variable Stars, held in Porto, Portugal, under the auspices of NATO, 31 in August - 12 September.

Seminars were held from March until July for the benefit of the staff on the following subjects:

- a) Theory of Errors, b) Theory of Approximations, c) General Relativity, d) Themes of Astrophysics, e) Themes of Positional Astronomy.

Research. The Head of this Department conferred with Prof. Z. Kopal and Dr. Moutsoulas, in Manchester, on the continuation of the program of stellar parallaxes and study of the Moon. In May he conferred with Prof. J. Rösch on the observation of the transit of Mercury of 9th of May 1970.

Chief assistant Dr. Antonacopoulos and assistant M. Zikidis worked on subjects of Celestial Mechanics and more particularly on the restricted three-body problem.

Mr. D. Papathanasoglou and E. Sarris investigated the seeing conditions at the Observatory of Athens. Together with Miss Arzoglou they measured the diameter of Mercury during the 9th of May 1970 transit.

Assistant Mrs. Macri - Antonacopoulou investigated subjects pertaining to Numerical Analysis and more particularly to the theory of Approximations.

Mr. D. Papathanasoglou spent September at Pic du Midi Observatory, working on the programs of stellar parallaxes and libration of the moon.

Publications.

- 1) D. Kotsakis:
 - a) Does Life Exist on the other Planets? Revised edition.
 - b) Introduction to Astrophysics; 2nd edition
 - Part A. The Solar System
 - Part B. Stars.
- 2) G. Antonacopoulos:
 - a) Equilibrium Solutions of the Secular Variations in the Restricted 2-body Problem and their Stability.
 - M. N. vol. 151, (1970), 123-132
 - b) The Influence of a Resisting Medium on 3-Dimensional Periodic Orbits of the Restricted 3-body Problem; Astroph. and Space Sc., vol. 9 (1970), 482 - 491.

The Head of the Department
Prof. D. Kotsakis

ASTRONOMICAL DEPARTMENT
UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1970

Staff. Mr. C. Catsonis was appointed Assistant of the Astronomical Department in April 1970.

Mr. N. Spirou worked as Scientific Collaborator of the National Research Foundation from July to October 1970. He was appointed Assistant of the Astronomical Department in October 1970.

IAU. Dr. G. Contopoulos was elected Assistant General Secretary of the IAU at the 14th General Assembly in Brighton, England. The Astronomical Department is taking care of the IAU secretarial work. Dr. Contopoulos is also the IAU representative in the European Physical Society.

Scientific work during 1970. 1) Dr. Contopoulos worked on the following subjects.

a) Orbit Theory : An exploration of highly perturbed dynamical systems of two dimensions has been made. Besides two papers on this subject which have been published in the Astronomical Journal, a third paper, dealing with the properties of nonperiodic orbits, is in press.

b) Dynamics of Spiral Galaxies : An explanation has been found for the preference of trailing spiral waves in spiral galaxies. It was found that near the inner Lindblad resonance, growing spiral waves tend to become trailing. A paper on this subject is in press in the Astrophysical Journal.

A paper dealing with near resonance cases in spiral galaxies is being prepared.

A study of the interactions of spiral waves has started. A mechanism involving the interaction of four waves near the inner Lindblad resonance has been proposed at the IAU Colloquium No. 10, in Cambridge, England, to account for the preservation of spiral waves in our Galaxy.

c) Dr. Contopoulos and Mr. Catsonis worked on an application of the «third» integral to the linear oscillations of ellipsoidal fluid masses.

d) Dr. Contopoulos, Mr. Spirou and Mr. Dionisiou (Assistant of the University of Athens) worked on problems of the post - newtonian approximations in General Relativity. The forms of the integrals of motion of an infinitesimal body inside a fluid were derived in some cases.

2) Dr. Bozis found some consecutive collision periodic orbits of the restricted problem of three bodies. A paper on this subject, submitted to Astronomy and Astrophysics, is in press.

Dr. Bozis and Dr. Antonacopoulos (of the University of Athens) continued their work dealing with periodic orbits starting at a certain angle from one of the primaries of the restricted problem.

3) Mr. Papageorgiou continued his work on chromospheric phenomena.

Publications. W. Becker and G. Contopoulos (Editors) «The Spiral Structure of our Galaxy» Proceedings of the IAU Symposium No. 38, D. Reidel Publishing Co., Dordrecht, Holland, 1970 (478 pages).

G. Contopoulos (in collaboration with Dr. S. McCuskey and Dr. T. Elvius) : Structure and Dynamics of the Galactic System, Report of the Chairman of Commission 33, Contributions from the Astronomical Department of the University of Thessaloniki, No. 53, 1970.

G. Contopoulos : «Resonance Phenomena in Spiral Galaxies», Proceedings, Symposium on Periodic Orbits, Stability and Resonances, D. Reidel Publishing Co., p. 322, 1970 = Contr. Astron. Dep. Univ. Thessaloniki No. 54.

G. Bozis : «Sets of Collision Periodic Orbits in the Restricted Problem of Three Bodies», Proceedings, Symposium on Periodic Orbits, Stability and Resonances, D. Reidel Publishing Co., p. 176, 1970 = Contr. Astron. Dep. Univ. Thessaloniki No. 55.

G. Contopoulos : «Orbits in Highly Perturbed Dynamical Systems. I Periodic Orbits», Astronomical Journal 75, 108, 1970.

G. Contopoulos : «Orbits in Highly Perturbed Dynamical Systems II. Stability of Periodic Orbits», Astronomical Journal 75, 190, 1970.

G. Contopoulos : «Resonance Effects in Spiral Galaxies», Astrophysical Journal 160, 113, 1970.

G. Contopoulos : «Gravitational Theories of Spiral Structure», Proceedings, IAU Symposium No. 38, D. Reidel Publishing Co., p. 303, 1970.

G. Contopoulos : «Recent Developments in Galactic Dynamics», Proceedings, NATO Summer Institute on the Structure and Evolution of the Galaxy, D. Reidel Publishing Co., 1970 = Contr. Astron. Dep. Univ. Thessaloniki, No. 58.

G. Bozis : Solutions of systems of differential equations in the form of Chebyshev series, Technical Annals, April, 1970 (in greek).

G. Contopoulos : Introduction to Astrophysics, Part IV, Cosmology, 2nd Edition, 1970 (in greek).

Meetings. Dr. Contopoulos was chairman of the Organizing Committee of the IAU Symposium No 10 : «Gravitational N-Body Problem» in Cambridge, England, August 1970, and gave an invited paper on Collisionless Stellar Dynamics.

Dr. Contopoulos participated in the IAU General Assembly in Brighton, England, during August 1970, as chairman of Commission 33.

Dr. Contopoulos was invited at the NATO Summer School in Ofir, Portugal, during September 1970, where he delivered lectures on the Evolution of Stellar Systems.

Mr. Catsonis also attended the NATO Summer School in Ofir, Portugal.

Lectures, Seminars. Dr. Contopoulos was invited and gave a lecture at the Tel-Aviv University. He continued his courses in Astronomy and Theoretical Physics at the University of Thessaloniki.

Visitors. Dr. L. Woltjer, Chairman of the Astronomy Department of Columbia University, and Dr. R. Fenkart, Basel, gave lectures at the University of Thessaloniki. Among other visitors were Prof. N. Lebovitz, Dr. M. Lecar, Dr. S. Aarseth and Dr. A. Kalnajs.

The Head of the Department
Prof. G. Contopoulos

DEPARTMENT OF ASTRONOMY
TECHNICAL UNIVERSITY OF ATHENS
ANNUAL REPORT 1970

Staff. This consists of Chief Assistants Dr. G. Katsiaris and Dr. D. Vlachos, both graduates in Mathematics and qualified Rural and Survey Engineers, and assistants I. Tsoutras, qualified Rural and Survey Engineer, and K. Loukidelis, graduate in Mathematics. These were appointed assistants on June 22, 1970 and June 4, 1970, respectively.

Instruments. During 1970 the following equipment was purchased with credits awarded to this Department:

- 1) One electric typewriter, IBM 715
- 2) One electrostatic photostat recorder type OCE 1, 400.

Teaching and Training. During the 1969-1970 academic year Prof. J. Argyrakos, Head of this Department held courses on General, Spherical, Practical and Geodetic Astronomy. He was assisted by Chief Assistants Dr G. Katsiaris and Dr D. Vlachos and assistants J. Tsoutras and K. Loukidelis. Seminars on special subjects were also held for last year students. Courses were attended by 120 + 100 students of the third and fourth year of the School of Rural and Survey Engineers.

Scientific Activities. Chief Assistant G. Katsiaris submitted a thesis on «Three Dimensional periodical Orbits of simple symmetry in the Restricted three-body Problem» and was awarded a PhD with honors.

This Department participated to a program of determining by astronomical observations the geographic coordinates of the summits of the triangulation network of the country. This program was established by the State Geodetic and Geophysical Board and the objective is to determine the deviation of the vertical. Chief Assistants Dr G. Katsiaris and Dr D. Vlachos worked on this project.

Publications. 1) Argyrakos, J., Vlachos, D., Simultaneous astronomical determination of the geographical Coordinates. Technika Chronika, v. 7, July 1970.

2) Vlachos, D.: Calculation of the displacements of large Dams. High Precision Triangulation., Technika Chronika, v. 8, August 1970.

3) Katsiaris, G. and Goudas, G.L.: The Symplectic Property of Ma-drizants, Astrophysical and Space Science, vol. 8 no 2, August 1970

4) Vlachos, D.: Contribution au problème de la compensation des réseaux de triangulation, Bulletin Géodésique, No 97, Septembre 1970.

5) Katsiaris, G. Three dimensional periodical orbits of simple symmetry in the restricted three-body problem, PhD thesis, Athens 1970.

The Head of the Department
Prof. J. Argyrakos

RESEARCH CENTER FOR ASTRONOMY AND
APPLIED MATHEMATICS
ACADEMY OF ATHENS

ANNUAL REPORT 1970

Staff. 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. Dr. C. P. Poulakos received his Ph.D. degree from the University of Athens with honors. He continued working during the entire year in the Center. Until March 1970 he worked as Research Assistant of the Center and was paid from funds made available through the National Research Foundation while in April 1970 he was appointed Assistant of the Center. Mr. M. C. Chondros continued offering his services as Secretary of the Center and was employed during the entire year with all the Secretary subjects 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.

Equipment. In the course of 1970 the following items have been acquired: 1) One Calculator Printer, Type H.P. 9120 A, 2) One Calculator Plotter, Type H.P. 9125 A, and 3) One Optical Cardreader, Type H.P. 9150 A.

Research Programs. The following research programs were carried out during 1970:

- 1) Statistical Study of Solar Activity (Professor 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 Problem of Star Formation (Professor J. Xanthakis and L. N. Mavridis in collaboration with Professor B. Strömngren). 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.

3) Distribution of the M-, S-, and C- Type Stars in Selected Areas of the Milky Way (Professor L. N. Mavridis partly in collaboration with Messrs C. P. Poulakos and A. C. Tsioumis). The photographic photometry and the study of the space distribution of the M-, S-, and C- Type Stars found in the six areas centered on the galactic clusters NGC 129, NGC 188, NGC 752, NGC 7789, NGC 7790, and M 25 was continued. The results concerning the area centered on the galactic cluster NGC 129 were published by C. P. Poulakos.

The research programs Nos. 2 and 3 are carried out in collaboration with the Department of Geodetic Astronomy, University of Thessaloniki.

Publications. The following publications appeared in 1970 «Contributions from the Research Center for Astronomy and Applied Mathematics, Academy of Athens, Series I (Astronomy):

No. 21 : J. Xanthakis. On a Relation Between the Indices of Solar Activity in the Photosphere and the Corona. (Solar Physics, Vol. 10, pp. 168-177, 1969, Athens 1970)

No. 22 : J. Xanthakis. Relations Entre l' indice des Aires, le nombre des éruptions à protons (proton flares), la variation du radio-diamètre de la couronne solaire et l' intensité des rayons cosmiques. (C.R. Acad. Sc. Paris, t. 271, p. 1009 - 1012, 1970, Athens 1970).

No. 23 : J. Xanthakis. On a Relation Between the Indices of Solar Activity in the Photosphere and the Corona. (Praktika de l' Académie d' Athènes, Vol. 44, pp. 153-185, 1969, Athens 1970)

Miscellaneous. Professor J. Xanthakis was the head of the Greek delegation in the XIVth General Assembly of the International Astronomical Union held in Brighton (Gr. Britain) August 18-27, 1970. The same meeting was also attended by Dr. C. Poulakos. Professor J. Xanthakis attended the Advanced Study Institute on «Physics of the Corona» held under the auspices of the Science Committee, North Atlantic Treaty Organization at Cavouri, Greece, September 6-17. The same Institute was also attended by Dr. C. P. Poulakos.

The Superintendent of the Center
Prof. Dr. J. N. XANTHAKIS
Member of the Academy of Athens

DEPARTMENT OF GEODETIC ASTRONOMY
UNIVERSITY OF THESSALONIKI
THESSALONIKI, GREECE

ANNUAL REPORT 1970

Staff. The following new appointments were made : 1) Miss Ch. Papanicolaou graduate in Physics has been appointed Assistant effective March 31, 1970. 2) Miss M. Chalkiopolou graduate in Physics has been appointed Assistant, effective April 1, 1970. 3) Mr. G. Asteriadis graduate in Mathematics has been appointed Assistant, effective June 26, 1970. 4) Mr. P. Elektris graduate in Physics has been appointed Assistant, effective December 5, 1970. 5) Mr. C. Tsakis graduate in Physics has been appointed Assistant effective December 5, 1970. 6) Miss P. Kyriakidou has been appointed Secretary, effective March 7, 1970. In this way the staff of the Department on December 31, 1970 included the following persons: 1) Professor L. N. Mavridis, Chairman, 2) Mr. A.C. Tsioumis, Assistant, 3) Miss Ch. Papanicolaou, Assistant, 4) Miss M. Chalkiopolou Assistant, 5) Mr. G. Asteriadis, Assistant, 6) Mr. P. Elektris, Assistant, 7) Mr. C. Tsakis, Assistant, as well as 8) Miss P. Kyriakidou, Secretary.

Equipment. The following equipment was acquired in 1970 : 1) one recorder, Hewlett - Packard, model 7100 BM 2) one data amplifier, Hewlett - Packard, model 2470A, 3) one electronic voltmeter, Hewlett - Packard, model 410C, 4) one D.C. power supply, Hewlett-Packard, model 6448B, 5) one D.C. power supply, Hewlett - Packard, model 6177B, 6) one AC voltage stabilizer, Wandel Goltermann, model WS-10, 7) three high voltage power supplies, Fluke, model 412B, 8) one oscilloscope, Hewlett-Packard, model 120B, 9) one function generator, Hewlett - Packard, model 3310A, 10) one audio signal generator, Hewlett - Packard, model 205 AG, 11) one universal bridge, Hewlett - Packard, model 4260A, 12) one voltmeter, Hewlett - Packard, model 400F, 13) one transistor tester kit, Heath, model IM-36, 14) one tube checker kit, Heath, model IT - 17, 15) four decade resistor kits, Heath, model IN - 17, 16) four decade capacitor kits, Heath, model IN - 27, 17) one timer counter, Hewlett - Packard, model DVM 5326B, 18) one chronocord, Littlemore Scientific Eng. Co., type 681, 19) one electric typewriter, IBM, 20) one receiver antenna, AEG-Telefunken, type A 162/1, LMK, 21) one gravity meter, LaCosta and Romberg, model G.

Research Programs The following research programs were carried out during 1970 :

1) Photoelectric Photometry of Galactic Cepheids (Professor L.N. Mavridis partly in collaboration with Dr. K.Bahner). The study of the light va-

riation of the anomalous cepheid TU Cas with the help of the developed new method, as well as the discussion of the photoelectric two - color observations of the remaining galactic cepheids, reported last year, were continued. A new series of photoelectric three - color observations of the same 18 galactic cepheids with the 38-cm reflector of the Stephanion Astronomical Station is in progress.

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 Messrs. C.P. Poulakos and A.C. Tsioumis). The photographic photometry and the study of the space distribution of the M-, S- and C- type stars found in the six areas centered on the galactic clusters NGC 129, NGC 188, NGC 752, NGC 7789, NGC 7790 and M25 was continued. The results concerning the area centered on the galactic cluster NGC 129 where published by C.P. Poulakos.

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

Teaching. Professor L.N. Mavridis gave during the academic year 1970-71 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.

Visitors. Professor Hans Kienle former Director of the Landessternwarte Heidelberg visited the Department and gave a colloquium lecture on April 3, 1970.

Miscellaneous. Professor L. N. Mavridis attended the XIVth General Assembly of the International Astronomical Union held in Brighton, August 18 - 27, 1970. He also attended the Advanced Study Institute on the «Physics of the Solar Corona» held under the auspices of the NATO Science Committee, North Atlantic Treaty Organization at Cavouri, near Athens, Greece in September 6-17, 1970. Also Mr. A.C. Tsioumis attended the NATO Advanced Study Institute on «Stellar Evolution and Variable Stars» held in Ofir, Portugal between August 31 - September 13, 1970.

The Head of the Department
Professor L. N. Mavridis

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF IOANNINA
ANNUAL REPORT 1970

Staff. Mrs Helen Demou was appointed laboratory technician, effective March 23, 1970.

Teaching. Prof. Svolopoulos gave courses in Astronomy to the third and fourth year undergraduate students. Training of the above students in Practical Astronomy and Celestial Mechanics was carried out with the assistance of Miss M. Alexandropoulos and Mr J. Hadjiconstantinou.

Equipment. A projection Comparator, Hilger and Watts Ltd, L150 was purchased.

Research Programs. Prof. Svolopoulos carried out microphotometric studies of early type stars.

Publications. 1) S.N. Svolopoulos, Spectrophotometric Study of 25 Orionis

Contr. Labor. Astronomy, University of Ioannina, No 4, 1970

2) S.N. Svolopoulos, Assymetry of Stellar Spectral Lines due to Gaseous Streams

Contr. Labor. Astronomy, University of Ioannina, No 5, 1970

3) S.N. Svolopoulos, Apollo 10, Apollo 11, (in Greek) Bulletin of the Geographic Service of the Army, No 97, p. 27, 1970.

Miscellaneous. Prof. S.N. Svolopoulos attended the following international meetings :

1) The XIVth General Assembly of the International Astronomical Union held in Brighton, August 17 - 28, 1970.

2) N.A.T.O. Advanced Study Institute on the Physics of the Solar Corona held at Cavouri-Vouliagmeni, September 6-17, 1970.

The Head of the Department
Professor S. N. SVOLOPOULOS

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF PATRAS
ANNUAL REPORT 1970

Staff. Miss Helen Livaniou, B. Sc. in Mathematics, was appointed assistant in February 1970.

Teaching. Dr. B. Barbanis gave courses in Astronomy to the third year undergraduate students in Mathematics and Physics. He held also a course on Differential Equations to the third year students in Mathematics and Physics and to the second year students of the School of Electrical Engineering.

Miss H. Livaniou was responsible for the exercises in Practical Astronomy.

Equipment The following equipment was purchased during 1970 :
1) An electronic desk Calculator HP 9100A, Hewlett-Packard, 2) A card punching machine, IBM 029/A22, 3) Three theodolites, 4) Four sextants, 5) A navy chronometer, Ulysse Nardin, 6) A recording chronograph, Favag, 7) A Focomat IIC, Leitz, 8) The first section of the Palomar Sky Atlas.

Research Program. Dr. B. Barbanis continued his studies on plane galactic orbits near the particle resonance in a spiral field.

Miss H. Livaniou participated to the observation of the transit of Mercury, May 9, at the Observatory of Pentele.

Publications. «Contributions from the Department of Astronomy, University of Patras» No 1. B. Barbanis : Particle Resonance in a Spiral Field, IAU Symposium No 38, 343, 1970.

Other Publications. B. Barbanis : Lectures on Differential Equations, (in greek), Patras, 1970.

Meetings. Dr. B. Barbanis participated in the following meetings :

1) IAU Colloquium No 10 on «Gravitational n-Body Problem» held in Cambridge, England, August 12 - 15, 1970.

2) The XIVth General Assembly of the International Astronomical Union (Brighton, August 18-27, 1970).

3) N.A.T.O. Advanced Study Institute on «Physics of the Solar Corona» (Cavouri - Greece, September 7-17, 1970).

Miss Livaniou attended the N.A.T.O. Advanced Study Institute on «Physics of the Solar Corona».

The Head of the Department
Professor B. Barbanis