ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1990

Minutes of Annual General Meeting held at the South African Astronomical Observatory, Cape Town, on Wednesday 1990 July 25 at 20h00.

Present

The President, Dr. Ian S. Glass, in the Chair. 28 members and 8 visitors were present.

Welcome by the Chair

The Chairman extended a hearty welcome to members and visitors and particularly to Mr. J. Bondietti, a former President of the Society and to Mr. Jim Knight, Director of the Solar Observing Section, who normally resides in Johannesburg.

Apologies

Apologies for absence were received from Dr. K.G. Fuhr, Messers Peter Briton, Jose Campos, Danie Overbeek and Peter van Blommenstein.

Minutes

Minutes of the previous Annual General Meeting held at the South African Astronomical Observatory on Wednesday 1989 July 26 at 20h00, which had been circulated among members through the medium of MNASSA, were taken as read. It was proposed by Mr. R. Hurly and seconded by Mr. C.R.G. Turk that they be adopted as an acceptable reflection of the proceedings. All in favour.

Matters arising from the minutes

Nil

Report of Council

The Honorary Secretary presented his Report on the proceedings of Council for the year ending 1990 June 30. It was agreed that the Report be adopted. (See this issue of MNASSA).

Reports of the Directors of the Observing Sections

Computing Section: Director: Mr. T. Hilton. Read by Mr. J. Churms. Comet and Meteor Section: Director: Mr. Jose Campos. Read by Dr. T. Lloyd Evans. Occultation Sections: Director: Mr. M.D. Overbeek. Read by Mr. C.R.G. Turk. Solar Observing Section: Director: Mr. J. Knight. Read by the Director. Variable Star Section: Director: Mr. Jan Hers. Read by Mr. R. Hurly.

The Directors and their co-workers were complimented and commended on the excellent work they are doing in furthering the advance of astronomy not only in Southern Africa but in the world at large. It would be invidious to single out any particular Section but reference was made to Mr. Danie Overbeek's record breaking 16101 observations of Variable Stars which makes him a world leader. (See this issue of MNASSA for reports).

Financial Statement

The Honorary Treasurer, Mr. D. Duprez, presented his annual statement for the Financial Year ending 1990 June 30. After a discussion it was agreed to accept the statement subject to audit. It was noted with satisfaction that there would be no further increase in the annual subscription of R75 for the

1990/1991 Financial Year.

Mr. D. Duprez was thanked for having handled the Society's finances with his usual expertise.

ASSA Endowment Trust (ASSET)

The Honorary Secretary of the Trust, Mr. C.R.G. Turk, presented his audited Annual Report for the year ending 1989 December 31. Donations received totaled R730 which raised the invested capital to R7116. The distributable reserves stood at R4601.

Mr. Turk was accorded a hearty vote of thanks for his work on behalf of the Trust. He noted that the income for the year had amounted to R1200. (See this issue of MNASSA for statement).

Election of Council for 1990/1991

President:	Mr. Jose da Silva Campos
Vice-Presidents:	Dr. I.S. Glass
	Dr. T.H.H. Lloyd Evans
	Mr. M. Soltynski
Members:	Mr. B. Fraser
	Mr. A. Hilton
	Mr. M.D. Overbeek
	Professor W.F. Wargau
Hon. Secretary:	Mr. H.E. Krumm
Hon. Treasurer:	Mr. D. Duprez
Business Manager:	Vacant

As more nominations for "Members" were received than the four required, a ballot was held and the above is the outcome.

Election of Auditors

It was proposed and seconded that Penkin, Zeller and Associates be re-elected Carried.

Membership Secretary

Mrs. Audrey Joubert was elected membership Secretary of the Society for another term of office.

The position which she occupies is no sinecure. She was commended and thanked for the diligent way in which she controls the ramifications of a membership secretary of a Society such as ours.

Maclear's Bottle

Mr. R. Hurly congratulated Mr. A.D.B. Cameron of the Cape Centre on his initiative, drive and tenacity in discovering the exact spot and the bottle where Maclear buried the bottle. The place marks the northern station used by Maclear in his re-survey of Lacaille's arc of the meridian. (Applause).

Presidential Address

With Mr. Rupert Hurly in the Chair the meeting proceeded to Dr. I.S. Glass delivering his Presidential Address entitled "Mira Variables".

Starting with the discovery of Mira itself by David Fabricius at the end of the 16th century, Dr. Glass explained the important role played by these variable stars in astronomy today.

The identification of mira variables in the Large Magellanic Cloud and the

observation of these in the infrared has enabled a reliable Period-Luminosity relationship to be set up.

Examples were given of studies concerning mira variables as distance indicators. These included the Small Magellanic Cloud, the Centre of the Milky Way galaxy and the galactic globular clusters.

The President concluded that mira variables could now take their place amongst the more reliable distance indicators in astronomy.

Vote of Thanks

Mr. M. Soltynski proposed a warm vote of thanks to Dr. Glass for his stimulating, informative and interesting address. (Applause).

Closing

There being no further business the Chairman adjourned the meeting at 22h10.

Members and visitors proceeded to partake of tea and biscuits kindly supplied by the Cape Centre to whom we owe a hearty vote of thanks for acting as our hosts of the evening.

H.E. Krumm
Honorary Secretary

REPORT OF COUNCIL

REPORT OF COUNCIL FOR THE YEAR ENDING 1990 JUNE 30

Council met on five occasions during their term of office. The average attendance was 12 out of a possible 16 members and alternates.

The President, Dr. I.S. Glass, took the Chair at all meetings.

Mrs. A. Joubert attended Coucil Meetings in her capacity as Membership Secretary.

Membership

According to Mrs. A. Joubert, the membership of the Society stood at 422 at 1990 June 30 compared with 456 at the end of the previous financial year. 50 new members joined the Society, 14 resigned, 67 were suspended for non-payment of subscriptions and 3 died. These figures show that the Society suffered a net loss of 34 members.

Obituaries

Mr. J.C. Bennett

The Society lost one of its most distinguished members in the person of Jack Bennett who died in Pretoria on 1990 May 30 at the age of 76 years after a long illness. He had suffered from arthritis for several years but his condition eventually deteriorated to such an extent that he was no longer able to do any observing. Its severity caused him to give up his home in Pretoria and move to Mothwa Haven in Eloffsdal where he passed away after much suffering.

John Caister Bennett was born in South Africa of English parents. His father, who was a Methodist missionary, called at the Cape enroute from Australia back to England but fell in love with the place and decided to stay here.

Jack was a member of the original Moonwatch Patrol but he will probably best be remembered as a comet-hunter. Two comets bear his name, one of which, that of 1970 became brilliant and was the brightest for many years. He will also be remembered for having visually discovered a supernova in a distant galaxy. He was the Director of the Comet and Meteor Section for many years, a position now held by the President-elect, Mr. Jose Campos of Durban.

He was President of the Society in 1968-69, was awarded the Gill Medal in 1970 and elected an Honorary Member of the Society in October 1989. In the same year the International Astronomical Union accepted a recommendation that the minor planet discovered by Rob McNaught of Siding Spring, N.S.W. on 1986 November 4, VD 4093 be named Bennett in recognition of his great work. The University of the Witwatersrand awarded him the honorary degree of MSc.

Miss C.C. van Ellinckhuizen

Miss Van Ellinckhuizen, a member of longstanding, passed away in October 1989 at Rondebosch, Cape. She bequethed her collection of SKY & TELESCOPE covering a period of 30 years to the Society. It was agreed to put it up for sale.

Finance

Council's efforts to stabalise the Society's financial position were described at great length in last year's Report and will not therefore be repeated here, suffice to say that the decisions were not without merit. Acting on the worthy Treasurer's forecast that the financial year would end with a not inconsiderable surplus, Council decided that the present annual subscription of R75 shall remain unchanged throughout the 1990-91 financial year.

Grant-in-Aid

Council acknowledges with thanks a grant-in-aid of R500 from the Department of Education and Culture, House of Assembly towards the production costs of the Society's publications.

Honorary Treasurer

Mr. D. Duprez assumed duty as Honorary Treasurer on 1989 July 1. The Society was indeed fortunate in acquiring the services of one of its members with his expertise. It is clear that he is dedicated to his task which absorbs a great deal of his free time.

Business Manager

When Mr. W.L. Combrinck left Cape Town for the Transvaal Mrs. Elizabeth Olsen kindly agreed to take over the duties of Financial Manager up to the end of the financial year, for which Council was duly thankful.

When no offers were forthcoming from local members of the Society to fill the vacancy when Mrs. Olsen retired, Mrs. Audrey Joubert, Mrs. Elizabeth Olsen and Mr. Cliff Turk took to the highways and byways in an attempt to seduce a suitable candidate, preferably retired and who was not a member of the Society into accepting the post of Business Manager at a salary to be agreed upon. Unfortunately they eventually returned to the Council table empty handed. They had done their best for which Council was truly thankful.

At its last meeting of the financial year held on 1990 June 18, Council decided to ask Dr. I.S. Glass to word a suitable notice for insertion in the next issue of MNASSA.

MNASSA

MNASSA lost its Assistant Editor, Mr. Jonathan Spencer Jones, when he resigned his post at SAAO at the end of August 1989 in order to return to Britain. His help was greatly missed at MNASSA where he served as Business Manager from 1978-84 and from 1981-89 as Assistant Editor mainly concerned with Centrepiece. He took a great interest in the affairs of the Society and held a number of positions including that of President from 1987-88.

At its 1989 October meeting Dr. I.S. Glass informed Council that he intended resigning as Editor of MNASSA with effect from 1989 December due to pressure of work.

Council extends a warm vote of thanks to Dr. Ian Glass for editing MNASSA with obvious distinction for almost six years. Its international standing is due in no small measure to his ability as an editor in the broadest sense and to the high standard he maintained. It is good to know that he has not severed his connections with MNASSA as he continues to compile and edit "NEWS NOTES".

Dr. Glass wishes to extend his thanks to Mr. Charles Allen for his help in opening and sorting mail arriving at SAAO in connection with the Society.

In the light of the Editor's pending resignation a meeting of the Editorial Board was convened to discuss the future of MNASSA and the likely difficulty in finding another Editor.

To a momentous meeting of Council held on 1989 October 16 the Board submitted the following alternative proposals:-

(1) That MNASSA be discontinued

(2) That an annual publication be instituted to appear after the Annual General Meeting.

Professor Brian Warner, who is a member of the Board, explained that it was not the intention of the Board that MNASSA should be discontinued provided that an editor could be found. After a long discussion during which the ping-pong ball danced across the table in such a manner from speaker to speaker that the Honorary Secretary might be forgiven for developing schizaphrenia, not to mention paranoia, it became clear that Council endorsed the Board's feelings that MNASSA should be retained, if at all possible. At this stage the meeting took on an atmosphere more reminiscent of a funeral parlour than a gathering of 15 gay members of Council. Luckily the gloom was soon dispelled and there were tidings of great joy when the previous editor, Mr. Joe Churms announced that he was prepared to take over the duties of MNASSA for the 1990 calendar year. Greeted with applause and with a hearty vote of thanks to Mr. Churms.

Council extends its warmest thanks to Mr. Maciej Soltynski for his regular contributions to Centrepiece. The exellence of his Southern Sky Notes are obviously the result of much thought and careful preparation. They are most helpful, informative and make interesting reading.

Annual Handbook

Miss Pat Booth proved herself a worthy successor to Mr. Rupert Hurly who edited the Handbook for 14 years. There is little doubt that its preparation is a daunting, time absorbing and responsible task requiring meticulous attention to detail. Council wishes to thank and congratulate Miss Booth on her production of the 1990 Annual Handbook.

There was an unprededented demand for the 1990 Year Book, such that it became necessary to print an extra 300 copies. This was attributed to popular talks given on the radio as well as increased sales in places such as the South African Museum Bookshop at the Planetarium in Cape Town.

Sky and Telescope

Complaints had been received from members about the unsatisfactory delays in the distribution of SKY & TELESCOPE. Council recognised that problems had occasionally been experienced with our local distributors but these were promptly rectified by the Membership Secretary. A more intangible problem arose from time to time due to the failure on the part of the publishers of SKY & TELESCOPE to mail the necessary documentation before the actual receipt of several consignments at the Cape. Customs will not release goods without the necessary documents.

The Honorary Treasurer wrote several strongly worded minutes to the publishers stressing the seriousness of the problem. His action seems to be bearing fruit.

Light Pollution

A member of Council, Mr. Brian Fraser of the Transvaal Centre wrote to Council expressing concern that nothing was being done about the pollution of the atmosphere by lighting. Light pollution affects most people especailly astronomers who are the hardest hit by it. He was aware that to educate the public is a task of enormous proportions and proposed that the Society could enlist the assistance of its Centres in starting a campaign to inform the public that light pollution does exist.

The issue of the pollution of the atmosphere by lighting has become such an important matter as to cause the International Astronomical Union to appoint a commission to study the subject.

It was agreed to ask Mr. Fraser to draw up a document which could be used as a press release in the name of the Society. Council decided that the document subsequently submitted by Mr. Fraser was a fair statement of the situation and that it be submitted to Dr. John Menzies of SAAO, and who was also a member of the above IAU Commission, for his comments. It was duly returned to Mr. Fraser for distribution to the Press after due notice had been taken of Dr. Menzies remarks.

ZUO Time Signals

Dissatisfaction and frustration dominated the discussions and correspondence on the ZUO time signal affair. The signals became less accurate as the year progressed. On one occasion Mr. M.D. Overbeek observed that ZUO was 460 milleseconds slow. Mr. Jan Hers of the variable Star Section, the "father" of ZUO, reported that the signals became progressively less reliable as time went on.

Mr. Overbeek, who has maintained constant contact with the Department of Posts and Telecommunications, eventually in desperation sent letters to IOTA and ILOC explaining the position in which occultation observers found themselves suggesting that they might bring the observers dilemma to the notice of Dr. Arndt, Director of the Department of Research and Development of the CSIR. Dr. Yoshio Kubo of the International Lunar Occultation Centre (ILOC) of Tokyo subsequently wrote to Dr. Arndt stating the necessity of an accurate time service in South Africa. He went on to state that South Africa is one of the most active regions in the world carrying out lunar occultation observations and for which they are most grateful.

In conclusion it might be stated that ZUO went off the air in October 1989.

Acknowledgements

Thanks are due to the Director of SAAO, Dr. M.W. Feast for the facilities placed at the disposal of the Society. The University of Cape Town and SAAO are thanked for their valued assistance in the production of MNASSA, particularly Mrs. Penny Dobbie (UCT) and Mrs. F.D. Paterson and Miss D. Cooper for typing.

Council fully appreciates the valuable work being done by the Centre Committees who make themselves responsible for arrangings meeting and other affairs for their members and the public.

Finally, the Observing Sections and in particular their Directors are to be commended for the valuable work that they carry out, often under very trying circumstances.

H.E. Krumm
Honorary Secretary

SECTION REPORTS

Computing Section

Director : A.S. Hilton

Report for July 1989 to June 1990

This section was formed in 1987 and it has attracted some 50 interested people who have all returned a questionnaire. The information has been tabulated and forms the basis of a Data Base of Astronomical computing software. A complete list of the software available was Printed in MNASSA Volume 47 nos. 9 & 10 Page 101-102. The addition to the Data Base of Software is as follows:-

10. TELLSTAR Produced by Scharf Software Systems, Inc. This Package is "Your Computer Graphics Window to the Universe." It displays on the Graphics Screen some 250 Stars, Planets, Halleys Comet and Messier objects for any particular location, Time and Date, one can scroll from one section of the sky to the next, search for a particular object by name, place a cursor over any object and identify it, or outline the constellations if required. There are also a number of utilities which enable one to compute the following:-

1) Equatorial to Horizontal Coordinates
2) Horizontal to Equatorial Coordinates
3) Ecliptic to Equatorial Coordinates
4) Precession since 1950
5) Solar system objects

The Package is available for Dos Compatible Computers.

Grazing Occultation Predictions are computed and distributed by the Section to the following Locations in Southern Africa, (Through the Director of Occultations, Mr. D. Overbeek):-

Cape Town	Cape	South Africa
Edenvale	Transvaal	South Africa
Harare		Zimbabwe
Nigel	Transvaal	South Africa
Pinetown	Natal	South Africa
Pretoria	Transvaal	South Africa
Sedgefield	Cape	South Africa
Windhoek		Namibia

All the star position data is kindly supplied by David Dunham and his team. It is interesting to note that to run these predictions takes a total of 24 hours of computing time on a 7.5 Mhz -Clock PC. The 1991 predictions will be run on a 24 Mhz -Clock 386 PC which should reduce the processing time to about 2 hours.

The Computing section will hold a number of informal meetings in the forthcoming year to exchange software and ideas.

Finally I would like to thank all those who have assisted the section over the past years.

Comet and Meteor Section

Director : J.A.S. Campos

It is with deepest regret that this Section, its members and Director, heard of the passing away of Jack Bennett on the 30th of May 1990. Jack was Director of this Section between 1968 and 1985. He discovered comets Bennett 1970 II and 1974 XV. His encouragement and advice will be greatly missed by many members here and friends overseas.

Report for the period January to December 1989:

Comets

During the year in review, 5 circulars were issued to interested members.

Comet Yanaka 1988r: Discovered by Japanese amateur astronomer T. Yanaka on 29th. Dec. 1988 in Ophiuchus, with 25x150 binoculars; this new comet was intrinsically very faint and it did not become brighter than 10.5 magnitude.

Comet Yanaka 1989a: On the 1st January 1989 T. Yanaka discovered his 2nd comet with the same instrument, an 11th mag. object near the Bootes/Virgo border in the eastern morning sky. At the time of discovery, this comet had passed perihelion and did not become brighter than mag. 11.

Comet Bradfield 1989c: Discovered by W. Bradfield, Australia on Jan 6th 1989, 12th mag. in Indus, with a 25cm reflector. This comet reached perihelion on Dec. 05, 1988.

Periodic comet Brorsen-Metcalf 1989o: Following unsuccessful searches at several observatories, it was recovered by E. Halin, Palomar Obs.; During the 2nd week of Aug./89 it reached mag. 6.1; revised orbital elements by B. Marsden gives it's period as 70.586 years (IAU Circ. 4805).

Comet Okazaki-Levy-Rudenko 1989r: Photographic discovery with a 0.25m Schmidt camera by K. Okazaki, Japan, 13th mag. on Aug. 24th and discovered visually by D. Levy, Arizona, 10.6 mag. on Aug. 25th and by M. Rudenko, Massachussets, 26th Aug. as an 11th mag. object in Hercules. This comet did not become as bright as it was expected but it reached 5.2 mag. with a 2 deg. tail on Nov. 25th.

Comet Helin-Roman-Alu 1989v: Discovered on photographic plates taken by Eleanor Helin, Brian Roman and Jeff Alu with the 0.46 Schmidt telescope at Palomar on Oct 1st, as a 14.5 mag. in Piscis, near the ecliptic, this comet became a moderately bright object of 9th mag. but no observations were received from members of this Section.

Comet Aarseth-Brewington 1989al: Discovered on Nov. 16th by K. Aarseth (Norway) at 8.5 mag. in Corona Borealis and independently discovered by H.J. Brewington, South Carolina, USA, with a 0.40m telescope. This comet attained mag. 3.7 on Dec. 17th, with a 2 deg. 40' long tail. This comet was the 27th comet during 1989 to be discovered or recovered, thus the "al" designation.

Comet Austin 1989c1: This 11th mag. diffuse comet was discovered visually on Dec. 6th in Tucana by amateur astronomer Rodney Austin, New Zealand. This much publicized comet was expected to put up a fine display and reach mag. zero near perihelion (T= 1990 Apr. 09.85 ET; q=0.349 AU) but it did not become brighter than 5th magnitude. This comet was well observed by members of this Section.

Observations were received from M. Begbie, J. Vincent, S. Walsh, Harare Centre; S. Encke, Windhoek; V. Neto, Brasil; R. Fleet, UK; T. Cooper, Transvaal Centre; M. Geyser, Pretoria Centre; P. van Blommestein, B. Hollenbach and C. Turk, Cape Centre; J. Campos, Natal Centre.

The observations received from members of this Section were summarized and sent to the International Comet Quarterly, and to W.R. Brooks Obs., both in the USA. Some of the comet observations were published in IAU circulars.

Comet seeking: Was undertaken by P. van Blommestein, Simon's Town, and by your Director who used a 5" Apogee telescope.

Fireballs and Meteor Showers

A -5.0 mag. fireball was reported by Mrs. M. Pilar, a member of the Natal Centre; it was observed from her home at La Lucia, on the 9th of May 1989 at 22h41 SAST. Yellowish head and reddish trail, duration about 3 seconds, ending at approx. 9 deg. south of Alpha Cen and 22 deg. above the sea horizon. No sound was heard.

A bright fireball was seen on May 14th at 05h15 SAST by a member of the public, Mr. Colin Barraclouth of Durban; it was visible for about 2 seconds, and it did appear to move very fast, along the Durban bayhead, from west towards east, disappearing over the harbour. No sound was heard. Magnitude brighter than that of Venus.

Geminids: Observed on December 13th 1988 by R. Fleet, Harare, faintest naked-eye star visible, 6.0 mag; facing northeast; 00h40 to 04h57 UT: 49 Geminids and 25 sporadic meteors (plus 5 naked-eye satellites).

Also observed by Cliff Turk from the Cederberg Mtns. on 1988 Dec. 14th between 22h58 and 23h58 UT; 20 Geminids were counted; all fairly slow, white in colour and only 1 with a very short-lived trail at about 23h12; 2 possible Puppid-Velids were also seen during the watch, appearing to emanate from the False Cross area towards the Geminid radiant, on parallel paths about 1 deg. apart and with a 30 second interval. The previous evening, Mr. Turk noticed about 7 meteors that appeared to come from the Geminid radiant. This meteor count was sent by Mr. Turk to the BAA Meteor Section.

Pyxids: This interesting shower was monitored by T. Cooper, Benoni, Van Blommestein, Simon's Town and by J. Campos, Durban, between March 3rd and 10th, 1989; a report appeared in MNASSA, Nos. 9 & 10, Oct./89 issue. Further obs. were received from Bill Holllenbach who, with a group of friends observed on the 4th March between 19h30/20h30 UT from the grounds of Sutherland Obs; 8 Pyxids

were counted and they appeared from a radiant at approx. RA 09h00 Dec. -35 degrees. During the same watch, 4 Corvids, 9 Velaids, 4 possible Leonids and 1 sporadic meteor were seen.

Possible meteors from Sco-Sgr system? Bill Hollenbach and a friend, observing from Vissers Hok Rd, between Durbanville and Melkbos on 28th July 1989 from 20h45 to 21h20 UT, counted 26 meteors of which 14 appeared to emanate from a radiant at approx. RA 18h00 and -36 deg., mostly white in colour and swift, ranging from magnitude +4 to -4; a map with the plotted paths was received. 12 sporadic meteors were also seen.

Alpha Capricornids and Eta Sagittarids: On the 29th July 1989; the first session, 18h25 to 19h25 UT was observed by Raymond Barber and Mr. and Mrs. Barber, Lynette Rens, Sheila Begg and J. Campos. A second session, between 20h05 and 21h05 UT was obtained by Rens, Begg and Campos. The Alpha Cap were interesting in that they produced 3 very bright fine meteors of mag. -2 and -3 with trails between 5 and 12 degrees long. The faintest naked-eye star visible (Campos) during both sessions, was +5.1 mag.

Alpha Scorpiids: Peter van Blommestein covered this shower from Simon's Town, between April 11th and May 6th, logging a total of 13 hours (clouded on May 3rd); no meteors seen; the faintest naked-eye star seen during the sessions was 4.5 mag. W Scorpius. This shower is known to produce fine fireballs.

Capricornids: Watched by Van Blommestein, Simon's Town, between 22h30 and 00h00 UT, 3rd/4th Aug: 1 Capricornid of mag. -1.0, white, 3 second duration; and between 20h30 and 22h30 UT, Aug 4th: 1 Capricornid of 4th mag., white, 2 sec.

Perseids: Observed by Richard Fleet from Hayes End, England, on the 12th Aug 1988, facing north, between 22h27 and 23h43 UT, naked-eye limit 4,5 (some cirrus), 23 Perseids counted and 4 sporadics.

All the meteor observations reported, were passed on to "Meteor News", which is published in the USA.

Other activities: During March 1989 your Director presented a talk/slide show at St. Mary's Diocesan School for Girls, Kloof and I have carried on with my monthly column with topics of interest on general Astronomy, published in the The Daily News, Durban. I also presented a talk with slides on "Comets" as part of a beginner's basic course on astronomy for members of the Natal Centre.

Once again, I thank Brian Marsden and Daniel Green for the supply of IAU circulars and I thank the SAAD and J. Menzies for the continuous support given. Thanks are also due to John Bortle, W.R. Brooks Obs. USA, for the supply of his comet circulars. My final thanks go to all the observers of this Section, for their time and observations.

Occultation Sections

Director : M.D. Overbeek

Activities in the three areas of occultation observing were quite satisfactory during the reporting year, as will be seen below.

During the reporting year, the national ZUO time service deteriorated badly before ceasing altogether, causing alarm and despondency amongst observers. At one time the service was so inaccurate that the Director had to write to the Postmaster General, pointing out to him that he was disseminating dis-information which could harm scientific endeavours.

Council requested the Director to elicit aid from the International Occultation Timing Association in the USA and from the International Lunar Occultation Centre in Japan. These bodies wrote to the South African parastatal organisation concerned, pointing out that observations obtained by users of a continuous broadcast time service are perhaps more important than is acknowledged by the South African scientific Establishment.

Occultation observers need not be discouraged by the third world-like lack of a national time signal. Total occultations can be timed quite satisfactorily using a quartz stop watch set to the SABC "six pips". If the stop watch has a "lap time" mode, then many events can be timed before the watch needs to be reset. Timing grazing and planetary occultations with the aid of a tape recorder can be accomplished safely and accurately by recording a national radio broadcast together with observers' comments. The reduction of timings obtained in this way are a little tedious and also, prior arrangements have to be made to record the broadcast together with a time signal. In view of the safety and convenience of the procedure as far as the observers are concerned, however, this procedure is highly recommended.

Total Occultations

Observer	*Disappearances*	*Reappearances*	*Total*	
H Cameron	20	1	21	
B Fraser	6	0	6	
KG Fuhr	113	83	196	
M Geyser	1	0	1	
J Knight	74	3	76	
MD Overbeek	75	6	81	Including 5 photoelectric.
J Smit	63	28	91	
C Turk	38	8	46	
J Vincent	81	10	91	
P v Blommestein	98	11	109	

Dr Fuhr, the oldest observer, deserves congratulations and the respect of us youngsters. Not only did he amass the largest total, but the number of his early morning reappearance observations exceeds the total of the rest of us.

Grazing Occultations

It is gratifying to note that so many freelance efforts are made by individual members. A graze observed from one or two stations is infinitely more valuable than no observation. Twenty two plus observers obtained 71 timings, in a total of fourteen attempts.

1989	*Star*	*Place*	*Stations*	*Timings*	*Observers. Leader underlined*
Jan 15	SAO 075413	Simons Town	1	3	'P van Blommestein'
Apr 10	Beta Tauri	Hennenman	2	20	'D Overbeek' M Hulatt.
Apr 10	Beta Tauri	Winterskloof	2	8	'C Lake' and students.
Apr 10	Beta Tauri	Pieterm'burg	2	4	'G Prosser' S Dale.
Apr 10	Beta Tauri	Isipingo	6	1 Miss.	'D Overbeek' S Begg S Booysen J Campanini J Campos S Campos J Canning H Mitchell L Rens Pam Ross Paul Ross All stations observed a miss due to the writer's failure to transmit sufficiently clear positioning information to the observers.
May 15	SAO 118355	Simons Town	1	2	'P van Blommestein'
May 14	SAO 118380	Naboomspruit	2	8	'D Overbeek' M Hulatt.
Jun 17	Antares	Aberdeen	1	1	'J Hers'
Jun 30	SAO 76094	Grootvlei	1	6	'D Overbeek'
Jul 12	X 20283	Rooihuiskraal	3	0	'B Fraser' D Michie D Overbeek. Intermittent cloud.
Jul 25	SAO 92484	Thabazimbi	1	8	'M Mulder'.
Jul 30	SAO 78483	Randburg	2	10	'D Overbeek' R Wallace.
Aug 17	42 Cap	Kenza, Kenya	4?	0	'S Begg' H Cowie and others.

Aug 17, Graze of 42 Capricornii: This event took place during a total eclipse of the moon, when a northern limit graze also occurred in Egypt. Paul Maley of IOTA and the writer planned to repeat the 1985 May 4 exercise which involved observing grazes of the bright star Zuben El Genubi at the northern and southern limbs, from the Sudan and from Southern Africa. (See MNASSA 44, 11 and 12)

Dr Hans-Joachim Bode of IOTA-ES was to travel from Germany to Egypt to take care of the northern observations and the writer was to organise the Kenya observations. In the event, the Kenya Minister of Interior saw fit to refuse the writer a tourist visa but fortunately our member Miss Sheila Begg who was on her way to visit her parents in Kenya stepped into the breach. She broke her Durban-Nairobi flight at Jan Smuts Airport to collect observing equipment and

for a crash course in the niceties of graze observing, which she could pass on to the Kenya amateurs. This she did very successfully but the exercise was ruined by cloud. Also, Dr Bode cancelled his Egypt arrangements because of the visa problem. All was not lost, however, as we have now established contact with the amateurs in and around Nairobi and may well call upon them to co-operate with us in future.

Planetary Occultations

Although no occultations were observed, the year was an interesting one. The following observers are thanked for their efforts: M Begbie, J Campos, J Churms, T Cooper, D de Beer, S Enke, R Field, B Fraser, D Laing, G Marshall, N McDonald, D Michie, M Mulder, G Prosser, D Schiller, J Smit, C Turk, P van Blommestein, N Wakefield, R Wallace and D West. They and the writer made a total of 107 observations. "Cloud" reports are not included in this total.

1989 #1, Feb 06: AGK3 +02 0414 by 3 Juno: An appulse at approximately the right time was reported by S Enke at Windhoek. Bad weather was experienced at Durban, the East Rand, Pretoria, Simons Town and Thabazimbi.

#2, Feb 15: AGK3+02 1383 by 338 Budrosa: At Sedgefield, J Hers observed a miss. Bad weather was experienced at Durban, on the East Rand, at Pretoria, Simons Town and Thabazimbi.

#3, Feb 19: AGK3 +13 0909 by 1143 Odysseus: Misses reported from the East Rand by the writer, Pretoria by J Smit and Simons Town by P van Blommestein. Cloud reported from Durban and Thabazimbi.

#4, Feb 25: AGK3 +04 0240 by 18 Melpomene: Miss reported from Johannesburg by B Fraser and Simons Town by P van Blommestein. J Smit in Pretoria reported a 2" miss.

#5, Feb 25: AGK3 +12 0528 by 69 Hesperia: Misses reported by B Fraser in Johannesburg, J Smit in Pretoria, P van Blommestein in Simons Town and N Wakefield in Walkerville. Edenvale had cloud.

#6, Mar 11: AGK3 +20 0971 by 530 Turandot: Misses reported from the East Rand by D Schiller, Johannesburg by R Wallace and D Michie, from Pretoria by J Smit and from Simons Town by P van Blommestein. Edenvale had cloud.

#7, Mar 15: AGK3+15 0592 by 690 Wratislavia: Misses reported from Cape Town by C Turk, from the East Rand by T Cooper, D Schiller and the writer, from Johannesburg by B Fraser, D West and G Marshall, from Pretoria by J Smit, from Simons Town by P van Blommestein, from Thabazimbi by M Mulder and from Walkerville by N Wakefield.

#8, Mar 17: SAO 185093 by 790 Pretoria: Aptly enough, the only observation was from Pretoria where J Smit saw a miss. Cloud was experienced on the the East Rand and Simons Town.

#9, Apr 10: AGK3+03 0981 by 415 Palatia: Misses reported from the East Rand by the writer, from Pretoria by J Smit and from Thabazimbi by M Mulder. Cape

Town and Pietermaritzburg had cloud.

#10, May 9: AGK3+02 2689 by 273 Atropos: On the East Rand the writer had a miss and cloud interruptions, at Pennington on the Natal South Coast, H Mitchell had a miss. Bad weather was reported from Durban, Pretoria and Simons Town.

#11, May 24: AGK3+01 1702 by 412 Elisebetha: Misses and some cloud reported from Durban by J Campos, the East Rand by T Cooper and the writer, from Johannesburg by B Fraser, Pretoria by J Smit and Walkerville by N Wakefield. Cloud and mist reported from Pietermaritzburg and Simons Town.

#12, May 29: SAO 139359 by 171 Ophelia: Misses reported from Durban by J Campos, from the East Rand where the writer had some cloud and Pietermaritzburg by G Prosser. Cloud was experienced in Pretoria and Walkerville.

#13, Jun 06: SAO 141914 by 313 Chaldaea: Misses were reported from Pietermaritzburg by G Prosser, Simons Town by P van Blommestein and Windhoek by S Enke. Cloud reported from the East Rand, Pretoria and Walkerville.

#14, Jun 16: SAO 187080 by 346 Hermentaria: Photoelectric recordings of misses were obtained in Cape Town by J Churms, on the East Rand by the writer and at Sutherland by D Laing. A visual miss was observed at Pretoria by J Smit. Cloud was experienced at Pinelands, Pietermaritzburg and Simons Town.

#15, Jun 29: AGK3-00 1824 by 87 Sylvia: Misses observed from the East Rand by T Cooper, D Schiller, and the writer, from Johannesburg by B Fraser and also from Walkerville by N Wakefield, Pretoria by J Smit, Pennington by H Mitchell and Pietermaritzburg by G Prosser. Sedgefield had cloud.

#16, Jun 30: AGK3+00 2098 by 601 Nerthus: Misses reported from the East Rand by T Cooper, D Schiller and the writer, and also by N Wakefield at Walkerville. Cloud obscured Pennington, Pietermaritzburg and Sedgefield.

#16a, Jul 02 and #16b, Jul 03, 28 Sagittarii by Saturn's Magnetosphere: In 1984 and 1988, astronomers at the Indian Institute of Astrophysics and the SAAO obtained light curves of stars occulted by Saturn's magnetosphere, which were highly suggestive of material at about 12.5 and 19 radii from the planet's centre. Dr AWJ Cousins, who obtained the 1988 curves, did not consider that a case had been made out for the presence of solid material. Be that as it may, the occultation of 28 Sgr presented another opportunity to investigate the matter and some 40 observatories around the world were invited to participate in a co-operative programme organised by Dr R Vasundhara of the Indian Institute of Astrophysics in an attempt to duplicate the observations.

Of the South African observatories invited to participate, the SAAO Cape Town had cloud, Sutherland had cloud and instrument problems but produced some results, Sedgefield reported cloud, Nigel reported software problems and the TVL Centre Johannesburg suffered a leakage current which produced several thousand bins containing zeros. Full traces of both events were obtained at the Edenvale observatory and the trace of July 2 appears to be the most complete one made worldwide. A complete trace was also obtained of the Jul 3 event but unfortunately, the writer increased the time constant of his photometer to one

second because of the large zenith distance involved and this caused any possible short fades to be damped out in the record.

The exercise failed to throw further light on the remarkable 1984-1988 results and we shall have to await a further opportunity.

#17, Jul 4: SAO 187255 by Titan: Misses observed on the East Rand by T Cooper and the writer, at Pennington by H Mitchell, at Harare by M Begbie, N McDonald and J Vincent, and at Pretoria by J Smit. Cape Town had cloud.

#18, Jul 9: SAO 157428 by 675 Ludmilla: Misses reported from the East Rand by T Cooper, from Pennington by H Mitchell, from Pretoria by J Smit, Simons Town by P v Blommestein, Thabazimbi by M Mulder. Cloud reported from Edenvale, Johannesburg, Pietermaritzburg and Walkerville.

#19, Jul 23: SAO 211938 by 693 Zerbinetta: Misses reported from the East Rand by the writer, Pennington by H Mitchell and Simons Town by P van Blommestein.

#20, Aug 15: AGK3+00 2576 by 409 Aspasia: Miss reported from the East Rand by the writer who had short interruptions from cloud. Cloud reported from Simons Town and Thabazimbi.

#21, Aug 20: AGK3+00 1998 by 386 Siegena: Misses reported from Johannesburg by R Wallace, Pretoria by J Smit and Thabazimbi by M Mulder. Cloud reported from Simons Town.

#22, Sep 2: AGK3+00 0076 by 24 Themis: A Photoelectric observation was attempted on the East Rand by the writer, who failed to obtain a trace but was nevertheless able to observe a miss through the photometer's beam splitter. In Pretoria, J Smit observed a miss. Cloud was reported from Simons Town.

#23, Sep 5: *AGK3+01 2821 by 79 Eurynome*: Appulses were observed from the East Rand by the writer, Pretoria by J Smit, and Thabazimbi by M Mulder. The appulse times were approximately five minutes early.

#24, Sep 19: SAO130468 by 893 Leopoldina: Misses reported from the East Rand by T Cooper and the writer and Pretoria by J Smit. Pennington had cloud.

#25, Sep 23: AGK3+04 0492 by 246 Asporina: Misses reported from the East Rand by the writer who had some cloud and from Johannesburg by G Marshall. Harare and Pennington had cloud.

#26, Oct 16: SAO 189062 by 359 Georgia: At Sutherland, D Laing obtained a photoelectric record of a miss. Visual misses were observed from Harare between cloud by J Vincent and at Simons Town by P v Blommestein. Cloud was experienced on the East Rand, Pennington, Pretoria and Walkerville.

#27, Nov 8: SAO 164047 by 16 Psyche: Miss reported from Simons Town by P van Blommestein. Cape Town, the East Rand, Harare, Pretoria and Thabazimbi had cloud.

#28, Dec 1: AGK3+21 0987 by 498 Tokio: Miss from Simons Town reported by P van Blommestein. Cloud covered Cape Town, the East Rand, Pretoria and Pennington.

#29, Dec 2: AGK3+10 1463 by 118 Peitho: The only predicted event that was not observed. The East Rand, Pennington and Pretoria and Simons Town had cloud.

#30, Dec 13: AGK3+08 0362 by 369 Aeria: At Cape Town, J Churms obtained a photoelectric trace of a miss. A visual miss was seen at Simons Town by P van Blommestein. The East Rand, Pennington and Pretoria had cloud.

#31, Dec 24: AGK3+22 0871 by 584 Semiramis: Appulses were observed from the East Rand by the writer and T Cooper, from Pretoria by J Smit. The appulses were at least five minutes early. Misses reported from Johannesburg by R Wallace, and from Pennington by H Mitchell. Observers at Durban and Ladysmith failed to identify the target star. Simons Town had cloud.

#32, Dec 27: Anonymous star by 6 Hebe: A merge at about the right time was observed at Pretoria by J Smit. Ladysmith and Pennington had cloud.

The minor planet observations were based on predictions produced by Dr Edwin Goffin of Hoboken, Belgium, who used facilities most generously made available to him by Agfa Gevaert, Belgium.

Solar Section

Director : J.E.D.I. Knight

1989 was a year of contrasts for the Solar section. Despite the fastest rise in Solar cycle activity on record, increased press coverage and interesting sights to be seen in the telescope, regular observations of the Sun has wilted and fallen on the shoulders of the faithful few. This was due to many factors, most importantly, the Director was ill for a great part of the year and without exposure, regular reports etc., this was a major factor in the motivation of regular observers and getting new potential observers off the ground.

One of our long standing and reliably regular observers, J.G. Barker of Durban passed away. He was observing the Sun long before the Solar section was established and it was through him that we began to co-operate with the Solar observing organisations in Germany.

Other regular observers were forced to stop their activities due to ill health and work commitments and we trust that when they have a chance, they can once again turn their telescopes towards the Sun. Despite the setbacks experienced, the section is still alive and did much useful work during 1989.

Solar activity in 1989 was very high. In January and February observed average monthly values for the Sunspot number were just over 200. April saw them drop to 172, the lowest for the year, whilst the highest values occurred in June, when they shot up to just under 300. A second high peak occurred again in September and a third, even higher peak was recorded in November when the values went up to 255. The second half of the year was more active than the first, which is consistent with expectations as this cycle (cycle 22) rushes towards its maximum.

As mentioned in last years report, the Sun was big news. The rapid rise of the current cycle has produced a dramatic increase in the Solar Extreme Ultra Violet (EUV) flux, for example. This has in turn increased the heating of the Earths upper atmosphere above 100 km, increasing atmospheric density which in turn has increased the drag on satellites. The result was that institutions like NASA became very concerned about the orbital-life times for the Hubble Space Telescope and Long Duration Exposure Facility (LDEF) missions in particular. Much replanning of reboost and other launches took place as a result. Several satellites were in fact lost by this increased drag and they burnt up on reentry far sooner than anticipated, whilst low altitude polar satellites tumbled out of control.

Large Proton Events also increased dramatically and this is of concern to commercial airliners, particularly those flying along Polar routes where the Earths magnetic field curves down to the surface. This allows charged particles to penetrate to low altitudes, thereby exposing passengers and particularly crew to elevated levels of radiation. The Russian, and American astronauts to a lesser extent, are exposed to an even greater risk. During October the total flux of Protons with energies greater than 10 MeV, was greater than that for the entire previous Solar cycle and the flux recieved in the last four months of the year almost equaled the flux for cycles 20 and 21 combined!

Other Solar induced newsmakers were the temporary shut down of the computers on the Toronto Stock Exchange in August due to the effects of a Solar flare induced Proton Event. Geomagnetic storms induced so much extra power into the Scandinavian and Canadian power grids that the province of Quebec suffered a long duration power failure. This storm was the result of flares produced by one of the largest Sunspots ever observed. Dramatic Auroral displays were also seen at low latitudes during this time, including Howick in Natal. Many a military institution went into a frenzy, as suddenly the "enemy" were jamming them, and found it rather difficult to accept that if they went outside and looked up, the answer was staring them in the face.

Solar section activities for the year are summarised as follows :-

Visual Observing: Solar activity fluctuated between the 170 and 293 values for the observed Sunspot average during the year. The peak of activity was in June, whilst the trough was in April. Despite these large differences, overall, the values levelled off into a plateau throughout the year. The Sun was cluttered with Sunspot groups, and often 15 or more were visible on the Solar disk making spectacular viewing and counting difficult.

As previously mentioned, the number of regular observers dropped and reports were received from the following observers during the year :- J. Barker (13 observations), D.S. Botha (160), J. Campos (10), H. Cameron (233), J. Knight (253), M. Lyons (36), D. Schiller (59) and F. van Nieuwkerk (30). Our observer in Namibia, S. Enke also began to submit daily Hydrogen Alpha drawings of the Solar disk.

Radio Telescope Observations: Our Radio Telescope run by A. Voorveld of Wits University was in operation almost continually throughout the year and provided useful information about Solar Radio activity.

Solar Flare Detection: Our network of Sudden Enhancement of Signal (SES) receivers increased to 4 and regular monitoring of stations in the United States and Australia allowed detection of flares using the East and

West propagation paths. Flare activity at the beginning of the year lagged behind those of cycle 21 and were not indicative of the dramatic increase in Sunspot activity. By year end, this situation had changed as activity picked up markedly. Flare activity is anticipated to increase markedly next year as we get to Solar maximum.

The number of violent flares did increase as expected and several of these produced strong enough events to be recorded as Ground Level Events (GLE), the first detected this cycle. Strong flares also played havoc with Radio communications up to the Giga Hertz frequencies, electronic equipment, power grids, etc.

Magnetic Storm Detection: Only one Magnetometer operated by M.D. Overbeek remained in operation throughout the year. Other units operated by D. Schiller and C. Winskill operated intermittently and were used several times at exhibitions.

Aurora Watch: After a visit to the Cape Centre by the Director, a network of observers was established to look for Auroral activity when an alert was issued. A major Geomagnetic storm occurring during darkness is a likely candidate for such activity and the watch is alerted by the Director when such a storm occurs. Astronomy being what it is resulted in cloud interference every time an alert was issued!

Despite these setbacks and false alarms, this group of observers is encouraged to continue with its activities. Spotting of a decent Aurora one day will make it all worthwhile as they will see an event that would only have been seen if they had been out of doors by chance whilst such a spectacle is in progress. The planetary Occultation observers have the same problem - and rewards. John Davison is the Cape coordinator for this group and interested members can contact him or the Director for details.

Other Activities:

A.S.S.A Centers; The Solar section monthly reports continue to be distributed to all A.S.S.A. centres for information and inclusion in their newsletters. This activity was disrupted and occurred at irregular intervals due to the protracted illness of the Director. Lectures and talks were given to the Cape, Pretoria and Transvaal centres during the year.

School Demonstrations; The Director and Frans van Nieuwkerk were involved with giving talks and practical Solar viewing demonstrations to school children from Gifted Child Schools that run Astronomy courses. Robyn Learmonth continued to be the Astronomy examiner for Boy Scout, Girl Guide, Cub and Brownie packs that took Astronomy proficiency badges.

Visits; This activity was severely curtailed during the year and the Director only managed to visit a few observers in the Cape, Natal and Transvaal. No overseas visits were undertaken.

Radio Broadcasts; The section continued to provide a weekly report broadcast over the Amateur Radio network on Sundays and Wednesdays. Unfortunately, this activity was curtailed towards the end of the year. Several reports and interviews were also broadcast over Radio South Africa on the local and overseas services.

Exhibitions; Several members took part in Astronomy week and the Wits Science Fun Day during the year.

Indications are that this Solar cycle could be the best on record and members of our Society are encouraged to be aware of the very high levels of activity. As this report indicates, the Sun is affecting us in more ways than we think.

Happy Sunspotting!

Variable Star Section

Director : J. Hers

Report for the period 1989 January 1 to December 31

With slightly fewer observers than the previous year, the total number of observations in 1989 was nevertheless an all time record. And here it is only right to pay tribute to the industry of Danie Overbeek, who continues to be a world leader in this respect. A special "thank you" also to all the other observers, because visual observations can never rely on one observer only. It is only through the combined efforts of many different observers, working at different places, with different instruments and at different times, that maximum accuracy can be obtained.

There is certainly no lack of interest in variable star observing, for enquiries from potential new observers are received at regular intervals. However, although the enquirers are sent a copy of Frank Bateson's booklet "The Observation of Variable Stars", which gives a simple introduction to the subject, this seldom results in any actual measures. Which is a pity, because making an estimate of magnitude is not nearly as difficult as many beginners seem to think. There are very many variables - especially here in the south - which are easily visible in small telescopes, and which are waiting to be observed, but which remain unmeasured simply because there are not enough people to do so.

Once again the cooperation with Janet Mattei, the Director of the AAVSO in the U.S.A. and Frank Bateson, Director of the Variable Star Section of the R.A.S. of New Zealand, has been greatly appreciated. Of particular value are the many new charts with photo-electric magnitudes which are being published in connection with the HIPPARCOS programme.

The Apple computer, which was aquired in 1983 to keep a record of all South African variable star observations, was replaced in October by a more modern IBM computer. Apart from its much higher speed, the new system now makes it possible to read in the voluminous Overbeek data direct from a magnetic diskette. The way has now been made clear to send all South African observations monthly by this method to the AAVSO and the RAS of N.Z., using the formats preferred by these organisations.

The following visual observations have been received during the year from observers in southern Africa.

Observers	*Town*	*No. of Observations*	
J.A. Campos	Durban	169	
T. Cooper	Benoni	483	
B. Fraser	Johannesburg	36	
R.W. Jones	Fish Hoek	1159	
M. Geyser	Pretoria	13	
C. Henshaw	Botswana	482	(1)
J. Hers	Sedgefield	132	
J.L. Jooste	Hartenbos	31	
P. Meyers	Cape Town	41	
M.D. Overbeek	Edenvale	16101	
L. Pazzi	Nigel	*	(2)
D. Schiller	Benoni	8	
J.A. Smit	Pretoria	316	
C. Turk	Cape Town	119	
		19090	

Notes (1) Plus numerous measures reported to other organisations.
(2) Photo-electric observations.

A.S.S.A. ENDOWMENT TRUST (ASSET)

Balance Sheet as at 31st December, 1989

Trust Capital	
Balance as at 31st December 1988	6386.29
Donations received during the year	730.00
	R 7116.29
Distributable Reserve	
Balance of Income and Expenditure Account	4601.21
	R11717.50
Represented by	
Investments:	
United Ltd, Fixed Period Deposits	3300.00
United Ltd, Indef. Period Deposits	1700.00
United Ltd, Fixed Deposits	6000.00
UBS Holdings Ltd, Equity Shares (at cost)	660.00
Savings Account:	
United Ltd	57.50
	R11717.50

Income and Expenditure Account
for the year to 31st December, 1989

Income		
Dividends and interest received:		1225.36
Deduct Expenses		
Postage	Nil	
Grant to ASSA	Nil	nil
Excess of income over expenditure for the year		1225.36
Excess of income over expenditure from previous year		3375.85
		R 4601.21
Notes		
United Fixed Period Deposits:		
15.5% p.a. maturing 30 Sep 90		R 2500.00
15.0% p.a. maturing 30 Oct 90		R 800.00
United Indefinite Period Desposits:		
Account No 4656-7102		R 1700.00
United Fixed Deposits:		
13.5% p.a. maturing 8 Oct 92		R 1000.00
13.3% p.a. maturing 23 Jul 91		R 2000.00
17.5% p.a. maturing 7 Dec 90		R 2000.00
16.25% p.a. maturing 25 Mar 90		R 1000.00
UBS Holdings Ltd. Equity Shares (cost)		R 660.00
(market value R2046.00)		

P.A.T. Wild
Trustee

C.R.S. Turk
Secretary

I have examined the above balance sheet and income and expenditure account which in my opinion respectively give a true and fair view of the state of the affairs of the ASSA Endowment Trust (Asset) as at 31st December, 1989, and of its income and expenditure for the year ended on that date.

G.H. Larmuth
Honorary Auditor

but this is regarded as unlikely to be the true explanation because all the available gas and dust would have been used up during the initial period of star formation. A second, also unlikely, proposed explanation is that these stars are somehow more efficient at mixing hydrogen - a virtually 100 percent efficiency would be needed - and thus maintaining the hydrogen burning phase.

The third and most likely explanation, proposed independently by Fred Hoyle and W.H. McCrea in 1964, is that blue stragglers result from the merging of two stars or their capture by each other to form a tight binary system; this would stir up the unburnt hydrogen and cause the new phase of hydrogen burning. This scenario is feasible because such encounters must occur relatively frequently in the tightly packed cores of globular clusters, and indeed it is estimated that about 1% of the stars in a globular cluster have had a close encounter with another star.

The blue stragglers are thought to play a critical role in the dynamical evolution of the cluster. While the Space Telescope observations do not conclusively allow one to distinguish between the various theories of their formation, other evidence for close encounters between stars and the existence of binaries in 47 Tuc suggests that the binary model is indeed the most likely. Further confirmation is that the high concentration of these stars in the core of the cluster suggests that they are significantly more massive than other cluster stars, as expected on the binary model. (Jonathan Spencer Jones)

Symposium in Honor of Michael W. Feast

A symposium entitled "Variable Stars and Galaxies" will be held from 5 - 7 February 1992 at the University of Cape Town in honor of Prof M.W. Feast on his retirement from the Directorship of SAAO. Topics will include variable stars, stellar populations, galactic structure, the Magellanic Clouds and the extragalactic scale. The invited speakers include A.A. Boyarchuk (Moscow), R.D. Davies (Manchester), H. Habing (Leiden), R.P. Kraft (Santa Cruz), D. Lynden-Bell (Cambridge) and A.R. Sandage (Pasadena). Interested astronomers are invited to contact Prof B. Warner c/o SAAO, PO Box 9, Observatory 7935 or telephone no. (27) (21) 650-2391.

ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA
PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1991

Minutes of Annual General Meeting held at the South AFrican Astronomical Observatory, Cape Town, on Wednesday 1991 July 24 at 20h00.

Present

The President, Mr Jose Campos, in the Chair. 20 members and 8 visitors were present.

Welcome to the President

A hearty vote of welcome from the floor of the meeting was accorded the President, Mr Jose Campos, who had travelled from Durban to conduct the meeting and deliver the Presidential Address.

Welcome by the Chair

The President extended a warm welcome to the members and visitors. He was fully conscious of the honour at having been President of the Society and expressed his pleasure in being able to attend this meeting as the retiring President.

Apologies

Apologies for absence were received from Dr K G Fuhr, Dr I Glass, Messrs P Cramb, Jan Hers, A S Hilton, J Knight and M D Overbeek.

Minutes

Minutes of the previous Annual General Meeting held at the South African Astronomical Observatory, Cape Town, on Wednesday 1990 July 25 at 20h00 which had been circulated among members of the Society through the madium of MNASSA, were taken as read. It was proposed by Mr R Hurly and seconded by Mr D Duprez that they be accepted as an acceptable record of the proceedings. All in favour.

There were no comments arising from the Minutes.

Report of Council

The Honorary Secretary presented his Report on the deliberations of Council for the year ending 1991 June 30. It was agreed that the Report be adopted. Mr R Hurly proposed a vote of thanks to the Hon. Secretary. Carried.

Arising out of the Report the President reported that the response to the National Symposium on Astronomy had been good as he had received 65 replies to his questionnaire. A fairly large number had come from Professionals, colleges and universities. He would be giving further details in due course.

Reports of the Directors of the Observing Sections

It was noted with appreciation that the Directors had submitted synopses of their reports for the purpose of the Annual General Meeting. The reports in full appear in this issue of MNASSA.

Occultation Section: Director: Mr M D Overbeek. Read by Mr R Hurly. Comet and Meteor Section: Director: Mr Jose Campos. Read by the President. Variable Star Section: Director: Mr Jan Hers. Read by Mr J Spencer Jones. Solar Observing Section: Director: Mr J Knight. Read by Mr R Hurly. Computing Section: Director: Mr Tony Hilton. Read by Mr M G Soltynski.

The Directors and their co-workers were complimented on the excellent work they were doing in furthering the advance of astronomy not only in Southern Africa but in the world at large. It would be invidious to single out any particular section but it was agreed to write Mr M D Overbeek a letter congratulating him on his 17000 observations of Variable Stars.

Financial Statement

The Honorary Treasurer, Mr D Duprez, presented his annual financial statement for year ending 1991 June 30.

The favourable financial position of the Society at June 30 rendered it unnecessary to increase the subscription above its present level of R75 per annum for the coming year. The Treasurer remarked that it was unlikely that this favourable position would be repeated at the end of the coming financial year due mainly to an increase in the production costs of MNASSA and the Yearly Handbook and a possible rise in the price of SKY & TELESCOPE.

The Hon. Treasurer pointed out that the Financial Statement had not been audited. It was not the first time that an unaudited statement was presented at an Annual General Meeting. He maintained that there was insufficient time between the end of the Financial Year and the AGM for this to be done and went on to suggest that the date of the AGM should be transferred to the month of August if this state of affairs were to be avoided in the future.

It was agreed to accept the Financial Statement subjet to audit.

Mr D Duprez was thanked for having looked after the Society's finances with his usual expertise.

ASSA Endowment Trust (Asset)

A statement of the affairs of the Trust was not available due to the absence of the Hon. Secretary, Mr C R G Turk.

President:	Dr T H Lloyd Evans
Vice-Presidents:	Mr Jose da Silva Campos
	Mr M G Soltynski
	Professor W F Wargau
Members:	Mr Brian Fraser
	Dr I Glass
	Mr A Hilton
	Mr M D Overbeek
Hon. Secretary:	Mr H E Krumm
Hon. Treasurer:	Mr D Duprez
Business Manager/ Membership Secretary	Mrs A Joubert

It was proposed by Mr Peter van Blommenstein and seconded by Mr A D B Cameron that the election of the above Members of Council and Office-Bearers be confirmed. All in favour.

Mrs Audrey Joubert was commended and heartily thanked for agreeing to combine the Office of Business Manager with her already arduous task of Membership Secretary.

Appointment of Honorary Auditor

It was proposed and seconded that Mr R Glass of the firm Messrs Penkinn, Zeller and Karro be appointed for another term of office. Confirmed.

Presidential Address

With Dr T H Lloyd Evans in the Chair, the meeting proceeded to listen to an interesting discourse by the President on The Photometry of Naked-Eye Comets. The method used was similar in principle to that employed by variable star observers but that is were it stops. Comets are not points of light but fuzzy objects. Not all observers of comets use the same approach depending on what part of the comet they decide upon to measure its magnitude. Mr Campos dealt with the relative merits of this aspect of the photometry of Comets.

The discussion which followed on the conclusion of his address was an indication of the interest shown by the meeting in the manner in which the President handled his subject.

(The Presidential Address appears in full in this issue of MNASSA).

Closing

Mr J Campos returned to the Chair and personally thanked members of the Cape Centre, particularly Mr Hollanbach, for their hospitality and help during his stay at the Cape. He also thanked the Cape Centre for hosting the 1991 AGM, not forgetting the welcome refreshments provided.
The Chairman adjourned the meeting at 22h16.

H.E. Krumm
Honorary Secretary

REPORT OF COUNCIL

Council held five ordinary meetings during their term of office. The average attendance was 10 out of a possible 16 members and alternates.

The Chair was taken by Vice-Presidents Dr I S Glass and Dr T H Lloyd Evans 3 and 2 occasions respectively.

Membership

Figures submitted by the Membership Secretary, Mrs A Joubert, revealed that 3 members had died, 9 resigned and 32 were suspended for non-payment of subscriptions. New members numbered 51. The membership stood at 429 at 1991 June 30 compared with 422 for the previous year.

An increase in membership of 7 is not good enough. The membership of the Society has continued to decline, especially over the last six years. In 1986 it stood at 467. This was followed by a stagnant period of 3 years during which the number hovered round the 456 mark plus or minus one either way, until 1990 when it dropped to the all-time low of 422. The average intake of new members per year has not compensated for the number of resignations and suspensions.

The situation is a matter for concern. Council decided that the time had arrived for a membership drive. As a first step Council respectfully requests Centres and their representatives on Council to encourage the many non-members of the Society attached to their Centres, to join the Society. This could effectively be done by Centres through the the medium of the notices which they regularly despatch to their members, explaining what they receive in valuable publications for the nominal yearly subscription of R75.

Finance

The Honorary Treasurer, Mr D Duprez, continued to manage the financial affairs of the Society with his usual dedication and expertise and for which he deserves the heart-felt thanks and congratulations of Council.

At the last meeting of Council for the year held in June, Mr Duprez announced that the year would end with a surplus of available funds amounting to R6000 which is in keeping with his forecast during the year that it would not be necessary to increase the present subscription of R75 for 1991-1992. This utopian situation will not last for very long. Increasing costs will once again cause Council to revert to the procedure dear to the hearts of most municipalities by increasing the rates.

A hearty vote of thanks is accorded Mr D Duprez for his painstaking labours.

Mr R Glass of the firm of Messrs Penkinn, Zeller and Karro is thanked for having audited the books of the Society.

Grant-in-Aid

Council acknowledges with thanks a Grant-in-Aid of R500 from the Department of Education and Culture, House of Assembly, towards the production of the Society's publications.

Business Manager

Mrs A Joubert is heartily thanked for agreeing to carry on as acting Business Manager until a replacement can be found. As you know she is also our Membership Secretary.

Council agreed to accept a proposal from the Editor of the Handbook, Miss Pat Booth, that the distribution of this publication to subscribers be handled by the Business Manager.

Awards

No Awards were made during the year.

During the course of a conversation with the late Jack Bennett's sister, Mr C R G Turk had suggested to her that an Award similar to the de Kock Award might be instituted in memory of her brother. She was obviously delighted with the idea and hoped that Council would accept Mr Turk's suggestion. Council had no hesitation in doing just that. The form of the Award is under consideration.

While on the subject of Jack Bennett it should be reported that his medals and awards are in the safe keeping of Professor W Wargau. He was giving consideration to having them exhibited in a suitable locality.

North Terminal Points of Maclear's determination of De La Caille's Arc of the Meridian

On 18 June 1990 Mr A D B Cameron reported to Council that he in conjunction with Mr Keith Graham of the Trigonometrical Survey had established the positions of the north terminal points. In collaboration with the National Monuments Council and the Archeological Department of the University of Stellenbosch, it was proposed to excavate the site of Maclears point in an attempt to locate a quart bottle which he had buried at a depth of 3 1/2 feet. At a subsequent meeting of Council Mr Cameron reported that the bottle in question had actually been found. The occasion was suitably celebrated but not with the aid of the contents of Maclear's bottle as Maclear had given strict instructions that it should not be opened. Maclear had no intention of hosting such jolifications.

A comprehensive article by Mr Cameron appeared in MNASSA vol.49 Nos. 11 & 12 December 1990.

The time had now arrived for Council to approach the Director of the National Monuments Council, Mr George Hofmeyr, with a proposal that commemorative plaques should be erected at the sites of Maclears and La Caille's north terminal points as a fitting memorial to the efforts of these two men. In reply to Council's request, Dr J Deacon informed the Honorary Secretary that her Council was very much in favour of commemorating the occasion in the manner suggested by the Society.

A committee consisting of Messrs A D B Cameron (convener), Peter Briton and Rupert Hurly is at present liasing with the Monuments Council regarding the design and wording of the plaques and the costs and funding of the project.

National Symposium on Astronomy

During September 1990 Council received a proposal from the President of the Society, Mr Jose Campos suggesting that a symposium be held in Cape Town during April 1991. Lectures were to be given by leading South African professional and amateur astronomers and possibly by someone from overseas.

Council spent many long and involved discussions on the event as it was soon realised that this Symposium was a project of no mean proportions. The costs would not be inconsiderable. By the time February 1991 had arrived there were few signs that any progress had been made and that April 1991 was out and that the event would have to be transferred to April 1992. It was recognised that the symposium as originally envisaged was a little too ambitious and that consideration should be given to a project of more manageable proportions.

The President agreed to the proposed changes and subsequently drew up a revised programme which he distributed to all members of the Society and other interested persons in the form of a questionnaire. The new date has tentatively been set for April 23 to 25, 1992. Replies to the questionnaire are awaited.

Light Pollution

Council heartily endorsed Mr Brian Frasers amended memorandum on Light Pollution and agreed that it be released to the Press on behalf of the Society. Mr Fraser reported back to Council with the news that his approach to SATV for a programme to be included in 50/50 had met with a positive response.

Foundation for Research Development and the two Observatories

The Minister of National Education, Mr Gene Louw, had introduced legislation to the effect that the Foundation for Research Development (FRD) would secede from the CSIR and become an independent statuatory body. The Minister required to be informed of the Society's attitude to the transfer of the South African Astronomical Observatory and the Hartbeeshoek Radio Astronomical Observatory to FRD which now fell under the Department of National Education. Council agreed to inform the Minister that it strongly supported the proposed transfer of the two Observatories to the Foundation for Research Development.

MNASSA and Annual Handbook

One gets the impression that those that freely give of their time and talents in the preparation and production of MNASSA and the ANNUAL HANDBOOK are seldom accorded the recognition which they so richly desrve.

The high standard of MNASSA has been maintained under the competent editorship of Mr Joseph Churms. "News Notes" which is compiled and written by Dr Ian Glass contain much informative material and always make interesting reading. Mr M G Soltynski has become an institution having produced "Sky Notes" for many years. Their excellence is obviously the result of much thought and careful preparation.

When it comes to the ANNUAL HANDBOOK it takes a Rupert Hurly or a Pat Booth to produce a publication of this nature where accuracy and attention to detail are absolute necessities. Council wishes to thank Miss Booth for the devotion she brings to bear on the preparation of the HANDBOOK and congratulates her on the standard she maintains. The demand for this publication continues unabated.

Acknowledgements

Thanks are due to the Director of SAAO, Professor M W Feast, for facilities placed at the disposal of the Society. Thanks are also due to the University of Cape Town and SAAO for their valued assistance in the production of the Society's publications, particularly Mrs Penny Dobbie (UCT) and Mrs F D Paterson and Miss D L Cooper of SAAO for typing.

Council fully appreciates the valuable work being done by the Centres in many ways including the publications which they produce as part of their activities.

The Directors and members of the Observing Sections are to be thanked and congratulated on their valuable contributions to the science of Astronomy.

H.E. Krumm
Honorary Secretary

SECTION REPORTS

Comet and Meteor Section

Director : J.A.S. Campos

Comets

Five circulars on bright comets were sent to observers of this Section, reporting the discoveries of comets Austin 1989c1, Periodic comet Wild 4 (1990a), comet levy 1990c and comet Tsuchiya-Kiuchi 1990i. Of these, comet Austin 1989c1 was well observed during its apparition in our skies by several members, namely Messrs M Begbie (Harare), M. Geyser (Pretoria) and S. Walsh (Harare); observed magnitudes were about 3.5 mag. fainter than predictions; also its tail was much shorter than predictions. This comet was also observed by J. Vincent, Borrowdale, Zimbabwe and by Sonja Encke of Windhoek and P. Blommestein, Simon's Town. This comet faded very quickly.

Comet levy 1990c was also well covered; shortly after discovery on May 20th 1990, its motion towards the northeast appeared to be exceedingly slow and a very short tail was reported; Some 4 months from perihelion passage this comet appeared to be an intrinsically bright object, showing a strong central condensation.

No reports were received on comet Cernis-Kiuchi-Nakamura 1990b neither on comets Skorichenko-George 1989e1 or comet Tsuchiya-Kiuchi 1990i. A photograph of comet Okazaky-Levy-Rudenko taken on the 9th December 1989 was received from Sonja Encke, Namibia.

I would like to thank the SAAO and Dr J W Menzies for all the information on comets, supplied throughout the year. Once more, my thanks to John Bortle for the frequent supply of his comet circulars, as well as B. Marsden and D. Green, for keeping me posted with the IAU Circulars.

Meteors

An updated report form for meteors and fireballs was distributed to members of this Section; however, during the course of the year, this report form was replaced by a similar report form prepared by the International Meteor Organization, (IMO), based in Belgium, to conform with their standard procedures. During the year in revision, several fireballs were reported, these, in turn, were passed on to the IMO. The 1990 Eta Aquarids

were observed by T. Cooper of Benoni; negative results on the Chi Scorpiids between 4th/6th June 1990 were reported by P. Blommestein. The 1990 Pyxid meteor shower was observed by J. Campos, Durban. A -10 mag. fireball was seen by Mr Schwarzenberg-Czerny of the UCT, from SAAO, Sutherland, on the night of 22nd Sep. 1990; Reports on other fireballs were also received from Mr P Blommestein and from the Rev. Gerrit de Beer, Ladysmith. All these reports were passed on to the IMO. Lastly, I would like to thank all the observers for the observations received.

Computing Section

Director : A.S. Hilton

Report for July 1990 to June 1991

This section was formed in 1987 and it has attracted some 55 interested people. Their information has been tabulated and forms the basis of a Data Base of Astronomical computing software.

A complete list of the software available was printed on Page 101-102 of MNASSA Vol. 47 nos. 9 & 10 October 1988. Plus there is additional software as indicated in the annual report on Page 122 of MNASSA, Vol. 49 nos. 9 & 10 October 1990.

Using a Philips LDH 0460 CCD Solid-state camera head, I was able to record a Planetary Occultation of Star S184383 Mag. 7.3 by Irma Mag. 14.8, which was in fact a miss. However the Triplet of Tho Ohphiucci was clearly recorded on the Video Equipment. If any person is interested in the equipment specification and cost please contact me.

Grazing Occultation Predictions are computed and distributed by the Section to the following Locations in Southern Africa, (Through the Director of Occultations, Mr D Overbeek):-

Cape Town	Cape	South Africa
Edenvale	Transvaal	South Africa
Harare		Zimbabwe
Nigel	Transvaal	South Africa
Pinetown	Natal	South Africa
Pretoria	Transvaal	South Africa
Sedgefield	Cape	South Africa

All the star position data is kindly supplied by David Dunham and his team in the USA.

This year the computing power was supplied by Greg Corbett and Profile plots were debugged by Brian Fraser. I thank them for their kind help.

The Computing section will hold a number of informal meetings in the forthcoming year to exchange software and ideas.

Finally I would like to thank all those who have assisted the section over the past years.

Occultation Sections

Director : M.D. Overbeek

Occultation activities were somewhat curtailed by the lack of a national broadcast time signal. Although it is possible to make good occultation observations without such a service, amateurs tend to be discouraged by what is perceived as a lack of interest on the part of the scientific Establishment in positional astronomy. At the invitation of the FRD, however, ASSA members are being canvassed as to their timing needs. Perhaps this will help to negate the unfortunate impression mentioned above.

Total Occultations

Mr Brian Fraser is to be congratulated on joining the ranks of photoelectric occultation observers. He uses an Optek solid state photometer to acquire the data and a personal computer to store and process it. The time and amplitude resolution is not yet up to photoelectric standards, but the first, difficult step has been taken. Observations were made by:

H Cameron	37	0	37	
B Fraser	14	0	14	Including 5 photometric
K G Fuhr	48	38	86	
M D Overbeek	26	19	45	Including 1 photoelectric
J Smit	66	47	113	
P van Blommestein	86	1	87	
J Vincent	67	13	80	

Grazing Occultations

1990	Star	Place	Stations	Timings	Observers.
May 31	ZC 1599	St Winifreds	4	22	S & R Barbour, P & P Cramb, R Field, H & P Mitchell, S Moodley. This was an excellent effort and highly consistent times were obtained.
Aug 2	ZC 2558	Edenvale	5	7	B Fraser, A McRae, R Learmonth, D Overbeek Toldo, D.

Planetary Occultations

The year was a reasonably eventful one. Thirty-one events were attempted but only one positive observation of an occultation was made. The following individuals are thanked for their support: B Anderson (Ane), M Begbie (Beg), D Blane (Bln), J Campos (Cap), T Cooper (Coo), G Corderley (Cor), S Dale (Dael), R Dale (Dae2), G de Beer (Deb), S Enke (Enk), R Field (Fie), B Fraser (Frz), T Garde (Gad), M Geyer (Ges), J Hers (Her), J Jooste (Joo), J Knight (Kni), R Learmonth (Lea), A McRae (Mcr), D Michie (Mic), H

Mitchell (Mit), M Mulder (Mud), G Prosser (Pro), J Smit (Smi), H Tjirkali (Tji), D Toldo (Tol), C Turk (Tur), P van Blommestein (vnB), J Vincent (Vic), R Wallace (Wac), S Walsh (Was), D West (Wes). I have been asked by IOTA to use the three letter designations given in brackets above, in order to conform with IOTA practice.

#1, Jan 9: LickV 11365 by 279 Thule: No luck. Five places reported cloud.

#2, Jan 18: AGK3 +17 0396 by 410 Chloris: Misses were reported from the East Rand by Ove, Naboomspruit by Wac, Pennington by Mit, Pretoria by Smi, Shurugwi by Gad, Thabazimbi by Mud who was not quite sure of the star's identity. In Johannesburg, Mcr saw two highly dubious disappearances.

#3, Jan 31: AGK3 +00 1595 by 83 Beatrix: Misses were observed on the East Rand by Ove, Pretoria by Smi and in Sandton by Wac. Two places reported cloud.

#3a, Feb 4: C29 13862 by 93 Minerva: Miss seen in marginal conditions on East Rand by Ove. Three places reported cloud.

#4, Feb 15: AGK3 +15 0185 by 30 Urania: A photoelectric miss was recorded by Ove on the East Rand where Kni and Lea had visual misses. Misses were also reported from Johannesburg by Brian Fraser's team comprising Ane, Cor, Tol and Tji. Smi in Pretoria and Mcr in Sandton also had misses. Two places reported cloud.

#5, Mar 5: LickV 8224 by 481 Emita: Misses were reported from the East Rand by Ove, Erasmia by Ges, Simon's Town by Vnb. Two places reported cloud.

#6, Apr 3: AGK3 by 203 Pompeja: Miss reported by Vnb in Simon's Town. Five places reported cloud.

#7, Apr 14: SAO 137402 by 397 Vienna: Misses reported from Pennington by Mit, from Shurugwi by Gad and Simon's Town by Vnb. Four places reported cloud.

#8, Apr 18: SAO 189429 by 116 Sirona: Conditions were poor. One observer reported seeing a miss but the observation is considered dubious. Six places reported cloud or sunlight.

#9, Apr 22: SAO 183899 by 161 Athor: Miss observed on East Rand by Ove. One place reported cloud.

#10, Apr 28: SAO 165147 by Mars: In Durban, Cap reported a "d" at 03 37 18 and an "r" at 03 42 37, both ± 2 seconds and Fie saw a d and r but did not time the events because of poor seeing. On the East Rand, Ove timed a d at 03 38 04.4 ± 10 seconds and r at 03 41 34.0 ± 1 second. In Harare, Vic reported a d at 03 38 42 and an r at 03 41 58. He described the observation as difficult due to cloud. Beg in Harare had a d at 03 08 05 and

missed the r due to cloud. In Pennington, Mit made two good observations but had a tape recorder failure. At Unisa, Wol used the Unisa 9 inch refractor to observe a disappearance at 03 37 17 and a reappearance at 03 41 11, both ± 1 sec. One place reported cloud.

#11, May 3: SAO 146135 by 38 Leda: On East Rand, Ove obtained a good photoelectric trace of a miss and Vnb in Simon's Town had a visual miss. From Pennington, Mit reported an occultation but there is a problem with the data.

#12, May 15: SAO 146669 by 388 Charybdis: Misses reported from the East Rand by Ove, Harare by Vic, Pennington by Mit and Pretoria by Smi.

#12a, May 25: SWAO 124991 by Comet Austin: Misses were reported from the East Rand by Ove, Erasmia by Ges, Johannesburg by Frz and Pennington by Mit.

#13, May 30: SAO 184196 by 88 Thisbe: Appulses at approximately the right time were reported from the East Rand by Ove and Pretoria by Smi. Misses were reported from Johannesburg by Frz and Mcr.

#14 and #15, Jun 7 and 8: Two SAO stars by Comet Austin: The moon proved to be too bright.

#16, Jul 10: LickV 5597 by 86 Semele: On the East Rand, Coo and Ove observed misses, as did Mit in Pennington and Vnb in Simon's Town. One place reported smog.

#17, Jul 15: AGK3 -01 1862 by 3 Juno: On the East Rand, Ove observed a definite disappearance at UT 16 12 15.9 ± 0.8 seconds and reappearance at 16 12 51.9 ± 0.2 seconds. Unfortunately, the strong dusk light prevented two other potential observers from locating the field in time and so confirming Ove's observation. In Malelane, Coo observed a miss as did Mit in Pennington. One place reported cloud.

#18, Jul 28: LickV 2309 by 8 Flora: In Pietermartizburg, Pro reported an appulse. At Simon's Town, Vnb observed a miss. Three places reported cloud.

#19, Jul 28: SAO 186216 by 8 Flora: In Pietermaritzburg, Dae thought she saw a 14 second dimming which was later ascribed to interference from car headlights and Pro saw a miss, as did Vnb in Simon's Town. Two places reported cloud.

#20, Aug 13: SAO 189599 by 516 Amherstia: On the East Rand, Coo and Ove saw an appulse at least two minutes before the predicted time, as did Smi. Two places reported cloud.

#20a, Aug 18: An unpredicted occultation of SAO 107166 by the central condensation of 1990c Comet Levy was observed by Coo from Benoni and Beg from Harare. A separate report of the observations has been prepared by Coo.

#21, Aug 19: AGK3 +0 2856 by 38 Leda: On the East Rand, Coo, Kni and Ove saw a miss, as did Smi in Pretoria and Vnb in Simon's Town. One place reported cloud.

#22, Sep 6: AGK3 +09 0045 by 377 Campania: In Pretoria, Smi had a miss. Two place reported cloud and other problems.

#23, Sep 7: SAO 190967 by 501 Urhuxidur: In Pietermaritzburg, Dael, Dae2 and Pro observed a miss. Two places reported cloud.

#24, Sep 23: SAO 146303 by 689 Zita: On the East Rand, Coo and Ove observed a miss, as did Wes at Lanseria, Mit in Pennington and Smi in Pretoria. One place reported mist.

#25, Oct 11: LickV 6717 by 196 Philomena: An appulse at approximately the predicted time was observed by Ove on the East Rand and Smi in Pretoria. Bln at Henley on Klip observed a miss as did Vnb in Simon's Town.

#26, Nov 19: SAO 189987 by 537 Pauly: Miss reports from Smi in Pretoria and Joo in Reitz. Three places reported cloud and Ove was misled by cloud which cleared at the last moment.

#27, Nov 20: AGK3 +10 0029 by 838 Seraphina: Misses were reported by Smi in Pretoria and Vnb in Simon's Town. Seven places reported cloud.

#28, Nov 26: AGK3 +08 0147 by 614 Pia: Misses were reported from the East Rand by Coo and Henley on Klip by Bln. Four places reported cloud and Ove was misled again by cloud.

#29, Dec 5: LickV 2528 by 107 Camilla: Three places reported cloud.

#30, Dec 30: Four places reported interference from sunlight. The Drakensberg, whence Lea had dragged her 200mm telescope, was shrouded in cloud.

The cloud reports put paid to the idea that our region should be called "Sunny South Africa".

Solar Section

Director: J.E.D.I. Knight

Active participation by our observers dropped during the year whilst the small number of "regulars" has remained intact and they continued to submit high quality reports and keep the Solar Section very much alive and productive. We owe them a vote of thanks! A lean, stable but highly formidable section has now begun to emerge. To make it more effective, new observers need to be found. The resource of the "established" astronomical community such as the average reader of this report, appears to be fully tapped, as one can see from the small number of active members.

The Solar Section echo's the normal sentiment towards astronomy, and no doubt the other directors experience the same problem. Notwithstanding the "99% syndrome" (99% sit and 1% do) that all forms of club's and societies seem to be afflicted with, something can and is being done - by the Solar Section at least.

The director in co-operation with the East Rand Observers (EROS) has begun to institute a program to bring astronomy to that section of the population not yet tapped - the schools and the man in the street. Slides and equipment such as mylar filter, wedges, planispheres and eyepieces as well as 200mm (8") and 114mm (4½") reflectors have already been purchased. Several portable mounts are being made for this purpose by Mr Brian Frazer (ASSA). Much more needs to be done before the show can hit the road. Initial, but limited funding has been acquired from a company in the private sector to meet the running costs of the Solar Section and the left- over will be used to purchase more equipment, mainly from overseas. We need help from council and the members of our society in the form of slides, ideas, visual aids and old equipment (eg 50 or 60 mm refractors that are no longer used) that can be borrowed, copied, constructed or otherwise "obtained"

Solar activity during 1990 continued to be very high, but not at the levels experienced during 1989. The year opened with the International Sunspot Number for January being the 3rd highest Monthly Number this cycle. Activity then dropped substantially in February, rallied slightly in March and then dropped rapidly to reach the lowest levels of the year in June. The sunspot numbers then sky-rocketed to reach the brief but highest peak of the cycle to date in August. Thereafter, the numbers dropped to more moderate levels and the year ended with the levels similar to those experienced in March and April.

"Naked eye" spots were to be seen on nearly 200 days this year. Exceptionally large sunspot groups into which quite a few earth's could be placed were to be seen in January, April, May, July, August, October, November and December. In March, there were at least 4 "naked eye" spots of various sizes to be seen on the Sun.

In July activity picked up and from then until the end of August, the larger sunspot groups had areas of around 3000 x 106 Km2 . If you think that is big, the huge pair of spots that appeared on an otherwise inactive sun in November stole the show. This group of sunspots consisted of a pair of massive spots and over 100 smaller ones clustered around them and covered an incredible 9420 x 106 Km2!

Filaments and Prominences were also fine sights to behold and spectacular displays were to be seen in June and July and September through to November. In all, Filament activity was prominent for 5 months and prominence activity for 3 months of the year.

As anticipated, flare activity was up over last years levels. There were 291 M-class and 17 X-class flares that erupted this year, of which, 188 were detected by our instruments. The largest flare was an X9 that occurred in May. Flare activity was high in March, April, May, August, November and December, with the highest number (52) occurring in November. Activity was low in February, July, September and October.

The events at high and satellite altitudes and the geomagnetic field were similarly active. Proton events and enhancements were also up with 21 being experienced in 9 months of activity. The strongest proton event reached 950 pfu in March, with most events being experienced in a cluster spread between March and August when 2 or more events occurred each month.

Levels of activity reached sufficient intensity to precipitate 3 polar cap absorption events this year. Severe disruption of transpolar signals occur during these times and communications were curtailed when these events occurred in March (the strongest), June and August. Getting closer to the ground, the geomagnetic field only experienced one month when no minor or major storm raged and that was in December. In all, 27 days of minor and 11 days of major storming occurred this year. Sudden storm commencement impulses were experienced in all months except January and in all, 21 events were recorded. Distinct solar flare effects were noted in the geomagnetic field in April, May and December.

Spectacular aurora were seen in March, as far north as Durban and a second aurora a few days later was seen in the Eastern Cape. Further auroral displays occurred in April and November. On the ground things got hot too, with ground level events and a Forbush decrease being experienced in August around the time when the sunspots were at their prime!

At the end of the year, the prediction models indicated that July 1989 was sunspot maximum and that the high levels would remain protracted for several years with peaks of activity expected in May 1991 and at least again towards the end of 1991. It remains likely that whilst spurts of very high activity will occur, the consistent show of strength exhibited by the sun in 1989 will not be repeated again this cycle.

Solar Section activities for the year are summarised as follows :-

1] Visual Observing.

Solar activity fluctuated markedly this year with distinct peaks and troughs as well as active and inactive sides. When the sun was active, the face was cluttered with sunspot groups and at one stage 17 groups were visible, making spectacular viewing and difficult counting.

As previously mentioned, the number of active observers dropped and the following reports were received from D.S. Botha (245), H. Cameron (266), J. Knight (249), D. Schiller (17) and F. van Nieuwkerk (6) giving a total of 783 Solar observations for the year. Our observer in Namibia, Mrs S. Enke had to suspend her observations due to illness early in the year. We miss her valuable hydrogen alpha observations and drawings.

2] Radio Telescope Observations.

Our radio telescope operated by A. Voorveld was in operation for most of the year and continues to provide much useful information about solar activity in the radio frequencies.

3] Solar Flare Detection.

The section netted a bumper crop of flares. This year our network of 4 sudden enhancement of signal receivers situated at 3 different observatories monitored signals from stations in Australia and the United States, allowing detection of flares using the East and West propagation paths. X and M class flares were in more abundance this year and 17 violent X flares and 291 M flares erupted. Most months experienced at least 15 to 20 such events! Solar flare detection was undertaken by J. Knight, D. Overbeek and A Voorveld.

4] Momitoring of the Geomagnetic Field.

Magnetometer observations were received from D. Overbeek and the Magnetic Observatory in Hermanus. Daily observations of the 3 hourly k Index, sudden storm commencements, impulses and solar flare effects are supplied by Hermanus and D. Overbeek supplied the auroral alerts. My special thanks to Mr D. Nagtergale for making this information available to us at the end of each month as this information is of immense use in the compilation of the reports and other publications.

5] Aurora Watch.

Several aurora alerts were issued during the year and many reports received, as the spectacular auroras in March were well seen. The other auroras were not as well observed and remained reserved for the lucky few who looked or happened to see it by chance. Cloud as usual hampered the activities of the aurora watch, which has now expanded to include the Cape and Natal. J. Davison is the contact person in the Cape and J. Campos is the contact person in Durban.

Any reader interested can contact us and we are especially looking for people in the western and central parts of the country. A telephone is essential as alerts are only issued when a major geomagnetic storm is in progress at the

right time of the day, ie when it is dark and alerts are usually phoned through at around 21h00 SAST. Auroras tend to occur more often at equinox time due to the more favourable alignment that occurs at that time. No special equipment is necessary, but do make a note of time, direction, colours, shapes, etc and don't forget to let us know what you saw, no matter how little information you may have.

6] Publications.

The solar section's data, observations and reports are distributed to 25 users and interested bodies in Southern Africa, Australia, The United States of America, the United Kingdom and Germany on a monthly basis. The solar section continues to be actively involved with colleagues and organisations overseas, particularly Messrs P. Taylor of the AAVSO Solar Section, B. Hardie of the BAA Solar Section, R. Wiechoczek of InterSol and M. Gotz of the Pettisindex in Germany.

The solar section monthly reports are distributed to selected ASSA Centres, the Planetarium, teachers and other interested people. The receipt, reduction and dissemination of solar data and information is now a major and expensive activity involving printing, photocopying, postage, Fax, phone calls, etc, the majority of it overseas. The Section produces around 160 pages a month and the costs now exceed R100-00 a month, and cannot be borne by the Society or the Section and as a result finance was sought and obtained from a sympathetic company.

The Solar Section's monthly reports are also published in "Canopus" the ASSA Transvaal Centre newsletter and in MNASSA and it is planned that a report will be published in a popular astronomical magazine within the next year. A computer and printer have now been purchased in order that reports can be published more speedily and regularly and that these reports can be distributed on computer media to the various publishers. More sophisticated equipment will need to be purchased in 1991 to allow full electronic data interchange with users locally and overseas.

7] Other Activities.

7.1 Schools.

Members of the section continue to be involved with this activity which hopefully will be greatly expanded in the coming year. Mrs R. Learmonth continued to be the astronomy examiner for Boy Scouts, Girl Guides, Cubs and Brownie packs that took proficiency badges and she and G. Jacobs are also involved in teaching things astronomical to schools for gifted children.

7.2 Visits.

This activity was severely curtailed again this year and the director only managed to visit a few observers in the Cape and the Transvaal. No overseas visits were undertaken this year.

7.3 Radio Broadcasts.

This was also severely curtailed this year, but this task was kindly taken over by A. Voorveld who provided solar reports to the Amateur Radio network which broadcast it all over the country on Sundays and Wednesdays.

7.4 Exhibitions.

Several members once again took part in the Astronomy Week and the Science Fun Day activities in order that things solar be exhibited. Grateful acknowledgement is also given to those members of the ASSA Transvaal Centre who assisted us in this task.

Variable Star Section

Director : J Hers

During this year 11 active observers - 12 in 1989 - were responsible for 22331 observations, an increase of 17% over the previous year. As in the past, by far the greatest number was made by Danie Overbeek, but it is also very pleasing to note that the 'other observers' increased their output by 40%.

Several observers took part in programmes in connection with the HIPPARCOS, ROSAT and other satellites and it is clear that such cooperation will become more important in years to come. What will now be specially needed is a better geographical distribution of observers, so that a constant watch can be kept on certain stars regardless of the weather.

A start was made to transfer the earlier Apple computer files (over 10500 observations) to the IBM system which is used at present.

As from March all Danie Overbeek's observations have been sent on computer disks to both the AAVSO and the RAS of New Zealand. Later in the year this was extended to include the results of most other South African observers.

The following visual observations have been received from observers:

J.A. Campos	Durban	51
T. Cooper	Benoni	1232
M. Geyser	Pretoria	22
C. Henshaw	Botswana	880
J. Hers	Sedgefield	230
J.J. Jooste	Reitz	5
J.R. Jones	Fish Hoek	1642
M.D. Overbeek	Edenvale	17151
J.A. Smit	Pretoria	439
J. Vincent	Harare	166
S. Walch	Harare	83
		22331

Chris had plans for the production of an atlas of more modest scale (and cost) than the TVMPSA but ill health and advancing years forced him to draw in his horns. The writer spent many hours with him during the years of retreat from the hurly-burly of life and learned of his acceptance of physical infirmities and the shrinking of the world round a person of failing powers.

Eventually, his condition necessitated permanent residence in a nursing home and it was during a visit to him there, that the writer was reminded that Chris, universally regarded as a real gentleman, was far more than that: He was a very gallant gentleman. We extend condolences to his wife, daughter and family.

C Papadopoulos and the Astronomical Society of Southern Africa

Member of Council	1973 - 1976
Vice President	1974 and 1976
President	1975
Tenth Gill Medal Recipient	1983
Honorary Member	1988

ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA
PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1992

Minutes of the Annual General Meeting held at the South African Astronomical Observatory, Cape Town, on Wednesday 1992 July 29.

Present

The President, Dr Tom Lloyd Evans, in the chair. There were 21 members and 6 visitors present.

Opening

The President welcomed all present and thanked the Cape Centre for hosting the meeting once again.

Apologies

Apologies for absence were received from: Prof M Feast, Drs Fuhr and Cousins, Messrs W Hollenbach, B Dumas and J da Silva Campos and Mrs L Rens.

Minutes

The minutes of the 1991 Annual General Meeting which were published in MNASSA Vol.50 Nos. 9 & 10 were taken as read. It was then proposed by Mrs A Joubert and seconded by Mr P van Blommestein that these be accepted as a true reflection of the proceedings. There were no objections.

Matters Arising
None

Report of Council
The Hon Secretary presented his report on the work of council for the year (in his inimitable style), and concluded by informing those present that he wanted to step down as Hon Secretary, but would still be willing to serve on Council if so elected.

Mr Rupert Hurly proposed a vote of thanks to Mr Krumm for the many years hard work and time he sacrificed for the benefit of astronomy in Southern Africa. This was unanimously adopted amid rousing applause.

Report by Directors of Observing Sections
Occultation Section: Director Mr M D Overbeek. Read by Mr R Hurly. Variable Star Section: Director Mr J Hers. Read by Mr P van Blommestein. Comet and Meteor Section: Director Mr J da Silva Campos. Read by Mr M J Soltynski. Solar Section: Director Mr Jim Knight. Read by Mr R Hurly. Computing Section: Director Mr A Hilton. Report not received in time for the meeting.

Financial Statement
The Hon Treasurer presented his report on the Society's financial position. This will be published elsewhere in a later issue of MNASSA. He also gave advance notification of his intention of stepping down at the 1993 Annual General Meeting.

A.S.S.A. Endowment Trust
Mr C R G Turk, Secretary of the Trust, presented his Annual Report for 1991. The balance sheet of the Trust will be published later in MNASSA.

Mr Turk was thanked for his sterling work on behalf of the Trust and accorded a hearty round of applause.

Election of Office Bearers
The following nominations were received and were duly elected:

Mr M J Soltynski
Prof W Wargau
Dr T Lloyd Evans
Mr B D Fraser
Prof B C Raubenheimer
Mr A S Hilton
Mr D Overbeek
Mr H Krumm
Brian Skinner
Mr D DuPrez
Mrs A Joubert

Election of Honorary Auditor
It was proposed and seconded that Mr R Glass be re-elected Hon Auditor. This was agreed and he was thanked by Mr duPrez for his assistance with the finances of the ASSA.

Presidential Address

After taking the chair, the new President, Mr M J Soltynski invited Dr Tom Lloyd Evans to deliver his Presidential Address entitled "Variable Stars and Stellar Evolution".

Vote of Thanks

Mr J Spencer Jones thanked Dr Tom Lloyd Evans for his interesting and detailed address.

Gill Medal

The Gill Medal was awarded to Prof Brian Warner of the University of Cape Town and would be presented to him at a function to be held in the Library of the S.A.A.O. on October 7th 1992 at 20h00, which occasion members are encouraged to attend.

General

Mr R Hurly proposed that the Society congratulate Prof Michael Feast on being awarded the De Beers Gold Medal for Physics - the first time an Astronomer has been so awarded. All in favour.

The outgoing President thanked the Cape Centre for hosting the A.G.M. and providing the tea and biscuits.

Closing

The meeting was adjourned at 22h38.

H.E. Krumm
Honorary Secretary

REPORT OF COUNCIL

Council met on five occasions during their term of office. The average attendance was 13 out of a possible 18 members and alternates.

The chair was taken by the President, Dr T H Lloyd Evans on 4 occasions and once by the Vice-President, M G Soltynski.

Membership

According to the Membership Secretary, Mrs A Joubert, the membership of the Society stood at 443 on 1992 June 30 compared with 429 for the 1991 financial year. 54 new members joined the Society, 14 resigned or were suspended and 5 died.

As part of the drive to attract new members, Council decided to supply the Centres with back numbers of Sky and Telescope for distribution among their members who were not already full members of the Society. The effect of this move should become clear during the coming year.

Obituary

Mr Peter Britan

Peter Britan passed away on 1991 August 16 at the age of 66. He had not been a well man for some time. In 1986 he was appointed an alternate on Council for the representative of the Natal Centre, a position which he held up to the time of his death. He was an active member of the Cape Centre and did much to stimulate an interest in astronomy among the pupils of schools at the Cape.

Mr Christos Papadopoulos

Chris Papadopoulos died peacefully in Johannesburg on 1992 May 2 at the age of 84. He was President of the Society in 1974/75 and the Gill Meddalist in 1981. He was an engineer by profession and came to South Africa from his native Greece many years ago. He played an active role in the affairs of the Transvaal Centre. He was an ardent observer and is well known for the compilation of a photographic Star Atlas known as the "True Visual Magnitude Star Atlas", a work which is of lasting value all over the world.

A full obituary will appear in a future issue of MNASSA.

Finance

We are fortunate in having a hardworking, dedicated and able Hon. Treasurer in the person of Mr Danie Duprez. Council extends its thanks and appreciation for his diligent control of the Society's finances, which is a time consuming job.

Like all good treasurers, Mr Duprez can be a Jeremiah, in other words a prophet of doom. For instance, at a recent meeting of Council, he pointed out that financial statements for the 1990/91 financial year reflected a deficit of R3,607.00. He went on to state that the Society continued to operate at a loss during the present financial year. This placed a stress on the financial resources such that within two years these would be reduced to zero. An increase in the annual subscription was clearly indicated if bankruptcy was to be avoided.

Increase in the Annual Subscription

Ever sensitive to such pronouncements by the Hon. Treasurer, Council could interpret the writing on the wall. After a debate it was agreed that salvation could only be achieved by increasing the subscription from R75.00 to R85.00 per annum as from 1 July 1992. R85.00 might sound a lot of money but members are getting a bargain when it is realised that a year's supply of Sky and Telescope bought from a bookseller costs R200.00.

Concession to ageing members: I R H Brickett - Legacy

In 1986 Council was notified that the late Mr I R H Brickett had left the Society a sum of R2,000.00. This was invested and the interest accrued would be used to subsidise the subscriptions of members who had resigned as they were no longer able to pay the full subscription. Each case would be considered by Council on its merits. At the time Council agreed on a flat rate of R40.00 per member per annum. During the current financial yuer council decided to scrap the flat rate and to replace it with a new rate of 50% of the subscription.

Grant-in-aid

The Society received with thanks a grant-in-aid of R350.00 from the Department of Education and Culture - House of Assembly. R500.00 was received during the previous year.

Membership Secretary/Business Manager

No reference to finance would be complete without a hearty vote of thanks to Mrs Audrey Joubert for agreeing to carry these two weighty portfolios. She is looking forward to the hour when a Business Manager is found.

National Symposium of Astronomy - 23rd - 25th April

This event was undoubtedly the highlight of the year. It was held at the South African Museum and the SAAO from 23rd to 25th April 1992. It was the brainchild of Mr Jose Campos who suggested, during his year as President, that a Symposium should be held in Cape Town during April 1991 but due to the amount of work involved, it was decided to transfer it to April 1992.

The Symposium which was a "first" for the Society, was an outstanding success and was attended by 80 professionals and amateurs from Southern Africa. The lectures were of a high standard.

The success of the Symposium was due in no small measure to the activities of the Sub-Committee of Dr Tom Lloyd Evans, Dr Ian Glass and Mrs Ann Strauss, who are to be congratulated on the results of their efforts. Thanks are due to Mrs Elmara Willis of the S A Museum Planetarium and her staff who played a large part in the arrangements which contributed to the success of the event.

Miss Janet Mattei Director of the American Association of Variable Observers, was prepared to attend the Symposium but funds were insufficient to bring her to this Country. This predicament brought forth a reply from Mr Jan Hers, Director of the Variable Star Section, suggesting a method whereby individual members of the Society could be asked to contribute a not inconsiderable amount of cash. Although there was not enough time to implement his suggestion, it did cause Council to consider the establishment of a special fund within the Society to cover future projects.

The Symposium ended with a braaivleis on the Saturday at SAAO hosted by Cape Centre members. Mrs Hettie Glass is thanked for her very able contribution to this event.

A full account of the Symposium appeared in MNASSA, volume 51, No's 5 and 6 June 1992.

MNASSA and Annual Handbook

MNASSA continued to be published at regular intervals during the year under the able Editorship of Mr J Churms.

As usual Dr Ian Glass's contribution which appears under the title of "News Notes" is always most informative and very interesting. Among the individual contributions it was good to see that Mr Jonathan Spencer Jones had returned to the fold after an absence of several years overseas.

Council extends its warmest thanks to Mr J Churms, Dr Ian Glass and Mr M G Soltynski whose "Southern Sky Notes" were quite clearly the result of much thought and careful preparation.

Council wishes to thank and congratulate Miss Pat Booth on her production of the 1992 Annual Handbook. The amount of preparation and care which goes into its compilation surpasses description. It requires the wisdom of Solomon, the patience of Job and the assistance of the Directors of the Observing Sections.

Professor M W Feast

Professor Feast retired as Director of the SAAO at the end of March 1992. A Symposium entitled VARIABLE STARS AND GALAXIES was held at the Leslie Building, UCT from February 5 - 7 in his honour.

The Society is dependent to a large extend on the co-operation of the Director and the Society is grateful to Dr Feast for his interest in its affairs and for the facilities of the Observatory which he always made available to the Society.

Astrological Society of South Africa

Mr Danie Overbeek informed Council that Mrs Heather Anderson of the Centre for Continuing Studies, University of the Witwatersrand, had formed the Astrological Society of South Africa using our acronym ASSA. Council decided that Mrs Anderson should be asked, very nicely, to change the name of her group and to stop using our acronum as there was already enough confusion in the mind of the public of the difference between "astronomy" and "astrology".

Their "Director" in his reply, which did not impress Council as it savoured of political jargon, flatly refused to either change the name of their group or to cease to use our acronum. Council decided that no purpose would be served by pursuing the matter any further.

Historical Section

Reacting to a suggestion by Mr Jose Campos, Council decided to form a Historical Section. Mr J Spencer Jones agreed to be the Director and to establish its activities. Members who have material of historical interest are asked to contact him at P O Box 9, Observatory, Cape 7935.

Amendment to the Constitution

Ballot papers were sent to all members of the Society for their decision. 68 replies were received of which 65 were in favour, 2 were against and 1 member could not make up his mind. As two thirds were in favour of the change, it was agreed that the Constitution be amended accordingly.

Item 12 of the Constitution states that 10 full members of our Society are required in order to form a Centre-Council suggested that this number be reduced to 5.

Acknowledgements

Thanks are due to the Directors of SAAO, Professor M W Feast and Dr Robert Stobie for facilities placed at the disposal of the Society. Thanks are also due to the University of Cape Town and the SAAO for their valued assistance in the production of the Society's publications, particularly Mrs Penny Dobbie (UCT) and Mrs F D Paterson and Miss D L Cooper of SAAO for typing.

Council fully appreciates the valuable work being done by the Centres in many ways including the publications they produce as part of their activities.

The Directors and members of the Observing Sections are to be thanked and congratulated on their valuable contributions to the Science of Astronomy.

H.E. Krumm
Honorary Secretary

SECTION REPORTS

Comet and Meteor Section

Director: J. A. da Silva Campos

During the year in review, 3 circulars on bright comets were sent to interested comet observers. Although in the past years visual comet photometry by amateurs contributed largely to this Section, the same cannot be said this year; the average small, tailess 9th magnitude comet that from time to time is visible in our skies can hardly attract the attention and enthusiasm of new comet observers.

Halley's comet has come and gone and perhaps what we now need to stir up interest once more, is a great comet such as the one of 1882!

Last April during the ASSA Symposium I pointed out that more comet hunters and comet observers are needed in Southern Africa: Recently two members, Messrs C.J. Volschenk of Kempton Park and Dave Blane of Henley-on-Klip have joined this Section.

Several reports on meteor showers and fireballs were received from Messrs P van Blommestein (Simon's Town), Bill Hollenbach (Cedarberg Obs.), T. Cooper (Benoni) and Mrs M. do Pilar (Durban). Two spectacular fireballs brighter than the full moon were both seen by Bill Hollenbach on the 1st of February this year; the incident was reported on Radio Kontrei and it drew a mixture of responses from the general public. A comprenhensive report on meteor activity observed during June 1991 was received from T. Cooper, totalling 645 minutes of watch on 6 meteor showers.

A detailed report on these observations was sent to Meteor News (USA) and to the International Meteor Organization and to its Fireball Data Centre (Germany).

Once more, I would like to thank all who sent in their contributions and support, namely Brian Marsden, John Bortle and J.W. Menzies.

Computing Section

Director: A.S. Hilton

Report for July 1991 to June 1992

This section had a net gain of 4 interested people increasing to a total of 59 people.

This year the section has been able to obtain a lot more Software from various 'Public Domain Software Sources'. A comprehensive list of the software is supplied with this report.

I previously distributed the software free of charge. However, I have incurred expenses in obtaining the software. I have thus decided to supply all the software packages at R10.00 per disk, which includes copying time, media, postage and packaging within the republic.

Any person wishing to obtain a copy of any of the software may drop me a line at:- P O Box 68846, BRYANSTON, 2021. and simply order the software by the designated Disk Number.

Finally I would like to thank all those who have assisted the section over the years.

Disk No 1109 ASTRONOMY COLLECTION 1 (1 DISK)

AST is a Practical Astronomy program for your PC - gives a host of options for astronomers including views of the sky, constellation drawing etc. REQUIRES : CGA card.

MOONBEAM determines phase, position, illumination and other general info regarding the position of the moon and its relationship to Earth. Will also plot moon on a screen generated star chart using the Yale Observatory Bright Star database (included). Req: CGA Card, printer optional.

OPTICS gets optical parameters from the sophisticated lens user and returns a myriad of technical information about reflecting lenses/telescopes. Adapted from basic program (Byte Mar 1983 p 450). Turbo Pascal source included.

SUNSET accepts the date, time and location of position. Displays general info about sun in relation to Earth e.g. declination of sun, equation of time, the azimuth angles and times of sunrise and sunset for any point on earth. **SOLAR** is similar to **SUNSET** program mentioned above, with slight variations.

SUNRISE computes time of sunrise and sunset when given Date / Latitude / Longitude of observer. Sidney BC co-ordinates included. Can be customised for other areas.

*** Disk XXXX ONLY AVAILABLE FROM CSIR**

The **TELEPHONE TIME SERVICE** numbers are: (012) 841 4338 or (012) 841 3846.

In order for you to be able to access the Telephone Time Service, the C.S.I.R. provides you with a disk. This disk is "personalized", i.e. it contains a built-in secret password which is automatically sent to the C.S.I.R. after the communications link has been established. The C.S.I.R. keeps a file in which each call is automatically recorded in the following format :

Password Date Time

and you will be billed every month according to the contents of this file. It is therefore advisable to keep your disk in a safe place in order to avoid unauthorized access to it. However, if you suspect that this has happened the C.S.I.R. will provide you with another disk (i.e. with another password). The programs are protected by RSA copyright law and international treaty provisions. You must treat the program just like a book.

Disk No 1604 & 1605 ASTRONOMY STAR CATALOGUE 5 (1 Disk)

ASTRONOMY STAR CATALOGUE lists the named and designated stars of the 88 constellations. The stars are generally of the 6th magnitude or brighter, but some other stars of interest are included along with dimmer stars that are within 10 light years. There are about 1700 stars included and the name, magnitude, spectrum type, distance, and other information is included for each star. Other information includes cross-referenced stars, whether or not the star is a binary, variable, erratic variable, and the period of variation. All the information is listed concisely in columns on each page, and is easily-accessible to the user.

CONSTELLATION 88 gives a diagram of each of the 88 constellations, along with their general co-ordinates, right ascension, and declination. **SOLAR SYSTEM** gives essential facts and figures on the planets, moons, asteroids, and satellites within our solar system. Information includes distance, diameter, rotation, revolution, orbit, eccentricity, and much more. Diagrams of celestial bodies are also in this program. ASTRONOMY NOTES contains general information concerning stellar astronomy. Many topics are discussed such as spectral classes, Hubble's constant, Kepler's Harmonic Law, and Hertsprung-Russell diagrams. CONSTELLATION NAMES lists the names of the constellations and ASTRONOMY NOTES contains information about different systems of distance, temperature, and time. The information included in all these programs is quite valuable for anyone who has an interest in astronomy. REQUIRES: 128K memory, one disk drive and color graphics.

Disk 1602 PLANETS 3.2 (1 DISK SET)

Version 3,2 March 3, 1986 : This Program computes information relating to the position, distance, magnitude, orbit view, skyview, etc. for the major planets, four minor planets or halley's comet on a specified date and time. Also, orbital data for any desired planet of comet can be entered and saved in a disk file. Skyview and oribital views can show forward or backward motion. File PLANETSA.COM is for use with an 8087 Arithmetic coprocessor and file PLANETS.COM is for use without an 8087.

STARFINDER

A Program to show new users how to start "The Starfinder" ON DISPLAY Program and its Documentation are all on this disk. To begin, bring up IBM PC DOS and BASIC.(Note: If you are using a printer other than the IBM Matrix or IBM Graphics Printer, you may need to modify the documentation to fit your printer. Run the BASIC program 'printers.bas' for more information.) Make sure that the printer is on, and then LOAD and RUN the BASIC program 'director.bas' from this Distribution Diskette. This will print a Program Directory, which contains information about the rest of the documentation, and about the Starfinder ON DISPLAY program. Following the instructions in the Program Directory, LOAD and RUN the other documentation program, 'usermanu', which will print the User's Manual.

Disk 0483 & 0484 ASTROSOFT COMPUTERISED EPHEMERIS (2 DISK SET)
A general-purpose astronomy software package consisting of three separate parts: Part 1 of ACE performs the most needed astronomical calculations, involving the sun, the moon, the planets, eclipses, astro photography exposures, mean sidereal time and Julian Day, precession of coordinates, phases of the moon, equinoxes and solstices, Galilean satellites of Jupiter, perpetual calendar, and Polaris. Part II of ACE (Solar System Data) provides for all the planets and satellites of the solar system, orbital and physical data, as well as descriptive and observational data. Part III of ACE (Sky Catalog) provides data on over 2000 deep-sky objects, the entire Messier Catalog, 100 named objects, all bright stars to magnitude 2.00, and 100 prominent double stars, with detailed commentary on nearly 400 of these objects. Objects may be searched for on the basis of one criterion or by a combination of criteria. Reqs. CGA.

Disk 9103-03 COMETP (1 Disk)
COMETP is a program that predicts the apparent position of a comet moving in a parabolic orbit. It is not suitable for objects moving in an elliptical orbit. It needs data input that is only available from sources such as observatories or astronomical publications so the user will need some prior knowledge of astronomy and comet orbits.

CATALOG TOOL 2.1
CT allows one to build a database of all the files on all your disks, lets one view, edit and print them out. The files are read from the disk directory and each title may be assigned a category (eg Utility or Game) and the user supplies a disk number or name to identify where the titles are.

DTA 1.2
DTA is a super directory utility that serves as a replacement for the DOS DIR, ATTRIB, and TREE commands. It features: alphabetized directory with file sizes & free space; optionally include attributes & time/date; select items by file attrib or time stamp; change any file attributes; treat directories separately or together with files alphabetized; compact subdirectory tree; optionally include sizes etc.

PC-FILENOTES 1.6
PC-FN is a 26k TSR which allows you to easily attach 160 character pop-up notes to your filenames. You can also view, delete, rename and tag copy files as well as change drives and directories.

DISK 9203-01 ASTROPACK ASTRONOMICAL TOOLS 2.0 (1 Disk)
ASTROPACK is a general-purpose mathematical astronomy program. It combines various time and position calculations that are often tedious or difficult to do by hand. It is intended for astronomy hobbyists, students, or anyone else who might be curious about when the sun will set next week, or how far it is from Stockholm to Sacramento. For users with serious requirements, Astropack gives reasonably accurate values that will supplement an astronomical almanac. It is valuable if an almanac for the appropriate time period is not available. If you have a standard printer, the program can also print tables of values for any time periods.

GALILEAN SATELLITES OF JUPITER 2.0
This program calculates the phenomena of the Galilean satellites of Jupiter. The output is presented in both a tabular and an animated graphic mode, and may be listed as well on a line printer. REQUIRES: CGA or better.

MOON
MOON is a well-done graphics display of the face of the moon with some fancy features: you can zoom in and out, move all around via cursor keys, go to the nearest "LANDMARK" (from a big database of craters, lunar mission sites, etc.) and have the system identify it for you, etc. Nice detail, very clear and relatively fast displays on my Hercules-clone system. NO docs at all. But menus are relatively simple to understand.

PLANETIA
PLANET provides the times and optionally azimuths of rising and setting and/or the equatorial co-ordinates (corrected for parallax) for planet. (Mercury is the default)

VIEWS OF SATURN 2.0
SATVIEW projects a mathematical model of a sunlit Saturn from any angle. Some of these are unfamiliar and impossible to be viewed from Earth. REQUIRES: CGA, EGA or VGA screen.

Disk No 797 SCIENCE SOFTWARE (ASTRONOMY) (1 DISK)
Educational programs to help explain fundamental concepts of astronomy. KEPLER - tutorial to solve Kepler's equation for elliptic, parabolic and hyperbolic orbits; SIDEREAL - tutorial which introduces relationships between Julian and calendar dates, solar & sidereal times ; J2000 - utility to convert stellar positions, proper motion, parallax & radial velocity from the standard epoch B1950 (FK4) to epoch J2000 (FK5) ; GALILEAN - tutorial to determine position of Galilean satellites relative to Jupiter ; ROCKET1 - determines flight performance of single stage model rocket using analytical (exact) solution. TNODE - determines info about equatorial crossings of earth satellites; SYNCSAT determines location of geosynchronous satellites relative observer. ATMOS - determines properties of standard atmosphere.

Disk No. 2611 SKYGLOBE 2.5 (1 DISK)
SKYBGLOBE 2.5 is the fun and easy educational astronomy program. It lets you view the sky at night and can display 15 000 stars (including the 7 000 visible to the naked eye) and the positions of the planets, as well as constellation lines. It also has 240 predefined locations worldwide. You can specify the time, date, direction and location of the view; change the number of stars viewed; adjust the magnification of the sky view and adjust the star brightness. SkyGlobe can display Lattitude, Longitude, and Ecliptic lines to help you orientate yourself on the celestial globe. In this version are enhancements to SkyGlobe's Auto-Increment mode that gives you the ability to simulate the passage of time on the PC. When in this mode, the sky view will begin to change in a manner that depends on the Auto-Increment parameters. For educational users, SkyGlobe is a great way to watch the patterns of the planets, such as retrograde motion, or to learn why we don't have eclipses every month. A useful feature of

SkyGlobe is its ability to quickly and easily change the lines and labels that help our eyes and minds make sense of the vastness of the sky. This can be very helpful to the novice just learning the stars. This update has added the capability to show an approximate outline of the Milky Way and galactic equator. REQUIRES: CGA, Hercules, EGA, or VGA graphics adapter. Supports screen printouts on Epson, Proprinter, or LaserJet compatible printers.

Disk 2001 STARVIEW 1.0.09 (1 DISK)
Starview displays a detailed map of the stars with much of the information available on the screen. (the display is very pretty). The database for this program is derived from the 4th edition of the Yale Bright Star Catalog and contains 9096 stars. Co-ordinates are Epoch 2000.0. This version of StarView implements display of objects in the solar system. These objects can be observed at any time or date. No non-stellar fixed objects are included. You may add your own data to the list of fixed objects used by StarView. StarView contains information on the SUN, MOON and ZENITH (for horizon display) and orbital elements for the planets. You can add your own data for planets, comets, asteroids, etc. to those listed. StarView has many features some of wich are as follows:- You may center the display on any object by pressing Enter and typing in any of the following identifications: name - common name or abbreviation (SUN, VEGA); Flamsteed Number and Constellation; Greek letter abbreviation and Constellation; Yale Catalog Number etc. One can directly set some display parameters; display rotation to decimal degrees; set field width; set limiting magnitude of display Observer's Geographic Longitude (degrees); Observer's Altitude above sea level (meters); Display Date; Display Time; Display Universal Time. The observer screen also allows you to enter a specific time and date for your observations. An automatic drive feature is included. This simulates the view in an actual telescope with a fixed mount, or an equatorial mount with R A clock drive. REQUIRES: Any video, 400K RAM; Mouse optional.

Disk 0002 Duff-Smith (1 Disk)
Peter Duffett-Smith Astronomy with your P C :-
This disc contains the BASIC subroutines and handling programs listed in the book "Astronomy with your personal computer". It is intended as a supplement to the book, enabling you to link the routines together when constructing a program without the tedium of having to enter the code from the keyboard line by line, You will need to consult the book to discover how to use the routines. Book Details:-
ISBN 0 521 26620 3 Hard cover
ISBN 0 521 31976 5 Paperback

Disk 0004 TRACK & ** ORBITS2 ** (1 Disk)
A SATELLITE TRACKING PROGRAM
The program permits the user to establish data records for up to twenty earth satellites and to track those satellites for the purpose of aiming radio antennas at them. The user can

select a particular function from a menu and that function will be executed automatically. The IBM Color Graphics Adapter and Display, or equivalent, is required for graphics routines in this program.Before the program can be run the user must supply some information unique to his own geographical location and ground station. He must also have a source of satellite orbital elements in order to periodically update the "numbers".

ORDER FORM

The following Astronomical Software packages are available from :

TONY HILTON, P O BOX 68846, BRYANSTON, 2021
(Director: Computing Section A.S.S.A.)

If you wish to have a copy of any of the software, please complete the order form below. The software is available at R 10.00 per disk which includes postage, packaging and media etc. to anywhere within South African borders.

NAME : .....

ADDRESS: .....

.....

DISK NO	TITLE	NO. OF DISKS REQUIRED	COST
1109	Astronomy Collection 1 (1 disk)		
1604 & 1605	Astronomy Star Catalogue 5 & 88 Constellations (2 disk set)		
1602	Planets 3.2. (1 disk)		
0483 & 0484	Astrosoft Computerised Eohemeris (2 disk set)		
9103-03	Cometo (1 disk)		
9203-01	Astropack Astronomical Tools 2.0 (1 disk)		
797	Science Software (Astronomy) (1 disk)		
2611	Skyglobe 2.5 (1 disk)		
2001	Starview 1.0.09 (1 disk)		
0002	Duff-Smith (1 disk)		
0004	Track & ** Orbits2 ** (1 disk)		
	TOTALS:		

PLEASE MAKE ALL CHEQUES PAYABLE TO : A.S. HILTON

Occultation Sections

Director: MD Overbeek

Most of the observations were made by a relatively small number of well motivated observers. In this connection, attention is drawn to a letter in MNASSA Vol 51, page 44. It is time that a serious effort be made to recruit new observers.

All observers are thanked for their efforts in a scientific field that is not known for spectacular results.

Total Occultations.

Observers are coping with the lack of a nationally broadcast time signal in a variety of ways. Statistics were reported to the Director by the following:

	Disappearances	Reappearances	Total	
H Cameron	24		24	
KG Fuhr	17	38	55	
J Knight	16		16	
MD Overbeek	47	15	62	incl. 1 photoelectric
J Smit	59	45	104	
P van Blommestein	82	6	88	
J Vincent	32	16	48	

Grazing Occultations.

Due to communications breakdowns involving personnel at IOTA, the SAAO and local workers, it was not possible to organise field outings in the Republic and Zimbabwe. Our colleagues in Namibia, who received independent predictions, were able to mount two expeditions as follows:

1991 03 22 NZC 844 Details not received as yet.
1991 03 24 NZC 1167 Details not received as yet.

In addition, P van Blommestein made a graze observation which was only partially successful due to cloud, from his home in Simon's Town.

Some changes in the process of obtaining predictions have been made and it is hoped that the 1991 fiasco will not be repeated.

Planetary Occultations

Predictions were supplied for 41 events. Twenty events were washed out by cloud and other conditions. The remaining 21 are listed below.

Two unsubstantiated occcultations were reported. The hard core of faithful workers are still waiting for the "big one" which will provide several chords, so defining the dimensions of a minor planet. One hopes that their labours will be rewarded soon.

The following observers are thanked for their contributions:
D Blane, A and M Boltman, T Cooper, R and S Dale, G de Beer, S Enke, R Field, B Fraser, T Garde, M Geyser, A Hilton, J Jooste, R Learmonth, H Lund, A McRae, M Mulder, G Prosser, J Smit, R Thompson, C Turk and P van Blommestein.

#0 Jan 4: FAC 176795 by 121 Hermoine. No general prediction sent. Benoni and Edenvale reported cloud.
#1 Jan 17: LickV 1712 by 11 Parthenope. Benoni, Edenvale, Pretoria reported cloud.
#2 Jan 17: PPM 96101 by 532 Herculina. Benoni and Pretoria reported cloud.
#3 Jan 25: SAO 183986 by 203 Pompeja. Benoni, Edenvale and Pretoria reported cloud.
#4 Jan 31: SAO 157542 by 43 Ariadne. Benoni, Edenvale and Ladysmith reported cloud.
#5 Feb 4: PPM 125971 by 201 Penelope. Miss reported in Ladysmith and Pretoria by G de Beer and J Smit. Benoni and Edenvale reported cloud.
#6 Feb 12: PPM 92304 by 886 Washingtonia. Interference from a bright sky reported from Benoni, Edenvale, Ladysmith, Pieter-maritzburg, Pretoria and Reitz.
#7 Mar 6: PPM 15622 by 514 Armida. Benoni, Edenvale, Lady-smith, Pretoria and Reitz reported cloud.
#7A Mar 7: -0 0622 by Pallas. The fading would have been too slight to be timed reliably by visual observers. A photoelectric attempt by the writer was foiled by cloud. Benoni and Windhoek had cloud.
#8 Mar 11: FAC 2112 by 15 Eunomia. Benoni, Edenvale, Ladysmith, Pretoria, Reitz and Windhoek reported cloud.
#8A Mar 16: Anon by 369 Aeria. Windhoek reported cloud.
#9 Mar 17: SAO 162723 by 334 Chicago. R Thompson of Windhoek reported a miss. Benoni, Edenvale, Ladysmith, Pretoria, Reitz and Simon's Town reported cloud.
#10 Mar 17: PPM 178847 by 788 Hohensteina. Benoni, Edenvale, Ladysmith, Reitz and Simon's Town reported cloud.
#10A Mar 20: Anon by 121 Hermoine. R Thompson of Windhoek reported a miss.
#10B Mar 26: Anon by 747 Winchester. Benoni Edenvale and Windhoek reported cloud.
#10C Mar 28: SAO 118734 by 30 Urania. Windhoek reported cloud.
#11 Mar 29: SAO 158344 by 846 Lipperta. Miss reported from Benoni by T Cooper.
#12 Mar 31: SAO 156875 by 96 Aegle. Benoni, Edenvale and Simon's Town reported cloud.
#13 Apr 2: SAO 181911 by 624 Hektor. Miss reported in Benoni,Edenvale, Pretoria by T Cooper, R Learmonth, D Overbeek and J Smit. Simon's Town and Windhoek reported cloud.
#14 Apr 15: SAO 184383 by 177 Irma. In Bryanston, A Hilton obtained a VCR recording of a miss. This is probably the first VCR recording made in Southern Africa of a planetary occultation event. Miss reported from the Kruger National Park, Edenvale, Ladysmith, Pietermaritzburg, Pretoria, Reitz, Shurugwi and Windhoek by A and M Boltman, D Overbeek, G De Beer, J Jooste, S Dale, G Prosser, J Smit, T Garde and R Thompson.
#15 Apr 18: FAC 211278 by 121 Hermione. Miss reported in Ladysmith and Pretoria by G de Beer and J Smit. Dubious miss reported in Edenvale and Windhoek by D Overbeek and R Thompson.
#16 May 27: SAO 184425 by 674 Rachele. S Enke of Windhoek observed a doubtful occultation lasting 1.5 to 2.0 seconds starting at UT 04 57 18.95 which is 7 minutes before the predicted time. Miss reported from Bellair, Edenvale, Ladysmith, Pretoria and Windhoek by R Field, D Overbeek, G de Beer and R Thompson, who may have started observing after Sonja Enke's positive observation. Simon's Town reported cloud.
#17 Jun 15: SAO 210543 by 356 Liguria. In Johannesburg, new observer H Lund reported an occultation lasting nine seconds start-ing at UT 04h 10m 34s, both

times plus or minus one second. Due to the relentless operation of Murphy's Law, the two regular observers on the Witwatersrand who should have been able to complement Lund's observation were prevented from observing. Miss reported in Ladysmith, Pretoria and Windhoek by G De Beer, J Smit and R Thompson.
#18 Jun 18: ACC 15624 by 198 Ampella. Benoni, Edenvale, Johannesburg, Ladysmith, Pretoria and Simon's Town reported cloud.
#19 Jun 19: SAO 159636 by 776 Berbericia. Miss reported in Pretoria and Windhoek by J Smit and R Thompson. Edenvale, Ladysmith, Simon's Town reported cloud.
#19A Jun 24: PPM 159359 by 103 Hera. Miss reported in Benoni, Edenvale and Pretoria by T Cooper, D Overbeek and J Smit. Simon's Town reported cloud.
#19B Jun 24: PPM 159359 by 514 Armida. Miss reported in Benoni, Edenvale and Pretoria by T Cooper, D Overbeek and J Smit. Simon's Town reported cloud.
#19C Jun 26: AGK3 +06 0115 by 41 Daphne. Miss reported in Edenvale, Benoni, Pretoria, Simon's Town and Windhoek by T Cooper, D Overbeek, J Smit, P Van Blommestein and R Thompson.
#19D Jul 2: PPM 173839 by 56 Melete. J Smit in Pretoria reported an appulse at approximately the right time. A dubious miss reported in Windhoek by R Thompson. Simon's Town reported cloud.
#20 Jul 3: AGK3 -00 2485 by 130 Elektra. D Overbeek in Edenvale and J Smit in Pretoria reported an appulse at the predicted time. Simon's Town reported cloud.
#21 Jul 4: SAO 164223 by 53 Kalypso. Miss reported in Edenvale, Ladysmith, Pietermaritzburg and Pretoria by D Overbeek, S Dale and J Smit. Simon's Town reported cloud.
#22 Jul 17: SAO 157866 by 899 Jokaste. Miss reported in Bryanston, Edenvale, Johannesburg and Pretoria by M Boltman, D Overbeek, R Lund and J Smit. Simon's Town reported cloud.
#23 Jul 31: Lowell 3483 by Triton. Miss reported in Benoni, Edenvale, Henley on Klip (dubious), Johannesburg, Ladysmith, Pretoria and Thabazimbi by T Cooper, D Overbeek, D Blane, G De Beer, A McRae, M Geyser and M Mulder. Simon's Town and Windhoek reported cloud and haze.
#24 Aug 8: SAO 166014 by 432 Pythia. Miss reported in Benoni, Johannesburg, Thabazimbi and Windhoek by T Cooper, A McRae M Mulder and R Thompson. D Overbeek obtained a good photoelectric trace of a miss at Edenvale.
#25 Aug 10: PPM 144729 by 842 Kersten. Attempted in Edenvale, Ladysmith and Reitz but the target star was too low.
#26 Aug 23: SAO 185353 by 404 Arsinoe. Miss reported in Edenvale (dubious) and Johannesburg by D Overbeek and B Fraser. Ladysmith, Pietermaritzburg and Reitz reported unfavourable conditions.
#27 Sep 28: AC 8235 by 379 Huenna. Bellair,Benoni,Edenvale, Ladysmith, Pietermaritzburg and Pretoria reported cloud. C Turk reported dusk light interference at Cedarberg.
#28 Oct 21: SAO 145812 by 920 Rogeria. Miss reported in Edenvale, Pietermaritzburg and Pretoria by D Overbeek, S Dale, G Prosser, J Smit. Newlands reported cloud.
#29 Oct 16: PPM 117499 by 91 Aegina. Benoni, Edenvale, Lady-smith, Pretoria and Reitz reported cloud.
#30 Oct 27: LickV 27062 by 163 Erigone. Newlands, Edenvale, Ladysmith and Reitz reported cloud.
#31 Nov 12: SAO 129042 by 1723 Klemola. Bryanston, Bellair Edenvale, Ladysmith, Pretoria, Reitz and Sandton reported cloud.

#32 Dec 5: PPM 156397 by 67 Asia. Edenvale, Ladysmith and Pietermaritzburg reported cloud and Reitz reported a light sky.
#33 Dec 30: PPM 122416 by 287 Nephthys. Miss reported in Pretoria by J Smit. Newlands, Bellair, Edenvale Pietermaritzburg and Reitz reported cloud.

SOLAR SECTION

Director: Jim Knight

Active participation by our observers continued during the year and a small number of "regulars" has remained intact and continued to submit high quality reports and so keep the Solar Section very much alive and productive. We owe them a big vote of thanks!

The Director in co-operation with the Transvaal centre continues to bring astronomy to that section of the population not yet tapped - the schools and the man in the street. Our 114mm (4½") reflector now has a portable mount and a second is being made for a 200mm (8") by Mr B. Frazer (ASSA). In last years annual report we made an appeal for help from council and the members of our society in the form of slides, ideas, visual aids and old equipment (eg 50 or 60 mm refractors that are no longer used) that can be borrowed, copied, constructed or otherwise "obtained". Only one person responded, Mr P. Briton, who provided us with copies of his "Sterrewag" magazine for distribution to schools. The appeal is repeated again this year in the hope that there may be at least one other such willing person prepared to assist.

We are now well into Solar Cycle 22. Sunspot minimum was in September 1986, and by July 1989, less than 3 years later, the cycle had reached it's maximum, the shortest and most rapid rise to "solar max" yet recorded! Despite two years having gone by since "solar maximum" one may be tempted to think all the action had passed and that things were quietening down as we headed once more to solar minimum. This was definitely not the case, the sun was as active as ever and it appears that this cycle will have a protracted period of high activity which will extend well into 1992, with a slow steady decline after that.

1991 was a very active year and started off in fine style too. January saw activity levels fall with respect to flares, with 36 events being recorded, whilst other solar indices continued to rise again for the 5th month in a row. During this month, the daily solar indices in fact reached their highest levels seen this cycle. If the highest levels were in 1989/1990, how does it happen that we see the indices reaching their highest level yet seen this cycle, in January 1991? In fact there are several maxima that can be observed in each cycle, as none of the indices reach their peak at the same time. Max and min are based on the Wolf Number, the oldest of the metrics used, and it is on this that solar max" is based. It does not present a very true picture of events on the sun unfortunately, as it really only looks at sunspot groups and the number of sunspots within them.

February was an even better month, with activity levels and solar indices dramatically up. The number of flares was almost double that of January, with 53 being detected and the daily sunspot number reaching it's highest levels. Two proton events also occurred, but they were very minor.

In March, the indices once again skyrocketed, with 123 flares being detected of which 35 reached major levels, the highest number of events in any one month for this cycle. Two massive flares, an X9 and an M6 erupted in quick succession on one of the days towards the end of the month, and this precipitated the largest proton event experienced so far in this cycle, reaching a massive high of 43 000 pfu at 10 MeV and 100 pfu at 100 MeV! They also caused a very

strong sudden storm commencement of 184 nT and the third most severe geomagnetic storm of this cycle, a polar cap absorption event of > 20 db, a forbush decrease in the cosmic background levels of > 10%, spectacular aurora being seen at very low latitudes and heavy electric power transformer damage being experienced in the NE of the USA!

Activity in April was well down from March as the indices dropped dramatically. There were only 42 flares detected, of which only 4 reached major levels, 1 small proton event and 2 proton enhancements. Severe geomagnetic storming continued to rage at the beginning of the month and was experienced again at the end of the month too.

May saw very similar conditions being experienced with 41 flares of which 6 were major events. The most dramatic drop was in the sunspot number which had been dropping steadily since the high in late January and early February. Three proton events were detected this month as well as 2 sudden storm commencements.

June was the turn around as all indices shot upwards again and much action was seen and experienced. 72 flares were detected of which 15 were major and for the first time this cycle several very powerful X12 class flares were noted. The GOES satellites sensors were saturated no fewer that 5 times during the month and it was equally unusual that all 5 of the events that saturated the poor satellites originated from the same activity region. Several proton events were detected, the first was a small event, but the second was very much more substantial, reaching 3 000 pfu and precipitating a 17 db polar cap event and an 18% Forbush decrease. Yet another proton event followed reaching 1400 pfu at 10 MeV and 69 pfu at 100 MeV and this too was strong enough to set off a polar cap absorption event, which reached a peak of 11 db. In fact, the proton counts were so high that they exceeded event levels for well over half of the month! This was not the end of it, however, mid month saw the first ground level event for over 2 years being detected. This ground level event reached a peak increase of 17%. The geomagnetic field was, as a result of all the activity, very active. June also saw the second highest levels of storming this cycle and these levels were only slightly lower than those experienced in March 1989. The GOES 6 and 7 satellites detected many magnetosphere crossings during this time as well. Geomagnetic storms were particularly severe at the beginning and again around the middle of the month, with levels high for most of the rest of the time, in fact only 2 days of quiet were experienced during the whole of June. During this period the planetary geomagnetic A index reached its highest level experienced so far this cycle.

July activity was lower than that of June, even though some of the indices actually rose slightly. There were 35 flares detected of which 10 were classified as major events. The sunspot number and the radio flux rose by 5% over the June levels. There were 4 proton events, 1 big, 1 reasonable and 2 minor. The satellites again detected multiple magnetopause crossings as a result of these events, but they were not favourable enough to precipitate any polar cap events or Forbush decreases. The geomagnetic field did get affected, however, and major storms were experienced during the month.

August levels were similar to those of July. Again 35 flares were detected of which only 4 reached major proportions. The sunspot numbers increased by a further 3%, whilst the radio flux dropped 1%. When at its minimum, the flux dropped to its lowest levels since April, before rising again sharply, to peak at 290.

Only 1 proton event was detected this month and the GOES satellites experienced magnetosphere crossings. The geomagnetic field was also fairly active and since March a near record number of days at major or above storm levels have been

detected, something not seen since 1960, when the largest solar cycle on record was in full swing.

In September activity began to fall substantially again with only 26 flares being detected and of these only 4 were major events, the flux fell 14% and the sunspot number by 25%. No proton events were noted but 2 proton enhancements were detected and not surprisingly, the geomagnetic field was also much quieter. An interesting phenomenon was noted this month - the sun appeared to have undergone a large scale restructuring! This resulted in the break down of what used to be long lived white light and hydrogen alpha patterns and this in turn made the identification of active latitudes extremely difficult. This restructuring is thought to result in episodes of moderate activity being experienced and we will be able to see what effects it will have in the months ahead.

October saw substantial rises, in contrast to the falls of the previous month. There was a 15% increase in the sunspot number, a 10% rise in the flux and 58 flares, including 9 major. There were 3 minor proton events, one of these was of the right stuff as it precipitated a small polar cap absorption event and a strong Forbush decrease. The geomagnetic field experienced several sudden storm commencement impulses, one of which was an incredible 400 nT shock. This massive sudden impulse resulted in a very large change of the geomagnetic field over a period of a few minutes and set off severe storm conditions around the earth. The massive restructuring of the sun that was observed in September was completed in October and resulted in the active regions shifting in latitude and longitude. The active longitudes moved dramatically from 010 Carrington longitude 2 rotations before the event, to 180 Carrington longitude after the restructuring!

November Solar activity levels and average daily indices were down considerably; nearly 50% in some cases, from those experienced in October and the average daily indices were at their lowest since June 1990. Only 29 flares were noted this month and 6 of these reached major levels. No satellite level proton events were recorded this month. The geomagnetic field was where most of the action took place though. November began with severe GMF storms being experienced and the GOES satellites experienced brief magnetopause crossings and by midmonth a further two incidents of magnetopause crossings were detected. In all, 22 of the days in November were unsettled to active and a sudden impulse was detected at the end of the first week. This triggered a spectacular auroral display viewed from mid and high latitude sites around the world.

December closed the year off on a high note, with solar activity levels and the average daily indices showing dramatic increases from the November levels. The number of energetic events more than tripled to 94 and the average daily indices rose from 20 to more than 50% and this month recorded the most energetic events since March 1991's 123 events. December's total was the 5th highest for this solar cycle! As we can see, despite being in the declining phase of this cycle, this period of activity indicates that the cycle is far from over. Despite all the flurry of flare activity, only one small proton enhancement was detected and the geomagnetic field was quiet with only 6 days of active or storm levels being experienced. Two solar flare effects were also detected, but these were small in nature. Limb activity was also dramatically up with spectacular looped prominences and filaments whose lengths ranged from 0.25 to 1 solar radius. The remarkable filament that extended 1 solar radius from the sun's disk was one of the largest seen.

The sunspots seen this year continued to concentrate in the southern hemisphere, and this has been the case since March 1990 and continues to increase. Northern spots peaked during June 1989 and have gradually declined ever

since and it is clear that they reach their "solar max" at different times too. It is also interesting to note that flare activity has predominated in the southern hemisphere throughout this solar cycle.We had an interesting and hectic time this year, not to mention the very interesting observing sessions. The high level of activity was to be expected, but not the restructuring.

Solar Section activities for the year are summarised as follows :-

1] VISUAL OBSERVING: A very welcome new and regular observer Mr H. Lund, who uses the projection technique joined us during the year. I wish to welcome, and thank him, for the regular and high quality reports that he has submitted. Reports were also received from D.S. Botha (23), H. Cameron (265), J. Knight (243), D. Schiller (10) and H. Lund (183) giving a total of 721 Solar observations for the year.

2] RADIO TELESCOPE OBSERVATIONS: Our radio telescope operated by A. Voorveld was in operation for most of the year and continues to provide much useful information about solar activity in the radio frequencies.

3] SOLAR FLARE DETECTION: This year our network of 4 sudden enhancement of signal receivers situated at 3 different observatories again monitored signals from stations in Australia and the United States, allowing detection of flares using the East and West propagation paths. Solar flare detection was undertaken by J. Knight, D. Overbeek and A Voorveld.

4] MONITORING OF THE GEOMAGNETIC FIELD: Magnetometer observations were received from D. Overbeek and the Magnetic Observatory in Hermanus. Daily observations of the 3 hourly k index, sudden storm commencements, impulses and solar flare effects are supplied by Hermanus and D. Overbeek supplied the auroral alerts. My special thanks to D. Nagtergale and D. Overbeek for making this information available to us.

5] AURORA WATCH: Several aurora alerts were issued during the year but no reports were received.

6] PUBLICATIONS: The solar section's data, observations and reports are distributed to 30 users and interested bodies in southern Africa, Australia, the United States of America, the United Kingdom and Germany on a monthly basis. The solar section continues to be actively involved with colleagues and organisations overseas, particularly Messrs P. Taylor of the AAVSO Solar Section, B. Hardie of the BAA Solar Section, R. Wiechoczek of InterSol and M. Gotz of the Pettisindex in Germany. The solar section monthly reports are distributed to selected ASSA centres, the Planetarium, teachers and other interested people. The Solar Section's monthly reports are also published in "Canopus" the ASSA Transvaal Centre newsletter and in MNASSA.

7] OTHER ACTIVITIES:

7.1 SCHOOLS: Members of the section continue to be involved with this activity which has been greatly expanded during the past year. Mrs R. Learmonth and Mrs S. Knight continued to be the astronomy examiners for Boy Scouts, Girl Guides, Cubs and Brownie packs that took proficiency badges.

7.2 VISITS: This activity was severely curtailed again this year and the director only managed to visit a few observers in the Cape, Natal and the Transvaal. No overseas visits were undertaken this year.

7.3 EXHIBITIONS: Several members once again took part in the Astronomy Week and the Science Fun Day activities in order that things solar be exhibited. Grateful acknowledgement is also given to those members of the ASSA Transvaal Centre who assisted us in this task.

Variable Star Section

Director: J. Hers

Maybe it was the result of the drought, but with the increase in the number of observations exceeding the annual rate of inflation, 1991 has proved to be an exceptional year. Although it scarcely seems possible, Danie Overbeek increased is output by more than 600, while no less than three of the "other observers" made more than 2000 measures each. Altogether a most commendable effort.

A sincere welcome is extended to our new observers G. de Beer of Ladysmith, S. de Villiers of Plumstead, Cape, N. Kriek of Britstown, L.A.G. Monard of Pretoria, P. van Blommestein of Simon's Town, and S. Walsh, of Harare (presently in Grahamstown). The measures made by observers in different parts of the country, away from the main centres, and in places where the night sky is still dark, are especially valuable.

The observations of nearly all South African observers have been sent monthly on disk to both the AAVSO in Cambridge, U.S.A. and the Variable Star Section of the R.A.S. of New Zealand. Both organisations have informed me that this action is very greatly appreciated, because it makes easier to them the very heavy load of having to enter all observations by hand. As in previous years, excellent cooperation has been maintained with the directors of both organisations, Dr Janet Mattei and Dr Frank M. Bateson.

If there is one field where more progress is needed, it is that of rapid two-way communications. It is true that there has already been one great improvement: data can now be received in Sedgefield by FAX, through the courtesy of the local office of "De Huizemark" - a gesture which is very much appreciated. However, astronomical alerts seem to have a perverse habit of occurring during long weekends, when everything closes down, and something more direct is needed. Investigations into possible forms of electronic mail are continuing..

The following visual observations have been received during the year from observers in South Africa.

D.L. Blane	Henley-on-Klip	2014	
T. Cooper	Benoni	2423	
G. de Beer	Ladysmith	55	
S. de Villiers	Cape Town	4	
M. Geyser	Pretoria	53	
C. Henshaw	Botswana	787	(1)
J. Hers	Sedgefield	317	
J.L. Jooste	Reitz	33	
R.W. Jones	Fish Hoek	2055	
N. Kriek	Britstown	12	
L.A.G. Monard	Pretoria	20	
M.D. Overbeek	Edenvale	17819	
J.A. Smit	Pretoria	746	
C. Turk	Cape Town	37	(2)
P. van Blommestein	Simons's Town	7	
S. Walsh	Grahamstown	104	
		26486	

(1) Plus measures of very bright variables sent to other organisations
(2) Measures made in 1990 but not previously reported.

BOOK REVIEW

LADY HERSCHEL: LETTERS FROM THE CAPE 1834-1838 *Edited by Brian Warner. Published by Friends of the South African Library, Publications Section, PO Box 496, Cape Town 8000, 1991. ISBN 0-86968-098-6. Pp172. Price R38 (£12 or $25 overseas).*

Lady Herschel was born Margaret Brodie Stewart, the daughter of a Presbyterian minister. She was only 18 in 1829 when she married John Frederick William Herschel whose age was equal to twice hers and who was often regarded as a rather forbidding sort of person. Nevertheless, the marriage seems to have been a success. Four years afterwards they took ship for the Cape of Good Hope where Herschel was to spend four years making the famous sky survey which forms the basis of the NGC or *New General Catalogue of Nebulae and Clusters of Stars*. This book paints the picture of a patient but happy astronomer's wife, busy with bringing up children, three of whom were born at the Cape, and supervising her rather numerous servants.

Almost immediately upon arrival the Herschels moved into Feldhausen, a comfortable country house in what is now Claremont and set about erecting an observatory and making themselves comfortable. Excitement was provided by various social events amongst the governing circle as well as by visits to inland towns, not to mention a veld fire on the estate. We see the domestic side of Herschel's life, especially his interest in the botany of the Cape and his efforts to grow local plants. Many of the illustrations which adorn the book are from geometrically precise pencil sketches made by Herschel himslf with the aid of his *camera lucida*. There are eight plates of Cape flowers drawn by Sir John and coloured by Lady Margaret.

Lady Herschel was by the standards of her time an extreme liberal in racial matters and was a great admirer of Dr John Philip, superintendent of the London Missionary Society in South Africa and of his son-in-law John Fairbairn whose *South African Commercial Advertiser* stood up for the rights of the indigenous peoples, greatly to the annoyance of many colonists. The treatment of the native inhabitants by the frontiersmen and the soldiery was a constant source of indignation, revealed in these letters.

Conscious of her status in society, Lady Herschel was careful to be intimate with very few people. One of these was Mrs (later Lady) Maclear of the Royal Observatory who she found "a sweet gentle lovely creature as ever you saw. . .", though stone deaf.

Like anyone staying a long time in a foreign land, Lady Herschel was from time to time homesick and the increased brightness of her tone is very noticeable as the moment of departure approached. Nevertheless, she enjoyed what the Cape had to offer, fully and inimitably. One only has to read her account of a luxurious ascent of Table Mountain, partly on horseback and partly carried in a "chair which was hung between two long bamboos & carried by four good natured blacks" to appreciate her unique view of the world.

These letters form a special record of an unusual family, full of local detail and appreciation of the Cape scene. Although their authoress was quite young, they reveal a surprising maturity and perspicacity in her outlook.

I.S. Glass

ASSA COUNCIL 1991/1992

President:	**Mr.M.G.Soltynski**
Vice-Presidents:	**Professor W.F.Wargau**
	Dr.T.Lloyd Evans
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	Mr.H.E.Krumm
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Hon.Treasurer:	**Mr.D.Duprez**
Business Manager:	**Mrs.A.Joubert**
Membership Secretary:	**Mrs.A.Joubert**

GETTING STARTED IN ASTRONOMY

Junior Reading:

Astronomy for the Under 10's : Patrick Moore
Our Home in Space : Catherine Phelan
The Inner Planets : Neil Ardley
How Far Away Are the Stars : Peppo Gavazzi
Man and Space : Macdonald
Exploring the Universe : Neil Ardley
Space Travel : Brimax (4 - 7 yrs)
The Night Sky : Tim Woods
Space : Macdonald

Adult Reading:

The Southern Sky: Practical Guide to Astronomy : David Reidy and Ken Wallace
Night Skies : Peter Mack
Stargazing for the Novice : Frans Conradie
Beginner's Guide : Bondietti (out of stock)
The Greenwich Guide to Stargazing : Carole Stott

Elmara Willis

ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA
PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1993

Minutes of the Annual General Meeting held at the South African Astronomical Observatory, Cape Town on Wednesday 1993 July 28.

Attendance

The President, Mr Maciej Soltynski in the chair with twenty four members and seven visitors present.

Opening

The President welcomed all present and thanked the Cape Centre for hosting the meeting again this year.

Apologies

Apologies for absence were received from: Prof W Wargau, Dr I Glass, Messrs T Cooper, M Serfontein, W Trow.

Minutes

The minutes of the 1992 Annual General Meeting as published in MNASSA Vol 51 Nos. 9 & 10 were taken as read. It was proposed by Mr P van Blommestein and seconded by Mr J Spencer Jones that that these be accepted as a true reflection of the proceedings. There were no objections.

Matters Arising

None

Report of Council

The Hon Secretary presented his report on the work of Council for the year.

Observing Section Reports

Computing Section: Director Mr A Hilton, read by Mr H Krumm.
Comet & Meteor Section: Director Mr T Cooper, read by Mr C Turk.
Occultation Section: Director Mr D Overbeek, Read by Mr J Churms.
Solar Section: Director Mr J Knight, read by Mr J Bondietti.
Variable Star Section: Director Mr J Hers, read by Mr P van Blommestein.
Deep Sky Section: Read by the Director, Mr A Slotegraaf.
Historical Section: Read by the Director, Mr J Spencer Jones.

Financial Report

The Hon Treasurer tabled his report which will be published seperately in MNASSA.

A.S.S.A. Endowment Trust

Mr C Turk as Secretary of the Trust presented his report for the year 1992. This will be published in MNASSA. The President thanked Mr Turk for his labours on behalf of the Trust and proposed a round of applause. Done.

Birthday Wishes

The outgoing President on behalf of the Society, wished Dr Alan Cousins for his forthcoming ninetieth birthday.

Long Service Award

Mr Harold Krumm was presented a book award as thanks for more than fifty years' service to the Society.

Election of Office Bearers

The following nominations were received and were duly elected:

President	:	Prof Walter Wargau
Vice President	:	Mr B D Fraser
		Prof B C Raubenheimer
		Mr M G Soltynski
Hon Secretary	:	Mr Brian Skinner
Hon Treasurer	:	Mr D DuPrez
Members	:	Mr A Hilton
		Mr M D Overbeek
		Dr R S Stobie
		Mrs L Rens

These nominations were made by Mr C Turk and seconded by Mr J Bondietti.

Election of Honorary Auditor

It was proposed that Mr R Glass of Penkin Zeller and Karro be re-elected Hon Auditor. This was agreed and he was thanked by Mr D DuPrez for his assistance with the finances of the ASSA.

Presidential Address

Mr J Churms took the chair on behalf of the newly elected President, Prof W Wargau and invited Mr M G Soltynski to deliver his Presidential Address entitled "A Brief History of Cataclysmic Variable Stars".

Vote of Thanks

Mr Cliff Turk (an experienced variable star observer) thanked Mr Soltynski for his informative and interesting address.

General

Mr C Turk asked that Directors of Observing Sections be reminded that their reports are for a calendar year (January to December) which gives them ample time to produce and send it to the Hon Secretary in time for the A.G.M. in July.

Closing

The meeting was adjourned for tea - provided by the Cape Centre - at 22h46.

Brian Skinner
Honorary Secretary

REPORT OF COUNCIL FOR THE YEAR ENDING 1993 JUNE 30

Council met on four occasions since the last A.G.M. with an average of 13 persons present out of a possible 19 members and alternates.

Membership

Our hard-working Membership Secretary, Mrs Audrey Joubert reports that membership was 462 as at 30th June 1993 compared with 443 a year earlier. Of these 70 were new members, whilst 23 members resigned or have died. A further 28 members were suspended for not paying subscriptions.

Obituary - Mr Tom Geary

Mr Tom Geary passed away during February at 60 years of age. He joined the staff of the then new Johannesburg Planetarium in 1960 as Technician responsible for maintaining the Planetarium's equipment and was appointed assistant director in 1966. He later succeeded Dr Arthur Bleksley as director in 1968. His enthusiasm and dedication to astronomy has been an inspiration to many, some of whom have even become professional astronomers. In 1990 the University of Witwatersrand awarded him the degree of Master of Science Honoris causa in recognition of his contribution to the promotion of astronomy in general and the planetarium in particular.

Finance

The Hon Treasurer, Mr Dany DuPrez has once again steered the Society through the financial morass, hampered at every turn by increasing costs. That he has succeeded is a tribute to his hard work and dedication to the task at hand. Council extend their sincere thanks to him for doing an excellent job.

** I remind members of his warning at last year's A.G.M. agbout the Society running at a loss. This will be discussed by Council in February 1994. Annual subscriptions are likely to be increased at the 1994 A.G.M.

Council wish to thank Mrs Audrey Joubert for her labours as Business Manager and Membership Secretary - hers is an important task at the cutting face of the Society's activities and she does it admirably.

MNASSA

MNASSA continued under the able editorship of Mr Joe Churms this past year. However, he has informed Council of his intention to resign this position as of December 1993. It is with a certain sadness that we take leave of him and wish him well in his retirement. This year he presented articles by Messrs Greg Roberts, Dr A W Cousins, Auke Slotegraaf, Tim Cooper, Keith Gottschalk, Justin L Jonas, Jonathan Spencer Jones, Jim Knight, Ian Glass, Danie Overbeek and others.

Council wishes to thank Mr Churms for his dedication and hard work in providing members with a very informative publication that has served to keep them up to date with development in astronomy in South Africa. Council also thank Mrs F D Paterson of SAAO for her contribution to MNASSA.

Annual Handbook

Council wish to express sincere thanks to Miss Pat Booth for her production of the Annual Handbook. This publication is often the only astronomical information an amateur may possess and therefore is the best advertisement for the Society. Miss Booth is aided and abetted by the Directors of the different sections who pass their enthusiasm on to others via the Handbook.

New Centres

At the last A.G.M. the Constitution was amended to allow groups of *Five* members to form a local Centre. Two such groups have applied for recognition, namely the *Helderberg Centre* and the *Natal Drakensberg Centre.* (It seems that the mountains are alive with amateurs) Council welcome them into the fold and wishes them a steady growth.

Astronomical Outreach

Council met with Mr Keith Gottschalk of the A.N.C. and discussed making Astronomy more accessible to the disadvantaged community. Mr Cliff Turk is preparing a series of lectures and demonstations with which to begin an outreach in the greater Cape Town area. Council urges all Centres to initiate some form of outreach amongst the disadvantaged community in their areas.

Acknowledgements

Council wish to thank Dr Robert Stobie, Director of SAAO, for the use of various facilities at SAAO. Special thanks also go to the staff of SAAO and the University of Cape Town Astronomy Dept for their invaluable work on Society publications.

Council extend their sincere thanks to the Directors of the Observing Sections for their contribution to Astronomical Science and for keeping amateur observing focused.

The Centres are commended for their sterling work in presenting astronomy to the public and for facilitating the interaction between amateur and professional astronomers.

Logo

Council realised the need for a Logo with which the A.S.S.A. could be identified. A special work of thanks to Margie Walters of the S.A. Museum Planetarium for designing the logo which has been adopted by Council.

Finally

Thanks also to any other persons that have made a contribution and whom I may have forgotten to name.

Brian Skinner
Honorary Secretary

COMET AND METEOR SECTION

Jose Campos

The report of the Comet and Meteor Section for the past year is divided into two parts. The outgoing Director, Mr Jose Campos, has provided the report for the period July-December 1992. The new Director, Mr Tim Cooper has provided the report for the period January-June 1993.

Report for July to December 1992 by J Campos

During the period July to December 1992, two circulars were sent to interested members. With regret, in early November I notified ASSA and Council of my resignation as Director of this Section, the reason being that I was leaving Durban to settle with my wife and children in Lisbon, Portugal.

Following my proposal to Council, for my successor as Director of this Section, I am extremely pleased that Council has agreed to appoint Mr Timothy Cooper of Benoni, - an experienced observer -, as the new Director of the Comet and Meteor Section from 1993 onwards.

I would like to thank all who contributed and supported this Section during the past 8 1/2 years that I served as Director. Although they are too numerous to name here individually, I would, however, like to thank T Cooper, Bill Hollenbach, Danie Overbeek, Jan Hers, Ray Field, John Vincent, Peter van Blommestein, Rev. G de Beer, John Bortle, Brian Marsden, Charles Morris, Richard Fleet, Joe Churms and J W Menzies.

A special thought for the late Jack Bennett, whom I succeeded as Director, and for Jack MacBain and Arthur Morrisby.

I wish to thank ASSA and the Council, past and present, for the support given to this Section and to me. I am sure that Tim Cooper will enjoy running this Section, as much a I have done, and I hope that it will grow from strength to strength. I hope that in the future I shall be able to continue to keep in touch with this Section.

Report for January to June 1993 by T Cooper

Since taking the reigns in January, four circulars have been issued to observers, with the objective of keeping subscribers who are interested in observing comets and meteors as up to date as possible. In the first six months the mailing list has increased substantially, and hopefully this will lead to an increase in observations made by ASSA members.

Both the International Comet Quarterly and the International Meteor Organisation have expressed interest in observations made in Southern Africa; while the northern hemisphere and Australasian regions are well covered, a gap exists in the records since so few observers are active in our part of the globe. It is my immediate aim to reverse this situation.

No reports have been received during this period of observations of the two comets visible in the first months of 1993, comets Swift-Tuttle and Schaumasse. However the former, which provided good views for northern hemisphere observers before perihelion, remained faint once it reappeared in February, and the latter remained fairly close to the northern horizon throughout its apparition for us in the south. It is some time now since we had a bright comet to observe, and this event is eagerly awaited.

Observers of meteors have been somewhat more active over this period. Reports of fireballs have been sent by Auke Slotegraaf (2), Rev. Gerrit de Beer, Danie Overbeek, Bill Hollenbach and Cliff Turk. All reports have been forwarded to the Fireball Data Centre (FIDAC) in Europe.

Several meteor showers have been observed. The α Crucids were observed by Cooper and Peter van Blommestein, and the observations indicate these meteors to be fast and white. The δ Cancrids and Pyxids were observed by Cooper, and in both cases no activity was detected this year. The ó Puppids were observed by Cooper and Kriek between April 20 and 23. Low levels of activity were detected on two nights. Cooper also observed the Virginids between April 22 and 23. Activity was detected only on the first night.

The highlight shower of the year so far has been the ή Aquarids, which is associated with comet Halley. Cooper carried out a detailed watch from April 28 until the moon and cloud interfered on May 6. Peak activity was observed on the morning of May 4, when 25 shower meteors were observed in a 68 minute watch. This shower was also observed by Graham Poole using his radar technique, confirming the radiant position at α=22h30m, δ =-1°.

The Ophiuchids were again observed in detail this year by Cooper from June 7 to 14, assisted on June 10 by Steve Arnold and on June 11 by Jim Knight and Shaun Adams. The usual complex activity was observed from this shower, which appears to show two main radiants at α=17h20m, δ=-20 and at α=17h48m, δ=-28°. The obseervaations of this shower are in continuation of a program started in 1988.

All of the above observers are thanked for their contributions, and I would also like to thank Jose Campos for his help and guidance in the past. Jose will continue to receive circulars and correspondence of the Comet and Meteor Section, and I hope he will remain in contact in the future.

Much is planned for the future of the Section. Already contact has been made with the various overseas bodies dealing with both comets and meteors, so that we can become integrated with their programs, as well as carrying out our own. The investigation into monitoring meteors by radio is now well advanced, and will provide a valuable technique in the future. And sooner or later we will surely get that long overdue bright comet to observe. But much useful work can be done now, and we need more individuals to observe comets and meteors. Let's hope ASSA members take up the challenge in the coming year.

COMPUTING SECTION

Director : A.S. Hilton

Report for July 1992 to June 1993

This section was formed in 1987 and it has attracted some 60 interested people. Their information has been tabulated and forms the basis of a Data Base of Astronomical computing software.

A complete list of the software available was printed on Page 90-95 of MNASSA Vol. 51 Nos. 9 & 10 October 1992. Plus there is additional software as indicated in the annual report on Page 122 of MNASSA, Vol. 49 Nos. 9 & 10 October 1990. An updated list is tabulated below, with order form attached.

The Computing section will hold a number of informal meetings in the forthcoming year to exchange software and ideas.

Finally I would like to thank all those who have assisted the section over the past years.

Disk No.1109 ASTRONOMY COLLECTION 1

AST is a Practical Astronomy program for your PC - gives a host of options for astronomers including views of the sky, constellation drawing etc. REQUIRES : CGA card.

MOONBEAM determines phase, position, illumination and other general info regarding the position of the moon and its relationship to Earth. Will also plot moon on a screen generated star chart using the Yale Observatory Bright Star database (included). Req: CGA Card, printer optional.

OPTICS gets optical parameters from the sophisticated lens user and returns a myriad of technical information about reflecting lenses/telescopes. Adapted from basic program (Byte Mar 1983 p450). Turbo Pascal source included.

SUNSET accepts the date, time and location of position. Displays general info about sun in relation to Earth e.g. declination of sun, equation of time, the azimuth angles and times of sunrise and sunset for any point on earth. **SOLAR** is similar to **SUNSET** program mentioned above, with slight variations.

SUNRISE computes time of sunrise and sunset when given Date / Latitude / Longitude of observers. Sidney BC co-ordinates included. Can be customised for other areas.

*** Disk XXXX ONLY AVAILABLE FROM CSIR**

The **TELEPHONE TIME SERVICE** numbers are: (012) 8414338 or (012) 8413846.

In order for you to be able to access the Telephone Time Service, the C.S.I.R. provides you with a disk. This disk is "personalized", i.e. it contains a built-in secret password which is automatically sent to the C.S.I.R. after the communications link has been established. The C.S.I.R. keeps a file in which each call is automatically recorded in the following format:

Password Date Time

and you will be billed every month according to the contents of this file. It is therefore advisable to keep your disk in a safe place in order to avoid unauthorized access to it. However, if you suspect that this has happened the C.S.I.R. will provide you with another disk (i.e. with another password). The programs are protected by RSA copyright law and international treaty provisions. You must treat the program just like a book.

Disk No.1604 & 1605 ASTRONOMY STAR CATALOGUE 5

ASTRONOMY STAR CATALOGUE lists the named and designated stars of the 88 constellations. The stars are generally of the 6th magnitude or brighter, but some other stars of interest are included along with dimmer stars that are within 10 light years. There are about 1700 stars included and the name, magnitude, spectral type, distance, and other information is included for each star. Other information includes cross-referenced stars, whether or not the star is a binary, variable, erratic variable, and the period of variation. All the information is listed concisely in columns on each page, and is easily-accessible to the user.

CONSTELLATION 88 gives a diagram of each of the 88 constellations, along with their general co-ordinates, right ascension, and declination. **SOLAR SYSTEM** gives essential facts and figures on the planets, moons, asteroids, and satellites within our solar system. Information includes distance, diameter, rotation, revolution, orbit, eccentricity, and much more. Diagrams of celelstial bodies are also in this program. ASTRONOMY NOTES contains general information concerning stellar astronomy. Many topics are discussed such as spectral classes, Hubble's constant, Kepler's Harmonic Law, and Hertsprung-Russell diagrams. CONSTELLATION NAMES lists the names of the constellations an d ASTRONOMY NOTES contains information about different systems of distance, temperature, and time. The information included in all these programs is quite valuable for anyone who has an interest in astronomy. REQUIRES: 128K memory, one disk drive and colour graphics.

Disk 1602 PLANETS 3.2

Version 3.2 March 3, 1986 : This program computes information relating to the position, distance, magnitude, orbit view, skyview, etc. for the major planets, four minor planets or Halley's comet on a specified date and time. Also, orbital data for any desired planet or comet can be entered and saved in a disk file. Skyview and orbital views can show forward or backward motion. File PLANETSA.COM is for use with an 8087 Arithmatic coprecessor and file PLANETS.COM is for use without an 8087.

STARFINDER

A Program to show new users how to start "The Starfinder" ON DISPLAY Program and its Documentation are all on this disk. To begin, bring up IBM PC DOS and BASIC. (Note: If you are using a printer other than the IBM Matrix or IBM Graphics Printer, you may need to modify the documentation to fit your printer. Run the BASIC program 'printers.bas' for more information.) Make sure that the printer is on, and then LOAD and RUN the BASIC program 'director.bas' from this Distribution Diskette. This will print a Program Directory, which contains information about the rest of the documentation, and about the Starfinder ON DISPLAY program. Following the instructions in the Program Directory, LOAD and RUN the other documentation program, 'usermanu', which will print the User's Manual.

Disk 0483 & 0484 ASTROSOFT COMPUTERISED EPHEMERIS

A general-purpose astronomy software package consisting of three separate parts: Part 1 of ACE performs the most needed astronomical calculations, involving the sun, the moon, the planets, eclipses, astro photography exposures, mean sideral time and Julian Day, precession of coordinates, phases of the moon, equinoxes and solstices, Galilean satellites of Jupiter, perpetual calendar, and Polaris. Part II of ACE (Solar System Data) provides for all the planets and satellites of the solar system, orbital and physical data, as well as descriptive and observational data. Part III of ACE (Sky Catalog) provides data on over 2000 deep-sky objects, the entire Messier Catalog, 100 named objects, all bright stars to magnitude 2.00, and 100 prominent double stars, with detailed commentary on nearly 400 of these objects. Objects may be searched for on the basis of one criterion or by a combination of criteria. Reqs. CGA.

Disk 9103-03 COMETP

COMETP is a program that predicts the apparent position of a comet moving in a parabolic orbit. It is not suitable for objects moving in an elliptical orbit. It needs data input that is only available from sources such as observatories or astronomical publications so the user will need some prior knowledge of astronomy and comet orbits.

CATALOG TOOL 2.1

CT allows one to build a database of all the files on all your disks, lets one view, edit and print them out. The files are read from the disk directory and each title may be assigned a category (e.g. Utility of Game) and the user supplies a disk number or name to identify where the titles are.

DTA 1.2

DTA is a super directory utility that serves as a replacement for the DOS DIR, ATTRIB, and TREE commands. It features: alphabetized directory with file sizes and free space; optionally include attributes and time/date; select items by file attrib or time stamp; change any file attributes; treat directories separately or together with files alphabetized; compact subdirectory tree; optionally include sizes etc.

PC-FILENOTES 1.6

PC-FN is a 26k TSR which allows you to easily attach 160 character pop-up notes to your filenames. You can also view, delete, rename and tag copy files as well as change drives and directories.

DISK 9203-01 ASTROPACK ASTRONOMICAL TOOLS 2.0

ASTROPACK is a general-purpose mathematical astronomy program. It combines various time and position calculations that are often tedious or difficult to do by hand. It is intended for astronomy hobbyists, students, or anyone else who might be curious about when the sun will set next week, or how far it is from Stockholm to Sacramento. For users with serious requirements, Astropack gives reasonably accurate values that will supplement an astronomical almanac. It is valuable if an almanac for the appropriate time period is not available. If you have a standard printer, the program can also print tables of values for any time periods.

GALILEAN SATELLITES OF JUPITER 2.0

This program calculates the phenomena of the Galilean satellites of Jupiter. The output is presented in both a tabular and an animated graphic mode, and may be listed as well on a line printer. REQUIRES; CGA or better.

MOON

MOON is a well-done graphics display of the face of the moon with some fancy features: you can zoom in and out, move all around via cursor keys, go to the nearest 'LANDMARK" (from a big database of craters, lunar mission sites, etc.) and have the system identify it for you, etc. Nice detail, very clear and relatively fast displays on my Hercules-clone system. NO docs at all. But menus are relatively simple to understand.

PLANETIA

PLANET provides the times and optionally azimuths of rising and setting and/or the equatorial co-ordinates (corrected for parallax) for planet. (Mercury is the default)

VIEWS OF SATURN 2.0

SATVIEW projects a mathematical model of a sunlit Saturn from any angle. Some of these are unfamiliar and impossible to be viewed from Earth. REQUIRES: CGA, EGA or VGA screen.

Disk No.797 SCIENCE SOFTWARE (ASTRONOMY)

Educational programs to help explain fundamental concepts of astronomy. KEPLER - tutorial to solve Kepler's equation for elliptic, parabolic and hyperbolic orbits; SIDEREAL - tutorial which introduces relationships between Julian and calendar dates, solar and sidereal times; J2000 - utility to convert stellar positions, proper motion, parallax and radial velocity from the standard epoch B1950 (FK4) to epoch J2000 (FK5) ; GALILEAN - tutorial to determine position of Galilean satellites relative to Jupiter ; ROCKET1 - determines flight performance of single stage model rocket using analytical exact solution. TNODE - determines info about equatorial crossings of earth satellites; SYNCSAT determines location of geosynchronous satellites relative observer. ATMOS - determines properties of standard atmosphere.

Disk No.2611 SKYGLOBE 2.5

SKYBGLOBE 2.5 is the fun and easy educational astronomy program. It lets you view the sky at night and can display 15 000 stars (including the 7 000 visible to the naked eye) and the positions of the planets, as well as constellation lines. It also has 240 predefined locations worldwide. You can specify the time, date, direction and location of the view; change the number of stars viewed; adjust the magnification of the sky view and adjust the star brightness. SkyGlobe can display Latitude, Longitude, and Ecliptic lines to help you orientate yourself on the celestial globe. In this version are enhancements to SkyGlobe's Auto-Increment mode that gives you the ability to simulate the passage of time on the PC. When in this mode, the sky view will begin to change in a manner that depends on the Auto-Increment parameters. For educational users, SkyGlobe is a great way to watch the patterns of the planets, such as retrograde motion, or to learn why we don't have eclipses every month.

Useful feature of SkyGlobe is its ability to quickly and easily change the lines and labels that help our eyes and minds make sense of the vastness of the sky. This can be very helpful to the novice just learning the stars. This update has added the capability to show an approximate outline of the Milky Way and galactic equator. REQUIRES: CGA, Hercules, EGA, or VGA graphics adapter. Supports screen printouts on Epson, Proprinter, or LaserJet compatible printers.

Disk 2001 STARVIEW 1.0.09
Starview displays a detailed map of the stars with much of the information available on the screen. (the display is very pretty). The database for this program is derived from the 4th edition of the Yale Bright Star Catalog and contains 9096 stars. Co-ordinates are Epoch 2000.0. This version of StarView implements display of objects in the solar system. These objects can be observed at any time or date. No non-stellar fixed objects are included. You may add your own data to the list of fixed objects used by StarView. StarView contains information on the SUN, MOON and ZENITH (for horizon display) and orbital elements for the planets. You can add your own data for planets, comets, asteroids, etc. to those listed. StarView has many features some of which are as follows:- You may center the display on any object by pressing Enter and typing in any of the following identifications: name - common name or abbreviation (SUN, VEGA); Flamsteed Number and Constellation; Greek letter abbreviation and Constellation; Yale Catalog Number etc. one can directly set some display parameters; display rotation to decimal degrees; set field width; set limiting magnitude of display Observer's Geographic Longitude (degrees); Observer's Altitude above sea level (meters); Display Date; Display Time; Display Universal Time. The observer screen also allows you to enter a specific time and date for your observations. An automatic drive feature is included. This simulates the view in an actual telescope with a fixed mount, or an equatorial mount with R A clock drive. REQUIRES: Any video, 400K RAM; mouse optional.

Disk 0002 Duff-Smith
Peter Duffett-Smith Astronomy with your P C:-
This disc contains the BASIC subroutines and handling programs listed in the book "Astronomy with your personal computer". It is intended as a supplement to the book, enabling you to link the routines together when constructing a program without the tedium of having to enter the code from the keyboard line by line, you will need to consult the book to discover how to use the routines. Book Details:-
ISBN 0 521 26620 3 Hard cover
ISBN 0 521 31976 5 Paperback

Disk 0004 TRACK & **ORBITS2**
A SATELLITE TRACKING PROGRAM
The program permits the user to establish data records for up to twenty earth satellites and to track those satellites for the purpose of aiming radio antennas at them. The user can select a particular function from a menu and that function will be executed automatically. The IBM Color Graphics Adapter and Display, or equivalent, is required for graphics routines in this program. Before the program can be run the user must supply some information unique to his own geographical location and ground station. He must also have a source of satellite orbital elements in order to periodically update the "numbers".

ORDER FORM

The following Astronomical Software packages are available from :

TONY HILTON, P O BOX 68846, BRYANSTON, 2021
(Director: Computing Section A.S.S.A.)

If you wish to have a copy of any of the software, please complete the order form below. The software is available at R 10.00 per disk which includes postage, packaging and media etc. to anywhere within South African borders.

NAME : .....

ADDRESS: .....

.....

DISK NO	TITLE	NO. OF DISKS REQUIRED	COST
1109	Astronomy Collection 1 (1 disk)		
1604 & 1605	Astronomy Star Catalogue 5 & 88 Constellations (2 disk set)		
1602	Planets 3.2. (1 disk)		
0483 & 0484	Astrosoft Computerised Ephemeris (2 disk set)		
9103-03	Cometp (1 disk)		
9203-01	Astropack Astronomical Tools 2.0 (1 disk)		
797	Science Software (Astronomy) (1 disk)		
2611	Skyglobe 2.5 (1 disk)		
2001	Starview 1.0.09 (1 disk)		
0002	Duff-Smith (1 disk)		
0004	Track & ** Orbits2 ** (1 disk)		
	TOTALS:		

PLEASE MAKE ALL CHEQUES PAYABLE TO : A.S. HILTON

DEEP-SKY OBSERVING SECTION ANNUAL REPORT: 1992-1993

Director : Auke Slotegraaf

The Deep-Sky Observing Section, dedicated to observing objects outside our solar system, was formed in October 1992. It currently has 21 members, 14 of whom joined in response to a brochure sent out to recently-elected Society members. Members received a brief observing guide explaining some of the basis of deep-sky observing.

In order to promote visual observing, the Section offer's a Bennett Certificate to those who observe the comet-like objects listed by the late Jack Bennett, director of the Comet & Meteor Section. Several observers are currently working on this project. These observations will contribute to the long-term goal of the Section, namely the production of a handbook of southern deep-sky objects.

Two newsletters were sent out to members, and a shorter third edition appeared in MNASSA.

Observations and sketches have been received from Ed Finlay (Johannesburg), Kerry Hampson (Pietermaritzburg) and Derrick Shaw (Bulawayo).

Good wishes and words of encouragement were received from the Herschel Club (Florida, USA), the Webb Society and the Astronomical Society of Victoria.

ASSA members who would like more information or who would like to join the Section are encouraged to write to the director at P O Box 608, Stellenbosch, 7599.

HISTORICAL SECTION

Director: Jonathan H Spencer Jones

It is my pleasure to present the first annual report of the Historial Section, which was formed in mid-1992 at the suggestion of past President, Jose Campos.

This Section is somewhat specialised in its nature and the disappointingly small response from ASSA members who wish to participate in its activities apparently confirms this view. Nevertheless, an archive of historical material has been started and some projects have been initiated.

Edwin Suter of Port Elizabeth kindly provided copies of photographs and some notes on a 9-inch reflecting telescope and observatory he constructed during the 1950s in Zimbabwe.

Jack Koen of Benmore has started a project on the German observatories in Namibia. Jose Campos indicated that once he had settled following his move to Portugal, he would investigate the availability of archival material on the old Campos Rodrigues Observatory in Mozambique. Jonathan Spencer Jones has begun an investigation on the Tananarive Observatory in Madagascar. It needs to be placed on record however, that any projects that depend on communications with other countries in Africa are severely hampered by seemingly poor postal services.

In conclusion, I would like to remind members that they can make important contributions to the Historical Section by providing photographs and/or other material for the archive or by undertaking historical investigations, and I would like to thank those who have made contributions during the period under review.

OCCULTATION SECTIONS

Director: MD Overbeek

TOTAL OCCULTATIONS

Dr KG Fuhr, the doyen of occultation observers, reports a bad year, with a total of one observation. He has since obtained a completely new optical train, from the lens of his eye to a 5 inch object glass in a telescope which is much more portable than his previous one. We wish him good observing with his new optics.

Observations were also reported by the following:

	Disappearances	Reappearances	Total
H Cameron	92	0	92
J Knight	72	0	72
D Overbeek	43	10	53
J Smit	42	23	65
P van Blommestein	74	0	74
J Vincent	32	12	44

The lack of a national time service continued to bother observers but being resourceful and well motivated observers, they managed to overcome the handicap in a variety of ways.

PLANETARY OCCULTATIONS

Only one very dubious occultation was reported but several estimates of appulse times were made, so all was not in vain. Observers are thanked once again for their perseverance and enthusiasm. Their names, together with their IOTA three letter designations, are listed below:

T Cooper (Cop), S Dale (Dae), G de Beer (Deb), S Enke (Enk), R Field (Fie) J Knight (Kn'i), H Lund (Lun), G Prosser (Pro), J Smit (Smi), C Turk (Tur) and P van Blommestein (Vnb). The writer is Ove.

#1	Jan 7	PPM92040 by 92 Aurora. Edenvale: Ove reported cloud Ladysmith: Deb reported cloud. Pietermaritzburg: Dae and Pro reported cloud. Pretoria: Smi reported a miss.
#2	Jan 15	FAC 3890326 by 511 Davida. Durban: Fie reported cloud. Ladysmith: Deb reported cloud. Newlands: Tur reported cloud.
#3	Jan 23	FAC 361318 by 2060 Chiron. Durban: Fie reported cloud. Edenvale: Ove reported a miss. Ladysmith: Deb reported cloud. Pretoria: Smi reported a miss.
#4	Feb 29	PPM 596071 by 654 Zelinda. Edenvale: Ove reported a miss. Ladysmith: Deb reported cloud.
#5	Feb 29	FAC 122166 by 51 Nemausa. Edenvale: Ove reported target star not visible. Ladysmith: Deb reported target star not visible.
#6	Mar 31	FAC 148107 by 51 Nemausa. Sky too bright reported from: Benoni: Cop, Edenvale: Ove, Ladysmith: Deb.
#7	Apr 1	PPM 96641 by 29 Amphitrite. Benoni: Cop reported a miss. Edenvale: Ove reported an appulse a minute early. Smi reported an appulse at about the predicted time.

#8 May 2 AC 24647 by 308 Polyxo. Benoni: Cop reported a miss. Ladysmith: Deb reported wind. Newlands: Tur reported cloud.

#9 May 3 PPM 511997 by 97 Klotho. Benoni: Cop reported a miss. Edenvale: Ove reported a miss. Ladysmith: Deb reported star not seen. Newlands: Tur reported cloud.

#10 May 13 LickV 5575 by 223 Rosa. Benoni: Cop reported a miss. Edenvale: Ove reported a miss. Pretoria: Smi reported miss.

#11 May 30 PPM 552490 by 175 Andromache. Benoni: Cop reported a miss. Edenvale: Ove reported a miss. Pretoria: Smi reported a miss.

#12 Jun 5 PPM 551949 by 27 Euterpe. Benoni: Cop reported appulse about a minute late. Edenvale: Ove reported appulse about a minute late. Ladysmith: Deb reported appulse about a minute late.

#13 Jun 10 PPM 172711 by 510 Mabella. Benoni: Cop reported a miss. Ladysmith: Deb reported sky too light. Pretoria: Smi reported a miss.

#14 Jul 4 PPM 532316 by 68 Leko. Benoni: Cop reported an appulse perhaps a minute early. Edenvale: Ove reported an appulse about as predicted. Pretoria: Smi reported an appulse as predicted.

#15 Jul 18 FAC 52331 by 52 Europa. Edenvale: Ove reported star not seen. Pretoria: Smi reported appulse at the right time.

#16 Aug 7 LickV 881 by 30 Urania. Benoni: Cop reported a miss and so did Kni. Edenvale: Ove reported a miss. Harare: Vij reported a miss. Pietermaritzburg: Dae and Pro reported cloud.

#17 Aug 11 AC 11126 by 279 Thule. Edenvale: Ove reported a miss. Harare: Vij reported cloud. Ladysmith: Deb reported cloud. Pietermaritzburg: Dae and Pro reported cloud. Pretoria: Smi reported a miss.

#18 Sep 12 LickV 4239 by 307 Nike. Edenvale: Ove reported cloud. Johannesburg: Lun reported cloud. Ladysmith: Deb reported cloud. Pretoria: Smi reported cloud.

#19 Sep 13 PPM 551121 by 380 Fiducia. Benoni: Cop reported cloud. Edenvale: Ove reported cloud. Johannesburg: Lun reported cloud. Ladysmith: Deb reported cloud. Pretoria: Smi reported a miss with intermittent cloud.

#20 Sep 22 AC 13908 by 21 Lutetia. Edenvale: Ove reported cloud. Ladysmith: Deb reported cloud. Pretoria: Smi reported cloud.

#21 Sep 24 LickV 2318 by 88 Thisbe. Edenvale: Ove reported cloud. Johannesburg: Lun reported star too low. Ladysmith: Deb reported cloud.Pretoria: Smi reported cloud.

#22 Nov 2 PPM 148519 by 756 Lilliana. Edenvale: Ove reported cloud. Ladysmith: Deb reported cloud. Pretoria: Smi reported cloud. Simon's Town: Vnb reported cloud.

#23 Nov 12 PPM 144083 by 546 Herodias. Edenvale: Ove reported cloud. Ladysmith: Deb reported cloud. Pretoria: Smi reported cloud. Simon's Town: Vnb reported star not seen.

#24 Nov 14 SA0187740 by 4179 Toutatis. All observers found the sky too bright.

#25 Nov 25 PPM 148139 by 41 Daphne. Only some observers notified. Edenvale: Ove reported cloud. Harare: Vij reported cloud. Pretoria: Smi reported cloud.

#26 Dec 13 +3 2332 by 4179 Toutatis. Only some observers notified. Benoni: Cop reported cloud. Edenvale: Ove reported cloud.

#27 Dec 14 SA0117865 by 4179 Toutatis. Only some observers notified. Benoni: Cop reported interference from moonlight.

#28 Dec 16 +10 1981 by 4179 Toutatis. Only some observers notified. Benoni: Cop reported cloud.

#29 Dec 26 SA0997923 by 4179 Toutatis. Only some observers notified. Benoni: Cop reported an appulse at about the predicted time. Pretoria: Smi reported an appulse a few minutes early.

#30 Dec 30 FAC 317543 by 18 Melpomene. Benoni: Cop reported cloud. Edenvale: Ove reported cloud.

GRAZING OCCULTATIONS

P van Blommestein observed a graze at home.An extremely successful exercise was conducted near Heidelberg when ZC 2797 grazed the moon on 1992 09 06. No less than 49 highly consistent timings were obtained by the following observers and one helper: D Blane, J Cohen, H Homer, H Lund, A McRae, A Overbeek, D Overbeek, A Voorvelt and D Voorvelt.

NAMIBIA

Occultation observations were made in Namibia by S Enke and R Wallace but details are not yet to hand.

SOLAR SECTION

Director: J.Knight

The active participation by our observers continued again during 1992 and our small number of "regulars" has remained intact and continued to submit high quality reports and keep the Solar Section very much alive and productive. Once again, we owe them a big vote of thanks!

We are now well into Solar Cycle 22. Sunspot minimum was in September 1986, and by July 1989, less than 3 years later, the cycle had reached it's maximum, the shortest and most rapid rise to "Solar Max" yet recorded! Three years have now passed since "Solar Maximum" and observations showed that things were starting to quieten down as we head towards Solar Minimum. The protracted period of high activity which was experienced in 1991 has now given way to a slow, steady decline interrupted by sporadic bursts of furious activity.

Let us look at what observations of the Sun in 1992 yielded:

JANUARY: Activity in January fell to less than half of December 1991 levels, with 40 energetic events compared to 94. Only 4 events reached major levels. Average daily indices however, remained comparable, except the daily sunspot area which fell 25%.

Major M flare activity with significant type II and IV radio sweeps greeted the New Year. Other major flares occurred on the 9th and 14th and a strong X1 flare occurred on the 26th. The 10.7cm flux reached a value of 303 on the last day of the month, which was the highest since the 310 values recorded in February 1991.

There were no proton events and only one small proton enhancement, reaching a value of 1.6 pfu on the 4th. The geomagnetic field was mostly unsettled with isolated periods of minor storming occurring for a few hours.

FEBRUARY: Activity levels rose again in February with 49 events of which 6 were at major levels. Both the 10 cm flux and sunspot area increased during the month. Flare activity occurred in 14 different activity regions, the most prolific producing 10 events, including half of the major flares. Large X type flares were recorded on the 16th and 27th. The X flare of the 27th was of long duration and accompanied by strong type II and IV radio sweeps. There was one

minor proton event and a proton enhancement this month following the X flare activity. This activity was also accompanied by a 9% Forbush decrease. The geomagnetic field was as a result considerably more disturbed with 9 days of storming at mid-lati-tudes. Five sudden impulses were detected this month, the largest measuring 34 nT and the GOES 6 and 7. Spacecraft experienced magnetopause crossings lasting around 3 hours. A large disappearing filament was observed on the 22nd as was suspected as being the cause of several days of geomagnetic storming.

MARCH: Activity levels plummeted nearly 90% compared to February, with only 4 energetic events being recorded for the whole month. There was only one major flare, an M4 recorded on the 15th. This
flare was of long duration and was accompanied by significant bursts across the spectrum as well as strong type II and IV radio sweeps. One proton enhancement and one minor proton event were recorded during the month. Geomagnetic activity was well down and ranged from quiet to active with no storm conditions being reported at mid-latitudes. A strong 51 nT sudden impulse was detected on the 17th in response to the M flare of the 15th.

APRIL: Activity levels increased moderately over March with 8 major events. The most active day was the 1st when 3 M flares erupted. Other active days were the 17th, 20th, 22nd and 24th. No proton events or enhancements were detected during the month. The geomagnetic field was quiet with only one day of minor storming being detected at the beginning of the month. A 13 nT sudden impulse was experienced on the 14th though. Prominence activity was up this month with sightings on the 4th, 7th and 14th. The largest was a 20° wispy type filament seen on the 14th.

MAY: Activity decreased again this month with only 5 energetic events. Like the previous 2 months, only one of these reached major levels. The radio flux and the sunspot numbers continued their declining trend. The largest flare occurred on the 8th and it was accompanied by strong radio emissions across the spectrum and a type IV sweep. A large eruptive prominence occurred on the 7th and it extended a massive 0.58 solar radii, it was associated with strong type II and IV radio sweeps and had a shock wave velocity of an estimated 2000 km/sec. There was one minor proton event and a proton enhancement this month in response to the strong M flare. The proton event reached 4600 pfu, making it the largest event since March 1991. A polar cap absorption event followed and reached an intensity of 20.4 db. The geomagnetic field was mostly quiet to active, with 2 days of storming at mid-latitudes. A 31 nT sudden storm commencement occurred on the 9th and this was followed by severe storming for 15 hours.

JUNE: Activity picked up in June with 9 energetic events being detected. The number of disappearing filaments typically rises during the declining portion of a solar cycle and in keeping with this characteristic, filaments exited the Sun on a daily basis through the month. On the 7th, the first class M flare to be recorded since May 8th occurred and was followed with a second such event the next day. On the 25th, two class M flares and the first class X flare since February were detected, the latter flare when the sunspot group was two days behind the Sun's west limb. A long duration proton event sparked by the class X flare peaked on the 26th at 390 pfu., dipped below event threshold, rose again, and ended on the 29th. Ground level protons were reported by some stations. The magnetic field experienced periods of minor storm conditions from the 8th through the 11th and then experienced storm conditions ranging from minor to severe (depending upon latitude) on the 12th. A brief period of minor storming occurred on the on the 24th and was probably linked to coronal hole activity. A sudden impulse associated with the X3 flare was recorded on the 27th; a major geomagnetic storm associated with these activities began on the 29th and ended on the 30th. An eruptive prominence stretching outward to 0.47 solar radii was

observed on the SW limb on the 21st, but otherwise the Sun was visually relatively quiet. Solar scientists were puzzling over an unexpected 'gamma ray afterglow' discovered on the Sun by NASA's Compton Gamma Ray Observatory. The glow, a strong emanation of high energy gamma rays, persisted for more than 5 hours after a solar flare explosion and a similar phenomenon occurred four days later, this time lasting more than 90 minutes.

JULY: Activity varied from low to high. Activity picked up in July with 1 class X, and 8 class M flares being recorded. The class X, and six of the class M events were spawned by a single sunspot group. The X flare occurred on the 8th, accompanied by a 2695 MHz radio burst. That event was followed on the 9th by a second major flare. An M class X-ray event occurred on the 18th and was associated with a bright surge on the west limb. The geomagnetic field was generally quiet or unsettled, with brief periods of storm conditions. which occurred on the 22nd and the 28th. There were no proton events or proton enhancement detected during the month. Other events of interest included impulsive prominence activity on the SW limb on the 20th, and an eruptive prominence on the Sun's west limb on the 22nd and 23rd. Additional events included an eruptive prominence on the SW limb on the 24th which extended out to 0.28 solar radii, a few small filaments which disappeared from the central disk on the 26th, and a second prominence which erupted on the west limb near the solar equator on the 27th.

AUGUST: Solar activity was up to moderate levels again this month with 13 energetic events being detected. Sporadic M flares occurred at the beginning of the month and then the Sun returned to a low activity level until the 20th when one activity region spawned 4 class M flares and this was followed with 3 additional M-level events on the 21st. An eruptive prominence was spotted on the Sun's NE limb on the 3rd. This large spot group (a maximum area of ±1440 millionths solar hemisphere, or nearly 4400 million km¨) dominated an otherwise unimpressive disk during the third week of August. The geomagnetic field remained at quiet to unsettled levels until the 4th when the first of several sudden impulses was recorded. This impulse - possibly a result of a disappearing solar filament approximately coincided with the start of an enhanced proton level at satellite altitude. A second impulse was recorded early on the 5th, followed by geomagnetic storm conditions at mid and high latitudes. Yet a third occurred on the 6th, and the proton enhancement gradually exceeded event level. A Forbush decrease of ±7% also occurred at this time. The geomagnetic field was quiet or unsettled for most of the period that followed, with storm conditions occurring again at mid and high-latitudes on the 20th. Numerous reports of aurorae were received from sites at latitude 45 degrees or higher on the 4th and 5th. However the polar cap absorption event normally associated with these activities did not reach event threshold, and the proton level began to wane late on the 6th. Periods of geomagnetic storm conditions attributed to multiple class M flare activity on the 21st occurred on the 22 and 23rd, and again on the 26th and 27th possibly due to a coronal hole. A number of reports were received from mid-latitude and higher locations which described aurorae on the 22nd and 23rd. The Sun's Northern Hemisphere was spotless on the 9th and 10th. Only two or three spot groups were visible on the Sun's disk on any one day, and the Sun's Southern Hemisphere was spotless on the 28th. A large (30 degree) filament disappeared from the Sun's NW quadrant on the 18th, but the event apparently did not impact the terrestrial environment.

SEPTEMBER: Solar activity was very high during September. The lull experienced in recent months was to be short-lived. An onslaught of activity began when the Sun produced a class M flare on the 4th, during the next five days this event was followed by no fewer than 2 class X flares and 20 class M flares - 2 of them major events all in the same spot group. Further outbursts occurred

again at the end of the month. Minor to major geomagnetic storm conditions began on the 8th as a result of the class X flares referred to above. Prolonged class M flare activity produced one sudden impulse (52 nT) on the 9th and a second on the 10th (54 nT), along with occasional severe storm conditions and a small Forbush decrease. The geomagnetic field was quiet to unsettled with a few periods of active conditions for several days; then a major storm began on the 17th, and a small sudden impulse was observed later in the day. Yet another sudden impulse (15 nT) was recorded on the 25th. The geomagnetic field was mostly quiet or unsettled until the 29th when isolated instances of major to severe storming occurred. Conditions subsided to minor storm levels on the 30th. Aurorae were readily apparent from sites as low as latitude forty-one degrees between the 2nd and 5th. Numerous reports of aurorae, viewed during the 8th to the 11th, were received from upper-middle and high latitude locations. Aurorae were common in the northern United States and Canada on the 16 and 17th and again between the 28th to the 30th. A large 40° filament was seen as it disappeared from the Sun's SE limb on the 29th.

OCTOBER: Solar activity was moderate to high during the month. The largest group on the disk (±1500 millionths solar hemisphere), produced 5 class M flares during a 24 hour period on the 26th, and added sixth and seventh events on the 27th. Five more M flares followed at the end of the month, but none of these flares attained major event status. The highlight of the final days of the month occurred on the 30th when the largest energetic event during October, a class X1.7 Tenflare was detected. Minor geomagnetic storming associated with a coronal hole occurred on the 1st. Thereafter, conditions varied between quiet and unsettled. A sudden impulse of 14 nT was recorded on the 8th. The geomagnetic field became disturbed on the 12th, and again on the 14th to the 16th. The second of these storms was associated with coronal hole activity. The geomagnetic field was mainly quiet to unsettled, with a few brief periods of storm conditions at middle and higher latitudes. A proton event at satellite altitude and polar cap absorption began shortly thereafter with periods of major geomagnetic storm levels at high latitudes. Other events of interest included an eruptive prominence at the NW limb on the 14th with material visible out to 0.16 solar radii, two filament disappearances on the 15th, and another small filament which disappeared from the Sun's NW limb on the 20th. Another eruptive prominence extending to 0.14 solar radii was observed at the SW limb on the 26th.

NOVEMBER: Solar activity was primarily low during most of November. On November 2nd - over a day beyond its west limb passage an activity region produced the most powerful solar flare since June, 1991, a X9.0 Tenflare. It is interesting to note that this event was only the tenth class X flare to occur during 1992. Solar activity climbed into the moderate range on the 18th after the eruption of a class M flare. Other M flares occurred on the 22nd and 23rd respectively and the final two class M flares during November were produced by two rather nondescript sunspot groups on the 29th and 30th. The proton event which began on October 30th after the eruption of a X flare, reached a maximum of 10 MeV on the 31st, and ended on the 6th. This event - eventually bolstered by effects of the X flare mentioned above - surpassed the 100 pfu threshold on the 2nd and its associated polar cap absorption ended on the 3rd. A sudden impulse of 60 nT, probably linked to the X1 flare, was recorded on the 1st. The geomagnetic field was quiet to unsettled during most of November, with brief intervals of storm conditions from the 9th to 13th. Geomagnetic storm conditions associated with a recurrent coronal hole occurred during the third week of the month, and emission from an M flare caused a slight proton enhancement at satellite altitude on the 24th. An active prominence was observed on the Sun's east limb near the equator on the 9th, and a moderately sized filament disappeared from

the SE on the 10th. Other events of interest included the disappearance of a 30° long filament from the NE limb on the 27th.
DECEMBER: Activity was very low again, with 3 class M flares being detected at the beginning of the month. These were to be the only events to attain class M or better intensity until the 31st of December. The total number of recorded class M or X flares during December [4] tied with the March 1992 total as the lowest number to occur since February 1988. None of this month's flares were major events. Then, early on the final day of 1992, a small type H sunspot group perched on the Sun's NW limb produced the month's fourth and final class M flare. The geomagnetic field became disturbed on the 1st and again on the 3rd, but otherwise conditions ranged between quiet and active. The geomagnetic field experienced intervals of storm conditions at high latitudes between the 7th and the 9th as a result of a trans-equatorial extension of a southern polar coronal hole. A sudden impulse of 19 nT was recorded on the 17th, and the GOES 6 spacecraft made a brief magnetopause crossing several hours later. A second sudden impulse of 16 nT was observed on the 27th, followed by intervals of minor to severe geomagnetic storm conditions on the 28th and 29th. This activity probably resulted from a disappearing filaments which left the Sun on the 22nd. The Sun's Northern Hemisphere was spotless on the 7th, and only one northern sunspot group was visible on all other days between the 6th and 17th. Other events of interest included the disappearance of several sizeable filaments from the Sun's central zone on the 22nd and 23rd, and from the SE limb on the 25th. The latter event did not significantly influence the terrestrial environment.

Solar Section activities for the year are summarised as follows :-

1] VISUAL OBSERVING: Observers H. Cameron, H. Lund and J. Knight continued to submit regular and high quality reports to the ASSA Solar Section, the AAVSO, the BAA and the German observing groups.

2] RADIO TELESCOPE OBSERVATIONS: Our Radio Telescope operated by A. Voorveld was in operation for most of the year and continues to provide much useful information about Solar activity in the Radio frequencies.

3] SOLAR FLARE DETECTION: This year our network of Sudden Enhancement of Signal receivers again monitored signals from stations in Australia and the United States, allowing detection of Flares using the East and West propagation paths. Solar Flare detection was undertaken by J. Knight, D. Overbeek and A Voorveld. This was not a good year for this type of observation as one receiver after another went out of action. Two receivers were struck by lightning whilst the third suffered from electronic problems

4] MONITORING OF THE GEOMAGNETIC FIELD: Magnetometer observations were received from D. Overbeek and for a limited period from the Magnetic Observatory in Hermanus. The reports from the Hermanus Observatory ceased early in the year once they had split off from their parent body and became responsible for their own funding. My special thanks to D. Nagtergale and D. Overbeek for making this information available to us.

5] AURORA WATCH: Aurora alerts were issued during the year but no reports of sightings were received.

6] PUBLICATIONS: The Solar Section's data, Observations and Reports are distributed in Southern Africa, Australia, The United States of America, the United Kingdom and Germany. The Solar Section continues to be actively involved with colleagues and organisations overseas, particularly Messrs P. Taylor of the AAVSO Solar Section, B. Hardie of the BAA Solar Section, R. Wiechoczek of InterSol and M. Gotz of the Pettisindex in Germany. The Solar Section's reports are also published in "Canopus" the ASSA Transvaal Centre newsletter and in MNASSA. A paper on the circumstances of the 1992 total solar eclipse was presented at the first ASSA National Symposium held in Cape Town.

7] OTHER ACTIVITIES:

7.1 SCHOOLS: Members of the Section continue to be involved with this activity which has been greatly expanded during the past year. Mrs R. Learmonth, Mrs S. Knight and the director continued to be the Astronomy examiners for Boy Scouts, Girl Guides, Cubs and Brownie packs that took proficiency badges. The municipality of Kempton Park and the Scripture Union approached the Solar Section to hold exhibitions, talks, demonstrations and viewing sections at their camps during the school holidays. Solar eclipse viewing parties were also undertaken.

7.2 VISITS: The Director visited the Transvaal, Pretoria and Cape Centres, as well as the SAAO facilities in Sutherland and Cape Town. No overseas visits were undertaken this year.

7.3 EXHIBITIONS: Several members once again took part in the Astronomy Week and the Science Fun Day activities in order that things Solar be exhibited. Grateful acknowledgement is also given to those members of the ASSA Centres who assisted us in this task.

7.4 ELECTRONIC MAIL: In the second quarter of the year, the world of international communications technology caught up with us. Through the department of Electrical Engineering's Software Applications Laboratory at the University of the Witwatersrand, we were able to get access to the international Internet computer network. This allows the Solar Section to communicate via computer to the Astronomical community at local institutions as well as direct communication with the world wide Astronomical community. Many of our overseas correspondence, Fax and report forms are now sent via the computer keyboard, offering a very considerable cost saving to the society and large time saving for the director. I would like to thank Professor Alastair Walker on behalf of our society, for taking this bold and far reaching move. I would also like to thank our President, Maciej Soltynski and the members of SAAO in Cape Town for patiently bearing the brunt of my e-mail assault since the time I came on air. Our e-mail address is: knight@odie.ee.wits.ac.za

7.5 TOTAL SOLAR ECLIPSE: The solar eclipse generated much interest. Many of the ASSA centres had some solar eclipse activity on the go and together we managed to raise the awareness of matters solar considerably. Expeditions by plane and ship were undertaken by the fortunate few, whilst those left on land did a sterling job running awareness programmes, public viewing sessions and even some scientific data gathering. A considerable amount of serious observing work was undertaken by ASSA members in Cape Town, Britstown, Johannesburg, Boksburg, Kempton Park, Pretoria and at the Hartebeeshoek observatory. I would like to thank all those members who submitted reports, photographs and data. A report of all this work will be published during 1993, once all outstanding contributions have been received.

VARIABLE STAR SECTION

Director : J Hers

This has once again been a spectacular year, the number of observations reaching a record high of 28553, an increase of 10 percent over the previous year. As in every year since 1981, Danie Overbeek's total of over 20 000 observations exceeded that of all the others combined by a very wide margin, but we should at the same time give credit to all those other observers, for their dedication and care in making accurate measures.

We welcome new observers Kirsten Naylor and Kevin Lobb of Grahamstown, and Neville Robinson of Pretoria, and hope that this marks only the beginning of a long and fruitful association. It is encouraging to note the substantial increase in observations coming from the Cape Peninsula, an area that was at one time almost written off because of its supposedly unsuitable climate. Perhaps we may now also expect to see a new resurgence of interest among the Natal astronomers, who were at one time among the best of the variable star observers, but who have been dormand for many years.

Observations from all South African observers continue to be sent each month on disk to the AAVSO in Cambridge, U.S.A. and to the Variable Star Section of the RAS of New Zealand, and close contact has been maintained with the Directors of both organisations, Dr Janet Mattei and Dr Frank M Bateson. Their always ready assistance is greatly appreciated. As from March 1992 the data has also been sent monthly to the SAAO in Cape Town and to the British Astronomical Association. Our sincere thanks are again due to the staff of the local office of "De Huizemark" for receiving FAX messages of astronomical alerts on our behalf.

Special attention was given to the observation of Nova Scorpii 92, Nova Doradus 92, and the three novae in Sagittarius. In each case an attempt was made to produce a 20"/mm chart as soon as possible - not always possible where cloudy weather prevented the accurate location of a nova.

In the case of N Sgr 92-2 such a chart was prepared, complete with preliminary comparison star magnitudes derived by measurement of images on the corresponding Papadopoulos True Visual Magnitude chart. When these magnitudes were later compared with independent photo-electric values, it was highly encouraging to find that the differences in most cases did not amount to more than 1 or 2 tenths of a magnitude. This means that the method can in future be used with confidence whenever some newly discovered object is in urgent need of a chart.

The following visual observations have been received during the year from observers in Southern Africa.

OBSERVER	TOWN	NO. OF OBSERVATIONS
D L Blane	Henley-on-Klip	617
A Boyd	Grahamstown	1
T Cooper	Benoni	1051
G de Beer	Ladysmith	18
S de Villiers	Cape Town	63
M Geyser	Pretoria	18
C Henshaw	Botswana	870
J Hers	Sedgefield	721
J L Jooste	Reitz	40
R W Jones	Fish Hoek	2270
N Kriek	Britstown	92
K A Lobb	Grahamstown	3
L A G Monard	Pretoria	774
K Naylor	Grahamstown	3
M D Overbeek	Edenvale	20284
N B Robison	Pretoria	390
J A Smit	Pretoria	885
C Turk	Cape Town	37
J Vincent	Harare	154
P van Blommestein	Simon's Town	6
S Walsh	Grahamstown	256
	TOTAL	28553

NIGHTFALL 2.4

Deep-Sky Observing Section
Astronomical Society of Southern Africa

The evening sky in Spring is remarkable -- mainly because of the virtual absence of the Southern Cross. Centaurus too is very low on the southern horizon and somehow the whole scene seems incomplete and barren, a celestial Sahara. Even Canopus is badly placed, though by midnight in mid-October, it has started to gain altitude. The Large and Small Magellanic Clouds are up, with the Small Cloud well-placed for observing. Scorpio is sinking in the south-west, with only its tail visible below Sagittarius. In the west, Altair shines like a lone beacon sinking in a sea that is the horizon. In the north, the distinctive square of Pegasus dominates, accompanied by the slim triangle of Triangulum and the bright pair of stars in Aries. Further east lies the bright knot of stars that is the Pleiades, followed by Aldebaran and the V of the Hyades. Due east lies Orion, straddling the horizon, and from my home he appears to be vaulting over the roof tops. I get a special thrill seeing Orion after its long winter absence, partly because it was one of the first constellations I learned, partly because it reminds me of the coming summer.

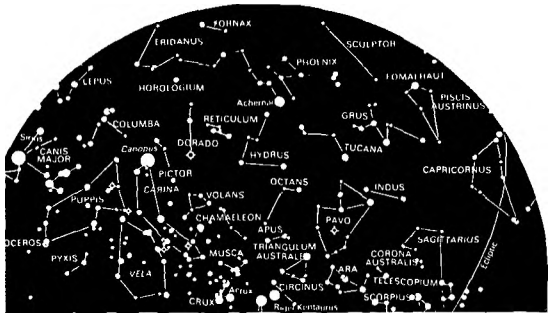
Turning to the north-west, seek out Altair. As shown on diagram 2, Altair points to the inconspicuous constellation of Capricorn, the Sea Goat. This curious mythological creature has the head and torso of a goat and the tail of a fish. William Tyler Olcott in *Star Lore of All Ages* (1911) wrote: "After Cancer, it is the most inconspicuous constellation in the zodiac, and it seems strange on this account that these signs should have held such a place of importance in the minds of the ancients, and that they should have survived without change of figure the assaults of the ages that these stars have gazed upon."

Capricornus was associated with the lowest point reached by the Sun below the celestial equator (23.5°) at the winter solstice. It therefore gave its name to the Tropic of Capricorn for latitude 23.5° South. It is the tenth constellation along the ecliptic, and is visible as a large crooked V of many faint naked-eye stars. Not particularly rich in bright deep-sky objects, it contains many double and multiple stars. Currently, the bright planet Saturn is also in Capricorn, making the constellation easier to find.

In the previous issue of Nightfall we looked at the Southern Triangle, made up of Achernar, Fomalhaut and the Peacock Star, α Pavonis. This triangle is still prominent in the night sky, and can be used to find Saturn. Extend a line from Achernar through Fomalhaut for about 21° to reach the bright yellowish star that is Saturn.

Saturn is shown on diagram 3 in the centre of circle 1. The circles are 5° wide and fit into the field of view of most binoculars. On the map, north is up and east is to the left. The faintest stars are about magnitude 7.5. With Saturn centred in your binoculars (Field 1), you should notice a number of bright stars in the vicinity. Use these stars to make sure you have your distances and directions right. About a degree due south is δ Cap (magnitude 2.8) and a degree to the northwest of Saturn lies a distinct 1° long line of three stars (42, 44 & 45 Cap, mags 5.2, 5.9 & 6.0). Look two degrees north-east of Saturn for the 5th magnitude μ Cap -- it was near this star, on the night of 25th September 1846, that Neptune was discovered. Since then, Neptune hasn't completed its orbit around the Sun, needing 165 years to do so.

Return to Saturn and look 2.5° south-west for γ Cap (mag 3.7) -- if your binocular field is 5° in diameter, the star should lie just on the edge of your view. γ and δ Cap make a wide



Spring sky, looking south: mid-October at 22:00

PROCEEDINGS OF ANNUAL GENERAL MEETING

Minutes of the Annual General Meetings held at UNISA, Pretoria, on Friday 1994 July 1.

1. Attendance

The President, Prof W Wargau, in the chair with twenty four members and four visitors present.

2. Opening

The President welcomed all present and thanked the Pretoria Centre for hosting the meeting.

3. Apologies

Apologies for absence were received from Messrs B Skinner, M Soltynski and A Slotegraaf.

4. Minutes

The minutes of the 1993 Annual General Meeting, as published in *MNASSA* Vol 52 Nos 9 & 10, were taken as read. It was proposed by Mr D Overbeek and seconded by Mr A Hilton that these be a true reflection of the proceedings. There were no objections.

5. Matters Arising

None.

6. Report of Council

On behalf of the Hon Secretary B Skinner the report of the work of Council was read by Mr M Haslam.

7. Observing Section Reports

Computing Section, read by the Director Mr A Hilton. Comet & Meteor Section, read by the Director Mr T Cooper. Occultation Section, read by the Director Mr D Overbeek. Solar Section, read by the Director Mr J Knight. Variable Star Section - No report was presented. Deepsky Section - No report was presented. Historical Section, Director Mr J Spencer Jones, read by Mr M Haslam.

8. Financial Report

The report by the Hon Treasurer Mr C Gray was read by Mr M Haslam. *[see page 84 - Ed]*

9. ASSA Endowment Trust

The trust report, prepared by Mr C Turk, was read by Mr M Haslam. *[see page 84 - Ed]*

10. Election of Office Bearers

The following nominations were received:

President	Mr B D Fraser
Vice-president	Prof W Wargau
Vice-president	Prof B C Raubenheimer
Vice-president	Mr A S Hilton
Members	Mr T W E Budge, Mr M D Overbeek, Mrs L Rens, Dr R Stobie

Mr T W E Budge was nominated by Mr A S Hilton and seconded by Mr M D Overbeek. All other nomination were proposed by Mr R Hurley and seconded by Mr C Turk. That all nominees be elected was proposed by Mr N Young and seconded by Mr M Poll.

11. Election of Honorary Auditor

It was proposed and accepted that Mr R Glass of Penkin Zeller and Karro be re-elected as Hon Auditor.

12. Presidential Address

Prof W Wargau invited Mr B Fraser to take the chair. Mr Fraser thanked Prof Wargau and called upon him to deliver the Presidential Address. *[see p 86 - Ed]*

13. General

On behalf of Council, Mr B Fraser gave recognition to Danie Overbeek who has received the AAVSO Director's Award and in addition an award for the 180 000 observations of variable stars he has made - the largest ever. [Applause]

Mr J Knight voiced his concern about the way Council seems to be treating section Directors, and feels that there is a lack of co-operation. He called upon the new President to give the Directors some support in their tasks. In addition, he wondered what direction the Society was going to take in the new dispensation.

Danie Overbeek said that two years ago Jose Campos tried, with no success, to get Dr Janet Mattei of the AAVSO to attend the conference in Cape Town. In February there is to be a conference at SAAO, and one of the delegates will be John Percy, past president of AAVSO. The ASSA should be sympathetic to him addressing a number of Centres. It may also be possible for Dr Mattei to visit South Africa. Council should do everything in its power to arrange a schedule for them and Mr Overbeek proposed a sub-committee be set up to discuss this.

Prof Wargau noted that Patrick Moore will be visiting South Africa. Mr Moore does not expect any fees, but would require accommodation, local transport and business class airfares. Prof Wargau proposed that a sub-committee be established to draw up an itinerary, since Mr Moore needs to know travel plans in advance. Mr Overbeek suggested that the Chairpersons of the Transvaal and Pretoria Centres co-ordinate the task, a suggestion supported by Mr N Young and Mr T Budge.

14. Closing

The President, on behalf of Council, thanked Mr Haslam for taking the minutes and also Prof Wargau and UNISA for providing the venue. The meeting adjourned at 20:50 for tea and snacks provided by the Pretoria Centre.

(Mike Haslam, acting for Hon Secretary)

REPORT OF COUNCIL

1. Introduction

Council met on five occasions since the last AGM with an average of 11 persons present out of a possible 33 members, alternates and appointees. The President (Walter Wargau) chaired one meeting, his Alternate (Jonathan Spencer-Jones) one and the first Vice President (Maciej Soltynski) three.

Mr D Duprez, the Hon Treasurer resigned during the year and was replaced by Mr Colin Gray who volunteered his services as Hon Treasurer.

2. Membership

The Society mourns the passing of two of our Honorary Life members, Dr G Fuhr and Mr W W P Hirst.

Our Membership Secretary reports that membership was 496 as at 20th June 1994 compared with 462 a year earlier. Of these, 72 were new members, whilst 15 resigned or have died. A further 23 members were suspended for not paying subscriptions.

3. Finance

Our current Hon Treasurer, Mr Colin Gray, has taken over from Mr Dany Duprez to whom we extend out grateful thanks for his efforts for the past few years. This Council post is the most onerous and requires dedication to the task at hand. Council extend their sincere thanks to Messrs Duprez and Gray for doing an excellent job with the resources available.

There has been an investigation of the finances of our Society to determine where costs can be reduced and savings made. Council has come to the conclusion that it is advisable to increase the subscriptions in order to ensure the continued survival of the ASSA.

Members will recall the warning given at the 1992 AGM about the Society running at a loss. It was then predicted at the 1993 AGM that annual subscriptions were likely to be increased at the next AGM. This was discussed by Council in February 1994 after the finances had been thoroughly checked,

It is with heavy hearts that Council decided that the subscriptions are to increase to R 110 per annum with immediate effect. The Hon Treasurer, reports a positive response to our request for early subscription renewals and donations to the ASSA. Members are sincerely thanked for this show of support.

Retired members of long standing are reminded that should they find the increased subscriptions difficult to meet, a reduced fee may be requested from Council.

4. Business Manager

Council wish to thank Mrs Audrey Joubert for her efforts as Business Manager and Membership Secretary - hers is an important task around which the entire Society revolves. She is responsible for getting our publications into the libraries of the world.

5. *MNASSA*

Council expresses its sincere appreciation to Mr Joe Churms for editing *MNASSA* until December 1993. Council wishes to thank Mr Slotegraaf for taking over as Editor and continuing to provide members with an informative publication that serves to keep them up to date with developments in astronomy. Council also thanks Mrs Penny Dobbie of the University of Cape Town for her contribution to *MNASSA* and the annual *Handbook*.

6. *Handbook*

Council wishes to express sincere thanks to Ms Pat Booth for her production of the annual *Handbook*. There were a few problems with the printing which caused a delay in publication of the 1994 edition. These were beyond our doughty Editor's control and any inconvenience to members is regretted. Ms Booth is assisted by the observing section Directors and passes their enthusiasm to others via this publication.

7. Acknowledgements

Council wishes to thank the following persons or institutions for assistance during the past year:

Dr Robert Stobie, Director of SAAO, for the use of meeting and Internet facilities at SAAO.

Special thanks also go to the staff of SAAO and the UCT Astronomy Department for forwarding post to me at UCT, and for their assistance with Society publications.

Council extends their appreciation to the Directors of the Observing Sections for their contributions to astronomical research and for focusing the efforts of amateur observers.

The Centres are commended for presenting astronomy to the public and for assisting the professional astronomical fraternity with public viewing nights at the different observatories.

Finally, I wish to thank all persons who have contributed to the work of the Society, and whom I may have forgotten to mention by name.

(B Skinner: Honorary Secretary)

COMET AND METEOR SECTION
Director: T P Cooper

1. Introduction

It is with pleasure that I present the report for the Comet and Meteor Section for the year 1993, my first full year as Director of this Section.

During 1993 I set myself the task of rebuilding a vibrant section. To this end, five observer circulars were sent out to keep observers fully up to date with events going on in the sky. These Circulars were never shorter than 4 pages, and in one case ran to 8 pages. I am happy to say that the demand for Circulars was excellent, and the mailing list grew from 20 at the start of the year to 38 at year end. Whether this increase in demand for information will translate into an increase in observational output remains to be seen.

While the meteor observers responded well, much improvement is required in 1994 in the observation of comets, though 1993 was a rather barren year in comets suitable for observation from southern Africa.

On a positive note, several individuals sent numerous meteor and fireball observations during 1993, contributing to a successful observing year. I would like to thank each individual who sent in their valuable observations. In particular, I would like to thank Bill Hollenbach and Peter van Blommenstein, both of whom, in addition to sending observations, have provided endless encouragement.

I now provide a summary of observations made during 1993. Observations of meteor showers were sent to the International Meteor Organisation (IMO) and in some cases to the British Astronomical Association Meteor Section. Reports of fireballs were sent to the Fireball Data Centre (FIDAC) in Germany. Reports of comets are sent to the International Comet Quarterly.

2. Meteor Showers

1993 saw a considerable increase in observations of meteor showers. Table 1 shows that 8 observers were active, observing 16 separate meteor showers. Several other individuals provided reports of casual observations without making hourly count. It should be noted that for observations to be of scientific value, observers must provide the correct observational information, including times of observation, limiting magnitude of the sky and magnitudes of the observed meteors. Only observations that met these criteria are included in Table 1. Specific details of the observed showers are given in Table 2.

3. Fireballs

Seven fireball reports were received. Of these, three were observed in 1992 and four in 1993. Details of the observations are given in Table 3.

4. Comets

Details on comets Swift-Tuttle (1992t), Schaumasse (1992x), West-Kohoutek-Ikemura (1993o), Schwassmann-Wachmann 2, Encke and Mueller (1993a) were provided in the Circulars. Only Peter van Blommenstein provided observations of comet West-Kohoutek-Ikemura, which remained below magnitude 11. It must be stated that none of the above comets were particularly well placed for southern hemisphere observers, and the best observing periods were hampered by the exceptionally long periods of unfavourable observing weather, particularly inland. The lack of comet observations from southern Africa is nevertheless disappointing. The Director will place greater emphasis on comet observations in 1994.

5. Lectures

The Director delivered his paper "Visual Observations and Evolution of Meteor Streams" to the ASSA Symposium at UNISA, and repeated it to the Transvaal and Pretoria Centres.

6. Conclusion

The past year has seen a firm foundation built for the future of the Section. Considerable interest was shown in the Observer Circulars and the three lectures given. Much useful work was done in the field of meteor observing. Finally, the dearth of comet observations indicates that more attention needs to be devoted to this activity in the coming year.

Table 1. Summary of Meteor Shower Observers 1993

Observer	Total Hours	Shower	Hours	Observer	Total Hours	Shower	Hours
Cooper T P	43.6	α Crucids	2.7	v. Blommestein P	14.7	α Crucids	3.8
		δ Cancrids	1.0			Capricornids	10.9
		Pyxids	1.8	Hollenbach W	8.0	Unlisted	8.0
		σ Puppids	2.8	Campos J	4.0	Perseids	3.0
		μ Virginids	2.0			Geminids	1.0
		η Aquarids	7.2	Stanley Adams S	2.7	Perseids	2.7
		Ophiuchids	11.6	Kriek N	2.4	σ Puppids	2.4
		δ Aquarids	5.0	Robinson N	2.0	Geminids	2.0
		Perseids	2.1	Karberg R	1.0	Orionids	1.0
		Leonids	2.7				
		Phoenicids	1.1				
		Geminids	1.0				
		Puppid-Velids	2.6				

Table 2. Details of observed meteor showers

Shower	Total Hours Observed	Total No. Meteors	Mean m_v	Pred. Speed	Pred. Colour	Trains %	Notes
α Crucids	6.5	4	1.8	Fast	White	Nil	Low activity
δ Cancrids	1.0	0	-	-	-	-	Inactive
Pyxids	1.8	0	-	-	-	-	Inactive
σ Puppids	5.2	6	3.2	Slow	-	50	Low activity
μ Virginids	2.0	3	2.2	-	White	Nil	Low activity
η Aquarids	7.2	71	2.2	Fast	Yellow	34	Max. May 4
Ophiuchids	11.6	27	2.5	-	-	4	No distinct max.
δ Aquarids	5.0	39	3.1	Med	White	3	Max. July 29
Perseids	7.8	31	2.5	Med	Y/W	68	Peak Aug 12.14
Capricornids	10.9	0	-	-	-	-	Post max observ.
Orionids	1.0	13	-	Fast	Yellow	15	Other nights cloud
Leonids	2.7	3	1.0	Fast	-	66	Low activity
Phoenicids	1.1	2	3.5	-	-	Nil	Low activity
Geminids	4.0	96	2.0	Med	Yellow	Nil	Max. Dec 14.0
Puppid-Velids	2.6	4	2.5	Med	Yellow	Nil	Low activity

Table 3. Details of reported fireballs

Date of Fireball	Name of Reporter	Visual Mag	UT of Observation	Start Coordinate	End Coordinate
1992 Jul 30	G de Beer	-4	16h25	13h30, -60°	13h30, -66°
1992 Oct 30	C Turk	-4	18h33	16h30, -43°	16h30, -30°
1992 Nov 25	A Slotegraaf	-6	19h40	07h05, -39°	07h05, -10°
1993 Jan 6	D Overbeek	-4	00h47	06h20, -55°	06h40, -15°
1993 Apr 25	W Hollenbach	?	22h20	not given	not given
1993 Jun 6	A Slotegraaf	-4	21h03	10h00, -35°	04h20, -45°
1993 Nov 4	A Carvatsos	?	~20h00	not given	not given

COMPUTING SECTION
Director: A S Hilton

This section was formed in 1987 and has attracted some 70 interested people. Their information has been tabulated and forms the basis of a data base of astronomical computing software.

A complete list of the software available for 1994 is presented below.

There were previously 13 packages available from the section. I have now added 38 new and updated packages to the list as well as a CD-ROM release, now available in South Africa.

Finally I would like to thank all those who have assisted the section over the past years.

1. SOFTWARE CATALOGUE

DISK 1109: ASTRONOMY COLLECTION 1

(1 DISK)

AST is a practical astronomy program for your PC - gives a host of options including views of the sky, constellation drawing etc. Req: CGA

MOONBEAM determines phase, position, illumination and other general info regarding the position of the moon and its relationship to Earth. Will also plot moon on a screen generated star chart using the Yale Observatory Bright Star database (included). Req: CGA.

OPTICS gets optical parameters from the sophisticated user and returns a myriad of technical information about reflecting telescopes. Adapted from basic program (*Byte* March 1983 p 450). Turbo Pascal source included.

SUNSET accepts the date, time and location of position. Displays general info about sun in relation to Earth e.g. declination of sun, equation of time, the azimuth angles and times of sunrise and sunset for any point on earth.

SOLAR is similar to the *SUNSET* program mentioned above, with slight variations.

SUNRISE computes time of sunrise and sunset when given Date / Latitude / Longitude of observer. Sidney BC co-ordinates included. Can be customised for other areas.

DISK NO 1604/5: ASTRONOMY STAR CATALOGUE 5

(2 DISK SET)

This program lists the named and designated stars of the 88 constellations. The stars are generally of the 6th magnitude or brighter, but some other stars of interest are included along with dimmer stars that are within 10 light years. There are about 1700 stars included and the name, magnitude, spectrum type, distance, and other information is included for each star. Other information includes cross-referenced stars, whether or not the star is a binary, variable, erratic variable, and the period of variation. All the information is listed concisely in columns on each page, and is easily-accessible to the user.

CONSTELLATION 88 gives a diagram of each of the 88 constellations, along with their general co-ordinates, right ascension, and declination. *SOLAR SYSTEM* gives essential facts and figures on the planets, moons, asteroids, and satellites within our solar system. Information includes distance, diameter, rotation, revolution, orbit, eccentricity, and much more. Diagrams of celestial bodies are also in this program. *ASTRONOMY NOTES* contains general information concerning stellar astronomy. Many topics are discussed such as spectral classes, Hubble's constant, Kepler's Harmonic Law, and Hertsprung-Russell diagrams. *CONSTELLATION NAMES* lists the names of the constellations and *ASTRONOMY NOTES* contains information about different systems of distance, temperature, and time. The information included in all these programs is quite valuable for anyone who has an interest in astronomy. Req: 128K memory, one disk drive and color graphics.

DISK 1602: PLANETS 3.2

(1 DISK)

Version 3.2 (1986 March 3) computes information relating to the position, distance, magnitude, orbit view, skyview, etc. for the major planets, four minor planets or Halley's comet on a specified date and time. Also, orbital data for any desired planet of comet can be entered and saved in a disk file. Skyview and orbital views can show forward or backward motion. File PLANETSA.COM is for use with an 8087 coprocessor and file PLANETS.COM is for use without an 8087.

STARFINDER
Shows new users how to start "The Starfinder" ON DISPLAY Program. To begin, bring up IBM PC DOS and BASIC. (Note: If you are using a printer other than the IBM Matrix or IBM Graphics Printer, you may need to modify the documentation to fit your printer. Run the BASIC program 'printers.bas' for more information.) Make sure that the printer is on, and then LOAD and RUN the BASIC program 'director.bas' from this distribution diskette. This will print a Program Directory, which contains information about the rest of the documentation, and about the Starfinder ON DISPLAY program. Following the instructions in the Program Directory, LOAD and RUN the other documentation program, 'usermanu', which will print the User's Manual.

DISK 0483/4: ASTROSOFT COMPUTERISED EPHEMERIS (2 DISK SET)
A general-purpose astronomy software package consisting of three separate parts: Part 1 of ACE performs the most needed astronomical calculations, involving the sun, the moon, the planets, eclipses, astro photography exposures, mean sidereal time and Julian Day, precession of coordinates, phases of the moon, equinoxes and solstices, Galilean satellites of Jupiter, perpetual calendar, and Polaris. Part II of ACE (Solar System Data) provides for all the planets and satellites of the solar system, orbital and physical data, as well as descriptive and observational data. Part III of ACE (Sky Catalog) provides data on over 2000 deep-sky objects, the entire Messier Catalog, 100 named objects, all bright stars to magnitude 2.00, and 100 prominent double stars, with detailed commentary on nearly 400 of these objects. Objects may be searched for on the basis of one criterion or by a combination of criteria. Reqs: CGA.

DISK 9103-03: COMETP (1 DISK)
COMETP is a program that predicts the apparent position of a comet moving in a parabolic orbit. It is not suitable for objects moving in an elliptical orbit. It needs data input that is only available from sources such as observatories or astronomical publications so the user will need some prior knowledge of astronomy and comet orbits.

CATALOG TOOL 2.1
CT allows one to build a database of all the files on all your disks, lets one view, edit and print them out. The files are read from the disk directory and each title may be assigned a category (eg Utility or Game) and the user supplies a disk number or name to identify where the titles are.

DTA 1.2
This is a super directory utility that serves as a replacement for the DOS DIR, ATTRIB, and TREE commands. It features: alphabetized directory with file sizes & free space; optionally include attributes & time/date; select items by file attrib or time stamp; change any file attributes; treat directories separately or together with files alphabetized; compact subdirectory tree; optionally include sizes etc.

PC-FILENOTES 1.6
PC-FN is a 26k TSR which allows you to easily attach 160 character pop-up notes to your filenames. You can also view, delete, rename and tag copy files as well as change drives and directories.

DISK 9203-01: ASTROPACK ASTRONOMICAL TOOLS 2.0 (1 DISK)
ASTROPACK is a general-purpose mathematical astronomy program. It combines various time and position calculations that are often tedious or difficult to do by hand. It is intended for astronomy hobbyists, students, or anyone else who might be curious about when the sun will set next week, or how far it is from Stockholm to Sacramento. For users with serious requirements, Astropack gives reasonably accurate values that will supplement an astronomical almanac. It is valuable if an almanac for the appropriate time period is not available. If you have a standard printer, the program can also print tables of values for any time periods.

GALILEAN SATELLITES OF JUPITER 2.0
This program calculates the phenomena of the Galilean satellites of Jupiter. The output is presented in both a tabular and an animated graphic mode, and may be listed as well on a line printer. Req: CGA or better.

MOON
This well-done graphics display of the face of the

moon has some fancy features: you can zoom in and out, move all around via cursor keys, go to the nearest "landmark" (from a big database of craters, lunar mission sites, etc.) and have the system identify it for you, etc. Nice detail, very clear and relatively fast displays on my Hercules-clone system. No documentation provided, but the menus are relatively simple to understand.

PLANETIA
Provides the times and optionally azimuths of rising and setting and/or the equatorial co-ordinates (corrected for parallax) for the planets.

VIEWS OF SATURN 2.0
SATVIEW projects a mathematical model of a sunlit Saturn from any angle. Some of these are unfamiliar and impossible to be viewed from Earth. Req: CGA, EGA or VGA.

DISK NO 797: SCIENCE SOFTWARE (ASTRONOMY)
(1 DISK)
Educational programs to help explain fundamental concepts of astronomy. *KEPLER* - tutorial to solve Kepler's equation for elliptic, parabolic and hyperbolic orbits; *SIDEREAL* - tutorial which introduces relationships between Julian and calendar dates, solar & sidereal times; J2000 - utility to convert stellar positions, proper motion, parallax & radial velocity from the standard epoch B1950 (FK4) to epoch J2000 (FK5) ; *GALILEAN* - tutorial to determine position of Galilean satellites relative to Jupiter ; *ROCKET1* - determines flight performance of single stage model rocket using analytical (exact) solution. *TNODE* - determines info about equatorial crossings of earth satellites; *SYNCSAT* determines location of geosynchronous satellites relative observer. *ATMOS* - determines properties of standard atmosphere.

DISK NO. 2611: SKYGLOBE 2.5
(1 DISK)
SKYGLOBE 2.5 is a fun and easy educational astronomy program. It lets you view the sky at night and can display 15 000 stars (including the 7 000 visible to the naked eye) and the positions of the planets, as well as constellation lines. It also has 240 predefined locations worldwide. You can specify the time, date, direction and location of the view; change the number of stars viewed; adjust the magnification of the sky view and adjust the star brightness. SkyGlobe can display Latitude, Longitude, and Ecliptic lines to help you orientate yourself on the celestial globe. In this version are enhancements to SkyGlobe's Auto-Increment mode that gives you the ability to simulate the passage of time on the PC. When in this mode, the sky view will begin to change in a manner that depends on the Auto-Increment parameters. For educational users, SkyGlobe is a great way to watch the patterns of the planets, such as retrograde motion, or to learn why we don't have eclipses every month. A useful feature of SkyGlobe is its ability to quickly and easily change the lines and labels that help our eyes and minds make sense of the vastness of the sky. This can be very helpful to the novice just learning the stars. This update has added the capability to show an approximate outline of the Milky Way and galactic equator. Req: CGA, Hercules, EGA, or VGA graphics adapter. Supports screen printouts on Epson, Proprinter, or LaserJet compatible printers.

DISK 2001: STARVIEW 1.0.09
(1 DISK)
Starview displays a detailed map of the stars with much of the information available on the screen (the display is very pretty). The database for this program is derived from the 4th edition of the Yale Bright Star Catalog and contains 9096 stars. Co-ordinates are epoch 2000.0. This version of StarView implements display of objects in the solar system. These objects can be observed at any time or date. No non-stellar fixed objects are included. You may add your own data to the list of fixed objects used by StarView. StarView contains information on the "sun", "moon" and "zenith" (for horizon display) and orbital elements for the planets. You can add your own data for planets, comets, asteroids, etc. to those listed. StarView has many features some of which are as follows:- You may center the display on any object by pressing Enter and typing in any of the following identifications: name - common name or abbreviation; Flamsteed Number and Constellation; Greek letter abbreviation and Constellation; Yale Catalog Number etc. One can directly set some display parameters; display rotation to decimal degrees; set field width; set limiting magnitude of display; Observer's Geographic Longitude (degrees); Observer's Altitude above sea level (meters); Display Date; Display Time; Display Universal Time. The observer screen also allows you to

enter a specific time and date for your observations. An automatic drive feature is included which simulates the view in a telescope with an equatorial mount and clock drive. Req: Any video, 400K RAM.

DISK 0002: DUFF-SMITH

(1 DISK)

This disc contains the BASIC subroutines and handling programs listed in the book "Astronomy with your personal computer" by Peter Duffett-Smith. It is intended as a supplement to the book, enabling you to link the routines together when constructing a program without the tedium of having to enter the code from the keyboard line by line. You will need to consult the book to discover how to use the routines.
Book Details:
ISBN 0 521 26620 3 (Hard cover),
ISBN 0 521 31976 5 (Paperback)

DISK 0004: TRACK & ** ORBITS2 **

(1 DISK)

This satellite tracking program permits the user to establish data records for up to twenty earth satellites and to track those satellites for the purpose of aiming radio antennae. The user can select a particular function from a menu and that function will be executed automatically. Before the program can be run the user must supply some information unique to his geographical location and ground station. He must also have a source of satellite orbital elements in order to periodically update the "numbers". Req: CGA.

2. NEW RELEASES

ASTRO202 0.25DD
Athabasaca University Micro-Planetarium
This planetarium program is written for MS-DOS and supports CGA, ATT, EGA and VGA graphics in 2 or 16 colors. Star maps can be saved as GIF files. IBM/Epson, HPCL and Postscript hardcopy files are supported. ASTRO will compute the proper motions of the 526 stars in the database.

CIRCUM10 0.50DD
Space Flight Simulator
CIRCUMSPACE v1.0 <ASP> Displays the sky as seen from anywhere within several hundred light years of Earth. Click to travel instantly to any of 7780 stars, or choose the warp mode to animate the journey quickly and smoothly. Learn which stars are neighbors and which distant. A great way to show off 386 and local bus technology. No math chip required. From the author of SkyGlobe.

COSMOS16 0.50DD
Professional Astronomy Planetarium Simulator

DEEPSKY1 2.00DD
Deep Sky Viewing Program (Deep Space 3-D)

NIGHT_1 2.00DD
Night Sky Viewing Program
The Night Sky ver.2.00 A computer Planetarium with stars to magnitude +7.49 for epoch 2000

PLANET10 1.00HD
Planet Watch Astronomy Program for Windows
This is a powerful reference tool that combines animated maps, planetary images, and a database of planetary information. It can be used at almost any level of astronomy experience. The novice can use PlanetWatch as an educational guide, the amateur astronomer or student can use it as a quick reference tool. It is an atlas of the Solar System, planetary ephemeris, and slide show in one easy-to-use program.

SKYGL352 1.00DD
Sky Globe Planet/Star Viewer
Award-winning Top Ten PC planetarium program that is fast, fun, and easy to use. SkyGlobe has 25,000 stars, constellation lines, the planets, Sun, and Moon, the Milky Way, the Messier Objects, and much more. It is the fastest program of its kind available, and uses the mouse or convenient command keys. Now with SVGA image support.

SKYMAP12 1.00HD
Sky Map Astronomy Program (Program Files)
SKYMAP1D 1.00DD
Sky Map Astronomy Program (Documentation)
Requires MS-Windows.

NGP1 2.00DD
The Revised New General Program for Non-Stellar Astronomical Objects
NGP is a database management facility built upon the Revised New General Catalogue of Nonstellar

Astronomical Objects (RNGC) (Sulentic and Tift 1973). The program's purpose is to make it easy to extract desired sets of objects based upon variable selection criteria, rapidly sort selected data upon various fields, view or print lists of selected objects and enter, view or edit personal notes for any object.

AC9117_1 2.00DD
Astronomical Clock
ASTROCLK very good astronomical clock and celestial tracking programme with celestial navigation.

3. MISCELLANEOUS SPACE & ASTRONOMY

AA_51 0.44DD
Orbit position calculator with source code
AERON 0.42DD
Astronomy and aeronautic (BASIC programs)
ALW113 1.00DD
Astronomy Lab for Windows
ASTRO20 0.12DD
Calculates planet ATA's and converts time/dates
DE118I 0.47DD
N-Body simulation of the motion of the Moon and planets
EPHEM421 0.64DD
Astronomical ephemeris: stellar/planetary positions
GRAV 0.10DD
Gravity simulator for Windows
GRAVITY2 0.27DD
Simulates motion of planetary bodies in space
JPLCLOCK 0.36DD
JPL mission clock program
JPSTPHN2 0.16DD
Animated display of Jupiter's satellites (CGA)
JUPIT 0.38DD
Plots Jupiter's satellites.
*MARS_* 0.75DD
Simulator of a mission to Mars (HPG slide show)
MCCLOCK 0.33DD
Mission control count down/tracking clock
MOON 0.16DD
Graphic display of the Moon's surface
NASAORB 0.16DD
A space flight simulator
ORBIT1 0.16DD
Orbit calculator
PARTSIM 0.64DD
Particle Simulator
PICLAB 0.50DD
Picture Lab
SFS101 0.73DD
Space flight simulator, CGA/HGC/EGA/VGA
STATION 0.18DD
Space station text adventure game
SATVIEW2 0.10DD
Saturn simulator

4. SATELLITE TRACKING PROGRAMS

BIRDDOG 0.10DD
Satellite tracking educational software
OEU 0.27DD
Orbital Element Utilities
SL_932 0.22DD
Satellite dish aiming program.
SOP9320A 2.00DD
STS-Plus Space Shuttle/satellite tracker, v93-20
SS4EXE 0.27DD
Sea-Sat Version 4.0
N2L9322 0.42DD
Vector to two line element (TLE) converter

5. CD-ROM ASTRONOMY

The *Space and Astronomy CD-ROM* (October 1993) has 6600 files of space and astronomy text files, images and software (500MBytes). The disc was produced by Thomas Shaffer in August, 1993. 1080 image files of the earth, the planets, and the space program will dazzle your eye. 5000 text files fully readable on the CD-ROM will fill your mind. A collection of space related shareware rounds out the disc. A handy viewer lets you browse the disc reading documents, viewing images and unzipping program files. For further information, contact the Director at the address below.

6. ORDERING INFORMATION

To obtain copies of the above software, and for more information, write to:

Director: Computing Section ASSA
Tony Hilton
PO Box 68846
Bryanston
2021

SECTION REPORTS

HISTORICAL SECTION
Director: J H Spencer Jones

It is my pleasure to present the second annual report of the Historical Section.

Regretfully, other pressures have meant that I have been unable to devote as much time as I would like to the Section and the only activities undertaken during the year have been the maintenance of an archive of historical material, which has grown with some items from the former Hon Secretary, Mr H E Krumm, and the writing of an obituary of Jack Bennett for the *Quarterly Journal of the Royal Astronomical Society*.

I would like to remind members that they can make important contributions to the Historical Section by providing photographs and/or other material for the archives or by undertaking historical investigations, and would encourage those interested to contact me.

OCCULTATION SECTION
Director: M D Overbeek

1. Introduction

It is with sorrow that I have to report the death in 1993 December of Dr K G Fuhr, who at 87 was our oldest contributor but also the most active occultation reappearance observer. An obituary will appear in *MNASSA*.

2. Total Lunar Occultations

Observer	Disappearances	Reappearances
K G Fuhr	1	5
J Hers	10	1
J Knight	75	8
M D Overbeek	28	6
J Smit	80	35
P van Blommestein	113	6

3. Grazing Occultations

This activity is still being hamstrung by lack of timely, accurate predictions. Observer's reluctance to venture into lonely, dark locations also inhibits our activities to a certain extent.

Date	Star	Place	Stations	Timings	Observers and Remarks
April 4	ZC 1381	Halfway House	4	0	T Budge, J Cohen, H Lund, M D Overbeek, C & J Rankin. Prediction in error.
April 28	ZC 1207	Johannesburg	4	45	T Budge, B Fraser, J Cohen, H Lund, M D Overbeek, M Haniball, L du Preez, W Wyndham.
September 24	ZC 2889	Redhill, Simon's Town	5	6+	P Botha, M Brown, A Parker, B Skinner, C Turk, P van Blommestein. Further times may become available.

4. Planetary Occultations

No occultations were observed but a number of appulse estimates were made. This activity attracts a hard core of dedicated observers who realise that in Science, results often come only after many frustrating attempts.

The observers who reported back are: D Blane, T Cooper, G de Beer, R Field, N Kriek, R Learmonth, M D Overbeek, G Prosser, J Smit, C Turk, P van Blommestein, Denise Voorvelt and A C Voorvelt.

Twenty-eight events were planned. Eight were not observed, mostly due to cloud. Three appulse estimates were made and 35 "miss" reports were made.

01 January 03, Lick 2 2963 by 42 Isis
Benoni: T Cooper reported observing an appulse at approximately the right time. He was not defeated by twilight as some of us were.
Edenvale: D Overbeek reported difficulties with finding the target star.
Pretoria: J Smit reported twilight problems.

02 January 23, PPM 1447513 by 191 Kolga
Benoni: T Cooper reported a miss.
Pretoria: J Smit reported a miss.
Simon's Town: P van Blommestein reported difficulties with twilight.
Thabazimbi had cloud.

03 February 12, PPM 548570 by 545 Messalina
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek reported cloud.
Pretoria: J Smit reported cloud.
Simon's Town: P van Blommestein reported target star not seen.

04 February 15, PPM 145502 by 635 Vundtia
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek reported cloud.
Pretoria: J Smit reported cloud.
Simon's Town: P van Blommestein reported difficulties with twilight.

05 March 08, PPM 509497 by 1428 Mombasa
Benoni: T Cooper reported a miss.
Edenvale: D Overbeek reported a miss.
Pretoria: J Smit reported a miss.

06 March 09, PPM 125839 by 1330 Spiridonia
Benoni: T Cooper reported a miss.
Edenvale: D Overbeek reported a miss and cloud interference until 0037.

07 April 02, PPM 578996 by 624 Hektor
Edenvale: D Overbeek reported a miss between 0219 and 0239.

08 May 29, PPM 526584 by 638 Moira
Britstown: Nico Kriek reported a miss.
Cape Town had cloud.
Edenvale: D Overbeek reported a miss.
Henley on Klip: D Blane reported a miss.
Pretoria: J Smit reported a miss.

09 June 24, PPM 511622 by 409 Aspasia
Edenvale: D Overbeek reported star not located in time (a dire result of overconfidence).
Pretoria: J Smit reported a miss.

10 June 26, PPM 548665 by 1258 Sicilia
Edenvale: D Overbeek reported some cloud.
Pietermaritzburg: G Prosser reported a miss.
Pretoria: J Smit reported cloud.

11 July 17, DM +12 5055 by 2494 Inge
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek reported cloud.
Pretoria: J Smit reported a miss.
Simon's Town: P van Blommestein reported cloud.

12 July 19, FAC 883958 by 2 Pallas
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek reported cloud.
Pretoria: J Smit reported cloud.
Simon's Town: P van Blommestein reported cloud.

13 July 20, PPM 166349 by 667 Denise
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek, Denise Voorvelt and A C Voorvelt reported a miss.
Ladysmith reported cloud.
Pietermaritzburg reported cloud.
Pretoria: J Smit reported cloud.
Sentrum, Botswana had cloud as reported by D Blane.
Simon's Town: P van Blommestein reported cloud.

14 July 22, PPM 511188 by 2196 Ellicott
Benoni: T Cooper reported a miss.
Edenvale: D Overbeek reported cloud.
A miss at Henley on Klip was reported by D Blane.
Ladysmith, Pietermaritzburg, Pretoria and Simon's Town had cloud.

15 July 24, PPM 531783 by 604 Tekmessa
Benoni: T Cooper reported a miss.
Edenvale: D Overbeek reported a miss.
A miss at Henley on Klip was reported by D Blane.
A miss at Ladysmith was reported by G de Beer.
Pietermaritzburg had cloud.
Pretoria: J Smit reported a miss.
Simon's Town: P van Blommestein reported cloud.

16 July 25, PPM 581784 by 1303 Luthera
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek reported cloud.
G de Beer at Ladysmith reported a miss.
Pretoria: J Smit reported cloud.
Simon's Town: P van Blommestein reported cloud.

17 Cancelled

18 August 03, PPM 601547 by 595 Polyxena
Benoni: T Cooper reported a miss.
Edenvale: D Overbeek reported a miss.
Pinelands and Simon's Town had cloud.

19 August 08, PPM 509316 by 1031 Arotica
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek reported a miss.
Robyn Learmonth of Kempton Park had a miss.
Pinelands had cloud as reported by C Turk.
Simon's Town: P van Blommestein reported the target star too faint, due to haze.

20 August 12, PPM 532900 by 1819 Laputa
Edenvale: D Overbeek reported a miss.
Pretoria: J Smit reported a miss.
Simon's Town: P van Blommestein reported haze and star too low.

21 August 18, PPM 531340 by 634 Ute
Benoni: T Cooper reported a miss.
Pretoria: J Smit reported a miss.
Simon's Town: P van Blommestein reported cloud.

22 August 24, PPM 621138 by 31 Euprosyne
Durban had cloud as reported by R Field.
In Ladysmith, G de Beer has a miss.
Pretoria: J Smit reported a miss.
Simon's Town: P van Blommestein reported cloud.

23 August 29, PPM 12316 by 218 Bianca
Durban, Ladysmith, Pretoria and Simon's Town had cloud.
Edenvale: D Overbeek reported cloud.
Pretoria: J Smit reported cloud.
Simon's Town: P van Blommestein reported cloud.

24 September 15, PPM 143578 by 75 Eurydike
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek reported appulse about 6 minutes late.
Pretoria: J Smit reported appulse more than 5 minutes late.
Simon's Town: P van Blommestein reported cloud.

25 October 06, DM +07 0293 by 1269 Rollandia
Benoni: T Cooper reported cloud.
Durban had cloud as reported by R Field.
Edenvale: D Overbeek reported rain.
Pretoria: J Smit reported cloud.
Simon's Town: P van Blommestein reported cloud.

26 October 17, PPM 118619 by 735 Marghanna
Benoni: T Cooper reported cloud.
Durban had cloud.

27 October 18, PPM 118783 by 444 Gyptis
Benoni: T Cooper reported cloud.
Durban had cloud.
Edenvale: D Overbeek reported cloud.
Pretoria: J Smit reported cloud.
Simon's Town: P van Blommestein reported cloud.

28 December 12, PPM 123007 by 156 Xanthrippe
Benoni: T Cooper reported cloud.
Edenvale: D Overbeek reported cloud.
Pretoria: J Smit reported cloud.
Simon's Town: P van Blommestein reported cloud.

FINANCIAL REPORTS

HONORARY TREASURER's REPORT

During a further year of relentless inflation and shrinking rands, your Association has had no other choice but to use reserve funds to finance its operations.

This is in common with many similar societies whose rules require that member's subscriptions are fixed for a year ahead and paid in advance.

As a result, the audited loss of the previous year (1993), at more than R 5500, is certain to be exceeded in the current year, and an estimated shortfall of R 9000 was reported to Council at its April meeting.

However, the response of members to last month's appeal to pay their increased 1994 subscriptions early, as well as to make donations, has been simply marvellous.

By the end of May a total of 100 advance subscriptions, together with more than R 2000 in donations, had been banked, which made a dramatic improvement in our bank balance.

With careful management of resources and regular monitoring of expenses, it is expected that the year ahead will be less traumatic. But the warning must be sounded that any further deterioration in the rand/dollar exchange rate will require a higher subscription in 1995. I appeal to all members to make further donations to the Society in order to rebuild our financial reserves.

My thanks are recorded to Mr R Glass of Zeller Karro for his financial efforts in auditing our accounts, and I recommend that he be re-elected as Hon. Auditor of the Society.

(Colin Gray: Hon. Treasurer)

ASSA ENDOWMENT TRUST (ASSET)

The Trust is pleased to present its annual accounts and reports that although donations received during the twelve months to 31 December 1993 were very poor, there were in fact a number of donations which members had sent to the ASSA Treasurer but which had not been passed on at the time the accounts were closed.

In spite of the Trust's negligible income, the Trustees took a decision on 1993 September 1 that the Trust will make an annual grant of R 1000 to ASSA in October each year commencing in 1993. The first grant was handed to the ASSA Council on 1993 November 1.

Donations to the Trust are retained in a capital account and can never be disposed of unless the Trust is wound up. The income earned by those donations is the source of the Trust's distributable reserve from which grants are made.

Further information regarding the Trust can be found in the Centrepiece in MNASSA for October 1977 under the title "What is ASSET?"

(Cliff Turk: Secretary)

ASSA ENDOWMENT TRUST (ASSET)

BALANCE SHEET AS AT 31ST DECEMBER 1993

1992		R - c
	Trust Capital:	
7 981-29	Balance at 31st December 1992	8 978-54
997-25	Donations received during the year	12-00
R 8 978-54		R 8 990-54
	Distributable Reserve:	
11 124-54	Balance of Income and Expenditure Account	12 764-40
R 20 103-08		R 21 754-94
	Represented by:	
	Investments:	
1 700-00	United Bank Indef Period Deposits	1 700-00
16 000-00	United Bank Fixed Deposits	18 000-00
660-00	ABSA Bank Ltd. Equity Shares (at cost)	660-00
	Savings Account:	
1 743-08	United Bank	1 394-94
R 20 103-08		R 21 754-94

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR TO 31ST DECEMBER 1993

	Income		
2 692-51	Dividends and interest received		2 641-16
	Deduct Expenses:		
	Bank service charges	1-30	
Nil	Grant to ASSA	1 000-00	1 001-30
R 2 692-51	Excess of Income for the year		R 1 639-86
8 432-03	Excess of Income from previous year		11 124-54
R 11 124-54			R 12 764-40

Notes:

United Indef period Deposits:	
Account No. 4656-7102	R 1 700-00
United Fixed Deposits:	
11.25% p.a. maturing 29 Apr 1994	R 7 000-00
14.20% p.a. maturing 8 Oct 1994	R 7 000-00
13.30% p.a. maturing 8 Oct 1994	R 4 000-00
ABSA Bank Ltd. Equity Shares (cost)	R 660-00
	R 20 360-00

The young open cluster M16 and the interstellar medium

Walter F. Wargau

An important contribution to astrophysics has been the realisation that the space between stars is not devoid of material. It has long been guessed that some nebulae may be sites of active star formation, and that others are the vestiges of novae and supernovae explosions.

Most of our knowledge about the interstellar medium (ISM) comes from observations within the disk of our Galaxy. Observations of nearby galaxies suggest that they contain interstellar matter of similar type.

The primary non-stellar constituents of the ISM are

- gas
- dust
- magnetic fields (of the order of one-millionth Gauss)
- cosmic rays
- radiation from penetrating starlight

The gas is made up of about 60% hydrogen and 30% helium with traces of heavier elements in approximately solar abundance. The hydrogen may be clumped in neutral (H I) and once-ionised (H II) regions, as well as molecular clouds containing mostly molecular hydrogen. The local temperatures may vary from 10 Kelvin (in molecular clouds) to 10 000 Kelvin (in H II regions).

Only about 1% by mass of the ISM is in the form of solid dust grains, with characteristic dimensions between 10^{-7} to 10^{-8} m. The dust is found in dust lanes, in H I and H II regions. In terms of numbers of particles, the gas exceeds the dust by 10^{12} to 1. Dust grains consisting mainly of graphite, magnesium and aluminium silicate, water and ammonium, and iron are probably not uncommon.

Interstellar dust has three important effects on starlight:

- extinction (the dimming of starlight through absorption and scattering);
- reddening (the scattering of the shorter/bluer wavelengths more than that of the longer/redder wavelengths;
- polarisation

This dimming of the starlight has an important effect on the magnitude-distance relationship

$$M_v = m_v + 5 - 5 \log d \qquad (1)$$

where M and m are the absolute and apparent magnitudes, respectively, d indicates the distance to the star in parsecs, and the subscript 'v' stands for visual. If a star with observed apparent magnitude m_v is fainter by A_v magnitudes due to interstellar extinction, then its true apparent magnitude is $m_v - A_v$; hence equation (1) must be modified to read

$$M_v = m_v + 5 - 5 \log d - A_v \qquad (2)$$

A_v is called the extinction coefficient.

What it the value of A_v? For stars near the galactic plane which are not obscured by dense interstellar clouds, the amount of extinction for visual radiation is, on average, 0.3 magnitudes per 1000 parsecs, or

$$A_v = 0.3\ d/1000 \qquad (3)$$

for a star at distance d in parsecs. Towards other regions of the Galaxy the general extinction may be higher or lower, and in the direction of interstellar clouds it may be as high as 2 to 4 magnitudes per 1000 parsecs. For example, the star ξ Ophiuchi with an apparent visual magnitude of 2.56 suffers a visual extinction A_v of 1.10 magnitudes. In the absence of interstellar extinction its apparent visual magnitude would be 1.46.

Another method to estimate the interstellar extinction uses the colour index (B-V). From this, the so-called colour excess E(B-V) can be determined,

$$E(B-V) = (B-V) - (B-V)_0 \qquad (4)$$

where (B-V) is the observed colour index and $(B-V)_0$ the unreddened colour index for a star of the *same* spectral type. The visual extinction A_v and the colour excess E(B-V) are proportionally related by

$$A_v = R\ E(B-V) \qquad (5)$$

where a value of R = 3.3 appears to be representative in the galactic plane.

The ISM is not distributed homogeneously. Embedded in these regions are mainly young stars in the form of open clusters and loose associations, such as OB associations. The investigation of these young open clusters is crucial to our understanding of the formation and evolution of stars with respect to their changing chemical composition.

If we examine a composite Hertzsprung-Russell diagram of various young and old clusters, we can see these changes. Cluster stars are formed locally at the same time with initially the same chemical composition. But individual stars have different masses, and theoretical models tell us that more massive stars evolve quicker than less massive ones. This explains the turn-off point from the main sequence on the H-R diagram for the cluster stars. The older the cluster the further down on the main sequence is its turn-off point. Such diagrams show that M16 is a fairly old cluster, while h and χ Persei is an example of a young cluster.

In collaboration with German astronomers R Chini and E Kruegel we investigated the stellar content of young open clusters. The aim was to evaluate a cluster's "initial mass function" (IMF). Our first target was M16 or NGC 6611, also known as the Eagle Nebula or Elephant Trunk. It is a compact H II region with an embedded young open cluster of OB stars. It is located in the Sagittarius arm at a distance of approximately 2.3 kiloparsecs.

The first crucial step is to make sure which of the stars we see in the direction of M16 are cluster members and which are foreground stars. By employing near-infrared measurements we devised a method to discern between cluster members and foreground stars (see Chini, R. & Wargau, W.F. (1990) Astron. Astrophys. 227, 213).

To briefly summarise the results: The R value in equation (5) for the direction to M16 is close to 5, implying that the extinction in this direction is abnormal. Our interpretation is that the dust which produces this abnormal extinction may be considered as an indicator for cluster membership. Model calculations show that this abnormal extinction may be caused by graphite grains which are larger than those found in the normal ISM.

In order to investigate the IMF for M16 we employed a two-step plan:

- Deep multi-colour CCD images (UBVRI) to detect stars down to 20th magnitude;
- Near-infrared photometric scanning (JHKL) of the central field of M16 in order to discriminate between foreground stars and cluster members.

Observations were carried out with the 1.0m and 1.9m telescopes at Sutherland as well as the ESO 2.2m telescope.

Our survey revealed, besides the infrared-bright optically visible O and B stars, 71 infrared sources. These infrared sources have no optical counterparts on the CCD images, and their nature is a mystery. They were initially found in M17 and are known as "cocoon stars" (see Chini, R. & Kruegel, E. (1985) Astron.Astrophys. 164 175). Understanding these sources could provide us with a further clue towards the IMF of M16. Does this near-infrared emission result from circumstellar matter around very young early-type stars, or does it result from cool luminous stars without surrounding dust shells?

The answer for M16 is surprising. Based on a number of arguments, such as infrared excess emission at 1.6 microns (typical for cool stellar atmospheres), the absence of dust emission, variability of some sources, and spectroscopy of the brightest sources (with the ESO 3.6m telescope) we classified these sources as late-type giants located behind the H II region. In fact, using arguments of stellar statistics, all 71 infrared sources may well be background objects (see Chini, R., Kruegel, E. & Wargau, W. F. (1992) Astron.Astrophys. 265, 45).

We found a population of background giants shining through the dust cloud of M16. As the existence of A, F and G cluster members can almost be excluded by our CCD data at R and I, there is no evidence for any other cluster members apart from those O and B stars already known. This result puts severe constraints on the stellar content of M16, where obviously only a cluster of O and early B-type stars have had time to form.

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1995

MINUTES OF THE AGM

Minutes of the Annual General Meeting held in Johannesburg at the Observatory at 20h00 on Friday 28th July 1995.

1. Opening
A quorum being present, the President welcomed those present and declared the meeting to be open. The President thanked the Johannesburg Centre for making facilities available for the meeting and providing refreshments. Trevor Gould was also thanked for acting as secretary for the meeting and taking minutes.

2. Apologies
Apologies were registered from The Honourable Secretary, Mr Brian Skinner; The Director: Historical Section, Mr Jonathan Spencer-Jones, and Professor Walter Wargau.

3. Minutes of the previous AGM
The Minutes of the previous Annual General Meeting, published in MNASSA, were approved by the meeting, the approval having been proposed by Tony Hilton and seconded by Danie Overbeek.

4. Matters Arising
There were no matters arising.

5. Report of Council
The Report of Council was read out at the meeting. Tom Budge proposed that it be accepted by the meeting, and this was seconded by Constant Volschenk.

6. Reports of the Observing Sections
The report of the Comet and Meteor Section was presented by Tim Cooper. The Computing Section report was presented by Tony Hilton. The Deep Sky Section report was read out by Chris Stewart on behalf of Auke Slotegraaf. The Historical Section report was read out by Brian Fraser on behalf of Jonathan Spencer-Jones. The Occultation Section report was presented by Danie Overbeek. The Solar Section Report was read out by Tim Cooper, on behalf of Jim Knight. The report of the Variable Star Section was read out by Brian Fraser on behalf of Jan Hers.

7. Financial Report
The Financial Report was read out by Brian Fraser on behalf of the Honourable Treasurer.

8. ASSA Endowment Trust
The President noted that the Report of the ASSA Endowment Trust had not been received in time to be read out, but that it would be incorporated in the printed minutes.

9. Re-Election of Auditor
The current auditor, Mr R Glass of Zeller Karro and Associates, was unanimously re-elected by the meeting having been proposed by C R G Turk and seconded by Mr C D Gray.

10. Election of Office Bearers
The following, having indicated their willingness to stand, were unanimously elected:

President:	Prof. B C Raubenheimer
Vice Presidents:	B D Fraser A Hilton Dr R S Stobie
Members of Council:	M D Overbeek Mrs L Rens D Smits

Alternates:
Mr P van Blommestein, Mr R Hurly, Mr J Spencer-Jones, Mr D Duprez, Mr H Krumm & Mr M G Soltynski

11. Presidential Address
The Presidential Address was delivered by Brian Fraser.

12. Urgent Business
Tom Budge noted that, at the recent Annual General Meeting of the Transvaal Centre, a proposal to change the name to "Johannesburg Centre" was carried. There being no further business the President declared the meeting closed at 21h45. A true record.

(Trevor Gould, acting for Hon Secretary)

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1995

REPORT OF COUNCIL 1994 - 1995

1. Introduction

Council met on five occasions since the last AGM with an average of 14 persons present out of a possible 29 members, alternates and appointees. Tom Budge chaired one meeting, and the President, Brian Fraser's, alternate (Jonathan Spencer-Jones) efficiently chaired the others.

2. Membership

The Society mourns the passing of two exceptional members: Dr R H Stoy (Gill Medal 1965) and Joe Churms (Long Service Award 1984).

Our Membership Secretary reports that membership was 455 as at 20th July 1995 compared with 496 a year earlier. Of these 72 were new members whilst 13 members resigned or have died. A further 77 members were suspended for not paying subscriptions.

To date 23 members have opted to receive *MNASSA* and the Handbook for the new reduced subscription.

3. Finance

Our current Hon Treasurer, Mr Colin Gray has our grateful thanks for his efforts over the past two years. This Council post is the most onerous and requires dedication to the task at hand. It has been further complicated by the effects of inflation which causes untold head (and heart) aches.

It was only after long and difficult consultation with *Sky & Telescope* that Council was forced to increase the subscriptions to R200 per annum (somehow I notice far more grey heads on Council of late - no pun intended). The Hon Treasurer reports a positive response from members to his request for early subscription renewals.

Members are sincerely thanked for this show of support. An anonymous benefactor provided an interest-free loan of R8 000 to relieve the cash-flow crisis experienced until subscriptions started coming in. This benefactor has earned the gratitude of Council and indeed of every member of the Society. The loan has been repaid in full.

Retired members of long standing are reminded that should they find the increased subscription difficult to meet, a reduced fee may be requested from Council.

4. Business Manager

Council wish to thank Mrs Audrey Joubert for her efforts as Business Manager and Membership Secretary - these are vital tasks which make the Society what it is today. She is responsible for getting our publications into the libraries of the world and ensuring that *Sky & Telescope* reaches every member.

5. *MNASSA*

Council wishes to thank Mr Auke Slotegraaf, the Editor for providing members with an informative publication that serves to keep them up to date with developments in astronomy. Council also thank Mrs Penny Dobbie of UCT for her contribution to *MNASSA* and the annual *Handbook*.

6. Annual *Handbook*

Council express sincere thanks to Miss Pat Booth for her production of the Annual *Handbook*. Miss Booth is assisted by the Directors of the observing sections and passes their enthusiasm on to others via this publication.

The 1996 edition will be the fiftieth and a commemorative edition is planned.

7. Acknowledgements

Council wish to thank the following persons or institutions for assistance during the past year:

Dr Robert Stobie, Director of SAAO, for the use of meeting and Internet facilities at SAAO.

Dr Derck Smits, our representative at the AS & TS for advice given and Mr Maciej Soltynski for a multitude of tasks admirably performed on Council's behalf.

Special thanks also go to Cedric Jacobs and Ethleen Lastovica of SAAO and Penny Dobbie of the University of Cape Town Astronomy Dept for forwarding post to me at UCT and assisting with Society publications.

Prof W Wargau and UNISA are thanked for the publication of the proceedings of the ASSA Second Symposium held in September 1993.

Council extend their appreciation to the Directors of the Observing Sections for their contributions to Astronomical research and for keeping amateur astronomers focused.

The Centres are commended for presenting astronomy to the public and for assisting the professional astronomical fraternity with public viewing nights at the different observatories. Messrs R Hurly and C R G Turk have been winning converts to astronomy for over 50 years between them at the SAAO open nights in Cape Town; Mr R R Arco of Ladysmith is also thanked for his sterling efforts amongst amateurs in his region. These members are an inspiration to us all and are commended for their efforts.

Finally, I wish to thank anyone who has contributed to the work of the Society, and whom I may have forgotten to mention by name.

(Brian Skinner, Hon Secretary)

SECTION REPORTS

COMET AND METEOR SECTION
Director: T P Cooper

1. Introduction

It is with pleasure that I present the report for the Comet and Meteor Section for the year 1994. The past year was a successful one for the section, and despite a reduction in the number of meteor observations, several comets were well observed, and observations were made of the effects of the impacts of comet Shoemaker-Levy 9 with Jupiter.

I now provide a summary of observations made during 1994. Observations of meteor showers were sent to the International Meteor Organisation (IMO) and reports of comets were sent to the International Comet Quarterly.

2. Meteor showers

1994 saw a decrease in observations of meteor showers over 1993. The observations summarised in Table 1 show that four observers were active compared to eight in 1993, observing eight recognised meteor showers compared to 16 in the previous year. Not all observations can be put to scientific use due to incomplete data. It should again be noted that for observations to be of scientific value, observers must provide the correct observational information, including times of observation, limiting magnitude of the sky and magnitudes of the observed meteors.

Specific shower details are as follows: Cooper found very low activity from the α Crucid, γ Normid, δ Pavonid and π Puppid streams in 1994. The η Aquarids were well observed by Nico Kriek and Cooper, with uncorrected peak rates of 28 per hour on the morning of May 4. The mean brightness for the campaign was 1.7, and 30% of the meteors left trains. Detailed results of several years of η Aquarid observations will be presented at the Third ASSA Symposium. The Ophiuchids showed usual low rates. Kriek witnessed a good Pegasid display on July 11 with 10 shower meteors in 1.4 hours. The δ Aquarids were not well observed in 1994 except by Kriek on August 1, seeing seven fast white meteors in 1 hour of mean magnitude 3.2.

3. Fireballs

Six fireball reports were received. Details of the observations are given in Table 2. Of these, one was magnitude -13, observed on May 4 from Namibia and reported by Sonja Enke. Two further reported events on July 20 and September 14 are not included since their descriptions rule them out as meteor events. The latter event was even reported on BBC news.

4. Comets

Four comets were observed by the Section in 1994 as follows. The details observations are being prepared as a paper to the Third ASSA Symposium.

Comet Mueller (1993a) This comet was observed by Andre van Staden by CCD imaging. No visual reports were received.

Comet Tempel 1 (1993e) This comet was observed visually by Cooper and with CCD by van Staden. It reached magnitude 9.6.

Comet Takamizawa (1994i) This comet was observed visually by Cooper, Bill Hollenbach and Gordon Bosch. Hollenbach's visual observations of jets in the coma were confirmed by van Staden's CCD images. The comet reached magnitude 10.

Comet Borrelly (1994l) This comet was observed visually by Cooper, Danie Overbeek and Peter van Blommestein, and with CCD by van Staden. The comet reached magnitude 8 before heading northwards, and was characterised by a highly elongated coma and faint anti-tail.

5. Comet Shoemaker Levy 9 impacts with Jupiter

Despite considerable efforts by Cooper and Jim Knight in the production of a comprehensive observing guide for the impacts, very few people contributed any useable observations. Danie Overbeek and Walter Wargau reported no enhanced photometric brightness of Europa during the first predicted impact. Sonja Enke supplied many detailed drawings of the appearance of the impact sites during the period July 23 to August 15, as well as a number of black and white photographs. The Director would like to thank Mrs Enke for her fine efforts, and Mr Knight for the predictions supplied by email. Additional visual reports and drawings were reported by M Geyser, J Vincent, G Jagers, G Borcherds, R Thompson, M Begbie, T Cooper and P van Blommestein. It remains the Directors intention to finally document all received observations and reports of the event.

6. Conclusion

The past year yielded a satisfactory number of useful observations. The observation of comets and meteors however remains the domain of only a handful of observers, and with so much useful work that one can contribute with only modest equipment, I would like to encourage others to take up serious long term observing projects on comets and meteors.

Finally, I would like to heartily thank those members who contributed observations for their efforts in 1994.

Table 1. Summary of meteor shower observers - 1993

Observer	Total hours observed	Shower	Hours observed
Cooper, T P	19.2	α Crucids	2.0
		γ Normids	1.0
		δ Pavonids	2.7
		π Puppids	4.0
		η Aquarids	3.6
		Ophiuchids	5.9
van Blommestein, P	6.5	unspecified	3.5
		δ Aquarids	1.5
		Orionids	1.5
Uys, W P	5.4	κ Aquarids	5.4
Kriek, N	3.5	η Aquarids	1.1
		Pegasids	1.4
		δ Aquarids	1.0

Table 2. Details of reported fireballs

Date	Name of reporter	Visual mag	Time (UT)	Start (1950.0)	End
1994 May 04	S Enke, I Looser	-13	04:27	01h20, -60°.5	07h37, -71°
1994 Jul 12	A van Staden	-3	18:15	not given	not given
1994 Aug 07	J Knight	-4	16:30	not given	not given
1994 Sep 24	A Slotegraaf	-4	22:13	04h30, -06°	05h30, -17°
1994 Oct 24	P v Blommestein	-3	23:20	not given	not given
1994 Nov 25	S Enke	-6/-7	20:37	23h20, -63°	06h30, -65°

COMPUTING SECTION
Director: A S Hilton

This section was formed in 1987 and it has attracted many interested people. Their information has been tabulated and forms the basis of a database of astronomical computing software.

A complete list of the software available for 1995 is tabulated below, with order form attached *[in order to save space, the lengthy list is not reproduced here - Ed]*

There are many DOS packages available from the original section. I have now added new Windows releases and updated packages to the list as well as a CD-ROM release, which is now available in South Africa. *Sky & Telescope* is full of other CD-ROM software, which can be ordered on credit cards.

Finally I would like to thank all those who have assisted the section over the past years.

HISTORICAL SECTION
Director: Jonathan H Spencer Jones

It is my pleasure to present the annual report of the Historical Section. The activities of the Section continued with the maintenance of an archive of historical material pertaining to the Society and its members. An obituary of Jack Bennett was published (1994: *QJRAS, 35,* 353) and an obituary of Joe Churms was prepared for publication in *MNASSA*.

Plans are in hand to prepare a history of the 's *Handbook* to mark its 50th anniversary in 1996.

Members are reminded that they can contribute to the Historical Section by providing photographs and/or other material for the archive or by undertaking historical investigations, and those interested are invited to contact me.

OCCULTATION SECTIONS
Director: M D Overbeek

1. Planetary occultations

The astronomical community is showing increasing interest in the minor planets and accordingly, occultation work in this field is of topical interest. The number of observers is small but the majority of them are highly motivated and it has been a pleasure to work with them.

If other population centres could emulate the highly motivated Gauteng group and form similar networks, the Society's coverage of these events will be much more valuable.

During 1994, one definite occultation and several appulse time estimates were reported. The observers K and S Aspinall, S Begg, J and P Curran, D Blane, T Cooper, F de Jager, S Enke, R Field, B Fraser, M Mulder, L Rens, N Robinson, J Smit, C Turk and P van Blommestein are thanked for their efforts.

#1 1994 Jan 6 PPM 155583 by 107 Camilla. From Edenvale and Pretoria, D Overbeek and J Smit reported misses.

#2 1994 Feb 6 GSC 4917 00502 by 41 Daphne. Benoni and Edenvale reported cloud.

#3 1994 Mar 3 PPM 226817 by 501 Urhixidur. Benoni, Edenvale and Pretoria reported cloud.

#4 1994 Mar 10 GSC 0248 01674 by 2060 Chiron. In Edenvale, the Director got the date wrong. From Pretoria, J Smit reported a miss.

#5 1994 Mar 14 GSC 0246 00164 by 41 Daphne. Edenvale and Pretoria reported cloud.

#6 1994 Mar 27 GSC 7324 00087 by 704 Interamnia. Benoni reported cloud. From Edenvale, D Overbeek reported a miss between intermittent cloud. From Pretoria, J Smit reported an appulse about 3 minutes late. Simon's Town had cloud.

#7 1994 Apr 1 GSC 1390 01732 by 52 Europa. In Benoni, T Cooper reported the star too low. From Edenvale and Simon's Town, D Overbeek and P van Blommestein reported misses. Pretoria and Vanderbijlpark had cloud.

#8 1994 Apr 9 PPM 122217 by 230 Athamantis. In Pretoria, N Robinson reported a miss and J Smit reported cloud. Benoni, Edenvale and Vanderbijlpark also reported cloud.

#9 1994 Apr 14 PPM 264120 by 613 Ginevra. In Benoni and Edenvale, T Cooper and D Overbeek reported misses.

#10 1994 Apr 22 PPM 129394 by 1048 Feodosia. Benoni, Edenvale and Pretoria reported cloud.

#11 1994 Apr 22 PPM 232942 by 740 Cantabia. From Edenvale and Vanderbijlpark, D Overbeek and F de Jager reported misses.

#12 1994 Apr 23 Lick 2 1050 by 859 Bouzareah. From Benoni, Pretoria and Vanderbijlpark, T Cooper, J Smit and F de Jager reported misses.

#13 1994 Apr 29 DM +17 2057 by 333 Badenia. Benoni and Edenvale reported cloud.

#14 1994 May 2 PPM 264651 by 454 Mathesis. From Pretoria, J Smit reported an appulse perhaps a few minutes early.

#15 1994 May 18. 1973 01072 by 5145 Pholus. In Benoni, T Cooper found the moon too bright. From Pretoria, J Smit reported a miss.

#16 1994 Jun 1 PPM 272898 by 1467 Mashona. From Edenvale and Pretoria, D Overbeek and J Smit reported misses.

#17 1994 Jun 2 PPM 265795 by 222 Lucia. From Pretoria and Vanderbijlpark, J Smit and F de Jager reported misses.

#18 1994 Jun 4 PPM 265594 by 116 Sirona. From Edenvale, Pretoria and Vanderbijlpark, D Overbeek, J Smit and F de Jager reported misses.

#19 1994 Jun 5 ACRS 178247 by 91 Aegina. From Edenvale, Pretoria and Vanderbijlpark, D Overbeek, J Smit and F de Jager reported misses.

#20 1994 Jun 13 PPM 265635 by 222 Lucia (Again). From Durban, a miss was reported by K Aspinall, S Aspinall, S Begg, J Curran, P Curran, R Field and L Rens. We can certainly do with more team efforts like this. Edenvale had cloud.

#21 1994 Jul 11 PPM 273049 by 29 Amphitrite. In Edenvale, D Overbeek saw an appulse 4 minutes early and in Pretoria, J Smit saw an appulse 2 minutes 30 seconds or more early. From Vanderbijlpark, F de Jager reported a miss. From Thabazimbi, M Mulder reported that the star was too low.

#22 1994 Jul 14 PPM 129031 by 357 Ninina. In Edenvale, D Overbeek observed a miss but is not certain that the right star was seen in the bright sky. In Pretoria, J Smit found the sky too bright.

#23 1994 Jul 21 PPM 175231 by 2 Pallas. In Edenvale, D Overbeek found the objects already separated by the time he started to observe. From Pretoria, J Smit reported a miss.

#24 1994 Jul 21 PPM 299641 by 508 Princetonia. D Overbeek in Edenvale reported a miss but was not quite sure of the star's identification. From Johannesburg and Thabazimbi, B Fraser and M Mulder reported misses. In Pretoria, J Smit was bothered by moonlight.

#25 1994 Jul 21 PPM 227261 by 55 Pandora. Edenvale, Johannesburg and Pretoria reported misses, observed by D Overbeek, B Fraser and J Smit.

#26 1994 Jul 27 FK5 1536 by 318 Magdalena. In Edenvale, D Overbeek made a photoelectric observation and obtained a reasonably good trace indicating a miss.

#27 1994 Jul 28 PPM 67962 by 96 Aegle. From Pretoria, J Smit reported a miss.

#28 1994 Aug 9 PPM 237350 by 318 Magdalena again. Edenvale, Pretoria, Vanderbijlpark and Windhoek reported misses, observed by D Overbeek, J Smit, F de Jager and Sonja Enke.

#29 1994 Aug 15 PPM 228378 by 405 Thia. Edenvale, Vanderbijlpark and Windhoek reported misses, as observed by D Overbeek, F de Jager and Sonja Enke who found the seeing bad.

#30 1994 Aug 20 PPM 227018 by 324 Bamberga. From Pretoria, J Smit reported a miss. Cloud and a low star altitude frustrated the Edenvale, Johannesburg and Vanderbijlpark observers.

#31 1994 Aug 23 DM-13 3763 by 10 Hygiea. In Edenvale, D Overbeek observed an appulse at approximately the right time. In Pretoria, J Smit observed a miss interrupted by intermittent cloud.

#32 1994 Sep 8 Lick5 3526 by 1086 Nata. Benoni, Durban and Vanderbijlpark reported cloud. Edenvale, Johannesburg, Pretoria and Windhoek had misses as reported by D Overbeek, H Lund, J Smit and S Enke.

#33 1994 Sep 11 PPM 96852 by 410 Chloris. Benoni, Johannesburg, Pretoria and Windhoek had misses, as reported by T Cooper, H Lund, J Smit and Sonja Enke.

#34 1994 Oct 17 Lick4 3280 by 19 Fortuna. This event produced a real tale of woes. In Benoni, T Cooper was ill, Cape Town received the notice late, Simon's Town had mist and F de Jager in Vanderbijlpark reported a miss. J Smit was unsure of the star's identity.

#35 1994 Oct 26 PPM 271854 by 624 Hektor. Benoni, Edenvale, Johannesburg, Pretoria and Vanderbijlpark reported cloud.

#36 1994 Nov 3 PPM 236848 by 38 Leda. Edenvale, Johannesburg and Pretoria reported cloud.

#37 1994 Dec 2 PPM 94769 by 142 Polana. Edenvale, Pretoria and Vanderbijlpark had misses as reported by D Overbeek, J Smit and F de Jager. Cape Town had cloud.

#38 1994 Dec 15 PPM 121569 by 336 Lacadiera. In Edenvale, D Overbeek observed a definite occultation from UT 01h 26m 45s.6 to 1h 26m 49s.9. In Cape Town and Pretoria Drs Tom Lloyd Evans and J Smit observed definite misses. Unfortunately, other members of the "Gauteng Fence" were prevented from observing for one reason or another. It was not possible to determine a realistic upper limit for the size of Lacadiera, as the Cape town observation was made too far south. The Edenvale observation gives a lower limit of 52 km. Perhaps the next positive event will be observed by a full complement of dedicated observers.

2. Total lunar occultations

Three observers timed 168 disappearances, 44 reappearances and 3 PEP. Over the years, death and a severe stroke took their toll of some of the more productive occultation observers and it is my sad duty each year to report a decline of this most satisfying branch of positional astronomy. It is interesting to note that the average age of the observers listed below is over 70.

Observer	Disappearances	Reappearances
MD Overbeek	26 (3 PEP)	22
J Smit	45	20
P v Blommestein	97	2

3. Grazing occultations

This activity has also declined, not the least reason being the volatile security situation. No observer relishes the thought of being confronted by a trigger happy householder, landowner or passer by.

Date:	1994 April 18
Star:	SAO 97120
Place:	Edenvale
Stations:	1
Observations:	3
Leader:	M D Overbeek

SOLAR SECTION
Director: J Knight

The decline of solar cycle twenty-two has slowed during the year and as expected, the number of spotless days increased considerably over those observed in 1993. Periodic outbursts of activity persisted and it was still possible to observe extensive sunspot groups. Most sources continue to predict a cycle minimum to occur during early 1996.

The active participation by our observers continued again during 1994 and our small number of "regulars" has remained intact and they continued to submit high quality reports and keep the Solar Section very much alive and productive. Once again, we owe them a big vote of thanks!

1. Visual observing

Observers H. Cameron, H. Lund and J. Knight continued to submit regular and high quality reports to the ASSA Solar Section, the AAVSO, the BAA and the two international observing groups based in Germany.

2. Solar flare detection

Two receivers were brought into action during the year, but due to the lack of signal from the VLF station that we monitor in Australia, no Solar Flare detection of any consequence was undertaken in 1994. Unless this station returns to transmitting signals, this

state of affairs will continue in 1995.

3. Monitoring of the geomagnetic field
Magnetometer observations of Geomagnetic field were undertaken and several storm reports were received from D. Overbeek.

4. Aurora watch
As the cycle is in decline, no Aurora alerts were issued during the year and no reports of sightings were received.

5. Publications
The Solar Section's data, Observations and Reports are distributed in Southern Africa, Australia, the United States of America, the United Kingdom and Germany.

The Solar Section continues to be actively involved with colleagues and organisations overseas, particularly the AAVSO Solar Section, the BAA Solar Section, InterSol and Pettisindex in Germany.

Solar Section reports and articles were published in *MNASSA*.

6. International collaborations
The Georgi Dobrovolski Solar Observatory in New York continued to submit regular Solar Observations to us during the year. It is encouraging to see that they still take the time to include us in their activities. I would like to thank them for sending us their data.

7. Other activities
7.1 Schools
Very little activity occurred in this field during the year.

7.2 Visits
The Director gave a pre total solar eclipse presentation to the Pretoria Centre.

On a personal trip to Zimbabwe a visit was undertaken to the Harare centre. Mirrors from their two main telescopes were brought back to South Africa and transported to the Cape for realuminising. I wish to thank T. Cooper for his assistance in this regard.

At the end of the year, a visit was undertaken to Namibia, hosted by the Director of the G Hoffmeister Memorial Observatory.

7.3 Electronic Mail
The e-mail is now firmly entrenched as the primary mechanism for communication with the Solar community.

All our reports, articles and publications are received and sent out in this manner. Over 95% of our correspondence now takes place via this mechanism.

7.4 The 1994 Total Solar Eclipse
The 1994 total solar eclipse generated much interest. Several of the ASSA centres had some solar eclipse activity on the go and together we managed to raise the awareness of matters solar considerably.

To capitalise on the lessons learnt from poor communication leading up to the 1992 event, the Solar Section initiated a regular e-mail eclipse newsletter to several centres and other interested parties. In the last few days leading up to the eclipse, over a dozen people in 5 ASSA centres were involved. They in turn passed this onto their members.

The e-mail communication allowed us to successfully place several observers onto the Naval supply ship that ventured into the path of totality off the Southern Cape Coast. This expedition was clouded out for the most part and they only had a few glimpses of totality and the Diamond Ring effect. A report of this event was published in *MNASSA*.

Most of the centres that staged public events were clouded out.

Regrettably no reports have been submitted to the Solar Section on this eclipse, but photographs were recieved from M . Graf in Namibia, T. Cooper and M. Haslem.

7.5 The impact of comet SL/9 with Jupiter
Comets and planets are not the normal subject of a Solar Report, but the event in July had a great deal to do with the Solar Section. The solar Section's e-mail link with the world allowed us to receive and transmit hundreds of messages and vast amounts of information and data on behalf of the Comet and Meteor Section.

Information on the impact is still being received via this mechanism today. I would like to thank T. Cooper for joining in the co-operative venture with us. This is an excellent example of how two differing sections of your society can combine to do real astronomy with very little resources.

8. The Sun during 1994

[A monthly description of solar activity will appear in the next issue of MNASSA - Ed]

9. Sunspot numbers for 1994

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	89	33	49	16	35	0	34	12	42	17	48	10
2	79	40	59	5	37	0	41	12	50	18	43	8
3	91	43	76	0	25	0	34	14	58	19	40	2
4	101	48	58	2	14	0	34	15	58	29	30	11
5	104	47	59	6	11	0	28	17	63	41	34	14
6	98	44	26	3	18	7	31	17	60	54	26	12
7	94	49	58	0	18	22	57	13	56	48	18	21
8	80	54	48	8	21	43	58	14	49	43	20	25
9	67	48	44	8	14	44	49	14	45	50	23	38
10	51	38	24	10	18	50	61	18	31	52	24	40
11	41	32	40	11	21	56	72	22	15	49	14	51
12	43	39	48	11	28	53	67	39	10	44	15	52
13	45	49	42	13	36	46	58	47	10	44	7	40
14	38	44	22	15	37	58	55	42	10	60	6	34
15	36	36	59	20	11	54	35	42	9	56	0	29
16	32	41	26	15	36	51	46	45	9	52	10	23
17	26	45	24	18	38	42	47	42	13	44	19	34
18	30	43	19	17	35	36	43	38	22	51	18	33
19	31	33	10	23	31	32	26	44	15	60	12	26
20	37	21	11	29	28	16	25	29	0	51	8	17
21	54	17	19	34	26	12	24	16	0	38	9	21
22	66	40	29	40	23	16	15	11	10	33	9	26
23	72	41	25	38	18	24	14	19	13	28	9	26
24	74	40	34	40	9	34	15	18	14	17	9	28
25	74	37	44	34	8	25	11	13	20	25	17	36
26	68	37	28	33	1	14	13	13	26	50	22	37
27	53	46	22	35	0	12	11	11	28	56	21	19
28	49	47	19	21	0	14	12	12	22	56	21	19
29	54		19	10	0	23	7	13	12	57	14	17
30	42		31	17	0	27	12	26	18	56	12	9
31	33		35		0		12	38		56		0

VARIABLE STAR SECTION
Director: J Hers

As for various reasons it was not possible to prepare a report for 1993 in time for publication, the present report covers a two year period.

Probably the most important feature of this period was the improvement in communications. In the past it happened too often that potentially valuable observations of newly discovered novae, outbursts of dwarf novae, etc. were missed because the news reached us too late to be of much use. There difficulties were largely overcome when acquisition of a fax machine in 1993 made it possible to receive alerts from the AAVSO with a minimum of delay.

The position was further improved when toward the end of 1994 it became possible to receive, as well as send, email messages. Since that time we have been in almost daily contact with Dr Janet Mattei the director of the AAVSO, and Dr Frank M Bateson of the Variable Star Section of the RAS of New Zealand (via Ranald McIntosh in

Auckland). Email has also made it possible to receive the IAU Circulars the moment they are published, and we can be certain that no discovery of nova, supernova or comet will be overlooked.

A welcome new development of a different kind, is that some of our observers have taken the initiative to introduce others to variable star observing. Jannie Jooste, who lives in Reitz, has been helping high school students to measure some of the simpler variable stars, and as a result I have received observations from Jaco Dreyer, Heinrich du Toit, Albert Fourie, Pieter Kleinsmith, Huibrecht Pieters, Daniel van Aswegen and Philip van Zyl.

Similar good work has been done by Simon Walsh, through the Astronomical Society of Rhodes University, which has brought observations from James Greaves, Bryan Kilian, Lynne Munton, Keri Ann Smythe, J. Stakesby Lewis and Tessa van Heerden. Probably unavoidably, observations are few, because studies soon interfere, but it is hoped that an interest has been kindled that will not soon be forgotten.

And finally we welcome High Lund, a new observers from Johannesburg.

The following visual observations have been received from observers in southern Africa:

1993

Observer	Town	No. Obs.
D L Blane	Henley-on-Klip	514
T Cooper	Benoni	588
S de Villiers	Cape Town	109
N J G Dreyer	Reitz	5
G A Fourie	Reitz	2
J D Greaves	Grahamstown	19
C Henshaw	Botswana	852*
J Hers	Sedgefield	592
J L Jooste	Reitz	26
R W Jones	Fish Hoek	2569
B Kilian	Grahamstown	1
N Kriek	Britstown	128
L A G Monard	Pretoria	1051
M D Overbeek	Edenvale	15870
H C Pieters	Reitz	1
N B Robinson	Pretoria	182
J A Smit	Pretoria	1406
J Stakesby Lewis	Grahamstown	1
P van Blommestein	Simon's Town	5
T van Heerden	Grahamstown	1
P P van Zyl	Reitz	1
S Walsh	Grahamstown	94
	Total	24017

1994

Observer	Town	No. Obs.
D L Blane	Henley-on-Klip	185
T Cooper	Benoni	556
S de Villiers	Cape Town	96
N J G Dreyer	Reitz	3
H A du Toit	Reitz	19
G A Fourie	Reitz	2
C Henshaw	Botswana	111 *
J Hers	Sedgefield	696
J L Jooste	Reitz	22
R W Jones	Fish Hoek	2154
P D Kleinsmith	Reitz	2
N Kriek	Britstown	73
H Lund	Johannesburg	3
C Mesu	Harare	3
L A G Monard	Pretoria	953
L Munton	Grahamstown	1
M D Overbeek	Edenvale	18985
H C Pieters	Reitz	14
N B Robinson	Pretoria	122
J A Smit	Pretoria	1455
K A Smythe	Grahamstown	1
D H van Aswegen	Reitz	8
P P van Zyl	Reitz	3
J Vincent	Harare	192
S Walsh	Grahamstown	219
	Total	25878

* plus measures of very bright variables sent to other organisations.

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1995

FINANCIAL REPORT

HONORARY TREASURER's ANNUAL REPORT
Colin Douglas Gray, Hon. Treasurer

As we all know only too well, inflation has continued to take its toll and your Society has had another difficult year.

The unaudited accounts for the past year to 30 June 1995 show a deficit of about R 10,000 – equivalent to more than R 20 per member – which has depleted our reserve funds.

This time last year, it was expected that the revised subscriptions of R 110 would cover on-going expenses for the financial year.

However, the further falls in the Dollar exchange rate, together with the higher postal tariffs and other charges have combined to cause a marked deterioration in our financial position.

On top of all this, the hefty increase in the cost of Sky & Telescope magazine in the coming year, of which members have been advised separately, was totally unexpected and has added to our woes – as well as to our new subscriptions!

An urgent appeal is made to all members to support the Society by paying their dues now and where possible to give donations also. Failing payment by the end of this month, Council has resolved that members be struck off the roll and will forfeit all the benefits of membership.

Finally, thanks are hereby recorded to our Honorary Auditor, Mr Ronnie Glass, of Zeller & Karro, and I recommend that he be re-elected at the Annual General Meeting.

PRESIDENTIAL ADDRESS

ASTRONOMY IN THE LIVES OF THE INDIGENOUS PEOPLE OF SOUTHERN AFRICA

Brian Fraser

Introduction

One reads about monuments like Stonehenge and temples in India and South America being associated with astronomical observation sites but one never hears of any astronomy associated with the local peoples. Can it be that the earlier inhabitants of South Africa were simply not interested in the sky or is it perhaps that the stories have simply not been recorded? I have been doing some research into the subject and would like to present some of my findings in this talk. There is not a lot to tell, so it is not going to be a long talk.

The bantu speaking tribes arrived in Southern Africa at least 1000 years ago. They are thought to have come from West-Central Africa in many groups, one group going towards Namibia, the others down the East coast of Africa as far as where Port Elizabeth is today. There was probably more than one migration which resulted in the different tribes settling in different areas. However, because of tribal wars and raiding of neighbour's territories and, ultimately, the massacres surrounding Shaka's reign and demise, there was a fair degree of cultural mixing. So some of the traditions and myths are shared by more than one tribe.

However before this time there were already people in southern Africa; they were the SAN (Bushmen) and the Khoi (Hottentots) and they inhabited areas across the whole land.

Long before European settlers came to the Cape it appears that there were visitors from the East, possibly India, who came to South Africa to trade for ivory, gold and other metals. They left a record of their presence in the form of stone monuments that stretch across the Northern Transvaal and Zimbabwe from the East coast across to Botswana. The Zimba-

bwe ruins and Mapungubwe may be part of this legacy. More about this topic later.

Astronomy

Very little has been recorded concerning the astronomy of the black tribes of South Africa. A few prominent stars, the milky way and the sun and the moon are just about all that they know. The stars tell them the time of year and are used, as in other societies around the world, to indicate when the time for planting has arrived. The Pleiades are known in Xhosa as IMI-LIMELA (the star that ushers in the ploughing season.)

The Milky Way - UM-nyele (literally raised bristles along the back, as on an angry dog).

Saturn is given as U-canzibe which represents the month of April. It is not clear why this should be so.

The month of June is known as Isi-limela, (the Pleiades). That is when this star group appears. This is the beginning of the Xhosa year.

One story concerning the moon in a book on life and customs of the Xhosa runs as follows:

"When the moon sets it ceases to exist. The moon that rises the next day is another and quite new moon. It is put there, in the heavens, by some indefinite agency. The sea-horizon is the boundary of the world, the sea stops there and beyond it is a vast pit. Here is stored an immense heap of moons ready for use, from which heap a fresh moon is placed in the sky each evening by some unknown agency."

Swazi Culture

The Swazi believe that the earth is flat and that the sun, or "male of the heavens" moves back and forth across the skies. Every evening the sun enters the hut of his mother to sleep there. In the morning it wakens strong and refreshed. The moon is the female consort of the sun, and in the cycle of fertility she dies once every month. During this time the moon is dark because she is covered by the sun. After this sexual coming together the moon is revived and becomes full again.

This notion of birth, growing to maturity, ageing and dying reflected by the phases of the moon, is inherent in all forms of human, animal and plant life. For this reason ceremonies to introduce a person to a new status occur when the moon is waxing or full, while those which isolate him from his fellows take place when the moon is waning or dark. During his introduction to childhood an infant is shown to the growing moon, while the corpse of a king is carried to the royal caves only when the moon is dark.

The difficulty in trying to research the traditions of the black tribes is shown in this explanation of the sky. Two reference books give two completely different versions of the story.

One goes as follows: To the Zulu the sky is a solid "blue rock", which completely encircles the earth.

"The sun, moon and stars are on this side of the rock. The sun by day travels in its path in the sky and at night it goes by a path through the sea till it comes out at a place where it rises in the morning. When it rises there is a great ball; this is the sun's mother that accompanies him when he is about to rise, and leaves him when he rises and goes back into the sea.

"The sun is a great chief, for when he has risen the stars and moon are dim. The sun has a summer house and a winter house. It goes north to a certain mountain or tree, where it stays for a few days; then it turns south, fetching the summer. The sun is fabled to be continually slain and continually reborn. There is supposed to be a large luminous body in the east from which a spark scintillates every morning to grow into the glorious eye of the day and to be devoured every evening in the west by a race of Bushmen.

"The moon, thought by some to be on this side of the sky, is thought by others to be a "hole in the heavens". It is said also to be the sun's officer. The period following the last day of the moon is that in which the moon is dead and no important undertaking is began till the new moon appears.

"One informant said: 'It used to be said the moon dies utterly, but it is not so - the days devour it and it diminishes till it is as thin as a man's nail. The sun finds it like this in the east, and he fetches it and travels with it, leaving it in the west, where the new moon can be seen.' Even in Shaka's days the Zulus used to beat drums when they saw the new moon, and no one worked in the garden the next day, for they believed they would never reap the benefit of that work."

Another version of this Zulu legend has the story slightly differently. "The sky is believed to be a rock, blue in colour, which stretches from the one end of the flat surface of the earth to the other. The great vault of rock rests on the edges of the earth, while the earth itself, being a flat surface, is held up by four bulls, 'carrying the earth on their horns. When one of them shakes its head, then the earth also shakes.' This

is how earthquakes are accounted for.

"The sky is above the sun and the moon. Both the sun and the moon move along their paths underneath the floor of the sky. They do not reach up to the sky because they must shine on the earth only.

"Zulu thought-patterns describe the sky as having perpetual light and that the stars are small holes in the floor of the sky through which the light filters at night. An old Zulu woman described the stars thus: 'When it has rained and the cattle are driven to the grazing grounds, they sometimes tramp through the mud and their feet go through the floor of the sky. Then the light comes through.' Asked to comment on falling stars, she said that these were caused by the cattle being in a hurry when running to the grazing and thereby dragging the foot which had trodden through the mud. 'That is the time when this thing is seen. The light is seen before the mud fills in again. So it is clear that iNkosi there has cattle.' She described the Milky Way as being the main entrance to the cattle enclosure.

Other astronomical beliefs

The Zulus have different names for Venus the evening star and Venus the morning star. They also have names for the Pleiades, Jupiter, Orion's belt, Spica and the Milky Way. When there is an eclipse there is thought to be something wrong with the sun or moon, and steps are taken to institute lamentations and sacrifices to awaken it from its lethargy.

This seems to be about the full extent of the astronomical beliefs of the black tribes. No record of names of constellations or star patterns. Surprisingly very little folk lore concerning the universe. Perhaps it is there but has just not been recorded. On the other hand there is a lot more that has been recorded concerning the Khoi and the SAN peoples.

The Khoi (Hottentots)

Because he grows up in the open pasture fields, the Hottentot has no need for any points of orientation other than the sun, and his knowledge of the stars is therefore very limited.

They do have some interesting tales concerning the celestial bodies. The planets Venus and Mercury are known and readily observed. Venus is known as "the Forerunner of the sun" or as the star at whose rising men run away (i.e. from illicit sexual encounters). Mercury is the Dawn Star or the star that comes when the udders of the cow are filled again; as an evening star it is not observed. Venus as an evening star is recognised to be the same celestial body as the morning star, and is then called the "Evening Fugitive", since it does not remain long in the sky.

Jupiter is also known, but is sometimes identified with Venus; when, however, it is seen "in the middle of the sky" it is called the "Middle Star."

The six stars of the belt and sword of Orion are grouped together as the Zebras. The three stars of the belt are the fugitive zebras and the hunter is at the end of the sword. The stars of the sword make up the arrow which is aimed at the middle of the stars in the belt. The Pleiades, on account of their thick cluster of stars, are called by a name derived from the verb "to assemble". They are also known as "Hoar-frost stars", since at the time when they become visible the nights may already be so cold that hoar-frost is found in the morning.

The following story is given the name The Orion Myth, or the Curse of the Women.

"The Pleiades said to their husband, 'Go thou and shoot those three zebras for us; but if thou dost not shoot, thou darest not come home.' And the husband went out with only one arrow, and he shot with his bow. But he did not hit, and he sat there because his arrow had missed the zebras. On the other side stood the Lion and watched the zebras, and the man could not go and pick up his arrow to shoot again. And because his wives had cursed him he could not return; and there he sat in the cold night shivering and suffering from thirst and hunger. And the Pleiades said to the other men: 'Ye men, do you think that you can compare yourselves to us, and be our equals? There now, we defy our own husband to come home because he has not killed game'."

In explanation the author (Hahn) states that Aldebaran is the husband of the myth and the Pleiades are his wives. His bow is pi Orionis; his sandals are epsilon and delta of the Hyades; his kaross is theta and gamma of the Hyades; delta, epsilon and zeta Orionis are the zebras and Leo is the Lion. The arrow is marked by i, d, c Orionis (not on map), with c at the end where the feather is fixed.

The gleam of the Milky Way and of the Magellanic Clouds reminds the Hottentot of the weak glow of the embers of a hearth fire. The Magellanic Clouds are also called "the two lion testicles." Sirius was

named the "Side Star", and alpha and beta Centauri are "the two eyes". Upsilon 1 and 2 Scorpii are called "the eyes of the lion." It will be remembered that the Khoi also speak of the stars as the eyes of the deceased.

Bushman Tales

The Children are sent to throw the sleeping sun into the sky.

The people of the early race first inhabited the earth. They lived before the present bushmen and many tales relate to them. It was their children who were responsible for putting the sun in the sky. One day the male children were persuaded by an old woman to approach the sun while he was sleeping and lift him up. They first had to wait till the sun lay down and went to sleep . They then stealthily approached him, together grabbed him and threw him into the sky.

The sun was then told to remain in the sky, become hot, dry the Bushman rice, take away the darkness and give warmth. "The sun takes away the moon, the sun pierces it with the sun's knife therefore it decays. Therefore it says 'O Sun! leave for the children the backbone!' The moon then painfully goes away and returns home but then returns to become another moon, which is whole. He becomes a new moon and again puts on a stomach: he becomes large, he is alive again. (The Mantis formerly, when inconvenienced by darkness, took off one of his shoes and threw it into the sky, ordering it to become the Moon.)"

The girl of the early race who made stars.

"The girl put her hands into the wood ashes; she threw up the wood ashes into the sky. She said unto the wood ashes: 'The wood ashes which are here must altogether become the Milky Way. They must lie white along in the sky, that the stars may stand outside of the Milky Way. The Milky Way must go round with the starsà' The darkness comes out, the stars wax red, while they had at first been white. The girl thought that she would throw up roots in order that the roots should become stars; therefore, the stars are red."

The Great Star, which, singing, named the stars.

There was a great star (gaunu) who named the stars. He sang as he uttered the stars names.

A prayer to a star

"My grandfather used to speak to Canopus. (Canopus and Sirius are female stars) when Canopus had newly come out; he said 'Thou shalt give me thy heart, with which thou dost sit in plenty, thou shall take my heart with which I am desperately hungry. That I might also be full like thee. For I hunger. Thou shalt give me thy stomach with which thou art satisfied. Thou shalt take my stomach, that thou mayest also hunger. Give thou me also thy arm, thou shall take my arm with which I do not kill. For I miss my aim'."

Doings and prayers when Canopus and Sirius come out.

When Canopus is seen in the morning sky in Winter it signifies that the sun will be a little warmer and this appears to be a time for some rejoicing. Similar sentiments seem to be associated with the appearance of Sirius. Once Sirius is in the sun's warmth the women go out early to seek for Bushman rice (termite eggs).

The Bushmen

The Cape Bushmen were close observers of the movements of the stars and constellations and had names for many of them. Thus Achernar is the "Star-digging-stick's stone" or the "Digging-stick's stone of Canopus", while Canopus itself is the "Bushman's rice star"; the Pointers to the Southern Cross are male lions; alpha, beta and gamma Crucis are lionesses; Aldebaran is a male hartebeest and Orion is a female hartebeest; Procyon a male eland, Castor and Pollux his wives; the Magellanic Clouds a steenbok; Orion's sword three male tortoises hung upon a stick, his belt three female tortoises so hung.

The heavenly bodies are regarded as once having been men or animals before being transformed into their present state. One tribe of the Eastern Kalahari regard the Southern Cross as a Giraffe.

Bleek and Lloyd relate the tale of a girl of the early race (preceding the Bushmen) wished for a little light so that the people might see to return home by night. She therefore threw wood-ashes into the sky and these become the Milky Way. In another it is told how a girl, at the time of her puberty seclusion, saw some people eating together at a dassie's house of branches. As a result they and the house, fixed by her looks, became stars in the sky, where they are now to be seen as the Corona Australis.

To the Bushmen an eclipse of the moon is always

considered a bad omen. "One would almost believe that a great calamity had befallen a kraal", writes Hahn, "such is the disturbance on such occasions. I have seen people moaning and crying as though suffering great pain. Those prepared for a hunting expedition, or already hunting in the field will immediately return home, and postpone their undertaking."

The same dread significance is attached to an eclipse of the sun. Like that of the moon, it is believed to herald much sickness and even death. Other celestial phenomena are also ill omens. The appearance of the Aurora Australis or of a comet threatens war and death, while a shooting star indicates that sickness will spread among the stock, and the people on such occasions move to another locality and implore the star to spare them.

The stars are said to be the eyes or the souls of the dead; and the Cape Bushmen offer prayers for food or rain to either them or the sun. A religious dance is held at the first rising of the Pleiades after sunset, when prayers are offered for rain.

One Bushman tale tells of the Dawn's-Heart star (Jupiter) having a daughter, who is identified with a neighbouring star (at the time Regulus or alpha Leonis). He calls her "my heart", he swallows her, then walks alone as the only Dawn's-Heart Star, and, when she is grown up, he spits her out again. She then herself becomes another Dawn's-Heart, and spits out another Dawn's-Heart child.

This appears to refer either to a close conjunction between Jupiter and Regulus or it refers to Jupiter and it's moons - which means that the Bushmen had very good eyesight.

Rock Art depicting Astronomical Objects

There are a number of sites in Southern Africa containing rock paintings of objects which are seen by archaeologists as comets. When one takes a closer look at the slides of these paintings and compares them to photographs of comets and meteors it would seem that most of the rock paintings reflect meteors and not comets.

Also to be found are engravings in rocks that could be some representation of the sun or perhaps some other bright object. These engravings, known as petroglyphs, take different forms. One form is a circular spiral, another is a circle with radial lines extending from it. These forms are also found in rock art from North America.

About 20 kms north-east of Carolina in the Eastern Transvaal there are some old monuments of dry stone on the hillsides. They lie on a farm Suikerboschfontein, a part up which has been set aside as a hiking trail. These monuments have been investigated by a historian, Dr Cyril A Hromnik, from Cape Town and this is what he has to say about them in the brochure on the hiking trail.

The Dying Sun Chariot

Southern Africa: the land of gold.

With the discovery of gold, ancient man moved from the age of stone to the age of metals, a transition which occurred somewhere between India and Mesopotamia. Man's search for gold caused Africa to enter the age of history.

Not surprisingly, southern Africa, the world's greatest repository of gold, caught the attention of Indian Prospectors and traders at least as early as the 1st millennium BC, if not earlier.

The Buddhist literature of India refers to Africa's gold trade in pre-Buddhist times i.e., at least as early as the 6th century BC. The early prospectors left evidence of their search not only in the form of alluvial diggings, reef workings and ore processing plants, but also in agricultural terraces and religious structures built of dry stone. Since 1983 these structures have been the subject of study of this research team.

Suikerboschfontein in Komatiland.

The area of Suikerboschfontein hiking trail drains into the Komati River, the main commercial artery of the ancient gold-producing region known as Komatiland (Eastern Transvaal, Swaziland and northern Zululand).

This region was prospected and traded during the 1st and 2nd millennium AD by Dravidian (South Indian) gold seekers along with the emerging Quena (Hottentots) and, later, with Bantu-speakers.

Gold was found in the Komati valley and copper deposits were detected in the immediate vicinity of Suikerboschfontein. Throughout this region ancient prospectors and traders constructed numerous shrines, temples and other places of worship.

Only a few of more than a dozen stone ruins at Suikerboschfontein have been investigated to date.

The Chariot

The most interesting of the ruins along the trail are the ruins of the Dying Sun Chariot temple, so named because of their shape and function. The temple consists of the shield shaped body of the chariot and two wheel-like compartments, attached symmetrically to each side. Several auxiliary structures are attached to the chariot from outside.

The well-preserved body of the chariot can be entered through a narrow door on the eastern side. Its front arch, marked by an upright stone built into the wall inside, aims at the Qanda (egg-shaped summit) of Doornkop, where the dying sun of the winter solstice sets at about 16:50 on June 21. On the other side of the arch begins a narrow passage which pierces the outer enclosure on the winter solstice sunset line thereby indicating the way of the dying sun's demise. Clearly this chariot is celestial rather than terrestrial.

The time is up when the sun is gone.

The chariot, the celestial car of the sun god (Suriyan) is a representation of time. Cyclical year-end festivities were celebrated annually in this temple. Worshippers gathered here to give thanks for the bounty received in the past year and prayed for the return of the dying sun without which there would have been no new planting season or harvest.

Offerings of mineral tints, fruit, vegetables, grains, nuts etc. were ground to a paste on rubbing spots on outcrop and on loose stones, which can be seen on both sides of the sun's path passage in the western part of the temples enclosure.

These spots attest to the faith of the ancient worshippers. Their trust that their prayers would be answered and the sun would return is indicated by a seat in the left wheel compartment. A priest (called sun) sitting on this seat and looking over the altar (charioteers rest post) that separates him from the main body of the chariot, faced the high cliffs in the north-east where the new sun would rise on the morning of June 22. His line of vision runs over a well built 'nose' or projection in the right side wall of the chariot. Here the lines of several cosmic alignments intersect.

The celestial wheel

The chariot's celestial nature is further indicated by its two lunar wheels, located on parallel axles at right angles to the shaft. The North Wheel can be seen under the cliffs across the stream. Its axle runs over the 'nose' towards the large flat seat of the officiating SUN in the southern cell just outside the chariot, and continues to the western edge of the South Wheel. The South Wheel is hidden beyond a low ridge, but its axle intersects the shaft of the chariot precisely at the eastern entrance to the chariot's enclosure and continues to the eastern edge of the North Wheel. The arrangement of the wheels reflect certain lunar connections which are too complex to explain here.

The article goes on to detail that a 10.25 km "Pilgrims Way North" was used by countless pilgrims during worship and sacrifice.

Conclusion

Astronomers (and others) will find much of this to be very controversial. But can we regard every stone monument in southern Africa as just another primitive kraal? Should we not be looking a little more closely at some of these ruins? Perhaps they are little more than ancient cattle enclosures. There is much research that needs to be done into the subject of the astronomical beliefs of the indigenous peoples of our country.

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Thanks to: Bert Woodhouse for providing the slides of Rock Art, Karen Calteau for obtaining many reference books and Lyn du Preez for the information on the Dying sun chariot and other assistance.

Brian Fraser
P.O. Box 28210,
Kensington,
2101.

CENTRE REPORTS

BLOEMFONTEIN CENTRE

It is my pleasure to report that the Bloemfontein centre now has about 50 active members. Meetings are held monthly at the University of the Orange Free State's Physics Department.

The Society's members are also able to make use of the facilities at the Boyden observatory.

A number of projects and courses were presented in collaboration with the Bloemfontein Education Centre.

Minutes of the AGM held on 1996 June 26 at 19:00, Department of Physics (UOVS).

Fifteen people were present. The chairman presented the annual report, discussed under the six point plan for the past year.

- The association is supported by laymen, and therefore training is a very important priority. During 1995, two courses in conjunction with the Bloemfontein Education Centre were presented, as well as a third course led by Mr H Calitz.
- At monthly meetings, lectures, slide shows and discussions were included in order to satisfy the need for stimulation by members.
- Members need an opportunity for development: visits to Boyden observatory provided the opportunity for hands-on experience in using a telescope, and other practical matters (e.g. photography, use of astronomical charts) were also addressed.
- Members need to be independent. Smaller workgroups were encouraged, which investigated different themes e.g. variable stars and telescopes.
- Members need time for relaxation. Social evenings (bring-and-braai, a star navigation evening at Koppiesrus) provided the opportunity for fun and laughter.
- The association needs to reach out. Monthly newsletters were sent to members. The media was supplied with information, radio-talks were broadcast and articles were published in local newspapers. Informative talks were given at three schools (an open air school at Zastron, and schools at Brandfort and Fouriesburg).

Through our Cape Town correspondent, Mr C de Coning, our Centre is being represented at the national level. The third ASSA Symposium is to be held in Bloemfontein.

The biggest disappointment of the past year was the poor support of the workgroups. The highlight was the delight each member experienced in pursuit of their amateur interests. The chairman thanked Mr Matie Hoffman for his input and support, Mrs Schoch from the Education Centre for her exceptional contribution, as well as each member of the committee.

The chairman informed those present of the ASSA Symposium to be held at the Education Centre, from 26 - 28 September.

The membership fees of R30 per person and R15 for each additional member was announced. A financial report has been furnished and is available on request. The following persons were elected to the committee:

Chairman:	Mr H Calitz
Vice-chairman:	Mr D Steyn
Hon Secretary:	Miss G Erasmus
Members:	Mr B van Zyl
	Mr N van der Walt
	Mr B Fourie

(Ms G Erasmus, Hon Secretary)

HARARE CENTRE

Minutes of the Annual General Meeting 1994/95
Harry Robinson Lecture Theatre, Prince Edward School, 1995 July 26, 18:00

1. Apologies
The following apologies were noted: Mr S Walsh, Mrs Ellis-Whitfield, Mr Dalziel

2. Minutes of previous AGM
It was regretfully announced that the minutes of the previous AGM were not available. The Chairman requested for proposal that the current AGM should nevertheless continue. This was proposed by Mr Mesu and seconded by Mrs Summerfield.

3. Matters arising
The topic of increasing publicity of the Society was raised and a suggestion was made by Mr Siemers that a copy of the Chairman's monthly article published in the *Sunday Mail* (entitled "Tour of the Sky") be added to the monthly notice circulated to members.

4. Treasurer's Report
The Treasurer, Mr Croyden, briefed members on the comparison of income and expenditure during 1994/95. He wished it to be noted that the Society still obtains a nil charge for hire of the meeting venue at Prince Edward and once again expressed his thanks to the Chairman, which he wished to be conveyed to the Headmaster of Prince Edward School. Secondly, the Treasurer announced that he proposed to keep the subscription rates at the same levels for the 1995/96 financial year. (Proposal: Mr Begbie, Seconded: Mr Siemers)

5. Chairman's Report
The Chairman, Mr Begbie, submitted and read his 1994/95 Annual Report. Several minor amendments were suggested, and these suggestions accepted by the Chairman.

6. Election of Office Bearers
Incumbent committee members were invited to re-stand, and the 1995/96 Committee of ASSA (Harare Centre) becomes:

Chairman:	M. J. Begbie
Vice-Chairman:	C. Mesu
Secretary:	D.J. Pringle-Wood (outgoing)
	P.W. Siemers (incoming)
Treasurer:	A. Croyden
P.R.O.:	Mrs Y. Walsh
Members:	J. Black, L. Murphree,
	D. J. Pringle-Wood
New Member	G. Hofer

7. Any Other Business
(1) Mr Mesu announced that Mr Vincent was prepared to conduct a course in mirror making during 1995 and requested likely numbers. Ten members indicated that they would be interested.
(2) The Treasurer announced that the 1995/96 subs were now due.
(3) The Chairman indicated that his amended Report would be available to be forwarded along with the Minutes of the AGM to the ASSA in South Africa.

There being no further business, the meeting was closed at 18:34.

Chairman's Report - 1994/1995
The year under review has been interesting in that a firm commitment towards a more progressive and dynamic centre has been made by the committee.

Meetings have been advertised by poster and the society now enjoys some media publicity. As a result two meetings were opened to the public resulting in large attendance of up to one hundred people. We will deal with a breakdown of the year's meetings first.

The July 1994 meeting was the Annual General Meeting and was followed by your chairman demonstrating the astronomical software available on the Prince Edward School Global Village computer.

In August the meeting consisted of a visit to Riembarta Hall to attend a public meeting entitled "Our Universe".

In September we celebrated the 25th Anniversary of the Apollo Moon Landings with videos of these events provided by Francis Podmore.

In October David Pringle-Wood brought us up to date on the subject of "Supernovae", in particular how our knowledge of the mechanisms of these violent events has increased since the 1987A eruption and the advent of the Hubble Space Telescope.

In November our Annual Xmas Slide Show Quiz came to an abrupt end before it even got started when the slide projector blew up and we postponed the quiz.

In December, as usual, no meeting took place.

The *Xmas Quiz* became *A New Year's Quiz* at our first meeting in January 1995. This took place at the Walshe residence and was preceded by an excellent talk by Simon Walshe concerning the anti-light pollution lobbying currently taking place and largely initiated by Simon himself at Rhodes University.

After the quiz telescopes were set up and we attempted to gaze skywards through the cloud while light pollution in the form of lightning below the horizon further thwarted our attempts. Overall a very enjoyable evening with super snacks pro-

vided by our hosts. Many thanks to the Walshe family.

Our second meeting in January was a panel discussion of general astronomy, questions being fired at your chairman, Cees Mesu and Paul Siemers.

February saw the first of our two public meetings. The lecture theatre was about 75% full to hear Paul Siemers give an excellent and highly entertaining lecture concerning "Relativity, Black Holes and Warped Space-time".

The second public meeting was the March one with, again, a well advertised presentation by Paul Siemers and Terry Garde with your chairman acting as mediator between the two speakers on the subject "The Possibility for Extra-terrestrial Life". The meeting was thrown open for questions directed through the chair by a capacity audience which included Cynthia Hind, the noted UFO expert.

The concept for the talk was a good one, and was well accepted by a large portion of the audience, but it is felt by your chairman that the presentation declined into a discussion centred around Unidentified Flying Objects and religious and metaphysical concepts and explanations that really are outside the scientific concepts and disciplines that the Astronomical Society must necessarily impose upon itself to maintain its status as a scientific body.

It must be noted that the centre does not assume responsibility for opinions and concepts put forward by individual members or guests of the centre.

In April the telescope purchased by Gateway School from the estate of the late Norman McDonald saw its official "first light" in its new residence. A pleasant evening was had at the eyepiece together with an astrophotography slide-show presentation by Gunter Hofer.

Cees Mesu, Terry Garde and John Vincent are to be thanked for their hard work in the construction of the roll-off roof and the installation of the telescope.

Some good work has been initiated by Simon Walshe concerning light pollution control in the near vicinity of the observatory, but some administrative problems need to be addressed before the instrument can realise its full potential as a learning tool and scientific instrument.

In May your chairman began a talk entitled "The Visual Observation of Comets". This talk concerning these enigmatic faint lights was brought to an abrupt end ten minutes into the presentation when the terrestrial lights and power failed completely!

The June meeting was the second (and this time successful) attempt on "Comets".

February saw the introduction in the *Sunday Mail* magazine section of "Tour of the Sky", an astronomical "What's up tonight?" and news article compiled by your chairman. Star charts and other graphical material is generated by the Global Village at Prince Edward School and this monthly presentation, according to the feed-back that I have had, is being received well by the public.

Also on the astronomy education front, projects submitted by pupils at the school for their University of London examination in astronomy were of an extremely high standard in 1995. The theory examination was written in June and results are expected probably by the end of September.

Your vice-chairman, Cees Mesu, was once again in charge of the annual retreat into dark skies which this year took place at Rifa in Chirundu. An enjoyable four days was had by all, and Cees is to be thanked for his organisation of this event.

Generally, a varied and enjoyable year has been realised. My grateful thanks go to Mr Clive Barnes, the headmaster of Prince Edward School, who always hosts and supports us so closely.

The following quote from a letter of thanks by the headmaster to a Dr H Koefman, who regularly contributes "Spaceflight" magazines to the school from his home in Dorset, England, is appropriate here.

"You will probably be pleased to know that the Astronomy Department goes from strength to strength... (and) a flourishing Astronomy Society that is linked with the (Astronomical Society of Southern Africa) and has its headquarters at Prince Edward School ... we are delighted and proud of the fact that Mr Begbie and his group are.... authorities on the astronomical movements in our country and submit to the national press regularly..."

Many thanks go to all members of the committee for a successful year, and may the Harare Centre keep progressing.

(M J R Begbie, Chairman)

NATAL MIDLANDS CENTRE

Minutes of Annual General Meeting held at the home of Ms J Baxter, Otto's Bluff on 15th July 1995 at 18:30.

Introduction
The Chairman, Mr R Jarmain, extended a warm welcome to everyone present, and thanked J Baxter for the use of her home. The meeting was attended by 13 members, with 8 apologies and 1 visitor.

Minutes of the Previous AGM
Minutes of the 1994 Annual General Meeting held on 13 July 1994 had already been posted to members, and were taken as read (Prop: M Christianson, Sec: T Chance).

Matters arising
Instruments/Observatory: all instruments are now safely stored at the home of M Christianson. A sub-committee has been formed under the chairmanship of M Christianson. Considerable progress has been made towards the establishment of an Observatory for the Centre.

Chairman's Report (Prop: M Christianson, Sec: P Hawkins)
Mr R Jarmain summarised the programme of activities of the Centre during the year. In particular, he made mention of:
- The steady increase in membership
- The continued educational endeavours, including the Adult Education course currently in progress at the Natal Museum
- The efforts of the sub-committee towards the establishment of an observatory
- The hard work of the outgoing Centre committee.

Treasurer's Report
Mrs H Chance presented the Statement of Income and Expenditure for the year, which reflected a closing balance of R 816.16, a gain of some R 335.

The Centre's major item of expenditure is the preparation and postage of the monthly newsletter *Stardust* – the meeting agreed that this was an excellent means of keeping in touch with inactive/elderly members, and that the expense was therefore justified.

A proposal was put to the meeting (Prop: P Hawkins, Sec: M Christianson) that annual membership subscriptions be increased by R 5,00 in each category. This was agreed to unanimously after a short discussion. The revised annual subscriptions will therefore be: Members: R35,00 Couples: R45,00 Pensioners & Students: R25,00

A further proposal (Prop: P Hawkins, Sec: M Christianson) that an Observatory Fund be established, was also agreed to unanimously.

Election of New Committee
The following members were nominated and elected:

Chairman:	Mr M Christianson
Vice-Chairman:	Mr T Chance
Secretary:	Mr J Watson
Treasurer:	Mrs H Chance
Newsletter:	Mr R Jarmain
Library:	Miss K Hampson
Education:	Mrs B Lawrence / Mr T Chance
P.R.O.:	Mr P Hawkins / Mrs B Lawrence
Instruments:	Mr M Christianson
Projects:	Mr S de Vos
Council Rep:	Mr J Watson

Instruments & Observatory
M Christianson reported as follows:
- Agreement has been reached with the Girl Guides Association to sub-lease a small portion of their land at World's View, which they in turn lease from the Pietermaritzburg Corporation.
- A letter has been written to Pietermaritzburg Corporation outlining our plans to establish an Observatory.
- R Clifford has prepared some preliminary drawings of a suitable building.

Other business
- R Jarmain read a letter from A Gray, the founder of Natal Midlands Centre.
- Fund-raising efforts for the Observatory to be embarked upon - approaches to be made to suitable organisations for donations.
- ASSA Symposium to be held in Bloemfontein in September.
- Wykeham-Collegiate and other schools keen for

viewing evenings - J Watson going to Land Camp at Cedara on 19/7/95.
• Vote of thanks to the Chair.

Closing
The meeting closed at 19:50, after which a delicious supper was enjoyed by all present. Thereafter several members set up telescopes and took advantage of the excellent viewing conditions from the front lawn.

Chairman's Report 1994/95
Ladies and Gentlemen: I remember that, at my first AGM as chairman in July 1988, I commenced my report by confessing to an entirely illogical sense of pride in the fact that my year in the chair had been marked by the appearance in the Smaller Magellanic Cloud of Supernova 1987A. If I have seemed during the year now closing to have been walking a millimetre or so taller, please ascribe it to the fact that I assumed the chair this time round to a veritable cosmic drum-roll as 21 fragments of comet Shoemaker-Levy 9 thundered into Jupiter.

It was that momentous event that provided the impetus for our first viewing session of the year, held at the Girl Guides' campsite near World's View in the hope of observing a spectacular pyrotechnics display as the first fragment struck home. Unfortunately, conditions deteriorated during the course of the evening to the extent that, by the time the anticipated "zero hour" arrived, Jupiter was seen at best sporadically and even then rather hazily owing to a superabundance of water vapour in the atmosphere. Still, I am happy to be able to report that several of our number did indeed see the scarring effects of what we came to call the "Great Jovian Jolt" during private backyard viewing sessions held during the week that followed.

A most pleasing feature of the year is the steady increase in membership that has taken place. The most probable reason for this is thought to be our programme of adult education courses held over the last few years. These would also no doubt account for the high general standard of our new membership in terms of especially of genuine enthusiasm, as reflected by the happy fact that attendance at our monthly meetings has consistently numbered well in excess of 50 per cent of our total membership. Unfortunately, however, the increase in our numbers was offset by the resignation during the year of Les Hunt and Ray Forder - neither through any drop-off in enthusiasm but for genuine personal reasons. We were distressed too when Shiela Dale, one of our staunchest members ever since our inaugural meeting 21 years ago, gave notice of her intention to resign - a decision, happily, which she was subsequently persuaded to reconsider. She did, however, step down from the committee, on which she had served on and off innumerable times during the centre's existence.

During the year it as decided to resurrect our "Project Palomar", aimed at establishing our own observatory. Having spent some years in limbo, the project now seems to be firmly on track with a subcommittee having been formed under the able chairmanship of Mike Christianson. A major advance was made by securing virtual assurance that a corner of the site leased to the Girl Guides Association will be made available to us for the building. We are fortunate too in having attracted to our ranks a professional architect in the person of Roger Clifford, who has already done commendable work in drawing up a preliminary set of plans. Much work lies ahead, though, not the least of it being the clearing of a sizeable tract of real estate, presently stocked with closely spaced gum trees - assuming, of course, that the City Forestry Department will agree to the clearing of those trees several years prior to their scheduled felling date. But no project, least of all one as ambitious and far-sighted as this one, was ever completed by shying clear of every obstacle and we look forward to the future with optimism.

Our monthly meetings have been characterised by a wide variety of interesting topics and activities, a résumé of these being the following:

August: "A pocketful of Galaxies": a slide-supported presentation by John Watson and Tim Chance, held in the main lecture room of the Department of Physics at the local university. This meeting was well attended by university staff and students and gave rise to a gratifying measure of interest amongst the student body which has been reflected repeatedly by the presence of several of their number as subsequent meetings through the year.

September: *Constellation of the Month*: a look at Sagittarius, with members of the committee discussing various aspects of the constellation and some of the objects which it comprises. *Our Wonderful Universe*: a showing of a video tape kindly donated to the centre by our "Foreign Correspondent"' Kerry

Hampson, during a regrettably brief period earlier in the year while home on leave from Miami.

October: *Whistle-stop to the Stars*: a programme of slides during which your chairman took members on an imaginary tour of the cosmos, looking en route at a selection of planets, stars, clusters, nebulae and galaxies.

November: *Stars and Shuttles Forever*: Kerry, now home (we hope permanently) from a year's sojourn in America, entertained us with a most interesting account of her States-side experiences, which included watching the launch of a space shuttle. *No-name Brand Dissertation on Variables*: a fascinating and extremely well informed talk by John Watson on the sundry types of variable stars.

December: Our meeting for this month made way for our traditional *Christmas function*, which this year took the form of a most enjoyable braai at the lovely home of Jan Baxter. Thanks to the vagaries of a superannuated internal combustion engine, I was denied the pleasure of attendance.

February: *Look-around for 1995*: John Watson gave a preview of astronomical phenomena expected during 1995 and Tim Chance followed this with a look-ahead at the space flights scheduled by NASA during the same period. *Spacewatch*: Bianca Lawrence kindly gave us the loan of this excellent video tape from her well stocked library. Owing to its length and the lateness of the hour, it was decided to watch only the first half, leaving the second in abeyance till the next meeting.

March: *Constellation of the Month* - Orion: a look at various aspects of the celestial Hunter, led again by members of the committee. *Spacewatch*: a viewing of the second half of Bianca's tape.

April: *Open Forum on Meteors*: a bring-and-share session, convened by Bianca, at which members took turns in imparting what amounted to an impressive assortment of knowledge on shooting stars. *Constellation of the Month*: your committee yet again gave evidence of their indubitable worth by dispensing information on a prominent sector of the sky, this time the constellation Leo.

May: *The Armillary Sphere*: Diane Grayson gave a most interesting talk on this ancient astronomical device, its history and application. I might mention that I derived especial enjoyment from her contribution, as I had undertaken to build a sphere from plywood to make the demonstration practically possible. I found the project extremely interesting and eminently satisfying, never having laid claim to any but the most rudimentary skill in the field of handicraft.

June: A *viewing session* was held at the home of Veronica and Chris Collingwood, with some 30 members in attendance. The sky was brilliant and the chill of the evening more than compensated for by the warmth and conviviality of the occasion. Many thanks indeed to Chris and Veronica for yet again placing their home at our disposal.

Earlier in this report I made mention of the programme of adult education courses presented over the past few years, I am happy to report that the fourth such course in presently being done by the team of lecturers, comprising John Watson, Tim Chance, Bianca Lawrence and Mike Christianson. Apart from these formal courses, talks are frequently given by our members to schools, Scout and Guide troops and other organisations. Judging by the frequency with which requests are made for such talks and by the comments and questions that ensue, it may safely be stated that they are highly successful and much appreciated. The centre's thanks are due to all those members who give of their time and effort in sharing their knowledge in this way.

In closing, I wish to express my sincere thanks to the members of the committee for their hard work during the past 12 months. In particular I must thank John for has unflagging work as secretary, a post he has held, if memory serves me right, for an unbroken spell of seven years. His minutes have always been of the highest order, business attended to with unimpeachable efficiency and correspondence dealt with immediate dispatch.

My especial thanks are also due to Tim for relieving me of the editorship of our newsletter at a moment when I felt certain that final departure of the last vestige of inspiration was imminent. He has maintained an excellent standard of penmanship and his articles have been notable for a well-nigh perfect blend of humour and informativeness. Moreover, he has done my self-esteem a world of good by qualifying his every reference to the centre chairman with an assortment of adjectives ranging from "intrepid" through "industrious" and "ingenious" to .. wait for it .. "indomitable"!!!

Ladies and gentlemen, I thank you.

(R M Jarmain, Chairman)

PRETORIA CENTRE

Minutes of the Annual General Meeting 1994/95
Christian Brothers College, Silverton, 1995 July 26, 19:00.

Opening and welcome
The chairman, Louis Barendse, opened the meeting and welcomed those present. Apologies were received from Prof W Wargau, Lana Slabbert, Chris Barnard, Dr Jannie Smit and the Esterhuise family.

Minutes of the previous AGM
The minutes of the previous AGM were read. The minutes were proposed as accepted by Neville Young and seconded by Marlene Barendse.

Chairman's report
The chairman, Louis Barendse, read his report for the year.

Treasurer's report
The treasurer, Marianne Barendse, read the financial statement for the year. The acceptance of the accounts was proposed by Neville Young and seconded by Rudi Schneider. After her report, a vote of thanks from the memberships was made to Marianne for all her efforts.

Jack Bennett Award
A citation proposing Michael Poll for the Jack Bennett award was read by Mike Haslam. Michael received his award amidst enthusiastic applause from the members and replied with a short speech of thanks.

Presentation to Roy Smith
The chairman made a vote of thanks to Roy Smith who donated a telescope to the Centre during the year. A book was presented to Roy, with the appreciation of the Centre.

Election of committee
The following were proposed for committee and were elected on a proposal by Blackie Swart, seconded by Peter Prinsloo.

Chairman:	Louis Barendse
Vice Chairman:	Michael Poll
Centre Rep:	Michael Poll
Secretary:	Mike Haslam
Treasurer:	Marianne Barendse
Dir. of observations:	Tim Cooper
Curator of Instruments:	Fanie Hartmann
Assistant Curator:	Mauritz Geyser
Newsletter editor:	Neville Young
Librarian:	Neville Young
P.R.O.:	Lorna Higgs
Additional members:	Irma Uytenbogaardt, Walter Wargau, Rudi Schneider, Frikkie le Roux, Tony Viljoen.

Any other business
• Due to economic circumstances, the subscriptions of members may have to be raised. Meanwhile, the subs for families have been changed to provide for a single payment to cover all additional members of a family beyond the spouses at a single price of R 10.
• A vote of thanks to the committee of 94/95 was proposed from the floor.
• Peter Prinsloo asked that all members wear name tags to identify themselves. This has already been discussed in committee and is to be implemented.
• It was proposed that an objective be set for the practical evenings, such as finding Pluto, etc. It was decided that the project to be done would be discussed at each month's meeting.
• It was asked if a Messier Marathon could be done next year. Peter Prinsloo volunteered to co-ordinate activities for the marathon.
• Danie Hartmann asked if there were any requirements for the observatory. None were proposed. Equipment purchases will be decided upon in committee according to the needs of the Centre.

There was no further business raised. Following a call for the newly elected committee to meet on Monday, 1995 July 31 at Louis' house, the AGM closed at 19:43. The meeting then continued with a normal monthly program.

(Mike Haslam, Hon Secretary)

Chairman's report - July 1995
We can look back on a very active and successful year. Membership increased to 102 members with an average monthly meeting attendance of 43. The committee met 5 times during the year.

"Beginner's Corner" over the year has been on

"What you can still learn about the moon" - Michael Poll, "The Foucalt pendulum" - Neville Young, "Basics on building a telescope" - Louis Barendse, "Mars" - Mike Haslam, "Star magnitudes" - Neville Young, "Foucalt test" - Louis Barendse, "All about star charts" - Michael Poll, "CCD camera" - Mauritz Geyser, and "Southern night skies" - Tony Viljoen.

"What's Up" was presented during the year by Louis Barendse, Fanie Hartman, Mike Haslam, Michael Poll and Lorna Higgs.

"Main Topics" have been, *Video of the Universe* - from UNISA, *Death of Stars* - Lorna Higgs, *The internal absorption in spiral galaxies* - Dr Barbara Cunow, a visitor from Germany. Jim Knight from ASSA's Solar Section discussed the November eclipse, Adie Viljoen, a centre member, talked about his visit to Kennedy Space Centre, Louis Barendse reported on his trip to the Cape for the solar eclipse, Dr Jannie Smits, the centre's prolific variable star observer, spoke about his observations during 1994, Nigel Bishop from UNISA gave a talk on general relativity theory, and Derck Smits, a radio astronomer from HartRAO, discussed novae in general.

"Practical/Social" evenings have been mainly at the Centre's Observatory and have been well attended. We old had two evenings away from the centre, and our thanks go to the Ehebauers and Richard Wade for their hospitality.

August Izinkhanyezi was held in Mooi River and was attended by 9 members from the Pretoria centre, with some excellent viewing conditions.

October saw the start of the telescope building classes. With 28 members registering to build, most of the builders are now at the final grinding stages, and some have already started polishing.

November Louis Barendse went to Cape Town for the solar eclipse. Louis went to sea to record the event, while Marianne stayed on dry land and took pictures from Melkbosstrand.

December We had the year-end function at the home of Louis and Marianne and a good time was had by all.

February We went on an astronomy weekend to the Doornpoort experimental farm. This was attended by 42 people.

March We had a visit from Max and Wilhelmina Gardiner from Australia. Max is the secretary of an astronomy club in Sydney.

During *April* Louis Barendse spent two weeks teaching guides and brownies the constellations, etc. for their astronomy badge. All the pupils passed their test. Our April practical was attended by children from Dalveira Guides, St Andrew's Ranger Guides, and North Ridge Guides as well as pupils from the Clapham High School Science Club.

In *May* we had our practical in Tiegerspoort which was attended by 60 people of all ages. We had clear skies for some good viewing.

In *July* we had a visit from Peter Jenniskens of NASA, to observe the kappa Pavonids meteor shower. Two observing teams, organised by Tim Cooper, were sent out on two nights. The shower was not seen but many sporadic meteor were.

Some members attended a talk by prof Strauss at the Lynnwood Ridge Primary School, and the centre members set up displays and telescopes for everyone to view. UNISA had two viewing evenings for their staff and while prof Wargau, Dr Cunow and Derck Smits attended to the visitors inside the observatory, Mike Haslam and Louis Barendse showed the guests Jupiter and the Jewel Box. During the 1994/95 year we also had talks and viewing sessions with St Hilda's Church, Elim Church, Boys High Science Club, Sagewood Education Centre and the winter school for gifted children.

I would like to thank Neville Young for his input as editor of our monthly newsletter. Over the past few months he has not been able to compile the newsletter because of studies but Marianne has kindly assisted Neville by being the scribe since March 1995.

A special thanks from the Pretoria Centre goes to Mr Roy Smith, for the generous donation in the form of a Calver telescope and an apogee telescope. We hope to have these all housed and set up in the New Year.

In conclusion I would like to thank each and every member of the Centre for their interest and support to the centre over the last year.

The recipient of the Jack Bennett Award for 1995.

(Louis Barendse, Chairman)

Citation: Jack Bennett Award 1996
Michael Poll

At the Annual General Meeting, we make a presentation of a telescope owned by Jack Bennett, once a member of the Pretoria Centre, whose name lives on in the comets he found using this very instrument.

CENTRE REPORTS

The Jack Bennett award is made to a member of our Centre in recognition not only of contributions made to astronomy in general but also those made to the Pretoria Centre and its membership.

Nominations made this year proposed that a very active member of our Centre be given this award. This member has given freely of his time to help people find their way around the night sky. Members of the public and astronomy hobbyists have come to respect his in-depth knowledge of where and what is twinkling in the night time sky.

I mentioned the night time sky, but even the daytime sky does not elude his attention, for during public exhibitions by our Centre he is to be seen showing solar projections of the sun to enchanted visitors and answering questions with a knowledge and a zeal that leaves many of us gasping.

Our nominee has been a member of a number of astronomy societies, overseas and in Africa. His interest has spanned many years, and over the years he has given back to astronomy, to our Centre, and especially our committee, his help, knowledge and guidance which has proved to invaluable.

There is thus no hesitation in announcing that the Jack Bennett Award for 1996 is being given to MICHAEL POLL.

BRIEFLY NOTED

[I received a letter quite a while back speaking out against astrology, and in preparation for publication, I regret that I mislaid it – would the kind reader who submitted it, please do so again?

In the mean while, the following astrological predictions have come to hand, and I take pleasure in sharing them with our members. I will cheerfully ignore any disapproving mutters from out astrologically challenged colleagues. Forewarned is forearmed – read on — Ed.]

> Warning: the following paragraphs contains words, imagery and/or causal attributions that may upset sensitive readers.

Aquarius (20 Jan - 18 Feb) You have an inventive mind and are inclined to be progressive. You lie a great deal. On the other hand, you are inclined to be careless and impractical, causing you to make the same mistakes over and over again. People think you are stupid.

Pisces (19 Feb - 20 Mar) You have a vivid imagination and often think you are being followed by the CIA or FBI. You have minor influence over your associates, and people resent you for flaunting your power. You lack confidence and are generally a coward. Pisces people do terrible things to small animals.

Aries (21 Mar - 19 Apr) You are the pioneer type and hold most people in contempt. You are quick tempered, impatient, and scornful of advice. You are not very nice.

Taurus (20 Apr - 20 May) You are practical and persistent. You have a dogged determination and work like hell. Most people think you are stubborn and bullheaded. You are a Communist.

Gemini (21 May - 20 Jun) You are a quick and intelligent thinker. Most people like you, as you are bisexual. However, you are inclined to expect too much for too little. In other words, you are cheap. Geminis are known for committing incest.

Cancer (21 Jun - 22 Jul) You are sympathetic and understanding to other people's problems. They think you are a sucker. You are always putting things off; that's why you'll never make anything of yourself. Most welfare recipients are Cancer people.

Leo (23 Jul - 22 Aug) You consider yourself a born leader. Others think you are just pushy. Most Leos are bullies. You are vain and dislike honest criticism. Your arrogance is disgusting. Leo people are thieves.

Virgo (23 Aug - 22 Sep) You are the logical type and hate disorder. This nit-picking is sickening to your friends. You are cold and unemotional and sometimes fall asleep while making love. Virgos make good bus drivers.

Libra (23 Sep - 22 Oct) You are the artistic type and have a difficult time with reality. If you are a man, you are more than likely gay. Chances for employment and monetary gain are excellent. Most Libra women are good prostitutes. All Libras die of venereal disease.

Scorpio (23 Oct - 21 Nov) You are shrewd in business and cannot be trusted. You will achieve the pinnacle of success because of your total lack of ethics. Most Scorpios are murdered.

Sagittarius (22 Nov - 21 Dec) You are optimistic and enthusiastic. You have a reckless tendency to rely on luck, since you lack talent. The majority of Sagittarians are drunks or dopers. People laugh at you a great deal.

Capricorn (22 Dec - 19 Jan) You are conservative and afraid of taking risks. You don't do much of anything; you are lazy. There has never been a Capricorn of any importance. Capricorns should avoid standing still for too long, as they take root and become trees.

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1996

MINUTES OF THE AGM

Minutes of the Annual General Meeting held at the Johannesburg Centre on 1996 July 10.

1. Welcome
Professor Christo Raubenheimer welcomed members to the Annual General Meeting and declared the proceedings open at 21h14.

2. Apologies
Apologies were received from F G Knight.

3. Minutes of the previous AGM
The minutes of the previous AGM were published in *MNASSA, 54 (11&12)*. The following correction is required:

> "The list of office bearers as published is incorrect. Mr P van Blommestein was elected as Member of Council. The Centre Representatives and Alternates were not elected at the AGM."

The above correction was proposed by Brian Fraser and seconded by Melvyn Hannibal.

4. Matters arising
There were no matters arising from the minutes.

5. Report of Council
The Report of Council was read out. It was proposed by Danie Overbeek and seconded by Tom Budge that the report be accepted.

6. Reports of the Observing Sections
The report of the Comet and Meteor Section was read out by Tim Cooper: the acceptance thereof was proposed by Constant Volschenk and seconded by Gil Jacobs.

The report of the Computer Section was read out by Tony Hilton: this was proposed by dr. Derck Smits and seconded by Peter van Laun.

The report of the Deep Sky Observing Section was read out by prof Raubenheimer on behalf of Auke Slotegraaf: proposed by Melvyn Hannibal and seconded by Louis Barendse.

Note that the report of the Historical Section was not received.

The report of the Planetary Occultation Section was read out by Danie Overbeek: it was proposed by Chris Stewart and seconded by Tim Cooper that it be accepted,

The report of the Solar Section was not received.

The report of the Variable Star Section was read out by Danie Overbeek on behalf of Jan Hers. Proposed by dr. Derck Smits and seconded by Tony Hilton.

7. Financial report
The Financial report was read out by Greg Corbett. This report was accepted after being proposed by Tom Budge and seconded by Constant Volschenk.

8. ASSA Endowment Trust
This report was read out by Greg Corbett and was accepted after being proposed by Tom Budge and seconded by Constant Volschenk.

9. Election of Honorary Auditor
It was proposed by Brian Skinner and seconded by Melvyn Hannibal that Mr R Glass of Zeller Karro & Associates be elected as Honorary Auditor.

10. Election of office bearers
The following, having indicated their willingness to stand, were unanimously elected (proposed by Cliff Turk, seconded by C D Gray):

President:	A Hilton
Vice Presidents:	Dr R A Stobie M D Overbeek Prof B C Raubenheimer
Members of Council:	Dr D Smits P von Blommestein T W E Budge T P Cooper
Hon. Secretary:	B Skinner
Hon. Treasurer:	C D Gray

11. Urgent business
Professor Raubenheimer announced that Danie Overbeek had been the recipient of the Amateur Achievement Award from the Astronomical Society of the Pacific: this award was presented by prof Raubenheimer on their behalf at the AGM.

Danie Overbeek commented:

"The award is largely due to the persistent monitoring of cataclysmic variable stars by myself although quite a few South Africans should really share the honour, either for their CV observing or for helping me with encouraging words or for assistance with data processing. My son Andy is especially deserving of thanks in this respect.

In view of the fact that cataclysmic variables are involved prominently, I have used nearly half of the prize money to purchase Brian Warner's definitive book on cataclysmic variables. I wish to donate the book to the Society so that it can serve to help others in their CV work and to encourage newcomers in the field to get started."

The following message was sent by Danie to the ASP on receipt of their award:

"It is a tremendous honour to be chosen to join the illustrious band of Amateur Achievement Award recipients. I have met quite a number of them and have counted a few of them amongst my personal friends. I have always been impressed by their dedication and devotion to the cause of amateur astronomy.

In these days of hi-tech, large budget astronomy, it inspires and encourages amateurs when members of their ranks, who are not necessarily advanced in hi-tech methods, are recognised in such a way by your prestigious Society.

By making these awards, you demonstrate that dogged perseverance could be just as useful to Science as the employment of expensive equipment and the following of the latest trends.

For your continued encouragement of amateur efforts, I am most grateful to the Astronomical Society of the Pacific.

With repeated thanks for your wonderful gesture."

12. Presidential address

Professor Raubenheimer presented his Presidential Address.

13. Closing

The meeting was declared closed at 22h20.

REPORT OF COUNCIL 1995 - 1996

Council met on four occasions since the last AGM with an average of 11 persons present at each meeting.

1. Membership

Total membership was 411 as at 1996 July 1 compared with 455 year earlier. To date, 51 of these members have opted for the reduced subscription. The reduced numbers can most probably be ascribed to the far higher cost of our subscriptions.

2. Finance

Our Hon Treasurer, Mr Colin Gray, is thanked for his efforts again this year. His efforts have been bedevilled by inflation due mainly to the Rand/Dollar exchange rate. The Hon Treasurer thanks members for their early subscription renewals. Thanks also to the numerous members who have once again made donations to the ASSA. These will be acknowledged in *MNASSA* in due course.

3. Business Manager

Council appointed Mr Cliff Turk as business manager this year. We have computerised out membership records and this has improved the efficiency of dealing with membership queries and *MNASSA* subscription renewals.

All members receiving *Sky & Telescope* have a subscription number. By quoting this number, subscription queries can now be addressed directly with Sky & Telescope on the Internet or via either the Hon Secretary of Business Manager.

4. *MNASSA*

Council wishes to thank the Editor, Mr Auke Slotegraaf, for providing members with an informative publication that keeps them up to date with developments in astronomy.

The Bloemfontein Symposium Proceedings made up a large part of the 1996 volume. Thanks also to

the Bloemfontein Centre for subsidising the publication of these Proceedings.

5. Annual *Handbook*

Council expresses sincere thanks to Miss Pat Booth for her production of the Annual Handbook. Miss Booth is assisted by the Directors of the observing sections who provide valuable information for all amateur observers.

6. Acknowledgements

Council wishes to thank the following persons or institutions for assistance during the past year:

Dr Robert Stobie, Director of SAAO, for the use of meeting facilities at SAAO

Special thanks to the staff of SAAO for forwarding post to me at UCT and Penny Dobie of the UCT Astronomy Dept. for assisting with Society publications.

Council extends their appreciation to the Directors of the Observing Sections for collating astronomical research by amateur astronomers.

The Centres who assisted the professional astronomical fraternity with public viewing nights at the different observatories are commended for their efforts.

7. Finally

I wish to thank all who contributed to the work of the Society this year and apologise for not being able to mention them by name.

(Brian Skinner, Hon Secretary)

ASSA ENDOWMENT TRUST (ASSET)

Trustees Report to the 1996 AGM of ASSA

The Trust regrets that it appears from the minutes of the 1995 AGM of ASSA that its report for the year ended 1994 went missing somewhere. Thus the accounts for the two years 1994 and 1995 are appended hereto.

Donations received during 1994 were inflated by late receipt of some of those made during 1993 (via ASSA Treasurer) and those for the current year are satisfactory. Income has increased form 1994 to 1995 even though a large amount of money was held in the savings account instead of being placed on higher earning investments. This was because it was foreseen that ASSA would have a cash shortage at the end of the year for which the Trust was able to provide a R 5000 loan. This loan was repaid in full on 1996 January 6.

The Trust has continued to make its annual grant of R 1000 to the Society and looks forward to being able to increase the amount in the future. It is hoped that there will be an increase in donations to the Trust which is now into its 20th year of building funds to support astronomy in southern Africa.

Donations to the Trust are retained in a capital account and can never be disposed of unless the Trust is wound up. The income earned by the donations is the source of the Trust's distributable reserve from which grants are made.

Further information regarding the Trust can be found in "Centrepiece" in *MNASSA* for October 1977 under the title "What is Asset?"

(Cliff Turk, Secretary)

"The purpose of the Trust is to establish a fund of capital form which the interest earned can be used as a permanent benefit to the Astronomical Society of Southern Africa. The capital itself cannot be spent. ASSET is appealing for donations from all members of the Society, and its audited accounts will be tabled at the Society's AGM every year. The Trust is legally constituted and is registered with the Master of the Supreme Court in Cape Town ... A donation to ASSET will be of permanent benefit to Astronomy in Southern Africa through the Society."

"Unexpected increases in expenditure often strain the Society's finances. Recent examples are the devaluation of the Rand which caused a considerable increase in the cost of Sky & Telescope ... In such circumstances a healthy Trust would be able to give much needed assistance immediately."

"It is hoped that all members will help the Trustees build the 'ASSA Endowment Trust' into a secure financial backing for the Society."

Cliff Turk (1977) What is ASSET? *MNASSA*, *36(9&10)*, Centrepiece

ASSET BALANCE SHEET AS AT 31ST DECEMBER, 1994

1993		1994
	Trust Capital:	
8 978.54	Balance at 31st December 1993	8 990.54
12.0	Donations received during the year	1 260.50
R 8 990.54		R 10 251.04
	Distributable Reserve:	
12 764.40	Balance of Income and Expenditure Account	14 444.56
R 21 754.94		R 24 695.60
	Represented by:	
	Investments:	
1 700.00	United Bank Indef Period Deposits	1 700.00
18 000.00	United Bank Fixed Deposits	20 000.00
660.00	ABSA Bank Ltd. Equity Shares (at cost)	660.00
	Savings Account:	
1 394.94	United Bank	2 335.60
R 21 754.94		R 24 695.60

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR TO 31ST DECEMBER 1994

	Income:		
2 641.16	Dividends and interest received		2 680.61
	Deduct Expenses:		
1.30	Bank service charges	0.45	
1 000.00	Grant to ASSA	1 000.00	1 000.45
R 1 639.86	Excess of Income for the year		R 1 680.16
11 124.54	Excess of Income from previous year		R 12 764.40
R 12 764.40			R 14 444.56

Notes:

United Indef Period Deposits:
- Account No. 4656-7102 — R 1 700.00

United Fixed Deposits:
- 13.30% p.a. maturing 8 Oct 98 — R 4 000.00
- 14.25% p.a. maturing 8 Oct 98 — R 8 000.00
- 11.45% p.a. maturing 29 Apr 99 — R 8 000.00

ABSA Bank Ltd. Equity Shares (cost) — R 660.00
(Market value R 3 828.00)

R 22 360.00

ASSET BALANCE SHEET AS AT 31ST DECEMBER, 1995

1994		
	Trust Capital:	
8 990.54	Balance at 31st December 1994	10 251.04
1 260.50	Donations received during the year	535.00
R 10 251.04		R 10 786.04
	Distributable Reserve:	
14 444.56	Balance of Income and Expenditure Account	16 358.35
R 24 695.60		R 27 144.39
	Represented by:	
	Investments:	
1 700.00	United Bank Indef Period Deposits	Nil
20 000.00	United Bank Fixed Deposits	20 000.00
660.00	ABSA Bank Ltd. Equity Shares (at cost)	760.00
Nil	Loan to ASSA	5 000.00
	Savings Account:	
2 335.60	United Bank	1 384.39
R 24 695.60		R 27 144.39

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR TO 31ST DECEMBER 1995

	Income:		
2 680.61	Dividends and interest received		2 913.94
	Deduct Expenses:		
	Bank service charges	0.15	
1 000.45	Grant to ASSA	1 000.00	1 000.15
R 1 680.16	Excess of Income for the year		R 1 913.79
12 764.40	Excess of Income from previous year		14 444.56
R 14 444.56			R 16 358.35

Notes:

United Fixed Deposits:

13.30% p.a. maturing 8 Oct 98	R 4 000.00
14.25% p.a. maturing 8 Oct 98	R 8 000.00
11.45% p.a. maturing 29 Apr 99	R 8 000.00
ABSA Bank Ltd. Equity Shares (cost)	R 760.00
(Market value R 6 929.00)	
	R 20 760.00

SECTION REPORTS

COMET AND METEOR SECTION
T. P. Cooper

The year 1995 proved to be a bumper one for the Section. Several bright comets made appearances, and the discovery of comet Hale-Bopp has caught the attention of the astronomical community in no uncertain manner. Several meteor showers were well observed, though the prolific outburst of the alpha Monocerotids in November was missed due to country-wide cloud.

I now provide a summary of observations made during 1995. Observations of meteor showers were sent to the International Meteor Organisation (IMO) and reports of comets were sent to the International Comet Quarterly (ICQ).

Table 1. Summary of meteor shower observations

Observer	Total hours	Shower	Hours obs.
Cooper T P	33.8	Pyxids	1.0
		π Puppids	4.0
		η Aquarids	12.4
		κ Pavonids	6.8
		α Capricornids	5.0
		β Hydrusids	1.0
		Orionids	3.6
Mitchell H	10.3	η Aquarids	10.3
Jenniskens P	6.0	κ Pavonids	6.0
Stanley Adams S	6.0	κ Pavonids	6.0
Robinson N	5.0	κ Pavonids	5.0
Poll M	3.0	Orionids	3.0
Viljoen A	3.0	κ Pavonids	3.0
Viljoen L	3.0	κ Pavonids	3.0
Geyser M	2.5	Orionids	2.5
v.Blommestein P	2.3	unspecified	2.3
Kriek N	1.3	η Aquarids	1.3
Overbeek D	1.0	κ Pavonids	1.0
Total	77.2		

1. Meteor Showers

1995 saw a gratifying increase in interest in meteor showers. Seven showers were observed by 12 observers. The observations are summarised in Table 1. Specific shower details are summarised below:

pi Puppids

Cooper observed this shower, which shows periodic outbursts, the last being in 1977 and 1982. In 1995 the shower again proved to be inactive.

eta Aquarids

At the Third ASSA Symposium held in Bloemfontein, Cooper presented a summary of activity of this shower based on southern hemisphere observations from 1986 to 1995. These observations included his own and those of Nico Kriek, Harry Mitchell and Colin Henshaw from southern Africa. The results indicated a maximum activity around May 4 with ZHR typically 60 meteors per hour.

kappa Pavonids

In July we were fortuante to host astrophysicist Peter Jenniskens from NASA, who predicted a possible outburst of this shower, last seen in 1986. The Pretoria Centre stationed two teams at Hartebeesthoek and Tiegerpoort each with two camera batteries and visual observers. The predicted outbursts did not occur, but both teams obtained successful photos and plots of the July sporadic activity. The Section wishes to express gratitude to dr. David Block, through whom the contact with dr. Jenniskens was made.

alpha Capricornids

This shower, well renowned for its slow, bright yellow meteors, showed higher than normal activity in 1995. Enhanced rates on July 29/30 were observed in Europe, USA and by Tim Cooper in South Africa. The rates normally show a mere trickle, but on this night the ZHR was as high as 15/hour. Full moon will hamper any follow up observations in 1996.

Orionids
The Pretoria Centre observed this shower as part of its October Practical meeting, with six observers staying on until the early morning, and three observers making hourly counts. A generated rate profile based on observations by Mauritz Geyser, Michael Poll and Tim Cooper indicated a ZHR of about 40/hour just before morning twilight on October 21. Other mornings were clouded out.

The year ended cloudy and wet, washing out the outbursts of the alpha Monocerotids and Leonids, and the Geminids.

Fireballs
Six fireball reports were received. Details of the observations are given in Table 2. The event on January 4 was observed by a Natal farmer during daylight, reporting a gas-blue flame and one second trail. The duration was about 2 seconds and there was no associated sound. Four days later Trevor Gould reported a fireball of 5 second duration which left a white smoky trail which lasted about 2 seconds. The object fragmented. On February 8, John van Blommestein observed a brightly coloured object of 2-3 second duration which fragmented into about 10 pieces. Orange, red and purple were reported. Peter van Blommestein witnessed a similar event on April 10, emanating from Orion. Of 4 second duration, the white fireball broke into three pieces. The event reported by Sonia Enke on June 4 was witnessed by two visiting German astronomers, who described the colours as green and red, as it moved from Vela to Pavo. Finally, Brian Skinner and Cliff Turk observed a silver/white fireball from the Cederberg on October 21. The duration was 3-4 seconds.

2. Comets
Seven comets were observed by the section in 195. Considerable interest has been aroused by comet Hale-Bopp, and by year end three comets reached brighter than mag 6.

Comet Takamizawa (C/1994 J2), Clark (71P) and d'Arrest (6P)
These comets were CCD imaged by Andre van Staden. Comet Takamizawa was imaged during January and February, in the latter case when the comet was about magnitude 15. Comet Clark was imaged in July showing a 5' tail and several curved jets within the coma. Comet d'Arrest was imaged in October at about magnitude 10.

Comet Hale-Bopp (C.1995 O1)
This comet was well observed visually by Mike Begbie and Tim Cooper, who both made magnitude estimates and estimates of comatic size and condensations, and imaged by Andre van Staden, Mauritz Geyser and Tony Viljoen. The comet brightened slowly to about mag 9.8 before entering the solar glare in November.

Comet Bradfield (C/1995 Q1)
Notification of the discovery of this comet was received from Patricia Whitelock of SAAO on August 18. Nearly the entire sub-continent was blanketed in cloud and none of the regular observers could secure any early measurements. Louis Barendse, Fanie Hartmann and Tim Cooper reported visual observations for a few days with the comet at around mag 5.5, before the comet headed into the solar glare. After perihelion, the comet remained inaccessible for southern observers.

Table 2. Details of reported fireballs

Date of fireball	Name of reporter	mag_v	Time UT	Start	End
1995 Jan 4	Stuart McLean	?	~08h00	n/a	n/a
1995 Jan 8	Trevor Gould	-6	19h55	n/a	n/a
1995 Feb 8	John v.Blomstn	-4	18h43	n/a	n/a
1995 Apr 10	Peter v.Blomstn	-4	18h39	n/a	n/a
1995 Jun 4	Sonia Enke	-6	21h17	20h20, -57°	08h50, -56°
1995 Oct 21	Brian Skinner	-3	21h28	22h30, 25°	20h15, 35°

Comet de Vico (122P)
Tim Cooper reported the only visual observations of this recovered comet, which reached mag 5 in October.

Comet Schwassmann-Wachmann 3 (73P)
This comet underwent an outburst in September, and became some 7 magnitude brighter than predicted. Jannie Smit was probably the first to record it visually on October 3 when it passed though one of his variable star fields.

The comet was extensively observed visually with report by Tim Cooper, Madga Streicher, Danie Overbeek, Brian Skinner and Peter van Blommestein. Dozens of CCD images, some of exceptional quality, were made by Andre van Staden and Mauritz Geyser.

3. Conclusion
The year ended on a very wet and cloudy note, such that very few observations were possible in the last three months. Despite this fact, there was a most satisfying return of observations on seven meteor showers, six fireballs and seven comets. I would like to thank those members who contributed observations for their efforts in 1995.

COMPUTING SECTION
A. S. Hilton

This section is now 9 years old and is taking a new look with regard to information transfer and assistance to interested ASSA members in that the Internet is being used. The computing section home page may be viewed at the following address:

www.icon.co.za/~hilton

A new catalogue of software available from the director has been produced and may be ordered by post, fax, email or voice mail as follows:

Post:	PO Box 68846, Bryanston, 2021
Fax:	620 6624
email:	hilton@icon.co.za
Beltel mail:	603 460
Phone no:	(011) 620 6513 (voice mail)
Car phone:	083 377 0616 (answering machine)

During this coming year, I would be requesting all members to respond to a questionnaire in order to update this section's database with email addresses, etc.

Finally, I would like to thank all of those who have assisted the section, especially my son John Hilton, who developed the Computing Section home page on the Internet. He would be happy to assist others in developing customised home pages.

DEEP-SKY OBSERVING SECTION
A. Slotegraaf

In an attempt to encourage deep-sky observing, a catalogue of comet-like objects discovered by the late Jack Bennett is distributed by the section to members and interested parties.

To increase awareness of the Bennett list – a southern version of the Messier list – an article was written for the *Southern Sky* magazine, an Australian publication. The article, which appeared in the May-June 1995 issue, elicited good response, so that the section is now in the rather odd position of – apparently – having more members outside the ASSA contributing observations, than is the case locally.

The Bennett list is also available on the Internet; temporarily from

ftp://ftp.seds.org/incoming

or from links reachable from the URL

http://www.seds.org/~spider/.

Work continues on upgrading the existing observing manual; the assistance of M Brazelle is gratefully acknowledged.

Two deep-sky reviews were published and sent to interested members; irregular *Nightfall* columns appeared in *MNASSA*, discussing local and international contributions.

ASSA members Brazelle, Brown, Finlay and Volschenk are thanked for their contributions.

Correspondence with section members in general has been regrettably low, in great part due to increasing demands on the Director's available time. Anyone who is interested in taking over the running of the section is urged to contact the director at PO Box 608, Stellenbosch, 7599.

OCCULTATION SECTIONS
M. D. Overbeek

1. Planetary Occultations.

A number of appulses and some dubious occultations were reported. A CCD camera with computer interface was used for the first time. None of the events was suitable for monitoring with the Edenvale photometer. The following are thanked for their always welcome reports: T Cooper, F de Jager, Sonja Enke, B Fraser, M Geyser, T Lloyd Evans, H Lund, J Smit, T Turner, C Turk and P van Blommestein.

#1 Jan 17, PPM 122559 by 654 Zelinda: Cloud reported from Edenvale, Fish Hoek, Johannesburg, Newlands, Pretoria and Vanderbijlpark.

#2 Feb 02, PPM 193294 by 764 Gedania: Misses reported by T Cooper in Benoni, T Turner in Fish Hoek, D Overbeek in Edenvale, T Lloyd Evans in Rondebosch and F de Jager in Vanderbijlpark. Pretoria had cloud.

#3 Feb 06, DM+18 2290 by 257 Silesia: Cloud reported from Benoni, Edenvale, Fish Hoek, Johannesburg, Pretoria and Vanderbijlpark.

#4 Cancelled.

#5 Feb 19, PPM 161072 by 593 Titania: Cloud reported from Edenvale, Fish Hoek and Johannesburg.

#6 Cancelled.

#7 Mar 5, PPM 100205 by 791 Ani: Misses reported by T Cooper in Bredell, D Overbeek in Edenvale, H Lund in Johannesburg and J Smit in Pretoria.

#8 Mar 10, DM-26 2824 by 241 Germania: Cloud reported from Bredell, Edenvale, Fish Hoek, Johannesburg, Pretoria and Simon's Town.

#9 Mar 19, DM-24 3743 by 23 Thalia: F de Jager reported a questionable disappearance probably due to dew, in Piquetberg and J Smit reported a miss between cloud. Fish Hoek and Simon's Town had cloud.

#10 Apr 2, DM-36 2563 by 324 Bambergia: Misses reported by T Turner in Fish Hoek, H Lund in Johannesburg, T Lloyd Evans in Rondebosch and F de Jager in Vanderbijlpark. Simon's Town had cloud.

#11 Apr 4, PPM 157429 by 35 Leukothea: Miss reported by H Lund in Johannesburg. Fish Hoek and Simon's Town had cloud.

#12 May 1, PPM 293470 by 115 Thyra: Cloud reported from Bredell, Edenvale, Johannesburg, Pretoria and Simon's Town.

#13 May 3, 5223 00024 by 18 Melpomene: J Smit in Pretoria reported an appulse at approximately the right time. In Edenvale D Overbeek had a dubious miss. Simon's Town had cloud.

#14 May 26, DM-06 3827 by 74 Galatea: Misses reported by T Turner in Fish Hoek, T Lloyd Evans in Rondebosch, J Smit in Pretoria and F de Jager in Vanderbijlpark. Johannesburg and Simon's Town had cloud.

#15 May 27, PPM 265607 by 271 Penthesilia: Misses reported by T Turner in Fish Hoek who only observed from UT 0208 onwards, by H Lund in Johannesburg, T Lloyd Evans in Rondebosch and J Smit in Pretoria.

#16 Jun 22, DM-11 5402 by 704 Interamnia: In Bredell, T Cooper had a miss D Overbeek in Edenvale started a minute after the predicted time and observed a dubious appulse a few minutes late. Fish Hoek and Simon's Town had cloud.

#17 Jun 28, DM-26 2791 by 535 Montague: In Edenvale, D Overbeek had a miss. Simon's Town had cloud.

#18 Jul 8, PPM 160114 by 618 Elfriede: From Bredell, T Cooper reported a miss as did D Overbeek from Edenvale. Fish Hoek had cloud.

#19 Jul 13, DM-23 2551 by 241 Germania: From Pretoria, J Smit reported an appulse at approximately the right time. Fish Hoek had cloud.

#20 Jul 23, PPM 297783 by 94 Aurora: Misses reported by T Turner in Fish Hoek, D Overbeek in Edenvale, H Lund in Johannesburg, J Smit in Pretoria, F de Jager in Vanderbijlpark and Sonja Enke in Windhoek.

#21 Jul 23, 1440 01954 by 145 Pholus: The star's faintness and low altitude defeated five observers.

#22 Jul 29, PPM 238493 by 492 Gismonda: In Edenvale D Overbeek saw two momentary disappearances immediately after UT 00 47 21.4, possibly due to atmospheric causes. From Erasmia, M Geyser reported that he had observed a miss, using a CCD camera. The time resolution was too coarse to give meaningful results but it should be noted that CCD cameras can provide valuable last minute astrometry. In Johannesburg, H Lund observed a miss. Simon's Town and Fish Hoek had cloud.

#22A Aug 11, GSC 6826 by 1992 QBI: Misses were observed by T Cooper in Bredell and D Overbeek in

Edenvale. There was not enough time to distribute a general notice to observers.

#23 Aug 16, 6384 00037 by 121 Hermione: In Edenvale, D Overbeek observed an appulse about three minutes early. Several observers received their notices too late, by courtesy of the SA Postal Services. Simon's Town had cloud.

#24 Aug 16, DM-06 4393 by 357 Ninina: Misses were observed by T Cooper in Bredell and F de Jager in Vanderbijlpark. Simon's Town had cloud.

#25 Aug 21, DM+20 0505 by 248 Lameia: A miss was observed by H Lund in Johannesburg and a miss after UT 0303 was observed by D Overbeek in Edenvale.

#26 Aug 23, Lick5 1406 by 10 Hygiea: Appulses a few minutes early were observed by T Cooper in Bredell, D Overbeek in Edenvale and J Smit in Pretoria. In Johannesburg, H Lund observed a miss. In Vanderbijlpark F de Jager observed from UT 2018 and observed a miss.

#27 Aug 26, DM-17 6704 by 166 Rhodope: Cloud was reported from Bredell, Edenvale, Pretoria and Vanderbijlpark.

#28 Aug 31, PPM 203264 by 983 Gunila: In Edenvale, Johannesburg and Pretoria, D Overbeek, B Fraser and J Smit observed through inter- mittent cloud and saw no occultation. Bredell had cloud.

#29 Sep 2, PPM 208223 by 99 Dike: In Edenvale and Windhoek, D Overbeek and Sonja Enke had misses.

#30 Sep 2, PPM 237570 by 173 Ino: In Edenvale and Pretoria, D Overbeek and J Smit observed an appulse several minutes early.

#31 Sep 19, PPM 20740 by 83 Beatrix: In Johannesburg and Pretoria H Lund and J Smit obseved misses.

#32 Nov 6, Lick5 3795 by 210 Isabella: Cloud was reported from Bredell, Edenvale, Fish Hoek, Johannesburg and Vanderbijlpark.

#33 Dec 20, PPM 226526 by 375 Ursula: In Bredell, T Cooper observed a miss Vanderbijlpark had cloud.

2. Grazing Occultations

For many years, predictions of grazes have been produced by ASSA members using data supplied by IOTA. Regional predictions are put on diskettes which are sent to various Centres. Often, this work has been tedious and frustrating, due to continual changes introduced by IOTA. My thanks go to all the members involved but especially to Brian Fraser who has produced predictions for the past five years with his usual quiet enthusiasm.

The Natal Midlands Centre organised an expedition to observe the graze of NZC 2497 on 1995 30 23. Cloud spoiled the attempt.

The Pretoria Centre, assisted by Johannesburg Centre members observed the graze of SAO 145382 at Pyramid. Seven stations were manned but only the northernmost two stations obtained significant timings. The apparently excessive north shift of the track has been reported to IOTA.

Stations: 7

Consistent Observations: 4

Observers: L Barendse, T Cooper (Leader), H Homer, H Lund, D Overbeek, M Pohl, P Prinsloo, J Ryn Zeevardt.

The Cape Centre attempted the graze of ZC 1271 on 1995-11-14. Due to communications problems, the team was unable to use the IOTA predictions which had been prepared for the Western Cape but an appeal over Internet produced a prediction from Toshio Hirose of the Japanese Lunar Observers' Group. Various factors mitigated against a successful outcome. Nevertheless, the Centre is to be congratulated for making a valiant attempt and I wish them well for the next attempt.

Stations: 5

Observers: D Duprez, R Hurly, J Joubert, B Skinner and C Turk.

3. Total lunar Occultations

Due to the lack of an easy to use time service and the sad fact that positional astronomy has a low glamour value compared with spectacular Hubble Space Telescope pictures, cometary impacts and similar space extravaganza, the number of occultation observers and observations has continued to shrink. I again urge ASSA members to encourage those young observers who want to involve themselves in real astronomy, to attempt total occultation observing. Predictions for a given station can always be made available if an aspiring observer shows sufficient interest.

Observer	Disappear..	Reappear..
MD Overbeek	31	3
J Smit	69	11
P van Blommestein	61	0

FINANCIAL STATEMENTS

Balance Sheet at 30 June 1996

	1996		1995	
ACCUMULATED FUND (1995 - Funds Deficit):				
Deficit at the beginning of the year	11 420		4 747	
Net income for the year (1995 - Loss)	15 861		10 898	
	4 441		15 645	
Funds transferred from The McIntyre Award	210		4 225	
Surplus at the end of the year(1995 - Deficit)	R 4 651		R 11 420	
REPRESENTED BY: CURRENT ASSETS				
Cash resources -				
Standard Bank of South Africa Limited -				
32 days notice account	31 405		17 173	
Plusplan account	22 367		8 437	
		53 772		25 610
CURRENT LIABILITIES				
Accruals	1 180		465	
Cheques not yet presented to the bank for payment	5 801		----	
Subscriptions received in advance	42 140		36 565	
		49 121		37 030
NET CURRENT ASSETS (1995 - Net Current Liabilities)		R 4 651		R 11 420

Income Statement for the year ended 30 June 1996

INCOME:		**1996**		**1995**
Subscriptions		73 040		45 919
Interest received (* Schedule 1)		2 804		1 017
Entrance fees		820		952
Sales of *MNASSA & Handbook*		17 786		5 560
Advertising in *MNASSA & Handbook*		200		174
Donations		7 592		3 375
		102 242		56 997
Less: **EXPENSES**				
"Sky and Telescope" expenses (* Schedule 2)	53 366		41 306	
Production of MNASSA and Handbook	20 918		11 389	
Postage of Publications	6 118		11 429	
Printing and stationery	1 039		1 478	
Bank charges	1 147		397	
Postal costs	2 793		637	
Honoraria	1 000		1 000	
Sundry expenses	---		259	
		86 381		67 895
NET INCOME FOR THE YEAR, transferred to Funds Deficit (1995 - Net Loss)		R 15 861		R 10 898

Schedules to the Income Statement for the year ended 30 June 1996

1. INTEREST RECEIVED:	1996	1995
Current account	----	50
32 Days Notice account	2 251	813
Plusplan	553	84
Fixed deposit	----	70
	R 2 804	R 1 017

2. "SKY AND TELESCOPE" EXPENSES:		
Subscriptions and clearing charges	48 738	31 135
Import surcharge Including Tax	4 628	10 171
	R 53 366	R 41 306

The McIntyre Award
Income Statement for the year ended 30 June 1996

	1996	1995
INCOME		
United Bank -		
Interest on fixed deposit	----	73
Syfrets -		
Interest on participation bond (See note below)	210	152
	R 210	R 225

Balance Sheet at 30 June 1996

	1996	1995
ACCUMULATED FUNDS		
Balance at the beginning of the year		4 000
Income for the year, as above	210	225
	210	4 225
Less: Amounts transferred to ASSA	210	4 225
	R NIL	R NIL

NOTE:

Income from Syfrets participation bond is an investment from which one half of the income accrues to The McIntyre Award.

The capital sum invested is not an asset of The McIntyre Award.

CAPE CENTRE

Minutes of the Annual General Meeting held on 10 July 1996 at the SAAO

1. Present:
24 members and 5 visitors.

2. Apologies
J. Davison, H. Sessions, R. Noack, W. Hollenbach

3. Minutes of the 1995 AGM
Taken as read in absentia.
Proposed: M.A. Gray Seconded: C.D. Allen

4. Chairman's Report
The Chairman, Mr Cliff Turk presented a report similar to the one he presented 20 years ago.

5. Treasurer's Report
Chris Forder reported that until the AGM there was a deficit of R35.00 but David van Heerden made a donation to make the books balance. Thank you David. The report is to be published in the Cape Observer.

6. Trust Report
Cliff Turk presented the report after explaining the reason for the existence of the Trust. There is now R6 224 invested and a distributable reserve of R7 512 which is available to the Cape Centre.

7. Election of Office Bearers

Chairman:	Gordon Bosch
Vice Chairman:	Steve Kleyn
Secretary:	Chris Forder
Treasurer:	Chris Forder
Council Rep.:	Andrew Gray
Members:	Pat Booth
	Joe Joubert
	Richard Sessions
	Abe Mahommed
	Cliff Turk
	Brian Skinner

proposed: D van Heerden Seconded: A Joubert

8. Election of Hon. Auditor:
Mr C. Turk
Proposed: B Skinner Seconded: C Forder

9. Chairman's address:
Cliff Turk spoke on the subject of light pollution and how effective outside lighting can be achieved without spoiling the night sky.

10. General
The new Chairman stated his ambition to get the Centre more active in practical astronomy.

Chairman's Report to the AGM of the Cape Centre for the year 1995/96

1. Meetings
Ten general meetings were held during the year, plus the usual social function in December. Details of the meetings, speakers and their subjects were as follows:

1995 July: Dr D Laney - Ancient astronomy in Central America.

August (Centre AGM): Ms P Booth - Boyden Observatory

September: Prof A P Fairall - Large scale structure of the universe

October: Prof M Feast - R Cor Bor stars

November: Dr P Zilstra - ESO

1996 February: Prof F Shillington - Ocean waves

March: Dr D Buckley - High speed spectrometer

April: Dr C Hromnik - Astronomical signs in Komatiland

May: Mr C Rijsdijk - SAAO & education

June: Dr P Martinez - Resonances in stars

The average attendance according to the book signatures was 26 members and guests. Total membership was 123.

In addition, committee members continued to hold informal meetings on all the Wednesdays other than the general meetings above. Some of the subjects were surprisingly advanced and certainly taxed the Chairman, even if not all of our members.

2. Observing
One grazing occultation was attempted near Voelvlei dam, but the star was difficult and only one uncertain timing was made.

3. Public relations
Two "sidewalk astronomy" evenings at the Cape Town Waterfront were highly successful with an estimated 1500 visitors peering through our telescopes on each evening. The Waterfront has invited us back again.

Visitors evening at SAAO still sees Centre members assisting on the second Saturday of each month. A total of 610 visitors were recorded in the visitors book.

4. Twenty years ago
When I wrote this report 20 years ago, at the end of my 2nd year as Chairman, there had been only eight general meetings plus a social (average attendance 34, total membership 72) but no informal meeting or observing expeditions. There had been 505 visitors to the SAAO, Prof David Thackeray had been awarded the Gill Medal by the Society and the Centre's Trust Fund had R 300.50 capital at the end of its first year (now R 6 224.87).

5. Thanks
The Centre's thanks are recorded to the Director of SAAO for the use of various facilities throughout the year, to our speakers for entertaining us and to all members who have contributed in many ways to help the Centre run smoothly. My personal thanks as Chairman go to all the committee members and especially my Vice-chairman who stood in for me at short notice when I injured by back.

(Chairman: Cliff Turk)

NATAL CENTRE

Chairman's report for 1995 - 1996

1. Introduction
I was extremely pleased in July 1995 to be elected as Chairman to the Natal Centre of ASSA. I had no ideas on paper at that time and within six days I had drawn up a series of objectives to present to the new committee at a Special Meeting on 18 July 1995.

This turned out to be a rather long list of suggestions and ideas of which some have been fulfilled and others not. Hopefully the ones that were not achieved could act as an inspiration to the new committee as a challenge for the future.

Of all the objectives, I felt the most important one, which by the way was not achieved, was to complete the observatory with its larger mirror and new telescope drive. Within the first month or so the telescope was modified to reduce its weight to achieve better balancing and at the same time the 10-inch mirror was upgraded to a 12-inch mirror. Due to unforeseen circumstances, the telescope drive gear took longer to fabricate and fit than was anticipated, but the gear is now finished and I'm sure the incoming committee will enjoy getting the job finished.

The next objective was to try and increase the amount of information we could put into our monthly magazine, *'Ndaba*. This I owe to my wife, Pam, who, also serving as secretary, spent most of her free time writing notes and sorting though tons of astronomical information that I was constantly dumping on her desk. Sometimes I would wake up in the early hours of the morning only to hear her still bashing away on the computer keyboard trying to get the *'Ndaba* completed. I would like to thank her for her sterling effort as Editor and would now like to tell her that I really didn't mean I would kill her if it wasn't out in time.

The magazine now boasts 12 pages, which is the maximum we can produce at our present subscription rate. Each *'Ndaba* costs R 1.84 to produce and post which comes out to R 22.08 per year per members. The subscription rates are R 25.00 which only leaves R 2.92 from each member to cover all out other running expenses. This is why the idea of running a raffle at each meeting became important, so as to finance new books, telescope repairs, etc.

2. Social events
Our first social event took place after the general meeting in August 1995 in the form of a wine and cocktail session sponsored by the Chairman, with assistance from Pat & Harry Mitchell. This introduced the new committee to the members and turned out to be a most enjoyable evening.

The second social event held was a picnic at the Amanzimtoti Bird Sanctuary in October 1995. Due to uncertain weather conditions at the time, only a few stalwarts braved the elements, which turned out

to be kind for the whole day. At this event Raymond Field brought all but the kitchen sink and at one stage was mistaken by a passer-by as a travelling American tourist.

One event that was resurrected during the year was our Christmas Bash, which we held at the Point Yacht Club. This event went off extremely well with lots of dancing, prizes and a special Christmas song sung by our dear friends Harry and Pat Mitchell. This party was so successful it carried on into the early hours of the morning and after Management of the Club had been sitting around waiting for us to go, they approached me and asked me to kindly switch off the lights and lock up on our way out.

3. Monthly meetings

During the year we had a wide range of lectures from dinosaurs to a laser being fired into space.

August: Raymond Field gave us a talk on the constellation Scorpius and this was followed by Arthur Arnold showing the latest images from the Hubble Space Telescope.

September: Dave Long from the University of Natal, Durban, brought along and demonstrated a weather satellite receiving station which displayed real time images. We were so busy watching the pictures we didn't notice a fierce electric storm creeping up on us until it blew all the lights out. The meeting then continued under torchlight.

October: Peter Hiscocks gave a report back on our visit to the ASSA Symposium held in Bloemfontein, and this was followed by Arthur Arnold who gave a talk to the Epic Voyage of the Galileo Space Probe.

November: Rob Lithe from Internet Africa gave a live demonstration of Internet and then went on to explain how it was expanding and how it is financed.

December: This took the form of an open astronomical discussion where you could ask and find out about things you always wanted to know in astronomy. It was also a time for making suggestions on how to improve the Centre.

January: Arthur Arnold gave a space update on latest events on astronomy and space. This was followed by a talk and slide show from Lyn Rens on her visit to the far east to observe the October 1995 total solar eclipse.

February: Arthur Arnold's space update was followed by an evening of demonstrations of various astronomical gadgets which could easily be made at home. I think Harry Mitchell took first prize that night.

March: Arthur Arnold's space update was followed by a talk and slide show given by professor Arthur Hughes from the University of Natal, Durban, on Antarctica "The Natal Connection"

April: This was an evening of book reviews presented by Peter Cramb and Raymond Field.

May: This was a talk and slide show presented by professor Tom Mason from the University of Natal, Durban, on dinosaurs and "Extra Terrestrial Events."

June: This took the form of a visit to the University of Natal, Durban, hosted by professor Max Michaelis, with a talk and demonstration on the latest research into very high power lasers for astrophysical research. Arnold Prause gave a demonstration of firing a laser into the atmosphere.

4. Educational activities

In October 1995 Harry Mitchell gave a lecture at Parkside School assisted by Irene Ross and Arthur Arnold.

November and December saw Harry Mitchell actively promoting astronomy down the south coast giving lectures to Warner Beach Junior and Senior Primary Schools as well as hosting a star party at his home for about 35 people.

Raymond Field assisted by Peter Hiscocks have a lecture to Waldorf School on 8 June 1996 which was enjoyed by all who attended.

For the third year running, Arthur Arnold with the assistance of Harry Mitchell, Peter Cramb and Raymond Field continued to give monthly lectures, demonstrations and viewing to school children, teachers and parents from many schools. This took place at Marists Brother School.

5. Izinkhanyezi 1996

This was the first time the Natal Centre had to carry all the expenses to host 'Zink 1996. This is because with the change in government policy there was no subsidy forthcoming from the Department of Education and Culture.

With the assistance of Peter Hiscocks who acted as Organising Chairman this event went off exceptionally well even though there was only a small number of people who could attend.

6. Membership
During the year, like all clubs and societies, members come and go. To help counteract this problem we ran a special for new membership during the months of December 1995 and January 1996, where the entrance fee wasn't applicable.

Over the year, we had one resignation, 18 who never paid and 25 new members. At present out membership stands at 118 members and three honorary members, Jose Campos, Steve Booysen and Andrew Gray.

7. Natal Centre Award
The committee decided not to present this award for the year 1995/1996 year.

8. Conclusion
In conclusion I would like to thank the committee for their assistance during the past year, and would also like to thank Mr Akal of Marist Brothers School for allowing us continued use of this venue.

I would also like to thank Andrew Gray for his assistance as Alternate ASSA Council Member on behalf of the Natal Centre. Thanks must also go to all the members who have attended meetings and supported me over the past year.

A special thanks must go to my wife Pam for putting up with all my ranting and raving, also to Harry Mitchell for all the work he has to put into the telescopes and other educational activities and to Raymond Field for always being there with his telescope and other gadgets when we desperately needed them.

I would like to wish the incoming committee all the success in the coming year.

(Chairman: Arthur Arnold)

The following office bearers were elected for 1996/7:

Chairman:	**Arthur Arnold**
Vice-chairman:	**Stuart Thomson**
Treasurer:	**Mrs Irene Ross**
Secretary:	**Mrs Irene Ross**
Curator of Instruments:	**Robert Suberg**
Librarian/PRO:	**Mrs Peta Cramb**
Centre ASSA Rep:	**Peter Cramb**
Committee:	**Mrs Pam Arnold**
	Bill Shone

NATAL MIDLANDS CENTRE

Minutes of the AGM held at the home of Miss K Hampson, 1996 July 13.

1. Introduction
The meeting was attended by 16 members of the Centre. Three apologies were received, and there were four visitors.

2. Minutes of the previous AGM
A copy of these had been sent to each member of the Centre with the *Stardust* newsletter for July 1996. It was therefore agreed unanimously to take them as read. Prop: P Hawkins, Sec: B Lawrence.

3. Chairman's Report
Mr Christianson reviewed the activities of the Centre during the past year, and thanked all those members (committee and other) who had worked hard to make the year a successful one. He made special mention of the educational activities of the Centre, and also have an extensive report on the excellent progress made in the building of an observatory at World's View. Prop: R Jarmain, Sec: P Hawkins.

4. Treasurer's Report
A Statement of Income and Expenditure was presented reflecting a closing balance for the year of R 677.36 (a shortfall of some R 139)
Prop: P Hawkins, Sec: L Christianson

A separate Observatory Fund had been established during the year, and this currently had an amount of approximately R 3000 in it, resulting from donations and special fund-raising event "Journey to the Stars". Proceeds from the Basic Astronomy training courses would also go to this fund.

5. Election of Office Bearers

The following members were nominated and elected:

Messrs J Watson, R Jarmain, R Roth, P Hawkins, S de Vos, A Versfeld, Ms K Hampson. Mr P Tarboton was also nominated, but subsequently withdrew.

6. Other business

a) Increased subscriptions - it was agreed to revise these as follows:

Members	R 40.00
Family	R 50.00
Senior citizens & students:	R 25.00

Prop: P Hawkins, Sec: H Chance.

b) Observatory fund - it was agreed that an amount of R 400 be transferred from General Funds to this fund. Prop: P Hawkins, Sec: H Chance

c) Mrs L Christianson - proposed that further public information and viewing evenings be held to raise funds for the observatory - new committee to consider this.

d) Mr P Tarboton - asked for an estimate of the amount needed to complete the observatory. M Christianson responded that an additional amount of approximately R 5000 would be required to finish Phase 1 of the building.

e) Mr J Watson - proposed a vote of thanks to Mr M Christianson for his leadership over the past year, and wished him well for his retirement and move to Cape Town.

7. **Closing**

The meeting closed at 20:50, after which all present enjoyed a curry supper together and some excellent viewing from K Hampson's back garden.

Chairman's Report for the year ended June 1996

It give me great pleasure to present the Chairman's report for the year ended June 1996. It had been a successful year from many points of view thanks to the hard work and dedication of your committee members and some of the members of the Centre.

The year started with the running of an astronomy course at the Museum, and is now ending with a new course starting at Umgeni Valley. These courses are a major source of new members and also brings in funds for the centre.

The other major event of the year, was the start that was made in building our own observatory. During October 1995 we signed a sublease with the Girl Guides in order to secure 1 hectare of their leased Municipal land for this purpose. In November the site was cleared of trees and in December the plans were submitted for approval which was finally received in February 1996. During March after an area had been cleared and the centre of the site marked by a group of members, the North-South line was established by Rusty finding Sigma Octantis for us and pointing out the direction of Celestial South. In April a start was made - we marked out the foundations positions with help from Roger Clifford and then digging commenced. On 10 June the foundations were cast and we are now up to floor level and should be able to progress from here to roof height in a short while. With a bit of luck and some good support the observatory will be completed this year (financial) and I am confident it will be a real boon to the centre. In June a fund raising function was held at Midmar which brought in approximately R 2000. More is needed however and further effort will be required.

During the year, regular monthly meetings were held and with the exception of May (20) and June (17) these were well attended.

August: a forum on dark matter; video presentation;

September: the meeting was at UNP and Dr Ilchew talked on 'Particle Physics'. The ASSA Symposium was held in Bloemfontein and JW and MJC attended;

October: symposium report back and a video;

November: a forum on solar wind and telescope displays were featured;

December: the Christmas party was held at the Victoria Club and was well attended;

February: a look around for 1996, and a video;

March: a discussion on the constellation Gemini;

April: Tim Chance - 'Winged Space Flight';

May: the topic was Virgo, Corvus and Crater. Also, the Natal Centre *Izinkhanyezi* was held and several from our centre attended and participated;

June: discussion of our fund-raising programme and a video were featured. "Journey to the Stars" held at Midmar.

I shall be leaving Pietermaritzburg at the end of September, so I wish the centre well. I hope you make easy progress in completing the Observatory and I wish you clear skies.

(M. Christianson)

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1997

MINUTES OF THE AGM

Minutes of the Annual General Meeting held at the Johannesburg Centre, Gill Street Observatory, on 1997 August 13.

1. Welcome
Tony Hilton welcomed: Past Presidents – Danie Overbeek, Brian Fraser and George Nicolson; Centre Chairmen – Ed Finlay (Johannesburg), Louis Barendse (Pretoria); Council Members, Directors of Sections and all members and declared the proceedings open at 20h05.

2. Apologies
Apologies were received from Robin Learmonth, Derck Smits and Michael Pol.

3. Minutes of the previous AGM
The minutes of the previous AGM were published in *MNASSA*, 55, 9&10. The above was proposed by Tom Budge and seconded by Danie Overbeek.

4. Matters arising
There were no matters arising from the minutes.

5. Report from Council
The Report of Council was read out. It was proposed by Melvyn Hannibal and seconded by Chris Penberly that the report be accepted.

6. Reports of the Observing Sections
The report of the Comet & Meteor Section was read out by the Director, Tim Cooper. The report of the Computer Section was read out by the Director, Tony Hilton. The report of Deep Sky Observing Section was read out by Tony Hilton on behalf of the Director, Auke Slotegraaf. Note that the report of the Historical Section was not received. The report of the Planetary Occultation Section was read by the Director, Danie Overbeek. The report of the Solar Section was read by the Director, Jim Knight. The report of the Variable Star Section was read out by Tony Hilton on behalf of the Director, Jan Hers.

7. Financial report
The financial report was read out by Tony Hilton. This report was accepted after being proposed by Tom Budge and seconded by Chris Stewart.

8. Report of ASSA Endowment Trust
This report was read out by Tony Hilton and was accepted after being proposed by Brian Fraser and seconded by Danie Overbeek

9. Election of Honorary Auditor
It was proposed by Brian Skinner and seconded by Chris Stewart that Mr. R Glass of Zeller Karro & Associates be elected as Honorary Auditor.

10. Election of office bearers
The following, having indicated their willingness to stand, were unanimously elected for the year 1997/98 (proposed by Cliff Turk, seconded by Andrew Gray)

President:	Dr R S Stobie
Vice Presidents:	M D Overbeek
	A S Hilton
	Dr D Smits
Members of Council:	P van Blommestein
	Dr D M Kilkenny
	T W E Budge
	T P Cooper
Hon Secretary:	B Skinner
Hon Treasurer:	C D Gray

11. Presidential Address
Mr Tony Hilton presented his Presidential Address. (A précis of the multi-media presentation appears on pp 1 - 3.)

12. Urgent Business of Gill Medal
Danie Overbeek was asked to give a brief talk on the history and significance of the Gill Medal.

> "In 1954, the Council of the ASSA approved the awarding of a medal in recognition of services rendered to astronomy in Southern Africa. It was proposed that it be known as the Gill Medal. The name Gill had been selected as being that of an outstanding genius who carried out his major work in South Africa.

Gill Medalists Danie Overbeek and Dr George Nicolson with ASSA President Tony Hilton.

It was intended that the recipient's services should be signal contributions to the advancement of astronomy in Southern Africa. The design of the medal was the work of Dr Peter Kirchhoff, professional sculptor and President of the Society at the time. He offered his services in designing the medal at practically no cost to the Society.

The following are the ASSA's Gill medalists:
H Knox Shaw
J Jackson
W H van den Bos
A W J Cousins
R H Stoy
W S Finsen
R D Thackeray
M W Feast
D S Evans
B Warner

The above are or were professional astronomers. Four amateurs were also honoured:

W P Hirst
J C Bennett
C Papadopoulos
M D Overbeek.

13. Presentation of the Gill Medal Recipient
On behalf of Council, Tony Hilton read out a citation and then had much pleasure in presenting the Gill Medal to Dr. George Duncan Nicolson, a very worthy recipient. Dr. Nicolson replied and thanked the Council.

14. Thanks
Tony Hilton thanked all those interviewed for their hospitality and support and especially his family for being patient with his Astronomical hobby. Finally he thanked the Johannesburg Centre for the use of their facilities and invited all to snacks, tea and liquid refreshments.

15. Closing
The meeting was declared closed at 22h33.

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1997

GILL MEDALIST: GEORGE DUNCAN NICOLSON

George D Nicolson has contributed in a major way to southern African astronomy since the 1960s, when he commenced doing radio astronomy at the Hartebeesthoek Radio Astronomy Observatory (HartRAO).

He was born in 1938 in Germiston and attended Germiston Boys' High School. He holds the degrees of BSc and PhD in engineering from the University of the Witwatersrand. He is a member of the International Astronomical Union and a Correspondent of the International Union of Radio Science (URSI). He has represented South Africa at General Assemblies of the IAU, URSI and COSPAR. He is the author of over 80 scientific publications.

He first became an engineer at the NASA minitrack station at Esselen Park, Johannesburg, in 1960. His involvement with astronomy began a year later when he was made Engineer/Astronomer at the NASA Deep Space Tracking Station at Hartebeesthoek in 1961. From 1965-1974 he was astronomer in charge of the radio astronomy programme at Hartebeesthoek.

When the Hartebeesthoek Radio Astronomy Observatory was founded in 1975 on the withdrawal of NASA, he was appointed its first Director. He had immediately to start building up a set of suitable receivers, starting from a single instrument which worked at 13 cm. The telescope had first to be placed under computer control.

Under his direction, capabilities were added for a variety of bands, from 18 cm to 2.5 cm, with upgrades being performed as new equipment became available. New possibilities included Very Long Baseline Interferometry (VLBI), geodesy, spectroscopic observation of masers and precise timing of pulsars, looking for their sudden changes in period, known as 'glitches'.

Most of George Nicolson's research work has been on galaxies, from surveys to detailed studies of their structure and variability. He has also worked on objects in our own Galaxy, including methanol masers, the structure of the nucleus of the Galaxy, the flares of Proxima Centauri and, especially, the variations of the X-ray binary Circinus X-1. His work has centred increasingly on the use of VLBI which requires the collaborative use of radio telescopes on different continents. A major part of this work involves setting up a very precise reference frame of compact extragalactic radio sources. The detailed structure of individual sources has been studied, as well as their development with time. A whole galaxy changes only very slowly, but a compact radio source at the centre may change significantly in only a few months. It is possible not only to study distant galaxies but solar system objects as well. A remarkable example was the use of the radio telescope at Hartebeesthoek in an international campaign to track a set of balloons placed in the atmosphere of Venus by the Russians, and so to determine wind velocities of a few tens of metres per second. The reference frame of some 400 radiogalaxies may also be turned round to determine positions and relative motions on Earth, including continental drift, if observations are carried out for a few years. Thus George has not only placed South Africa on the map with unprecedented precision, but has determined where she is going.

REPORT OF COUNCIL 1996 - 1997

Council met on five occasions since the last AGM with an average of twelve persons present at meetings.

1. Membership

Total membership was 344 as at 1 July 1997 compared with 411 a year earlier. Membership is now R80.00 per annum. Members may subscribe to *Sky & Telescope* at a discount rate through the Society. The problems with *Sky & Telescope* distribution should be a thing of the past because all subscriptions will now be annual as from the month of application; which need not be the same as the Society book year.

2. Finance

The Honorary Treasurer, Mr Colin Gray, is thanked for his efforts to improve the *Sky & Telescope* subscription conditions for our members this year. This was in addition to the already complex task of keep-

ing our finances in order. Our Society is indebted to the numerous members who have once again made donations to the ASSA. All extra contributions are gratefully received because they allow the subscriptions to be maintained at the current rate for as long as possible before an increase is needed.

3. Business Manager

Mr Cliff Turk has continued as Business Manager this year. His main function is the world-wide distribution of *MNASSA* and the Handbook. Overseas sales of *MNASSA* almost cover the total cost of *MNASSA* production. In this instance the Rand/Dollar exchange rate works in our favour. Many thanks to Cliff for his sterling work.

4. *MNASSA*

The Editor, Mr Auke Slotegraaf continues with an informative publication that keeps members up to date with developments in astronomy. He is also responsible for establishing a Web site on the Internet giving us exposure on the information super-highway. The high standard of his work is a credit to the ASSA.

5. Annual *Handbook*

Ms Pat Booth continued as Editor of the annual *Handbook* and is assisted by the Directors of the observing sections. This excellent *Handbook* is used by amateur observers from all over the Southern Hemisphere.

6. Acknowledgements

Council wish to thank the following persons or institutions for assistance during the past year:

Dr Robert Stobie, Director of SAAO, for the use of meeting facilities at SAAO and for chairing Council meetings in the absence of the President.

Mrs Penny Dobbie of the University of Cape Town Astronomy Department for her assistance with Society publications.

Council extend their appreciation to the Directors of the Observing Sections for collating astronomical research by amateur astronomers and also for forwarding the results of observations to international Astronomical bodies.

The local Centres who assisted the professional astronomical fraternity with public viewing nights at the various observatories are commended for their efforts.

Last, but not least, the Johannesburg Centre for hosting the Annual General Meeting again this year, the third year in a row.

7. Finally

Council wish to thank all who contributed to the work of the Society this year should they not have been mentioned by name.

(Brian Skinner, Hon Secretary)

ASSA ENDOWMENT TRUST (ASSET)

Trustees Report to the 1997 AGM of ASSA

Donations received during 1996 were slightly more than double the amount received the previous year. Income has also increased by a few rands in spite of a high cash balance being maintained in order to assist ASSA during what has become its seasonal shortfall.

The R 4 000 loan to ASSA shown in the annual accounts to 31 December 1996 was increased by a further R 2 000 during April 1997, but the whole amount is expected to be repaid before the end of June.

It is pleasing to note that the market value of the Equity shares (including those issued in lieu of dividends) has increased to over R 10 000 by early June 1997. The total cost including foregone dividends is R 1 030.35.

The Trust has continued to make its annual grant of R 1 000 to the Society for the fourth consecutive year and will increase the amount of this during 1997.

(Cliff Turk, Secretary)

ASSA ENDOWMENT TRUST (ASSET)

BALANCE SHEET AS AT 31ST DECEMBER 1996

1995		R - c
	Trust Capital:	
10 251-04	Balance at 31st December 1995	10 786-04
535-00	Donations received during the year	1 180-00
R 10 786-04		R 11 966-04
	Distributable Reserve:	
16 358-35	Balance of Income and Expenditure Account	18 285-24
R 27 144-39		R 30 251-28
	Represented by:	
	Investments:	
20 000-00	United Bank Fixed Deposits	20 000-00
760-00	ABSA Bank Ltd. Equity Shares (at cost)	938-15
5 000-00	Load to ASSA	4 000-00
	Savings Account:	
1 384-39	United Bank	5 313-13
R 27 144-39		R 30 251-28

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR TO 31ST DECEMBER 1996

	Income		
2 913-94	Dividends and interest received		2 927-09
	Deduct Expenses:		
	Bank service charges	0-20	
1 000-15	Grant to ASSA	1 000-00	1 000-20
R 1 913-79	Excess of Income for the year		R 1 926-89
14 444-56	Excess of Income from previous year		16 358-35
R 16 358-35			R 18 285-24

Notes: United Fixed Deposits:

13.30% p.a. maturing 8 Oct 1998	R 4 000-00
14.25% p.a. maturing 8 Oct 1998	R 8 000-00
11.45% p.a. maturing 29 Apr 1999	R 8 000-00
ABSA Bank Ltd. Equity Shares (cost) (Market value R 8 328-00)	R 938-15
	R 20 938-15

SECTION REPORTS

COMET AND METEOR SECTION

T P Cooper

1. Introduction

Despite the fact that the year 1996 was probably one of the wettest and cloudiest on record, it was probably the most active for the Section. A total of 26 separate observers reported observations on 10 meteor showers, 7 fireballs and 9 comets. The interest in observing comets and meteors is no doubt due largely to the appearance of what will become probably the two brightest comets in recent history, namely Hyakutake and Hale-Bopp, and the enhanced activity over the last few years of several major meteor showers, most notably the Perseids, Orionids, Leonids and Geminids. Whatever the reasons, I am thankful to those observers who sent me their observations.

I now provide a summary of observations made during 1996. Observations of meteor showers were sent to the International Meteor Organisation (IMO), and reports of comets were sent to the International Comet Quarterly (ICQ). Observations are also shared with other overseas organisations, including the BAA Meteor and Comet Sections.

2. Meteor Showers

The observations are summarised in Table 1. Specific shower details are summarised below:

April Lyrids Six meteors observed in a 1-hour watch on April 22.

Ophiuchids Observed from June 4-18 except June 9 and 10 which were cloudy. Seven separate radiants of the complex were found to be active.

Perseids This shower reached maximum on the morning of August 12, in the form of several long-pathed meteors around 01h30 UT. The activity of the sharp peak caused by the last apparition of comet Swift-Tuttle is slowly abating.

Orionids Rates around the period of October 20 from this shower were between 10 and 20 per hour as reported by 4 observers.

Geminids Observations were received from 12 observers. In the Cape two groups of beginners were led by Gordon Bosch (20 observers) and Auke Slotegraaf (7 observers). Those who observed in the early morning hours were rewarded by high zenithal hourly rates of around 70/hour. In Europe one observer observed over 1200 meteors on the night of maximum.

Pi Puppids, kappa Pavonids, December Phoenicids, Puppid-Velids, Leonids All these showers showed low activity in 1996.

3. Fireballs

Seven fireball reports were received. Details of the observations are given in Table 2. In line with previous years, nearly all observations occur before 11 pm local time, indicating that most potential fireball sightings are missed. The brightest event was a magnitude -6 fireball observed from Boyden Observatory by Dave West.

4. Comets

Comet Hyakutake This comet reached magnitude 1.5 with a 14° tail in late March. It was out of sight for us at its closest approach to earth, when it reached magnitude 0 with a 90° tail, but was recovered later in the year as a 4th magnitude early morning object.

Comet Hale-Bopp (C/1995 O1) During 1996 the comet brightened from magnitude 9 to 4, when it was lost in the November twilight.

Comet Kopff The comet became around magnitude 8 during mid year, while in Sagittarius, fading to magnitude 11 by October.

Comet Tabur The comet reached around magnitude 7.5 in August before cloudy weather interfered, the comet moved too far north for observation, and the comet faded rapidly in October as it literally ran out of gas.

Comet Brewington The comet was observed in July and August at magnitude 8.

Reports were also received for comets Machholz 1, Gunn, Jackson-Neujmin and Churyumov-Gerasimenko.

5. Publications and Lectures

The Director's paper *A decade of visual eta Aquarid observations* was published in WGN, **24**, 5.

A lecture on comet Hale-Bopp was given to the Pretoria Centre on June 26. Separate observing memoirs on comet Hyakutake, Hale-Bopp and several other comets for which observations have not been published are in progress. These memoirs will serve as forum for presenting the observations of the Section in a scientifically useful form.

6. Conclusion

The year 1996 kept me very busy as Director, processing a huge number of visual observations, photos, CCD images, sketches and verbal reports. I hope this trend will continue, and can assure ASSA members that their observations are put to good use. I encourage similar efforts in 1997.

Table 1 Summary of Meteor Shower Observers 1996

Observer	Total hours	Shower	Hours observed
Cooper T P	31.5	Ophiuchids	20.4
		κ Pavonids	3.9
		Perseids	3.5
		Geminids	2.7
		Puppid-Velids	1.0
Streicher M	7.3	Orionids	4.1
		Geminids	3.2
Prinsloo duT	8.0	April Lyrids	1.0
		π Puppids	1.0
		Ophiuchids	1.0
		Orionids	2.0
		Geminids	1.5
		Puppid-Velids	1.5
Van Blommstein P	4.0	Orionids	2.0
		Leonids	2.0
Van Zyl K	3.3	Geminids	3.3
Lloyd Evans T	2.3	Leonids (1995)	2.3
Bosch G	1.4	Geminids	1.4
Bosch D	0.5	Geminids	0.5
Eygelaar J	1.0	Geminids	1.0
Kannemeyer W	1.0	Geminids	1.0
Weigt M	2.2	Geminids	2.2
Skinner B	3.2	Geminids	3.2
Forder C	1.4	Geminids	1.4
Thompson R	0.3	κ Pavonids	0.3
Slotegraaf A, *et al*	7.0	Orionids	2.0
		Geminids	4.0
		Dec Phoenicids	1.0
Total			74.4

Table 2 Details of Reported Fireballs

Date	Name of reporter	m_v	Time UT	Start co-ord	End co-ord
1996 April 19	Willie Koorts	-5	~16h35	11h20, +21°	10h30, +29°
1996 April 28	Willie Koorts	-4	17h58	not given	not given
1996 May 14	Trevor Gould	-3	16h38	10h08, +14°	07h40, +30°
1996 June 19	duToit Prinsloo	-4	16h58	17h25, -49°	15h35, -35°
1996 June 22	Dave West	-5/-6	18h15	13h40, -12°	13h17, -05°
1996 July 28	Pieter Prinsloo	-4	16h32	not given	not given
1996 Nov 20	Peter v.Blomm.	-3.5	18h48	00h20, +08°	19h40, +18°

Table 3 Summary of Observers

Observer	Meteors	Comets	Fireballs
Cooper T	5	5	—
Streicher M	2	1	—
Prinsloo duT	6	—	1
van Blommestein P	2	4	1
Slotegraaf A	3	—	—
van Staden A	—	6	—
Begbie M	—	2	—
Smith T	—	5	—
Walsh S	—	1	—
Geyser M	—	2	—
Van Zyl K	1	—	—
Skinner B	1	—	—
Lloyd Evans T	1	—	—
Weigt M	1	—	—
Bosch G	1	—	—
Forder C	1	—	—
Eygelaar J	1	—	—
Kannemeyer W	1	—	—
Bosch D	1	—	—
Hollenbach W	—	1	—
Higgs L	—	1	—
Thompson R	1	3	—
Koorts W	—	—	2
Gould T	—	—	1
West D	—	—	1
Prinsloo P	—	—	1

COMPUTING SECTION
A S Hilton

This section is now 10 years old and is taking a new look with regard to information transfer and assistance to interested ASSA members in that the Internet is being used. The computing section home page maybe viewed at the following address:

www.icon.co.za /~hilton

A new catalogue of software available from the director has been produced and may be ordered by post, fax, E Mail or voice mail as follows:

Post: P O Box 68846 Bryanston 2021
Fax: 620 6624
email: hilton@icon.co.za
Beltel Mail: 603460
Phone No: (011) 620 6513 (Voice Mail)
Car Phone: 083 377 0616 (Answering Machine)

During this coming year, new titles will be made available from my home page; please log in for latest astro software.

Finally I would like to thank of all of those who have assisted the section, especially my son John Hilton, who developed the Computing Section home page on the Internet. He would be happy to assist others in developing customised home pages.

DEEP-SKY OBSERVING SECTION
A Slotegraaf

An eight-page newsletter for the first half of 1997 was sent to 30 members, which included one in Argentina, three in Australia, one in Kenya and two observers in Zimbabwe. A second newsletter will be produced in June.

To promote deep-sky observing, the activities of the Section are now publicized on the Internet. A web page describing various items of interest to deep-sky observers may be found at:

www.global.co.za/~auke/astron/index.html

Past issues of *Nightfall* and *Deep-Sky Reviews* are archived here. An article about John Herschel's so-called "non-existent" objects is also on-line, as is James Dunlop's catalogue. The Section's observing guide can now be down-loaded, and future updates will be found here as well. A series of pages dedicated to Jack Bennett and his catalogue can be accessed.

One long-term goal of the Section is to compile a handbook of southern visual deep-sky objects; an example of the contents can be browsed from these pages (starting at the /ds_guide.html page).

ASSA members are reminded that a paper copy of the introductory deep-sky observing guide is available free of charge from the director. New observers are encouraged to share their observations with other members by joining the section and exploring the rich southern skies.

Please note the new postal address: PO Box 12838, Die Boord, Stellenbosch, 7599.

OCCULTATION SECTIONS
M D Overbeek

1. Total Lunar Occultations

This useful and rewarding activity continues to decline, possibly because it is not considered glamorous enough by the rising generation of observers. The observers listed are all in their 70's.

Observer	Disappear..	Reappear..
MD Overbeek	29	10
J Smit	42	18
P van Blommestein	70	0

2. Planetary Occultations

Interesting observations were made but once again it has not been possible to publish the outline of a sizeable minor planet, crossed by chords representing dis- and reappearance timings made by scattered observers. The hard core of observers are not discouraged, however. The following observers are thanked for their contributions: D Blane, T Cooper, F de Jager, B Fraser, J Hers, N Kriek, T Lloyd Evans, H Lund, C Rijsdijk, J Smit, T Smith, T Turner and P van Blommestein.

Feb 13, PPM 190311 by 895 Helio:
Bredell, Edenvale, Fish Hoek and Vanderbijlpark reported cloud.

Mar 2, PPM 95997 by 47 Aglaja:
Bredell and Edenvale reported cloud.

Mar 29, PPM 196509 by 308 Polyxo:
Bredell, Edenvale, Johannesburg and Vanderbijlpark reported cloud.

Mar 30, CMC 709304 by 912 Maritima:
From Bredell and Pretoria, T Cooper and J Smit reported a miss.

Apr 28, PPM 291761 by 98 Ianthe:
From Johannesburg and Pretoria, H Lund and J Smit reported a miss.

May 2, PPM 264897 by 714 Ulula:
From Bredell, Edenvale and Pretoria, T Cooper, D Overbeek and J Smit reported a miss.

May 6, PPM 262688 by 764 Gedania:
Bredell, Edenvale and Johannesburg reported cloud.

May 7, GSC 6237 by 146 Lucina:
Bredell, Edenvale and Johannesburg reported cloud.

May 19, GSC 0124 6298 by 52 Europa:
Bredell and Edenvale reported cloud.

May 24, PPM 322731 by 54 Alexandra:
In Bredell, T Cooper observed an appulse at the predicted time. In Edenvale, D Overbeek observed an appulse 1-2 minutes early. In Johannesburg, H Lund had a dubious appulse. From Pretoria, J Smit reported an appulse two minutes before predicted time.

May 28, GSC 6223 00850 by 1416 Lucina:
From Edenvale, D Overbeek observed an appulse at the predicted time. In Johannesburg, H Lund found conditions marginal.

Jun 10, PPM 231555 by 1 Ceres:
The predicted track of the shadow fell over the Cape and we had some hopes of good observations. The writer contacted a number of individuals who do not participate in the programme regularly. He suggested that the SAAO attempt photoelectric observations but there were difficulties, probably due to the short lead time given. He travelled to Malmesbury as the Gauteng area was adequately covered and rather far from the centre line of the track. In the event, cloud, mist and bad seeing foiled most of the attempts. Also, Ceres proved to be rather bright compared with the target star, making visual observations difficult in less than ideal conditions.

In Pinelands, C Turk had some mist but reported a disappearance at SAST 0426, 28 seconds, ±2 seconds.

In Rondebosch, C Rijsdijk observed a disappearance at SAST 0435, 36 seconds and a reappearance at SAST 0437, 40 seconds. In the same area, and T Lloyd Evans using a small reflector, could not be sure of a definite dis- or reappearance.

In Simon's Town, P van Blommestein had a misty sky and was not sure of his observations.

In Sedgefield, J Hers had bad seeing and was not sure.

In Pretoria, J Smit observed an appulse at the predicted time.

In Britstown, N Kriek observed an appulse but did not time it, as did T Smith in Keetmanshoop.

Bredell, Erasmia, Malmesbury and Vanderbijlpark had cloud or mist. The observers cannot be accused of not trying!

Jun 12, GSC 6225 00781 by 146 Lucina:
From Pinelands, C Turk reported the target star too faint. Edenvale and Johannesburg reported cloud.

Jun 20, DM-28 3129 by 9 Metis.
In Johannesburg, H Lund had a dubious miss. From Pretoria, J Smit reported an appulse at predicted time. In Rondebosch, T Lloyd Evans had a miss. In Vanderbijlpark, F de Jager had an appulse at the predicted time.

Jun 23, PPM 178942 by 40 Harmonia:
In Bredell, T Cooper had a miss. From Edenvale and Vanderbijlpark, D Overbeek and F de Jager reported an appulse two minutes before the predicted time. Pretoria reported cloud.

Jul 5, PPM 236841 by 558 Carmen:
From Edenvale, Johannesburg and Pretoria, D Overbeek, H Lund and J Smit reported a miss

Jul 10, PPM 719786 by 654 Zelinda:
From Pretoria, J Smit reported a miss.

Jul 29, PPM 735280 by 203 Pompeja:
From Edenvale, Johannesburg and Pretoria, D Overbeek, H Lund and J Smit reported a miss. From Simon's Town, P van Blommestein reported a dubious miss.

Aug 5, PPM 722611 by 133 Cyrene:
Bredell, Edenvale, Johannesburg and Simon's Town reported cloud.

Aug 9, PPM 298133 by 446 Aeternitas:
From Bredell, Edenvale and Johannesburg, T Cooper, D Overbeek and H Lund reported a miss. Simon's Town reported cloud.

Aug 18, PPM 72297 by 30 Urania:
In Edenvale, Nylstroom and Pretoria, D Overbeek, T Cooper and J Smit observed an appulse at the predicted time whereas F de Jager in Vanderbijlpark

observed the appulse approximately a minute late. Johannesburg and Simon's Town reported cloud.

Aug 18, PPM 270520 by 449 Hamburga:
Edenvale, Johannesburg, Pretoria, Simon's Town and Vanderbijlpark reported cloud.

Sep 15, PPM 203374 by 712 Boliviana:
In Bredell, Edenvale, Henley on Klip, Pretoria, Rondebosch and Vanderbijlpark, T Cooper, D Overbeek, D Blane, J Smit and T Lloyd Evans reported a miss. Keetmanshoop reported cloud.

Sep 17, PPM 207489 by 659 Nestor:
From Bredell, Edenvale, Pretoria and Rondebosch, T Cooper, D Overbeek, J Smit and T Lloyd Evans reported a miss. Keetmanshoop had cloud.

Oct 13, PPM 720575 by 74 Galatea:
From Pretoria and Rondebosch, J Smit and T Lloyd Evans reported a miss. Bredell, Edenvale and Johannesburg reported cloud.

Oct 19, PPM 236151 by 466 Tisiphone:
Bredell, Edenvale, Johannesburg and Pretoria reported cloud.

Oct 23, PPM 89571 by 1437 Diomedes:
From Keetmanshoop, Theo Smit reported a miss. Bredell, Edenvale and Pretoria reported cloud. The star was too low for H Lund in Johannesburg and the moon was too bright for P van Blommestein in Simon's Town.

Nov 10, PPM 207237 by 3596 Meriones:
Keetmanshoop was not dark enough. Bredell, Edenvale, Johannesburg, Pretoria and Simon's town reported cloud.

Nov 10, PPM 204712 by 12 Victoria:
In Keetmanshoop, Theo Smit had a dubious miss. Bredell, Edenvale, Johannesburg, Pretoria and Simon's Town reported cloud.

Dec 13, CMC 706577 by 289 Nenetta:
In Johannesburg, H Lund attempted an observation by CCD but cloud spoiled his effort. Bredell, Edenvale, Johannesburg and Vanderbijlpark reported cloud.

Dec 28, GSC 1947 00361 by 451 Patientia:
Bredell, Johannesburg, Pretoria and Simon's Town reported cloud.

Dec 29, Lick4 1378 by 112 Iphigenia:
T Cooper in Bredell and Jannie Smit in Pretoria reported a miss. In Johannesburg, H Lund made an unsuccessful CCD attempt but has made steady progress with his CCD appulse observing project. Simon's Town reported cloud.

3. Grazing Occultations

The weather has been the implacable foe of observers hoping to make good grazing occultation observations. Nevertheless, there were some partial successes in the Gauteng region:

Feb 8, ZC 1795, Heidelberg. F de Jager travelled to the site but had cloud.

Mar 11, ZC 2271, Vanderbijlpark. Six stations were manned by T Cooper, F de Jager, A Overbeek, D Overbeek, D Toldo and P van Laun. Ten timings of varying quality were obtained and F de Jager succeeded in obtaining a good record of the event on video tape.

Jul 18, ZC 1458, Vanderbijlpark. Five stations were manned by F de Jager, B Fraser, V Llewellyn, A Overbeek and D Overbeek. F de Jager made one good timing but the rest were frustrated by cloud.

Nov 20, ZC 180, Pretoria. J Smit obtained a reappearance timing.

4. Acknowledgements

Edwin Goffin and his employer, Agfa-Gevaert are thanked once again for supplying planetary occultation predictions. Brian Fraser has patiently dealt with successive conflicting inputs from IOTA and has succeeded in producing grazing occultation predictions, which have been sent to various Centres on diskette.

SOLAR SECTION
J Knight

Solar cycle twenty-two displayed its sunspot minimum during the year with a record number of spotless days occurring from September to December. A thirty-seven day series of spotless days in September and October marked the longest uninterrupted sequence since 1924, and the ninth longest this century. The longest (ninety-two days) was recorded in 1913. Slightly shorter thirty-six day series occurred in 1933 and 1944.

Participation by our small team of active observers continued and we owe them a big vote of thanks!

1. Visual Observing

The Solar Section observers submitted reports to the ASSA Solar Section, the AAVSO and to two groups in Germany.

2. Solar Flare Detection

Solar Flare detection records were submitted to the AAVSO during the year.

3. Monitoring of the Geomagnetic Field

Magnetometer observations of the Geomagnetic field continued to be undertaken during the year. As the cycle is almost at Solar Minimum, no Aurora alerts were issued during the year and no reports of sightings were received.

4. Publications

The Solar Section continues to be actively involved with colleagues and organisations overseas. The Solar Section's data, Observations and Reports are distributed in Southern Africa, Australia, New Zealand, the United States of America, the United Kingdom and Germany. The 1995 Solar Section report was submitted to *MNASSA*.

5. International Collaborations

The Georgi Dobrovolski Solar Observatory in New Zealand continued to submit regular Solar Observations to us during the year. It is encouraging to see that they still take the time to include us in their activities. I would like to thank them for sending us their data.

6. Other Activities

6.1 Electronic mail

The e-mail is the primary mechanism for communication with the local and international Solar community. All our reports, articles and publications are received and sent out in this manner. Our e-mail addresses are:

knight@odie.ee.wits.ac.za and jim@rubico.com.

7. The Sun During 1996

January

The new year began with very low activity and few sunspots to be seen. C class flares were recorded on the 3rd and 5th. A brief eruption of spots occurred at the end of the first week and again at mid-month. The geomagnetic field experienced storm conditions due to a coronal mass ejection from the Sun at this time. Little other noteworthy activity occurred during the remainder of January.

February

The only activity in the first half of the month occurred when a group rotated around the Sun's western limb on the 3rd and a series of Type III radio sweeps were recorded. The geomagnetic field experienced major storm levels on the 10th and on the 13th, the >2 MeV electron fluence climbed into the high range and remained there during the rest of the period. The final week of February saw a continuation of the current long series of very low daily solar activity levels. An interesting region emerged on the 24th, with a reverse-polarity sunspot cluster (when compared with Cycle 22), and was the first signs of new solar Cycle 23. A 13-degree filament also faded early on the 24th. Little noteworthy activity occurred during the remainder of February.

March

The Sun's visible hemisphere was spotless during most of March. Two short-lived spot-groups made brief appearances on the 6th and on the 11th. A 22-degree-long northern polar crown filament disappeared from the NW quadrant on the 13th and the geomagnetic field experienced periods of major storm conditions. Very low daily activity levels were recorded during the remainder of March. On the 23rd class C1 flare erupted and the geomagnetic field experienced isolated storm conditions around the 25th.

April

Apart from a small sunspot group that skirted the solar equator during the first four days of the month the Sun's visible hemisphere was spotless between the 5th and 11th. The geomagnetic field experienced storm levels on the 12th, 14th-15th and 17th-18th. On the 22nd a class M flare and four C flares erupted, the first flare of this X-ray intensity category to be recorded since October 1995. A significant Type II radio burst and 86 s.f.u. Tenflare accompanied the eruption. The >2 MeV electron fluence varied between high and very high until the 25th, when it declined to moderate. The Sun was quiet during the remainder of April. Sunspot activity was limited to the emergence (and subsequent disappearance) on the 28th of a small group in the NE hemisphere.

May

The Sun was relatively quiet until May 5th when class C flare activity picked up. Class C flares also on the 7th, 8th and 11th. The highlight of the period, however, was the appearance on the 10th of the first verified high-latitude spotted region from the coming solar cycle. Its spotted presence on the visible hemisphere was fairly short (two days), but such mileposts are important to those of us who eagerly await the arrival of the next Cycle. The disk spotless from the 17th to the 22nd and again from the 24th

June

Solar activity was very low from June 1st through 20th, in spite of some moderate sunspot activity. The geomagnetic field was mostly quiet with occasional periods of unsettled conditions until the 6th and 19th, when minor storming occurred. The Sun's visible hemisphere was spotless until the 18th and then remained active throughout the rest of the period. Other events of interest included prominence activity noted at both limbs on the 17th and the 24th spawned a class C1/SF solar flare. At month's end, no spotted regions had appeared in the Sun's Southern Hemisphere since June 9th.

July

On the 8th a C1 flare erupted followed by the first class X flare (X2.6/1B) to be recorded since November 1992. This major flare was accompanied by an M1 flare, a 10 centimetre radio burst, and a coronal mass ejection is believed to have occurred in conjunction with the event. A second M flare occurred early on the 10th, along with numerous with lower X-ray events. An activity region rotating off the Solar disk on the 13th/14th, producing C1 and C4 flares, a fading filament and other mass motions. From the 14th through to the 18th, the disk was spotless, and the observed 10 centimetre solar radio flux dropped to an exceptionally low value. With the exception of the 19th, the visible hemisphere continued to be spotless through to the 25th. A sudden impulse of 10 nT was recorded on the 28th, and geomagnetic field conditions rose.

August

Solar activity was very low until the 7th and 8th, when a long-duration C class flares occurred. Activity continued at very low levels between the 9th and 15th. Sunspots were confined to the Sun's Northern Hemisphere, where two new cycle spot-groups appeared. Two C class flares occurred on the 22nd and by the 23rd, the number of sunspots had increased. Several class C flares occurred during the remainder of August and the geomagnetic field was at major storm levels on the 23rd, the 29th and 30th. The >2 Mev electron fluence rose on the 26th, and remained high during the rest of the month.

September

Activity remained in the very low range in September. The geomagnetic field was at minor storm on the 10th due to a solar wind stream. The >2 MeV energetic fluxes also climbed into the high range around that time. The visible hemisphere of the Sun continued to be spotless during most of the month. When sunspots did appear, new cycle spot groups outnumbered those from Cycle 22 by 2 to 1.

October

The Sun's visible hemisphere continued to be spotless throughout the period which began September 13th. The 37 day array of consecutive spotless days ended with the emergence on the 20th of a lone spot. This marked the longest uninterrupted sequence since 1924. A large filament near the Sun's south-eastern limb began to disappear on the 19th, eventually becoming an eruptive prominence which attained a height of more than a solar radius in hydrogen-alpha images. A long duration large mass ejection X-ray enhancement accompanied this event. The geomagnetic field experienced periods of major storm conditions between the 18th and 20th, followed by a second series of severe conditions on October 22nd-23rd. By the 28th the solar disk was again spotless and remained so throughout the rest of October.

November

Solar activity was low during the beginning of November. The Sun was spotless until a brief outburst occurred on the 11th. This long period of quit conditions ended in the third week when up to four groups of spots could be seen and several C class flares erupted. A huge coronal mass ejection, greater than the diameter than the Sun's erupted off the western limb during the fourth week. A M1 class fare also erupted on the 29th and this was followed by several C class flares. In contrast sunspot activity decayed in the last week of the month.

December

Solar activity was low during early December but the C Class flare activity continued as activity areas rotated off the visible disk. C class flare activity again occurred on the 16th, 19th and 24th. The event of the 24th was accompanied by a Type II radio burst. Minor geomagnetic storms also occurred at this time. Many spotless days were recorded in December as activity continued to be very low, reflecting typical solar minimum conditions.

8. Sunspot Numbers for 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	13	12	4	6	0	7	8	19	7	0	0	23
2	16	11	0	11	0	8	9	21	8	0	0	11
3	20	0	0	11	0	8	8	20	7	0	0	0
4	29	0	0	8	0	10	0	19	7	0	0	0
5	0	0	0	1	0	14	7	13	0	0	0	12
6	0	0	12	0	15	17	0	10	0	0	0	10
7	3	0	3	0	13	19	17	19	9	0	0	9
8	15	0	0	0	13	18	23	10	8	0	0	9
9	20	0	0	0	13	20	28	14	0	0	6	20
10	10	0	0	0	19	13	25	17	0	0	13	15
11	0	0	14	0	29	8	20	20	0	0	14	23
12	0	0	16	9	18	7	13	14	7	0	9	26
13	0	0	15	6	18	0	9	11	0	0	9	26
14	0	0	14	0	16	0	0	20	0	0	12	25
15	0	9	11	0	14	0	0	14	0	0	18	17
16	0	2	10	2	11	0	0	9	0	0	31	24
17	0	0	9	11	9	0	0	10	0	0	22	24
18	0	0	8	17	6	10	0	8	0	0	13	17
19	0	8	6	15	0	16	0	9	0	0	9	12
20	0	11	0	17	0	10	0	9	0	7	9	25
21	8	15	11	15	0	10	0	8	0	3	15	20
22	2	14	15	14	1	11	0	9	0	0	22	15
23	0	9	14	9	1	13	0	12	0	0	36	8
24	0	21	13	5	0	17	0	15	0	0	40	0
25	9	15	13	0	0	19	0	9	0	8	50	0
26	9	12	22	0	0	20	8	11	0	14	50	0
27	9	9	21	0	0	20	9	10	0	7	36	0
28	10	8	15	5	0	20	12	10	0	4	26	0
29	9	14	11	0	0	18	16	10	0	0	23	0
30	17		0	0	0	16	18	12	0	0	20	0
31	12		0		0		20	17		0		0

VARIABLE STAR SECTION

J Hers

Although two observers, Berto Monard and Hugh Lund increased their number of observations, the total number dropped from 23651 in the previous year to 18492 in this year. This can be attributed not only to poor weather conditions, but also to the fact that some of our observers spent a great deal of time getting new PEP and CCD equipment in a working condition. These efforts can only be applauded, and we wish them well. It is hoped that in days to come it will lead to, if not a greater number of observations, but certainly to much more accurate ones. In time it may also help to at least ameliorate the vexed question of imprecise comparison star magnitudes.

But the weather is something we can do nothing about, and as it is not practical to suggest that observers should relocate to a more arid part of the country, we must try to see what else can be done. It will be seen from the list shown below that 95% of observations originated in Gauteng and the Cape Peninsula, i.e. all around the big cities. Variable star observers in other parts of the country, particularly the dry western regions , in Namibia and Zimbabwe , are very urgently needed. There are indeed a number of local centres of the ASSA spread around the country, as well as several independent local astronomical societies, but until now not one of them has shown even the slightest interest in the observation of variable stars. And this is after all by far the simplest and most important way of making a meaningful scientific contribution to astronomy.

This is something which should be rectified. One reason for the present attitude may well be that people look on it as a kind of hard labour, and that it is too difficult – which it isn't! It is certainly no more difficult than, say, timing occultations by the Moon or minor planets, and it has the advantage that it is independent of the clock: it can be done at any time of the night.

I would like to start by suggesting that there should be at least one variable star observer in each local society - or preferably two , so that they will not feel all alone, and can discuss things together. If there is any problem as to what should be done, or how it should be done. I shall give them all the help they need.

During the year there has been, as in previous years, very close and cordial contact with Dr. Janet Mattei, the Director of the American Association of Variable Star Observers, and Dr Frank Bateson, the Director of the Variable Star Section of the RAS of New Zealand. Further improvements in access to the Internet has made day by day contact very simple, and during the year AAVSO Alerts and News Flashes have been regularly forwarded to local observers who are able to receive them. It is hoped that before long every observer will have direct access to the Internet.

The following visual observations have been received from observers in South Africa and Zimbabwe:

Observer	Town	Number of observations
J. Hers	Sedgefield	793
R.W. Jones	Fish Hoek	1 327
J.L Jooste	Reitz	6
H. Lund	Johannesburg	104
C. Mesu	Harare	103
L.A.G. Monard	Pretoria	2 655
M.D. Overbeek	Edenvale	12 336
J.A. Smit	Pretoria	974
S. de Villiers	Caoe Town	106
S. Walsh	Grahamstown	88
Total:		18 492

PRESIDENTIAL ADDRESS

Small astronomical observatories and unusual telescopes of Gauteng

Tony Hilton

Every president during his term of office should get around to see his electorate; this is true for the political arena, but this position in ASSA simply means that one only has to run the AGM and present an address to the members at the end of his term in office.

During the past few months I have visited observatories in the region with a view to collecting and documenting as much interesting information as possible about each site. This address is in the form of a Power Point presentation (66 slides) followed by a one hour video of the sites.

Danie Overbeek (Dowerglen, Edenvale)
Altitude ..... 1671 m
Latitude ..... S 26° 09' 16.3"
Longitude ..... E 28° 08' 17.2"
Tel ..... (011) 453 6918

The structure:
A small wooden portable observatory with tilt-over roof, ±1.8m², built in 1972.

The telescope:
Home-built 12½-inch (317mm) Cassegrain telescope, square masonite hardboard tube 1.2m long, electric drive, large setting circles and smooth slow-motion controls. The instrument has a small 1-inch (25mm) x6 finder and an auxiliary 3-inch (75mm) x48 refractor. A turret gives a choice of 167 or 267 magnifications on the main instrument. Due to high usage of the telescope the aluminium coating on the primary mirror has to be re-coated annually.

Other equipment in observatory:
home-made Photoelectric Photometer (IP21) with high-speed strip recorder; Julian Day clock; time signal radio receiver

Other equipment on site:
Two channel home-made seismograph (vertical & horizontal); Radio Solar Flare detector - Sudden ionospheric disturbance (SID); Magnetograph - detects flare-related magnetic disturbances; 8-inch (200mm) portable Newtonian, assembles in a minute.

Notes:
Danie is a dedicated and prolific observer of variable stars (his personal tally exceeds 250 000 observations) and has achieved high tally's in lunar and planetary occultations and has recorded many flares and earthquakes.

Domenic Toldo (Elmapark, Edenvale)
Altitude ..... 1709 m
Latitude ..... S 26° 09' 16.1"
Longitude ..... E 28° 09' 23.9"
Tel ..... (011) 454 1418

The telescope:
Home-built 8-inch (200mm) short focus f/5, fully computerised in right ascension and declination. Has a database of many stars and all the planets

Other equipment on site:
Magnetometer and recorder - detects flare-related magnetic disturbances; three channel solar flare detector - a super sensitive very low frequency (VLF) super heterodyne radio receiver that detects the sudden enhancements of signal (SES), monitoring 71.6 Khz, 21.4 Khz and 24.0 Khz continuously with recordings (one receiver is fully tuneable across the VLF band.)

Jim Knight (Atlasville, Boksburg)
Altitude ..... 1600 m
Latitude ..... S 26° 09' 03.1"
Longitude ..... E 28° 17' 30.9"
Tel ..... (011) 973 1380

The structure:
A wooden shed, ±3.5m², with an asbestos roll-off roof, six wheels. Built in 1991 for about R3 500.

The telescopes:
A 4-inch (200mm) f/12.5 refractor on loan from the

Society and a 3-inch (75mm) f/9.5 refractor are mounted on a very large and robust mount, made by Monty Northan.

Other equipment:
Three portable telescopes – a 4½-inch (112.5mm) f/11, an 8-inch (200mm) f/4.5 Newtonian and a Celestron C90 Schmidt/Maksutov – are used for school astronomical evenings.

Notes:
Jim is a keen solar observer and issues many reports around the world. He also observes comets and meteors and does occultations, but is suffering from small aperture syndrome and wants to upgrade to large telescopes.

Tim Cooper (Bredell A.H., Kempton Park)
Altitude ..... 1656 m
Latitude ..... S 26° 05' 25.4"
Longitude ..... E 28° 18' 57.2"
Tel ..... (011) 967 2250

The structure:
The first in Benoni was a wooden shed with a roll-off roof and was 3m x 3.5m.

The second, at the above location, is presently under construction. The observatory will be made from a steel frame with corrugated iron sides and roof; a feature will be low sides with a roll-off roof. The observatory will have a 2m x 3m warm room and the observatory of 5m x 3m will house two telescopes.

The telescopes:
The main telescope is a Meade 16-inch (400mm) f/4.5 Starfinder Dobsonian, which will be used for variable star work. The second telescope is home-made; this 8-inch (200mm) f/7.5 Newtonian will be equatorially mounted and electrically driven and will be used for comet and CCD work.

Other equipment:
A portable 4½-inch (112.5mm) f/7.9 Newtonian is used for grazing occultations and school observing.

Notes:
Tim is a very enthusiastic observer of meteors (from a horizontal position in his sleeping bag) and also spends many hours observing comets and processes many observations reported to him and produces excellent observing tables and reports.

Jannie Smit (Waverley, Pretoria)
Altitude ..... 1326 m
Latitude ..... S 25° 41' 59.9"
Longitude ..... E 28° 14' 38.0"
Tel ..... (012) 332 1388

The structure:
A thoughtfully constructed observatory, approximately 2m x 2m, built into the existing house with an internal wooden staircase for access. Features a light aluminium slide-off roof, with a wheel at each corner. The roof has a lip all round and as it closes the one set of wheels drop off the rail and the roof forms a lid over the observatory making it quite dust proof. The roof is locked down once closed.

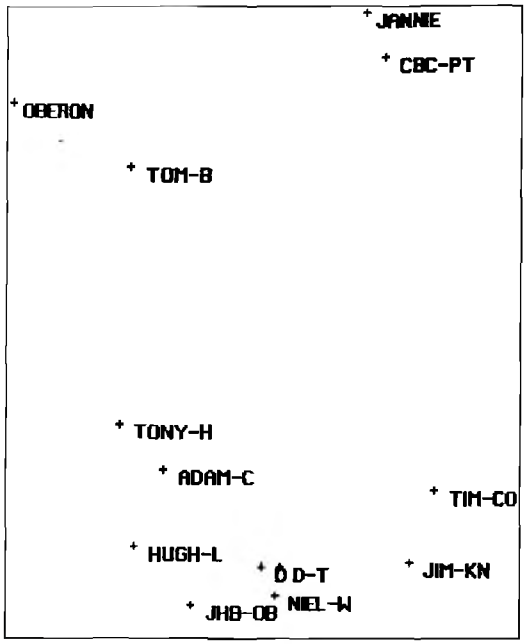
The telescope:
The main telescope is a Classic 8-inch (200mm) Meade Schmidt-Cassegrain f/10, with enlarged declination setting circles and a home-made adjustable eyepiece focuser.

Other equipment:
A home-made adjustable seat for all heights (very nifty); a two-tier triangular support connecting the pier to the north wall doubles as viewing table and storage shelf whilst bracing the pier (a good place for storing eyepieces and for star charts whilst viewing etc.)

Notes:
Jannie is a keen observer of variable stars and has recorded many planetary, lunar and grazing occultations

Christian Brothers College – CBC (Pretoria Centre, Pretoria)
Altitude ..... 1204 m
Latitude ..... S 25° 44' 11.5"
Longitude ..... E 28° 16' 00.5"
Tel ..... (012) 333 9158 (Louis Barendse, Chairman PTA)

The structure:
The dome and observatory structure were built with the aid of the PTA of CBC on the school grounds, while the telescope and accessories remain the property of the Pretoria Centre. The observatory is roughly 4 metres in diameter with a metal dome and manually operated shutters. It was built in 1976 and has had some improvements and modifications since then.



All sites were surveyed with a Garmin GPS 38 Personal Navigator. Key: Danie Overbeek (D), Domenic Toldo (D-T), Jim Knight (JIM-KN), Tim Cooper (TIM-CO), Jannie Smit (JANNIE), Christian Bros. College (CBC-PTA), Adam Chetwynd (ADAM-C), Gill Street (Johannesburb) (JHB-OB), Tom Budge (TOM-B), The Leiden Station (OBERON), Hugh Lund (HUGH-L), Dr. Niel Williams (NIEL-W), Tony Hilton (TONY-H).

The telescope:
An open-frame 12½-inch (320mm) f/9 Newtonian on an English mount dating back to 1870. The current mirror was imported from the USA in 1943 and was installed with its open-frame tube at the residence of Mr. Hoogenhout in Waterkloof. It was sold to the Pretoria Centre in 1967 and moved to the Radcliffe Observatory in 1969. In May 1974 the Radcliffe Observatory closed and the telescope was moved to its present site and was fully operational in late 1977.

Notes:
The site is used for practical astronomy for the school and members of the centre, with frequent public viewing sessions.

Adam Chetwynd (Duxberry, Sandton)
Altitude ..... 1269 m
Latitude ..... S 26° 04' 23.6"
Longitude .... E 28° 02' 57.1"
Tel ..... (011) 783 9558

The structure:
Completed late in 1996, it is built of brick. The electric remote controlled roll-off roof is constructed from tubular steel in the form of a flattened arch and has a special ceiling of insulating material for temperature control. It is quite dust proof and rolls on six wheels. The observing deck is 5m square with a sunken warm room of 5m x 1.8m at the north end.

The telescopes:
A large fully imported Meade 16-inch (400mm) Schmidt-Cassegrain LX200 f/10 with computer, other accessories and is equatorially mounted on a 24-inch (600mm) pier; accurate polar alignment is currently being finalised. Other telescopes include a 10-inch (250mm) LX200 and a 4-inch (100mm) Meade with accessories and tripods etc.

Notes:
Adam is a keen general observer and is looking forward to participating in future observing programs.

Gill Street Telescopes – Johannesburg Centre (Observatory, Johannesburg)
Altitude ..... 1870 m
Latitude ..... S 26° 11' 05.6"
Longitude .... E 28° 04' 28.3"
Tel ..... (011) 616 3202 (Ed Finlay, Chairman Jhb. Centre)

The structure and telescopes:
The largest dome houses the 26½-inch (675mm) Innes refractor; the lens was ordered in 1909 from the Dublin firm of Sir Howard Grubb (casting a lens of this size was no easy matter, and there were other troubles; the lens was finally installed in 1925). Over 3000 double stars were discovered with it and well over 600 new minor planets.

The largest of the hill-top domes is the Papadopoulos dome and houses three telescopes:

The Twin Franklin-Adams 6-inch (150mm) f/18 refractor, a 7-inch (175mm) f/15 photovisual refractor and the 12-inch (300mm) f/16 Tinsley Cassegrain (donated by Chris Papadopoulos).

The above are all piggy-backed on one mount,

which will shortly have a digital read-out fitted. These telescopes are used by the Centre for basic astronomy and for public viewing evenings every month.

The smaller dome houses the 12-inch (300mm) f/8 Jacobs Newtonian, which is currently out of order.

Tom Budge (Protea Ranch, Vlakplaats)
Altitude ..... 1458 m
Latitude ..... S 25° 49' 34.2"
Longitude ..... E 28° 01' 06.6"
Tel ..... (012) 669 0421

The structure:
The 3m x 3m observatory is currently under construction – the walls of natural indigenous stone are now complete. The pier is an 18-inch (650mm) concrete water drain pipe which is concreted to two large rocks. The roof will slide off to the south.

The telescope:
A 10-inch (250mm) f/10 LX200 Meade Schmidt-Cassegrain. The telescope and CCD camera will be coupled to the house 50-60 m away once the observatory is completed.

Notes:
The skies are very dark at this site and many deep-sky viewing evenings are arranged at this location.

The Leiden Station-Oberon (Hartebeespoort)
Altitude ..... 1210 m
Latitude ..... S 25° 46'23.7"
Longitude ..... E 27° 52' 36.1"
Tel ..... (01205) 51425 (Frans van Niekerk, Site Manager)
The land now belongs to the Pretoria Technikon and is used by the Bureau for Student Development. There are three domes at this site: The East dome houses the John Franklin-Adams 10-inch (250mm) photographic refractor, which was donated to the Union/Republic observatory in 1909 and moved to its present location in 1954. It was used to complete the southern portion of the Franklin Adams sky chart.

The centre dome houses the 16-inch (400mm) twin astrograph, known as the twin Rockefeller Telescope. The telescopes were identical, and the arrangement was designed for a safety-measure. When photographing the sky, both telescopes were loaded, so that if one plate proved faulty for any reason the other would be all right.

The West dome housed the 36-inch (900mm) Cassegrain telescope known as the flux collector, the telescope was operated from a control room and all the light collected by the telescope was directed to a five channel electronic photo-detector which analysed the light which was recorded on punch tape.

This facility and its telescopes were used primarily by Dutch astronomers.

Hugh Lund (Parkhurst, Johannesburg)
Altitude ..... 1595 m
Latitude ..... S 26° 08' 12.0"
Longitude ..... E 28° 01' 22.0"
Tel ..... (011) 788 8195

The structure:
A wooden observatory with a clever design for the roof, using inverted gull wing panels. The roof panels open like a flower with the aid of large crank handles, and the north gable tilts out. The 2.5m x 2m false floor is about four feet off the ground.

The telescope:
Optics were purchased from Meade. The open-frame 12½-inch (312mm) f/6 Newtonian is mounted in a sturdy split-ring equatorial mount with a friction drive. The eyepiece and diagonal rotate on the top of the open frame for easy access.

Other equipment:
Home-made computerised digital read out of right ascension and declination using shaft encoders and a 286 computer.

A home-made kit Cookbook 245 (upgraded version) CCD Camera connected to a 386 computer. The CCD sensor is 252 pixels wide x 242 line with internal binning. The field of view is 12 arc min x 9 arc min. A water heat exchange is used for cooling.

A 486 computer in the study is used for image processing and storage.

Notes:
Hugh has taken many images with the CCD camera. It has taken many hours to align the sensor in the optical train and there were many failed images. He now has it down to a fine art and is in a CCD program for the AAVSO, directed by Gary Walker. Hugh is currently observing 5 variable stars for this program. He suffers from light pollution and does very little visual variables but still attempts many planetary occultations.

No. 17 Ada Road, Malvern East, Germiston
The observatory is empty and is being used as a children's play room. The current owner has no knowledge of who built the observatory. Danie Overbeek thought that Mr. Eban Van Zyl originally built the structure.

Dr. Niel Williams (Bedfordview)
Altitude ..... 1739 m
Latitude ..... S 26° 10' 39.7"
Longitude ..... E 28° 09' 08.3"
Tel ..... (011) 455 4862

The structure:
A compact 5m x 3.5m observatory with brick walls and a corrugated iron slide-off roof, built 1958 to 1960 and housing two telescopes

The telescopes:
The 12-inch (300mm) f/15 rotating open-frame Newtonian supported in a double-yoke mounting with friction drive; completely home-made by Niel with Danie Overbeek's help.

A 5-inch (225mm) f/15 Broadhuest-Clarkson lens refractor is permanently mounted in the observatory and has a clockwork drive.

Both of these telescopes have not been used for years. They were used for planetary and lunar occultations. Neil was a keen observer during the Moon watch program from 1957 to 1958 using 2-inch (50mm) and 3-inch (75mm) apogee telescopes.

Niel has a 6-inch (150mm) f/15 Irwing & Son refractor (no mount) which was bought from a teacher at Kersney College; it has a brass cell and the lens has a certificate of recommendation from Dr. Stevenson.

Tony Hilton (Norscot, Sandton)
Altitude ..... 1559 m
Latitude ..... S 26° 02' 13.0"
Longitude ..... E 28° 00' 28.2"
Tel ..... (011) 465 2257

The structure:
An elevated brick and plaster observatory built during extensions of the house in 1995. The slide-off roof, which blends with the existing house roof, was completed in October 1996. The observatory is 3.9m x 3.9m. The root of the pier has a concrete and brick column to a block in the foundations; this was to stop the observatory floor springing under the weight of people moving around.

The telescopes:
John Vincent built the German mount and tube in Salisbury, Rhodesia and imported the 6-inch (150mm) f/15 Jaegers refractor lens as a porthole; it was purchased from him in 1975. It moved with the family to Durban in 1982, to Randburg in 1986 and to its present location in 1987. It has two finder scopes and a turret of 5 eyepieces.

The Celestron C8 Classic f/10 can be used in the observatory or wheeled out on its sturdy tripod to three pre-determined lugs on the balcony; this avoids the need to align the telescope each time it is used. The telescope has a joystick for slow-motion control while taking photographs.

Other equipment:
Radio Solar Flare detector and recorder- Sudden ionospheric disturbance (SID); magnetograph - detects flare-related magnetic disturbances; home-made photodiode photometer with high-speed Pye Scale Lamp Micrometer and strip recorder.

Three home-made digital clocks, 6 digit display (mm:ss:th) built in 1974, 4 digit display (m:ss:t) built in 1975 and 8 digit display (hh:mm:ss:th) built in 1979. All of these clocks can be frozen and re-synchronised with the push of a button. The first two have an audible second tone simulating the WWV time signal.

Complete weather station which logs, temperature (inside and outside), humidity (inside and outside), wind speed, wind direction, dew point and barometric pressure.

Time signal radio receiver, Computer, Intercom to house etc.

Tony Hilton delivered his Presidential Address on 1997 August 13 at the Johannesburg Centre. He is past Chairman of Salisbury (Harare) Centre, Durban Centre and Transvaal (Johannesburg) Centre, and is the current Director of the ASSA Computing section.

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1998

MINUTES OF THE AGM

Minutes of the Annual General Meeting held at the Cape Centre, Cape Town, on 1998 July 22.

1. Welcome
The President, Dr Bob Stobie welcomed all present and requested that all past Presidents present identify themselves by standing. Those present were: Messrs Jan Hers, Ian Glass, Tom Lloyd-Evans, Maciej Soltynski, Peter Smits, Jonathan Spencer-Jones, Jack Bondietti, Danie Overbeek, M Andrew Gray and Rupert Hurly.

2. Apologies
Apologies were received from Dr A.W.J. Cousins, Messrs C.D. Allen, T. Cooper, T. Turner, C.R.G. Turk, H. Krumm, A. & J. Joubert, A. Slotegraaf and J. Knight.

3. Minutes of the previous AGM
These were published in *MNASSA*, **56**, 9&10, October 1997. It was proposed by Mr M.A. Gray and seconded by Mr C. Rijsdijk that these be accepted as a true record of the 1997 meeting. This motion was accepted unanimously.

4. Matters arising
None

5. Report from Council
Compiled and read by the Hon Secretary, Mr Brian Skinner.

6. Reports of the Observing Sections
Comet & Meteor Section (read by Mr Case Rijsdijk on behalf of the director, Mr Tim Cooper); Computing Section (no report tabled); Deepsky Section (read by Dr Ian Glass on behalf of the director, Mr Auke Slotegraaf); Historical Section (read by the Director, Mr Chris de Coning); Occultation Sections (read by the Director, Mr Danie Overbeek); Solar Section (no report tabled); Variable Star Section (read by the Director, Mr Jan Hers)

7. Financial report
Mr Colin Gray tabled the audited report. Mr M.A. Gray proposed its acceptance and this motion was adopted unanimously.

8. Report of ASSA Endowment Trust
Mr Brian Skinner read the report and presented the balance sheet on behalf of the Trust's Secretary, Mr C.R.G. Turk. Acceptance of the report was proposed by Mr Rupert Hurly and seconded by Dr Ian Glass. This motion was carried unanimously.

9. Election of Honorary Auditor
It was proposed by Mr M.A. Gray that Mr R. Glass, Senior Partner at Zeller Karro be appointed for a further term. This motion was carried unanimously.

10. Election of office bearers
The following proposal from Mr C. Turk and seconded by Mr M.A. Gray, was the only one received and adopted unopposed. Those nominated were:

President	Mr Danie Overbeek
Vice President	Dr Bob Stobie
Vice President	Mr Derck Smits
Vice President	Mr Peter van Blommestein
Members	Dr D.M. Kilkenny
	Mr Tom Budge
	Mr Tim Cooper
	Mr Case Rijsdijk
Hon Treasurer	Mr Colin Gray
Hon Secretary	Mr Brian Skinner

11. Presidential Address
The new President, Mr Danie Overbeek invited Dr Bob Stobie, the outgoing President, to deliver the annual presidential address entitled 'The South African large Telescope', the text of which is published separately in *MNASSA*.

12. Closing
Mr Danie Overbeek declared the meeting closed at 21:52 and invited all the past Presidents to accompany him to the SAAO Library where they would be photographed together as a group. Members were invited to enjoy the tea and biscuits kindly provided by the Cape Centre, who were thanked by the President on behalf of Council for their hospitality in hosting the meeting.

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1998

REPORT OF COUNCIL 1997 - 1998

Council met on five occasions since the last AGM with an average of eleven persons present at meetings.

1. Membership
Total membership was **268** as at 1 July 1998 compared with **344** a year earlier. Membership is now R80.00 per annum.

2. Finance
The Honorary Treasurer, Mr Colin Gray, is thanked for his efforts on behalf of our members for the past year. Council wishes to thank the numerous members who have once again made donations to the ASSA. These are gratefully received because they allow the subscriptions to be maintained at the current rate for as long as possible before an increase is needed.

Donations to the ASSA Trust are also important because the interest on the capital invested is available to provide for future members' subscriptions to be maintained at realistic levels.

3. Business Manager
Mr Cliff Turk has continued as business Manager this year. Overseas sales of *MNASSA* almost cover the total cost of *MNASSA* production. In this instance the Rand/ Dollar exchange rate works in our favour. He has also been responsible for the publication of the main functions of Council office bearers in *MNASSA*. Council expresses its thanks to Cliff for his hard work.

4. *MNASSA*
Mr Auke Slotegraaf continues to edit an informative publication that keeps members up to date with developments in astronomy. He has also established a Web site on the Internet on behalf of the Society. This site is of a high standard and is a credit to the ASSA. Council is delighted with this new development.

5. Annual *Handbook*
Miss Pat Booth has continued as Editor of the Annual *Handbook* and is assisted by the Directors of the observing sections. The *Handbook* is distributed by Cliff Turk to amateur and professional observers living all over the world. Council extends its sincere thanks to Pat and Cliff for their sterling work on the *Handbook*.

6. Acknowledgements
Council wish to thank the following persons or institutions for assistance during the past year:

Dr Robert Stobie, Director of SAAO, for the use of meeting facilities at SAAO.

Mr Pieter van Blommestein, for chairing Council meetings in the absence of the President.

Mrs Penny Dobbie of the University of Cape Town Astronomy Department for her assistance with Society publications.

Council extend their appreciation to the Directors of the Observing Sections for collating astronomical research by amateur astronomers and also for forwarding the results of observations to international Astronomical bodies.

The local Centres who have assisted the professional astronomical fraternity with public viewing nights at the various observatories are commended for their efforts.

Last, but not least, the Cape Centre for hosting the Annual General Meeting this year after a hiatus of some four years.

7. Finally
Council wishes to thank anyone who contributed to the work of the Society this year even should they not have been mentioned by name.

(Brian Skinner, Hon Secretary)

ASSA ENDOWMENT TRUST (ASSET)

A continuing steady flow of donations has raised the capital of the fund to R 12 800 and the distributable reserve is now R 20 200 making the total of funds being adminstered just over R 33 000.

The Trust's annual grant to ASSA to help defray some of the expenses has been increased to R 1 500 during the past year. Other forms of support for Astronomy in Southern Africa are under consideration and new suggestions will be welcomed. (Cliff Turk, Secretary)

BALANCE SHEET AS AT 31st DECEMBER 1997

1996		R - c
	Trust Capital:	
10 786-04	Balance at 31st December 1996	11 966-04
1 180-00	Donations received during the year	840-00
R 11 966-04		R 12 806-04
	Distributable Reserve:	
18 285-24	Balance of Income and Expenditure Account	20 212-03
R 30 251-28		R 33 018-07
	Represented by:	
	Investments:	
20 000-00	United Bank Fixed Deposits	20 000-00
938-15	ABSA Bank Ltd. Equity Shares (at cost)	1 180-75
4 000-00	Loan to ASSA	nil
	Savings Account:	
5 313-13	United Bank	7 837-32
R 30 251-28		R 33 018-07

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR TO 31ST DECEMBER 1997

	Income		
2 927-09	Dividends and interest received		3 427-19
	Deduct Expenses:		
	Bank service charges	0-40	
1 000-20	Grant to ASSA	1 500-00	1 500-40
R 1 926-89	Excess of Income for the year		R 1 926-79
16 358-35	Excess of Income from previous year		18 285-24
R 18 285-24			R 20 212-03

Notes: United Fixed Deposits:

13.30% p.a. maturing 8 Oct 98	R 4 000-00
14.25% p.a. maturing 8 Oct 98	R 8 000-00
11.45% p.a. maturing 29 Apr 99	R 8 000-00
14.45% p.a. maturing 29 Apr 99	R 4 000-00
ABSA Bank Ltd. Equity Shares (cost)	R 1 180-75
(Market value R 9 612-00)	
	R 25 180-75

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1998

HONORARY TREASURER'S REPORT

It is pleasing to report on a financial year that shows a healthy consolidation of resources, resulting in a net asset value of R 23 000, subject to audit.

This has been brought about by a strict policy of spending only when equivalent funds have been received from members and subscribers to *Sky & Telescope*, *MNASSA* and the *Handbook*. There three publications are now virtually self-supporting.

As a result, the effects of the wild fluctuations in the Dollar/Rand rate have been minimised, even though the dollar started the year at R 4.45 and has risen progressively to the present R 6.45.

Thanks are recorded to those members who sent donations with their subscriptions, as well as to the Trust for its financial support.

C. D. Gray

SECTION REPORTS

COMET AND METEOR SECTION
T P Cooper

1. Meteors

1.1 Summary of observed showers

Observer	Shower	Hours Observed
Cooper T P	alpha Centaurids	3.0
	eta Aquarids	30.1
	Sco/Sgr complex	2.1
	alpha Capricornids	1.0
	beta Cetids	5.0
	Leonids	2.0
Streicher M	Perseids	1.4
	Orionids	2.5
	Leonids	0.6
Prinsloo duT	Pyxids	1.0
	iota Aquarids	1.0
	alpha Capricornids	1.0
	alpha Cygnids	1.0
	Taurids	1.0
	Geminids	1.5
	Puppid-Velids	0.5
Van Zyl K	eta Aquarids	1.9
	delta Aquarids	3.0
Skinner B	alpha Centaurids	2.0
	delta Pavonids	1.1
	delta Aquarids	2.2
Slotegraaf A	eta Aquarids	3.5
Swart H	eta Aquarids	0.8
Marais A	Leonids	0.6
Van Blommestein P	Aquarids	3.0
	Capricornids	3.0
	Orionids	1.0
	Taurids	1.0
Hollenbach	unknown	0.7
	Total	78.5

1.2 Total observing time per observer

Observer	Number of showers	Total observing time (hours)
Cooper T	6	43.2
van Blommestein P	2	8.0
Prinsloo duT	7	7.0
Skinner B	3	5.3
Van Zyl K	2	4.9
Streicher M	3	4.5
Slotegraaf A	1	3.5
Swart H	1	0.8
Hollenbach W	1	0.7
Marais A	1	0.6
Total		78.5

1.3 Notes on some specific showers observed

alpha Centaurids: Cooper observed on the night of February 6/7, seeing 2 possible Centaurids and 23 sporadics. Skinner observed on the night of 8/9, seeing 2 Centaurids and 5 sporadics.
Pyxids: du Toit Prinsloo observed 1 Pyxid on the evening of March 6 in a one hour session.
delta Pavonids: Brian Skinner observed no Pavonids and two sporadics on April 7.
eta Aquarids: This year saw the best global coverage ever of the eta Aquarids, with a large portion of all the observations made from southern Africa by Tim Cooper, Hermann Swart, Auke Slotegraaf and Koos van Zyl. As usual, rates reached ZHR=60/hour around the maximum about May 5. The full results were published in MNASSA, 56, 7&8, 56-58.
Sco/Sgr complex: Cooper observed weak activity on the evening of June 2. Other nights were spoiled by cloud.
alpha Capricornids, iota and delta Aquarids, Perseids and beta Cetids: These showers all form part of the complex activity during July and August, and a number of observers sent reports this year. Here follows a summary. Cooper observed 2 Capricornids and 3 sporadics on the evening of July 25. Koos van Zyl observed for 3 hours on the night of July 26/27, logging 9 Capricornids, 4 Piscis Australids, 18 delta Aquarids, 6 alpha Capricornids and 14 sporadics. The following night, du Toit Prinsloo observed 6 Capricornids and 2 other meteors in a one hour session. Brian Skinner observed for 2.5 hours on July 29, seeing 9 delta Aquarids. Magda Streicher observed for two hours on the morning of August 12, seeing 17 meteors of various description. Cooper observed on the mornings of August 10-12, seeing 63 meteors, including 8 beta Cetids and 7 Perseids. The remainder were largely Aquarids and sporadics. du Toit Prinsloo observed 3 iota Aquarids and 3 sporadics on the evening of August 22.
alpha Cygnids: du Toit Prinsloo reported seeing 5 alpha Cygnids in a one hour watch on July 4.
Leonids: Cooper observed on the mornings of November 17 and 18, seeing 6 Leonids on the latter in one hour, despite bright moonlight conditions. The first night was characterised by poor weather for both Cooper and Streicher, who saw only 4 meteors in just over a half an hour. Anton Marais also observed the Leonids with similar results.
unknown: Bill Hollenbach reported numerous meteors which seemed to emanate from Musca on the night of March 29, while observing from the Cederberg Observatory. The activity included a burst of 4 meteors in under 1 minute around 19h05 UT.

2. Fireballs

2.1 Summary of observed fireballs

(See table overleaf)

2.2 Details of specific events

1997 January 24 - seen widely by many members of the public, reported on Radio 702 and in the *Saturday Star* on January 25. The following eyewitness reports were collected:

Dr Tom van Vuuren, observed from 6 Blyde Street, Farrarmere, Benoni, estimated the object as brighter than the full moon, about magnitude -15. He observed a blue head and white trail.

Trevor Gould, observing from Sandton, reported seeing the object in the east, travelling south, descending about 5° from the horizontal. The head was bright green and the tail reddish. Duration 2 seconds before he lost sight of it behind buildings. He estimated the object as magnitude -10.

Mohamed Ali Adam, observing from Actonville, Benoni, said he first saw the object from a point near

the horison where the sun rises. It disappeared over Wattville, Benoni. He was unsure of the duration, estimating it as a few seconds. He described the object as green at the top, red at the bottom and firey at the back. He estimated the brightness as greater than the full moon.

Ali Ebrahim, observing from Lenasia, noted the colour as green, of oval shape, very bright in the centre, with a short blue tail. He reported the path as horizontal moving north to south.

1997 April 8 - seen about 40° above north western horizon, travelling horizontally from west to east for about 50°. Described as red colour, visibly flaming and left a white smoke trail of 1.5-2 seconds duration and about the width of an aircraft contrail. The speed was slower than a normal meteor.

1997 May 3 - Colour emerald green, duration 2 seconds, left 1 second train.

1997 May 5 - Both Cooper and van Zyl observed this eta Aquarid fireball during a dedicated watch on this shower. It was the brightest Aquarid seen during the 1997 campaign. The colour was bright green, and it left a 30 second train.

1997 May 10 - colour white, duration 2 seconds, broke into several pieces 20° above horizon.

1997 June 16 - seen from car during daylight, white, duration 1-2 seconds.

1997 July 22 - colour bright blue/white, duration 2 seconds, broke into several pieces in last half second.

1997 August 7 - seen in broad daylight as the object flashed across field of binoculars. Colour white, brightness compared to nearby Venus which was being observed at the time.

1997 August 8 - colour white, duration 3 seconds.

1997 September 24 - colour green, fragmenting, very slow path of 20°.

3. Comets

3.1 Summary of observed comets

Observer	Comet (observing method)
Begbie M	Hale-Bopp (V,S,P)
Cooper T	Hale-Bopp (V,S,P)
Smith T	Hale-Bopp, Hartley 2, Wild 2 and Tabur (V)
van Staden A	Hartley 1, Hartley 2, Gunn, Russell 3, Wild 2, Schwassmann-Wachmann 1 and Kowal 2 (C)
van Zyl K	Hale-Bopp (V)

(V = visual observations, C = CCD images, P = photographs, S = sketches)

Date of fireball	Name of reporter	Visual magnitude	Time UT	Start (2000.0) Coordinate	End Coordinate
1997 Jan 24	T Gould, T van Vuuren, M Ali Adam, A Ebrahim	−10 to −15	*c*20h12	not given	not given
1997 Apr 8	A Kielczynski	−3	20h30	not given	not given
1997 May 3	B Hollenbach	−4	20h00	09h20, -10°	06h40, -32°
1997 May 5	T Cooper, K van Zyl	−3/−3.5	03h20	23h05, +24°	23h14, +31°
1997 May 10	T Gould	−6	16h13	not given	not given
1997 Jun 16	D Garbutt	>−5	~07h00	not given	not given
1997 Jul 22	N Young	−4	18h33	not given	not given
1997 Aug 7	N Young	−4	11h15	not given	not given
1997 Aug 8	P v. Blommestein	−3.5	17h23	20h40, -25°	20h00, -50°
1997 Sep 24	K van Zyl	−6	20h49	not given	not given
1997 Nov 29	P v. Blommestein	−4	21h50	not given	not given

3.2 Details of specific comets

Hale-Bopp (C/1995 O1): The comet was well observed and all observations will be published as a separate publication of the Comet and Meteor Section. Mike Begbie made over 200 observations of the comet, numerous sketches and photographs, which will form the back-bone of the report, but other members have also made excellent contributions.

The first observation of the comet low in the north was by Mike Begbie on April 15, when he estimated the magnitude as -0.3. The last observation of 1997 was made by Tim Cooper on Christmas night, with the comet at magnitude 8.0.

Comets Hartley 1, Hartley 2, Gunn, Russell 3, Wild 2, Schwassmann-Wachmann 1 and Kowal 2: These comets were all imaged by CCD by Andre van Staden. The images will appear in a separate publication of the Comet and Meteor Section.

4. Conclusion

During calendar 1997, the Section observed a number of meteor showers, with particularly useful scientific coverage of the eta Aquarids. Eleven fireball reports were received, including the very bright nightime event of January 24, which may have reached magnitude -15. Despite the Directors *MNASSA* article detailing how to report fireballs, many members still send in incomplete reports. Comet Hale-Bopp became the Great comet of 1997, generating much interest amongst the general public, and providing the Section with its brightest comet since comet West in 1975.

As usual, observations are forwarded to the International Meteor Organisation, International Comet Quarterly and the BAA Comet and Meteor Sections and Society of Popularisation of Astronomy.

To all observers who took the trouble to submit their observations to the Director I extend my thanks, and can assure them that their observations are put to maximum use.

DEEP-SKY OBSERVING SECTION
A Slotegraaf

The previous 12 months saw the debut of the *Deepsky Observers Companion* (DOC) — the Section's webpages on the Internet. Through these regularly updated pages, members can now access a database of deepsky objects, covering the sky from declination -17° to the south pole (coverage of the sky further north is not expected within the next two years). A word of special thanks to Willmann-Bell Publishers, who have agreed that sections of their Uranometria 2000.0 atlas may be used as the basis for the pages.

Currently, the DOC pages:

- describe the Section's activities, achievements and goals,
- publicise and archive descriptions of deepsky objects, and
- contain comprehensive on-line resources and observing tutorials, aimed at observers of all experience levels.

Members who do not have Internet access can write the director for a list of the material available, which can then be printed out as requested. Special permission has also been granted by Sky Publishing Corporation to reprint and distribute to Section members certain observing-related articles that appeared in *Sky & Telescope*.

An email-based discussion list has been set up, allowing for the exchange of ideas related primarily to southern hemisphere deepsky observing.

An observing award scheme, aimed at promoting hands-on astronomy, has been established by the Section (subject to approval by Council). To this end, a series of observing lists have been drawn up, offering a challenge to observers at all skill levels. In the course of this work, the director was assisted by Rui Henriques, who took part in a quick survey of the southern sky to identify suitable targets. As a result, an ASSA Deepsky Catalogue was drawn up, including suitable objects in each constellation south of +6°.

Members are encouraged to take part in the project and earn certificates:

- for the **beginner**, two lists are available: Lacaille's Catalogue, and Part 1 of the ASSA Deepsky Catalogue.
- for the **intermediate**-level observer, there are three choices: Jack Bennett's Catalogue, James Dunlop's Catalogue, and Part 2 of the ASSA Catalogue.
- the **advanced** observer can currently choose between Part 1 and Part 2 of John Herschel's Catalogue.

Section member Magda Streicher of Pietersburg is to be congratulated for completing her Bennett Catalogue; extracts from her 80-page report are available on the DOC webpages.

Other members are encouraged to work towards these awards; not only do they provide a ring-side seat to some of the best sights in the universe, but the skills acquired can be applied effectively to the work of the other observing sections.

Two further projects are currently underway: the first is an investigation into Lacaille's Catalogue and the modern-day references to its entries; the second examines the type of data reported by deepsky observers, with the aim of developing a systematic, comprehensive framework within which to record observations. Anyone interested in working on these should contact the director.

Regular editions of *Nightfall* continue to appear in *MNASSA* Centrepiece, providing an informal look at the monthly night sky and the activities of observers.

ASSA members are reminded that a paper copy of the introductory deep-sky observing guide (amongst others) is available free of charge from the director. New observers are encouraged to share their observations with other members by joining the section and exploring the rich southern skies.

Postal address: PO Box 12838, Die Boord, Stellenbosch, 7613. Email: auke@global.co.za
DOC pages: http://www.global.co.za/~auke
or http://members.xoom.com/auke/index.htm

OCCULTATION SECTIONS
M D Overbeek

1. Total occultations by the moon

It is possible that members other than those listed below observed occultations and reported them without notifying the undersigned. In order that annual reports be complete, all members who have observed occultations should report their activities to the Director.

Teams	Disappear.	Reappear.
AC Hilton	23	0
J and S Knight	22	0
DA and MD Overbeek	48	9
J Smit	42	23
C Turk	11	1
P van Blommestein	55	0
Total	201	33

C Turk observed 23 occultations in the years 1992 to 1996, not included in past annual reports.

2. Grazing occultations by the moon

Lamentably, no successful observations were made in 1997, for reasons explained in previous annual reports. The Cape and Johannesburg Centres did in fact plan expeditions which had to cancelled due to cloud.

Brian Fraser is thanked for again preparing graze predictions, which were forwarded to various Centres by the Director.

3. Planetary occultations

It is certain that the improved star positions now available to predictors will result in less disappointments to observers. During the year under review not one occultation was observed, despite the efforts of the faithful few, who are thanked for their continued dedication.

Twenty nine events were attempted and a further eight were predicted but not observed due to cloud.

Those who reported back are: T Cooper, F de Jager, R Field, B Fraser, AC Hilton, T Lloyd Evans, H Lund, B Monard, C Rijsdijk, J Smit, T Smith, C Turk and P van Blommestein.

Jan 3 Lick4 3158 by 125 Liberatrix: Bredell had cloud. At Edenvale, Overbeek observed a miss. Pretoria and Simon's Town had cloud.
Jan 18 PPM 97112 by 112 Iphigenia: Bredell, Edenvale, Pretoria and Simon's Town had cloud.
Feb 11 PPM 194487 by 541 Deborah: Edenvale, Johannesburg and Pretoria had cloud.
Mar 13 PPM 179237 by 13 Egeria: Edenvale had cloud.
Apr 30 PPM 127386 by 139 Juewa: Edenvale, Overbeek low and hazy. Johannesburg, H Lund, low. Pretoria, J Smit observed a miss. Vanderbijlpark, Francois de Jager observed a miss.
May 10 PPM 290475 by 759 Vinifera: Bredell, Tim Cooper received notice late. Edenvale, Overbeek observed a miss. Keetmanshoop, Theo Smit found star too high. Simon's Town had cloud.
May 13 PPM 720340 by 803 Picka: Edenvale, Overbeek observed a miss. Johannesburg, H Lund made unsuccessful CCD attempt. Keetmanshoop, Theo Smit observed a miss. Pretoria, J Smit observed a miss. Simon's Town had cloud.
May 14 PPM 761598 by 285 Regina: Edenvale, Overbeek observed a miss. Johannesburg, H Lund had an unsuccessful CCD attempt. At Keetmanshoop, Theo Smit observed a miss. Pretoria, J Smit observed a miss. Simon's Town had cloud.
May 27 PPM 241119 by 70 Panopaea: Bredell, Johannesburg, Simon's Town and Vanderbijlpark had cloud.
May 28 PPM 178659 by 377 Campania: Bredell, Johannesburg, Simon's Town and Vanderbijlpark had cloud. Pretoria, J Smit observed a miss.
Jun 9 PPM 736211 by 425 Cornelia: Johannesburg, H Lund observed a miss. Hugh also made a failed CCD attempt. Pretoria, J Smit observed a miss. Simon's Town had cloud.
Jun 9 PPM 197668 by 723 Hammonia: Edenvale, Overbeek observed a miss. Johannesburg, H Lund observed a miss. Pretoria, J Smit observed a miss. Simon's Town had cloud.
Jun 15 PPM 269206 by 971 Alsatia: Bredell, Tim Cooper observed a miss. Edenvale, Overbeek observed a miss. Keetmanshoop, Theo Smit observed a miss.
Jun 20 PPM 297224 by 75 Eurydike: Johannesburg, H Lund observed a miss.
Jun 28 PPM 266519 by 552 Sigelinde: Edenvale, Overbeek observed a miss. Johannesburg, H Lund observed a miss. Keetmanshoop, Theo Smit observed a miss. Pretoria, J Smit observed a miss.
Jun 29 PPM 238184 by 1129 Neujmina: Edenvale, Overbeek observed a miss. Johannesburg, H Lund observed a miss. Keetmanshoop had cloud.
Jul 16 DM-30#3837 by 108 Hecuba: Jukskei Park, Tony Hilton had a miss. Edenvale, Overbeek observed a miss. Johannesburg H Lund observed a miss. Pretoria, J Smit observed a miss. Rondebosch had cloud.
Jul 17 CMC 701044 by 101 Helena: Edenvale, Overbeek observed a miss. Pretoria, J Smit observed an appulse at the predicted time.
Jul 17 DM+08#2548 by 18 Melpomene: Edenvale, Overbeek observed a miss. Johannesburg, H Lund observed a miss. Pretoria, J Smit observed a miss. Vanderbijlpark, Francois de Jager observed a miss from 1926 on.
Aug 1 PPM 237723 by 170 Maria: Edenvale, Overbeek observed a miss, intermittently observed. Johannesburg, H Lund observed a miss. Pretoria J Smit observed a miss. Rondebosch had cloud. Vanderbijlpark, Francois de Jager observed a miss.
Aug 8 PPM 721505 by 783 Nora: Johannesburg, H Lund observed a miss. Jukskei Park, Tony Hilton observed a miss. Keetmanshoop, Theo Smit observed a miss. Pretoria, J Smit observed a miss. Rondebosch had cloud.
Aug 8 PPM 230559 by 46 Hestia: Edenvale, Overbeek observed a miss. Jukskei Park, Tony Hilton observed a miss. Johannesburg, H Lund observed a miss. Pretoria, J Smit observed a miss. Vanderbijlpark, Francois de Jager observed a miss.
Aug 8 PPM 322995 by 735 Marghanna: Edenvale, Overbeek observed a miss. Jukskei Park, Tony Hilton observed a miss. Pretoria, J Smit observed a miss. Rondebosch, Tom Lloyd Evans observed a miss. Vanderbijlpark, Francois de Jager observed a miss.
Aug 12 PPM 263664 by 280 Philia: Edenvale, Overbeek observed a miss.
Aug 17 PPM 182724 by 8 Flora: Edenvale, Overbeek unable to observe appulse due to moonlight. Pretoria, J Smit reported the appulse was possibly early.
Aug 20 PPM 721397 by 783 Nora 124: Pretoria, J

Smit observed a miss.
Sep 1 PPM 733353 by 108 Hecuba: Edenvale had cloud. Pretoria, J Smit observed a miss.
Sep 2 PPM 96490 by 241 Germania: Edenvale had cloud. Keet manshoop and Pretoria were troubled by dawn light
Sep 5 PPM 182697 by 8 Flora: Edenvale, Pretoria and Johannesburg had cloud.
Sep 6 PPM 181497 by 319 Leona: Edenvale, Overbeek observed a miss. Johannesburg, H Lund observed a miss. Pretoria, J Smit observed a miss and had some cloud. Vanderbijlpark, Francois de Jager observed a miss.
Sep 13 PPM 268243 by 20 Massalia: Edenvale, Johannesburg and Pretoria had cloud.
Sep 21 PPM 93885 by 343 Dembowska: Edenvale had cloud. In Johannesburg, H Lund found star too low. Pretoria, J Smit had an appulse at about the right time.
Nov 7 PPM 146608 by 253 Mathilde: Johannesburg had cloud. Keetmanshoop, Theo Smit observed a miss. Pretoria, J Smit observed a miss.
Nov 15 PPM 274606 by 130 Elektra: Johannesburg and The Willows had cloud.
Nov 22 PPM 239257 by 489 Comacina: Edenvale, Overbeek observed a miss. Pretoria, J Smit observed a miss.
Dec 21 PPM 119917 by 404 Arsinoe: Edenvale, Overbeek observed a miss. Pretoria, J Smit and P van Blommestein observed a miss. Rondebosch had cloud.

The executive of the International Occultation Timing Association and Agfa Gevaert of Mortsel, Belgium are thanked for facilitating the production and disseminating of the minor planet occultation predictions, which are prepared by Edwin Goffin of Agfa Gevaert.

VARIABLE STAR SECTION
J Hers

The number of observations made during the year under discussion (22,593) shows a significant increase over the previous year, which is all the more gratifying because it contains a number of CCD and PEP measures which require considerable more skill and attention, and therefore time, than the visual ones. Although not strictly comparable they have in this report been simply added together to obtain the totals.

All visual observations have, as in previous years, been forwarded to both the AAVSO and the Variable Star Section of the R.A.S of New Zealand, and have also been entered in the local database , which at the end of the year contained over 280 000 entries, from 1979 to the present. PEP observations have been forwarded to Howard J. Landis, the Chairman of the AAVSO Committee for Photoelectric Photometry, while some of the CCD measures have been sent to Arne Henden at the U.S. N.O. at Flagstaff.

The active observers, although relatively small in numbers, have done a wonderful job, and here are some remarks about each one of them.

Dave Blane , in past years one of our very active observers, of whom we had heard little for some time, made towards the end of the year made a very welcome return to observing.

Jannie Jooste, who seems to have found the astronomical seeing conditions in the Free State rather less favourable than he expected, has nevertheless gone out of his way to introduce high school pupils to variable star observing. This is a wonderful example which might well be followed by others.

Win Jones, who for some years had managed to produce a couple of hundred observations each month in the probably rather less than ideal climate of FishHoek, has stopped visual observing altogether to concentrate fully on photo-electric measures. With 276 observations he has in one short year graduated to be at the very forefront of AAVSO PEP observers, also being the only one in the southern hemisphere.

Hugh Lund taught himself the intricacies of CCD observing , and with 98 observations was fully operational at the end of the year.

We are always glad to receive observations from beyond the border, and Cees Mesu's observations from Harare are specially welcome.

Berto Monard has been increasingly busy exploring the less well observed CV's, especially the socalled TOADs.("Tremendous Outburst Amplitude Dwarf Novae"). It is hoped that his responsibilities at the CSIR will leave him enough time to continue this for many years.

Danie Overbeek does not need any introduction. With 15718 observations this year he has been too long not only at the top of our list, but also at the top of any list anywhere in the world. When people ask me :"How does he do it, doesn't he ever sleep", I really cannot answer, it is just one of those facts of life one has to accept. But we can all join in congratulating him for doing it once again.

Jannie Smit , with an average of about 100 observations per month, is probably our most dependable observer of both Long Period and Cataclysmic variables.

Cliff Turk, used to be a very active observer years ago, and we welcome his resumption of observing after his retirement. We can only hope that he will not find, as so many of us do, that after 'retirement' one has less spare time than ever before.

Fanie de Villiers has continued with visual observations, but has also towards the end of the year been working closely with Win Jones on photoelectric photometry. He has also expressed the intention to branch out into CCD observing, and we expect great things from him in future.

Simon Walsh did in previous years some very good work at Rhodes University to popularise variable star astronomy among the members of the Astronomical Society at Rhodes University. Now a teacher in Zimbabwe, he seems to be so very busy with other things, that we shall probably have to wait some time until he can resume observing.

It will be seen from the list of names that there is still a very poor geographical distribution of the variable star observers. Nearly all observers live in the big cities, where light pollution makes it very difficult to use existing instruments to best advantage. Observers in the country districts, and especially in the north western regions and Namibia, would be in a position to make a unique contribution to astronomical research. The work is by no means difficult, and size of telescope is not particularly important, for there are variables of so many different kinds and magnitudes waiting to be observed that even the smallest telescope can do extremely valuable work.

For more information please contact the Director, P.O. Box 48, Sedgefield 6573. Tel. 044-343-1736.

Observer	Location	Visual	CCD	PEP
D.L. Blane	Henley-on-Klip	30		
J. Hers	Sedgefield	508		
J.L. Jooste	Reitz	4		
R.W. Jones	Fish Hoek			276
H.F. Lund	Johannesburg	88	98	
C.Mesu	Harare	59		
L.A.G. Monard	Pretoria	4 151		
M.D. Overbeek	Edenvale	15 718		
J.A. Smit	Pretoria	1 311		
C.Turk	Cape Town	71		
S. de Villiers	Cape Town	225		21
S.Walsh	Grahamstown	33		
		22 198	98	297

Total observations: 22 593

PROCEEDINGS OF THE ANNUAL GENERAL MEETING 1999

MINUTES OF THE AGM

Minutes of the Annual General Meeting held in Pretoria on 1999 July 28.

1. Opening
The meeting was attended by 76 members of ASSA and the Pretoria Centre of ASSA. A quorum being present, the Chairman of the Pretoria Centre, Louis Barendse, welcomed everyone to the meeting and handed over the chair to the President of ASSA, Danie Overbeek. Danie thanked the Pretoria Centre for hosting the meeting and declared the AGM open.

2. Apologies
Apologies were received from the Hon. Secretary Brian Skinner and from Dr Jannie Smit.

3. Minutes of the previous AGM
The minutes of the 1998 AGM as published in *MNASSA* were approved by the meeting, proposed by Tim Cooper and seconded by Louis Barendse.

4. Matters Arising
There were no matters arising.

5. Report of Council
The report of Council was read to the meeting by acting secretary Mike Haslam.

6. Reports from the Observing Sections
The Comet and Meteor section report was read by the Director, Tim Cooper. The Computing section report was read by the Director, Tony Hilton. The Deepsky section report was read by Tim Cooper. The Occultation section report was read by the Director, Brian Fraser. The Variable Star section report was read by Danie Overbeek. No reports were received from the Historical or Solar sections.

7. Financial Report
The financial report was read out by Mike Haslam on behalf of the Hon. Treasurer.

8. ASSA Endowment Trust
No report was received.

9. Re-election of Auditor
No directives were received as to the appointment of the auditor. On a proposal by Danie Overbeek, seconded by Michael Poll, it was decided to re-appoint Mr R Glass, the same auditor as last year.

10. Election of Office Bearers
The following nominations were received for positions on Council for the year 1999/2000, proposed by Mr C R G Turk and seconded by Mr M A Gray.

President:	Prof D Smits
Vice Presidents:	Mr P van Blommestein
	Mr M D Overbeek
	Dr D M Kilkenny
Members:	Miss P Booth
	Mr T W E Budge
	Mr T P Cooper
	Mr C Rijsdijk
Treasurer:	Mr C D Gray
Secretary:	Mr B Skinner

There were no further nominations or objections received at the meeting.

11. Presidential Address
The Presidential Address was delivered by Danie Overbeek.

12. Closing
There being no further business, the meeting was closed at 21:15.

(Mike Haslam, for Hon. Sec. Brian Skinner)

REPORT OF COUNCIL 1998 – 1999

Council met on five occasions since the last AGM with an average of 10 persons present at meetings.

1. Membership
Total membership was 140 as at 1 July 1998 compared with 268 a year earlier. Membership is now R80.00 per annum. Subscriptions are slow in coming in this year.

2. Finance
The Honorary Treasurer, Mr Colin Gray, is thanked for administering the finances for yet another year. Council wishes to thank the numerous members who have once again made donations to the ASSA. Donations to the ASSA Trust are also gratefully received because the interest on the trust capital is available to subsidise future subscriptions. This will ensure that subscriptions are always affordable.

3. Business Manager
Mr Cliff Turk has continued as business Manager this year. Overseas sales of *MNASSA* are a source of dollar income for the Society and virtually cover the total cost of *MNASSA* production. Council expresses its thanks to Cliff for his hard work. The work of the Hon Secretary is simplified greatly by his endeavours and I wish to extend personal thanks to him for his assistance in Council affairs.

4. *MNASSA*
Mr Auke Slotegraaf continues to edit an informative publication that keeps members up to date with developments in astronomy.

5. Annual Handbook
Miss Pat Booth has continued as Editor of the Annual Handbook and is assisted by the Directors of the observing sections. The Handbook is distributed by Cliff Turk to destinations all over the world. Council extends its thanks to Pat and Cliff for their sterling work on the Handbook. It is intended to revise the format of the Handbook in the new millennium.

6. Gill Medal
The Gill Medal has been awarded and will be presented to the recipient at a fitting occasion. He is unable to attend the AGM due to being at work contributing even more knowledge to the field of astronomy.

7. Honorary Membership
Council has awarded Mr Rupert Hurly honorary membership in recognition of the many years of dedicated service to astronomy; the ASSA, and the many years service on Council.

8. Award Certificates
Council agreed to certificates of merit being awarded by Directors of Observing Sections to deserving observers. These are available from the Hon Secretary on request.

9. Acknowledgements
Council thanks the following persons or institutions for assistance during the past year:

Dr Robert Stobie, Director of SAAO, for the use of meeting facilities at SAAO.

Council extend their appreciation to the Directors of the Observing Sections for encouraging astronomical research by amateur astronomers and for forwarding the results of observations to international Astronomical bodies.

The local Centres who have assisted the professional astronomical fraternity with public viewing nights at the various observatories are commended for their efforts.

Last, but not least, the Pretoria Centre for hosting the Annual General Meeting this year.

10. Finally
Council wishes to thank anyone who contributed to the work of the Society this year despite them not having been mentioned by name. (Brian Skinner, Hon. Secretary)

COMET AND METEOR SECTION

T P Cooper

Summary of observed meteor showers

The following observers reported observations of meteor shows (shower names and hours observed follow in brackets):

Cooper T P (Pyxids 1.5; Virginids 23.6; Pi Puppids 8.8; Eta Aquarids 19.2; Alpha Capricornids 11.2; Orionids 6.0; Leonids 1.3; Geminids 2.7), Streicher M (April Lyrids 1.8; Eta Aquarids 1.3; Orionids 1.8; Leonids 2.5), Van Zyl K (Pi Puppids 2.0; Eta Aquarids 9.4), Skinner B (Eta Aquarids / Chi Scorpids 3.5; Capricornids / Delta Aquarids 7.0; Southern Piscids 2.9; Draconids 3.2; Orionids 7.4; Leonids 6.0), Van Blommestein P (Various 0.7; Pi Puppids 1.0; Leonids 2.0), Turk C (Leonids 2.2; Geminids 2.7), Christianson M (Leonids 4.3), Lloyd Evans T (Leonids 2.0; Leonids-1997 2.0), Slotegraaf A (Leonids 1.5; Geminids 4.0), Paul I (Leonids 1.5; Geminids 4.0), Henriques R (Leonids 1.8), Henriques L (Leonids 1.5), Knox Davis E (Leonids 1.5), Gould T (Leonids 1.1), Venter D (Leonids 0.3) and Rens L (Leonids 0.5). Total observing time was 157.7 hours.

Total observing time per observer

Observer	Number of showers	Total observing time (hours)
Cooper T	8	74.3
Skinner B	6	30.0
Van Zyl K	2	11.4
Streicher M	4	7.4
Slotegraaf A	2	5.5
Paul I	2	5.5
Turk C	2	4.9
Christianson M	1	4.3
Lloyd Evans T	1	4.0
v.Blommestein P	3	3.7
Henriques R	1	1.8
Henriques L	1	1.5
Knox Davis E	1	1.5
Gould T	1	1.1
Rens L	1	0.5
Venter D	1	0.3
Total		157.7

Notes on some specific showers observed

Virginids: Tim Cooper logged nearly 24 hours of plotting on the Virginid complex in response to the Society for Popularisation of Astronomy project run by Alastair MacBeath in the UK. The data confirmed some weak radiants previously observed as well as some possible new activity centres.

Pi Puppids: The year under review was possibly the last time this shower could undergo good activity due to perturbations of the stream by Jupiter. Koos van Zyl and Tim Cooper found the stream to be inactive however.

June Bootids: Several observers reported chance observations of the June Bootids, which underwent an outburst in 1998. The shower was first observed by Denning in 1916, and last underwent an outburst in the 1920s. This year reports were received from Mike Haslam and Pieter Prinsloo from the Pretoria Centre, Gordon Bosch from the Cape Centre, and Craig Stewart, who was in the Richtersveld with a school outing. He observed 35-40/hour on the evening of June 27. The meteors were slow, long pathed, commonly orange, and three fireball reports were received. The shower is the remains of comet Pons-Winnecke.

Eta Aquarids: This shower was again well observed by Magda Streicher, van Zyl and Cooper, and a joint paper with the Astronomi-

cal Society of Victoria, Australia was published in *MNASSA* Vol 57, p62-63.

Draconids: The Draconids were another shower predicted to undergo an outburst in 1998, due to the return of the parent comet Giacobini-Zinner. The shower was found to be inactive from South Africa, though a short outburst was witnessed from Japan. This indicates the narrowness of the meteor stream in the vicinity of the comet.

Orionids: The shower was well observed by Brian Skinner, Streicher and Cooper, despite cloudy conditions. Best rates of around ZHR=30/hour were observed on the morning of October 21.

Leonids: Observations were received from 15 individuals, totalling 24.2 hours. The predicted storm did not occur, but may still happen in 1999. Maximum rates for South Africa were on the morning of November 17 instead of the predicted November 18. Those who observed only on the latter morning were disappointed, but Magda Streicher, Trevor Gould and Tim Cooper witnessed fine activity on the former morning, with a high proportion of very bright fireballs. Streicher had the best seat in the house, logging 129 Leonids in 110 minutes.

Geminids: The Geminids were heavily affected by cloud. Slotegraaf, Paul, Turk and Cooper managed some useful observations, with good activity from mainly faint Geminids on the morning of December 13. The following morning yielded a lower rate, mainly of brighter Geminids, which is typical of the mass sorting known to be present in this stream. Elsewhere in the world, observers with clearer conditions witnessed the years strongest meteor showing.

Fireballs

1998 saw no less than 27 fireball reports, summarised in the table below. Many were witnessed during watches on recognised showers, especially the Leonids. The full reports will be published in a separate *MNASSA* article.

Comets

Summary of observed comets

Observer	Comet
Cooper T	Hale-Bopp, SOHO, Williams, Giacobini-Zinner
van Staden A	Hale-Bopp, Mueller, Gehrels 2, Wolf-Harrington, Howell 2, Williams, Meunier-Dupouy
Streicher M	Tempel-Tuttle, SOHO
Smith T	Hale-Bopp, Hartley 2
Begbie M	Hale-Bopp, SOHO
v.Blommestein P	Hale-Bopp, SOHO
Barendse L	SOHO
Viljoen T	SOHO
Turk C	SOHO, Williams
Skinner B	SOHO, Williams
Lloyd Evans T	SOHO
Slotegraaf A	SOHO
Pringlewood D	SOHO
Winterbottom J	SOHO

Details of specific comets

Comet Hale-Bopp: Begbie, Smith, van Blommestein and Cooper observed this comet in 1998, starting the year at magnitude 7 and fading to magnitude 10 by year end. The comet was also CCD imaged by Andre van Staden. A 70 page monograph detailing all southern African observations from 1995 to 1998 is nearing completion.

Comet SOHO: This comet, discovered by the Solar and Heliospheric Satellite, was well observed by ASSA members, fading from magnitude 4 in mid May to 9 by early July. At its best the comet sported a narrow 5 degree tail. The comet underwent a 1.5 magnitude outburst in brightness in early June. The full results were published in *MNASSA* Vol. 57, p58-61.

Comet Williams: This comet was discovered

by Australian variable star observer Peter Williams, when the comet was in the field of the variable star EK Tra. It was observed by Skinner, Turk and Cooper, and imaged by van Staden. At its brightest it reached magnitude 8 in late August.

4. Conclusion

Despite the fact that 1998 was characterised by very poor observing weather, the Section's members put in a very fine effort, logging over 150 hours of meteor observation, 27 fireballs and 10 comets. Those observers who reported their observations are heartily thanked.

Date	Name of Reporter	Visual Magnitude	Time (UT)
1998 January 11	D Overbeek	–5	01h39
1998 April 29	K van Zyl	–3	03h07
1998 June 27 (x2)	P Prinsloo	–3 / –3	not given
1998 June 27	M Haslam	–5	16h58
1998 July 24 (x3)	B Skinner	–4 / –6 / –4	21h07, 22h34, 23h13
1998 September 15	B Hollenbach	daylight	06h27
1998 September 30	B Hollenbach	–3	18h30
1998 October 8 (x2)	B Skinner	–4 / –3	20h39, 20h48
1998 October 18 (x2)	B Skinner	–5 / –4	21h41, 23h36
1998 November 17 (x6)	T Cooper	–3 / –3 / –4	01h04,01h13,01h17
		–4 / –6 / –5	01h25,01h50,02h16
1998 November 17 (x3)	L Rens	–3 / –4 / –3	02h00-02h30
1998 November 17 (x3)	M Streicher	–4 / –4 / –4	00h28,00h53,01h26
1998 November 18	T Lloyd Evans/C Turk	–3	02h10

DEEP-SKY SECTION
A Slotegraaf

Work continued throughout the year, mainly on the so-called 'non-existent' objects recorded by John Herschel in the 1800s. These objects - mostly open clusters - were entered into the original NGC but were later labelled 'non-existent' in the Revised NGC. However, a number of these clusters are readily visible in binoculars and small telescopes. Observers who are interested in searching out these interesting objects are urged to contact the director.

Establishing a standardised observing checklist has been another on-going project, and discussions with local and overseas observers have highlighted several points for attention.

As reported at the previous AGM, the Abbe Lacaille's catalogue of deepsky objects is being reviewed. Several of his objects seem to be 'missing' from standard catalogues; a preliminary version has been drawn up and will shortly be sent to observers for review.

Magda Streicher of Pietersburg continued her staunch support of the section, as did Gabriel Giust of Argentina. Malcolm Kirkwood of Knysna has recently joined the section, and we look forward to his contributions.

OCCULTATION SECTION
B Fraser & M D Overbeek

At some time during the year Danie Overbeek handed over to me the directorship of the occultation section. We have been working closely together for a number of years, with me providing some of the computer predictions and Danie co-ordinating the observers around the country, so the switch over has been relatively painless.

Danie still looks after the minor planet occultations and his contribution makes up the bulk of this report.

I am not sure that I have results from all the observers of lunar occultations for the year, however if there are any observation details not yet to hand they will be included in next years report.

Grazing occultation expeditions have been rather sparse for the past few years and last year saw this trend continue. The interest from the various centres has been dwindling in recent times, perhaps people are too busy avoiding hijackers and dodging bullets or perhaps what is needed is just one enthusiastic organiser in each centre to motivate the members.

Lunar occultations are perhaps the easiest of observations that a serious amateur who wants to make a scientific contribution, can do. Yet the number of observers keeps dropping. The regulars who have been observing occultations for many years are commended for their dedication.

Occultation prediction software has made life a lot easier for us. Not so many years ago we relied solely on computer predictions provided by institutions overseas. Today we are able to produce these predictions on a small PC for anybody at any location in the country.

We have available to us a number of software packages :-

LOW - Lunar Occultation Workbench is a package written in Belgium and which provides lunar occultation predictions for any observer by simply giving it the geographic location of the station.

OCCULT - the minor planet occultation package written by David Herold in Australia contains a very useful section for reducing the observations when a successful occultation has been observed. It also provides minor planet predictions and maps of the shadow paths.

GRAZEREG - the grazing occultation prediction program used by IOTA (International Occultation Timing Organisation) and written by Dr Eberhard Riedel in Germany - runs off tables supplied by IOTA.

All of these packages contain large data bases of stars whose positions are now getting to be so accurately known and consequently the predictions are becoming more reliable.

Total Lunar Occultations

B Fraser (4 disappearances)
MD Overbeek (11 disappearances)
B Skinner (10 disappearances)
J Smit (39 disappearances, 13 reappearances)
C Turk (24 disappearances, 33 reappearances)

Grazing Occultations

There was only one successful grazing occultation expedition during the year. It occurred at Boksburg on September 2nd 1998. Five observers and three assistants timed 18 events as the 5.9 mag star ZC2865 underwent a grazing occultation. The observers were T Cooper, MD Overbeek, F de Jager, B Fraser and A Hilton. They were assisted by DA Overbeek, VB Fraser and W Lockhart. See *MNASSA* vol 58 nos 1&2 for details.

ASSA/IOTA Planetary Occultation Programme.

There were 34 minor planet predictions on the

list last year, of which 13 were not observed for various reasons. Of the remaining 21 events, one resulted in a successful occultation seen by 5 observers in the Gauteng area.

Jan 5 +25 01410 by 123 Brunhild: Edenvale, D Overbeek reported an appulse. Pretoria, J Smit reported a miss. Simon's Town reported cloud.

Jan 16 -03 06408 by 957 Camelia: Edenvale, Johannesburg, Pretoria and Simon's Town reported cloud.

Feb 14 FK5 227 by 1116 Catriona: The large scale exercise in observational astronomy! See *MNASSA* 57, page 10.

Feb 15 PPM 179066 by 394 Arduina: At Cedarberg Observatory, C Turk and colleagues reported a miss. Durban reported cloud. Johannesburg, H Lund reported a miss. Simon's Town, P van Blommestein reported a miss.

Feb 16 PPM 231608 by 485 Genua: Durban, Edenvale, Johannesburg, Pretoria and Simon's Town reported cloud and mist.

Feb 16 PPM 224632 by 478 Tergeste: Bredell, Durban, Edenvale and Pretoria reported cloud.

Feb 17 ACRS546497 by 514 Armida: Bredell, Durban, Edenvale and Pretoria reported cloud.

Feb 22 PPM 198002 by 326 Tamara: Johannesburg, H Lund had a 20 second interruption by cloud at the predicted time and reported a dubious miss. Pretoria and Edenvale reported cloud.

Feb 25 TAC+09 03359 by 426 Hippo: Rondebosch, Tom Lloyd Evans observed from 2305 to 2335 and reported a miss. Edenvale, Pretoria and Windhoek reported cloud.

Mar 20 PPM 71836 by 562 Salome: Not observed for a variety of reasons.

Mar 30 PPM 705352 by 584 Semiramis: Edenvale, Johannesburg, Pretoria and Windhoek reported cloud.

Apr 2 PPM 96205 by 27 Euterpe: Pretoria (Trevor Green and Jannie Smit) and Windhoek had cloud.

May 19 PPM 717603 by 742 Edisona: Edenvale reported a miss. Sedgefield, J Hers reported a miss. Rondebosch and Simon's Town had inclement weather.

Jun 10 PPM 297075 by 571 Dulcinea: Pretoria, J Smit reported a miss. Vanderbijlpark, F de Jager reported a miss. Simon's Town reported cloud.

Jun 12 PPM 237176 by 1127 Mimi: Edenvale, D Overbeek reported a miss. Harare, F Podmore and C Mesu reported a miss. Johannesburg, H Lund reported a miss. Simon's Town reported cloud.

Jun 16 PPM200662 by 18 Melpomene: Observers in Edenvale, Johannesburg, Pretoria and Simon's Town were frustrated for a variety of reasons.

Jun 27 PPM 236753 by 248 Lameia: Five chords were obtained by T Cooper, B Fraser, H Lund, D Overbeek and J Smit in Bredell, Sunninghill Park, Johannesburg, Edenvale and Pretoria. See *MNASSA* 57, page 85.

Jun 28 FK5 737 by 226 Weringia: Edenvale, D Overbeek reported a miss. Johannesburg, H Lund reported a miss. Pretoria, J Smit reported a miss. Rondebosch, T Lloyd Evans reported a miss. Vanderbijlpark, F de Jager reported a miss. Simon's Town had haze.

Jul 10 0593 00038 by 2 Pallas: Not observed for a variety of reasons.

Jul 29 PPM 719911 by 624 Ute: Bredell, T Cooper reported a miss between intermittent cloud. Edenvale, D Overbeek reported a miss. Johannesburg, H Lund reported a miss. Sedgefield, J Hers reported a miss.

Aug 11 TAC-07 08489 by 6 Hebe: Edenvale, D Overbeek found the target star too faint. Johannesburg, H Lund attempted a CCD observation.

Aug 24 TAC-04 15107 by 678 Fredegund: Johannesburg, H Lund reported a miss. He had a blink, possibly due to seeing. Pretoria J Smit observed an appulse and at Sedgefield, J Hers observed appulse about 4 minutes late.

Aug 27 PPM 237981 by Uranus: Bredell and Pretoria, T Cooper and J Smit both found the star too faint.

Aug 28 1281 01170 by 52 Europa: Johannesburg, H Lund started late and reported a miss. Pretoria, J Smit observed an appulse at the predicted time, in dawn light.

Sep 23 TAC+1901423 by 65 Cybele: Edenvale, D Overbeek reported a miss. Sunninghill Park, B Fraser reported a dubious miss. Pretoria, J Smit reported a miss. Rondebosch and Simon's Town had weather problems.

Sep 30 PPM 121053 by 52 Europa: Pretoria, J Smit reported a miss. Rondebosch, T Lloyd Evans reported a miss after 0242. Edenvale, Simon's Town and Jukskei Park (Tony Hilton) had cloud.

Oct 2 PPM 209269 by 286 Iclea: Edenvale, D Overbeek reported a miss. Johannesburg, H Lund reported a miss. Pretoria, J Smit reported a miss. Rondebosch, T Lloyd Evans reported a miss. Simon's Town reported cloud.

Oct 14 TAC+04 01219 by 197 Arete: Edenvale, D Overbeek reported a miss. Rondebosch, T Lloyd Evans found the target star too faint. Johannesburg, Simon's Town and Vanderbijlpark reported cloud.

Oct 29 PPM 145101 by Tethys: Amateurs who do not usually attempt planetary occultations because they are not confident of finding target stars were invited to attempt this observation, as the target star and Tethys were next to Saturn and so could be identified easily and positively. A satisfactorily high number of observers participated: In Gauteng John Barsby, Tim Cooper, Brian Fraser, Trevor Green and D Overbeek had misses as predicted. The Durban area did well, reporting misses by Messrs Aspinall, Collingwood, Cramb (Peter and Peta), Field and Hughes (who used NUC Physics Dept CCD equipment). Bloemfontein and Natal Midlands did not report back. Albert Jansen of Prins Albert, using a video camera and Tom Lloyd Evans of Rondebosch had definite misses. These two misses were the nearest to the centerline of the shadow path. Murphy struck again by foiling observers still nearer to the centerline: Sedgefield and Plettenberg Bay had cloud and Arthur Fitt of Knysna did not get the message that the latest predicted time was SAST 2037. He most unfortunately stopped observing before the critical time. In Papua New Guinea, Steve Hayward and his teenage son Jason working independently, observed occultations lasting 26.4 seconds. This means that they were several degrees north or south of the centerline. A positive observation from the Sedgefield, Knysna or Port Elizabeth area could have removed the ambiguity. That's the way it goes!

Nov 2 PPM98371 by 447 Valentine: Not observed for a number of reasons.

Nov 20 PPM208277 by 521 Brixia: Simon's Town, P van Blommestein reported a miss. Edenvale, Johannesburg and Pretoria reported cloud.

Nov 23 PPM 144585 by 119 Althaea: Pretoria, J Smit reported a miss. (Dubious because of cloud) Edenvale, Johannesburg, Sedgefield and Simon's Town reported cloud.

Dec 12 TAC+18 01099 by 65 Cybele: Pretoria, J Smit reported a miss. Rondebosch, T Lloyd Evans reported a miss. Edenvale, Johannesburg and Sedgefield had cloud.

Dec 22 PPM 97331 by 333 Badenia: Edenvale, D Overbeek reported a miss. Pretoria, J Smit reported a miss. Harare reported cloud. The star was too low for Jan Hers in Sedgefield.

The team members named above are thanked most sincerely for their efforts.

VARIABLE STAR SECTION

J Hers

The total number of observations was almost exactly the same as that in 1997, and, as usual, by far the largest number was made by Danie Overbeek ("What else would you expect from MDO?") but, as before, once again a very creditable second place by Berto Monard.

We are pleased to welcome two new observers both of whom have the advantage of living away from the big cities: Peter Wedepohl, of Somerset West and Chris de Villiers, of Van Rhynsdorp which is situated near the west coast, climatically probably one of the better regions in the country. Others living in country regions please note: we are expecting great things from you too!

Particularly pleasing was the increased number of PEP observations by Win Jones and Fanie de Villiers, whose output not only compared very favourably with that of other AAVSO observers, but who are in fact the only PEP observers on the AAVSO list in the southern hemisphere. As before, observations have been forwarded direct to Howard J. Landis, the Chairman of the AAVSO Committee for Photoelectric Photometry.

Hugh Lund has made very good progress with his CCD equipment, using it to measure a limited number of stars, but has found it exceedingly time consuming . And this brings us to an important matter. It seems to be some sort of an unwritten law of nature that as soon as something becomes possible, it immediately becomes necessary. In the USA, where the relative cost of electronic equipment tends to be much lower than here, the number of amateurs using CCDs is increasing rapidly, and it has in fact been suggested that visual observations of variable stars are now out of date, and that new observers would be well advised to change over to CCD immediately.

There is nothing new in this. The development of computers and electronic instrumentation has in recent years made obsolete many of what used to be typical amateur activities, and this is bound to continue. We have lately seen spectacular examples of variable star light

Observer	Location	Visual	CCD	PEP
J Hers	Sedgefield	715		
R W Jones	Fish Hoek			313
H F Lund	Johannesburg	26	126	
C Mesu	Harare	31		
L A G Monard	Pretoria	4988		
M D Overbeek	Edenvale	14029		
J A Smit	Pretoria	1549		
C Turk	Cape Town	60		
C de Villiers	Vanrhynsdorp	54		
S de Villiers	Cape Town			180
S Walsh	Harare	99		
		21557	126	493

Total observations: 22,176

curves produced by automatic recording equipment. At present these cover only minute parts of the sky, and one can scarcely make a guess at the tens of thousands of variables that can be found and measured – and measured continuously – once the whole sky is covered.

But that will probably take quite a long time. Among the problems are the large number of variables, the need for continuity, and the extremely large amount of data that will result, and – very important – the need for sifting the wheat from the chaff, separating the important from the unimportant. It is here that the dedicated visual observer will no doubt continue to play a most important part, for he is the one who will be uniquely able to realise immediately, to give an example, that a certain cataclysmic variable has had a sudden outburst.

While we shall therefore welcome and fully support anyone who wants to start a CCD or PEP observing programme, we shall at the same time continue to support anyone willing to make visual observations. There is nothing out of date about it, and after all, it is probably the best way to learn some practical astronomy, and to find one's way among the stars.

PRESIDENTIAL ADDRESS

ROBERTS TO THE CCD

A review of Southern Africa amateur astronomy during the 20th century

M D Overbeek

One could visualise amateur astronomy in the 20th century as a long road: Standing at the start is a giant named AW Roberts and at the end of the road sits the CCD or charge coupled device, a wafer of silicon no larger than a finger nail.

Who was Roberts? World-wide, Arthur William Roberts ranks among the foremost amateur astronomers of this Century.[1] He came to South Africa as a Presbyterian missionary from his native Scotland in 1883 in order to teach at Lovedale College near Alice in the Eastern province. While still in Scotland, he taught himself astronomy and mathematics and was determined to make Astronomy his second career in South Africa. He set about his two careers in a determined and systematic manner. His teaching career prospered and he was eventually made a Senator in the Union Parliament, to represent the black peoples of South Africa. But tonight we are concerned with his astronomical career.

In those days, variable stars were observed by few amateurs. Roberts, however was intrigued by reports of variable star work by Gould of Cordova and others. He proceeded to qualify himself as a variable star observer. He was a prolific correspondent and received much advice from his fellow Scot, Sir David Gill of the Royal Observatory at the Cape.

When he arrived in South Africa, Roberts had no telescope, no astronomical experience and no usable star charts. He set to work to prepare himself for an ambitious variable star programme, using an old surveyor's theodolite to scan the southern heavens. He did this for two years in a highly systematic fashion, making charts which contained his own mag-

nitude estimates of the brighter stars. During this familiarisation period, he discovered no less than twenty long period variable stars. His familiarisation period over, Roberts set to in earnest and became enormously productive. Gill recognised Robert's skill and dedication and supported the struggling amateur with data and advice. He helped Roberts to obtain a two inch prismatic photometer. In skilled hands, this instrument was capable of astonishingly accurate results.

Suitably equipped, Roberts amassed a large body of observations, which were accurate enough to support sophisticated analysis. In 1899, he published a paper giving the upper limit of the densities of four Algol variables[2]. In all he published seventy noteworthy papers on variable stars, chiefly in the Astrophysical Journal and the Monthly Notes of the Royal Astronomical Society. Among other achievements, Roberts was able to show that he had found the variable V Puppis to be a binary star whose components are nearly in contact and that the stars involved are severely distorted into elliptical shapes by gravitational tidal effects. This was followed by a similar paper on the light curve of the variable RR Centauri. Roberts made a total of 10 000 observations of this interesting variable star. The two papers provided critical proof of tidal theories that had only recently been presented by Poincare and Darwin[3]. By 1905, midway through his observing career, he had already made over 250 000 observations.

It should be pointed out that, during the period when Roberts was doing his most important work, he was working as a full time teacher, living under the most primitive conditions and physically isolated from astronomers who could have given him support. His amateur work was not confined to variable stars: He published a paper on future solar eclipses in South Africa, which was still used in the planning of observations during the total solar eclipse of 1940, nearly 60 years later.

So, at the beginning of the century we have Roberts, rugged, solitary, self reliant, using basic optical equipment in a primitive environment. At the end of the century, we have the little silicon chip, fragile, supported by an array of extremely sophisticated hardware and software, in a carefully controlled environment. Yet this little chip is more tireless, more sensitive and more objective than Roberts could be. In the right hands, one little chip can outperform the great Roberts.

Between Roberts and the CCD, much has happened in the field of amateur astronomy. Before proceeding, we need a definition of "Amateur Astronomers". A good working definition would be, those who observe heavenly phenomena and formally report their results to scientific organisations without being paid for these activities. We should also include the group of amateurs who demonstrate or teach astronomy in a formal way. Unfortunately it will not be possible to discuss the activities of those good folk who put a great deal of effort into observing the heavens in order to enjoy their beauty. This activity should really be called "recreational astronomy."

The review which follows is based partly on material in an account of amateur astronomy in South Africa which I wrote a few years ago[4].

We shall deal with the following:

1 The ASSA and South African Institutions
2 Variable Stars
3 Occultations
4 Solar work
5 Comets
6 Meteors
7 Education
8 Publications
9 Computing

1. Institutions

The Astronomical Society of Southern Africa (ASSA) appoints a number of directors drawn from amateur ranks, to cover various activi-

ties. The directors encourage amateurs to do systematic, useful work and provide guidance where required. Observers report their observations to the directors who in turn forward the data to various international data collection bodies. The ASSA has been of great value in focusing the attention of amateur astronomers on various worth while activities and in encouraging them to do systematic work in these fields. The observatories at the Cape and Johannesburg have been very supportive of amateur activities and in several cases took amateurs under their wings and encouraged them to participate in professional research. Some of the amateurs, such as AJ Cousins, RP De Kock and G Knipe joined the ranks of the professionals as a result of this encouragement. One of the happier aspects of amateur astronomy activities in South Africa is the cordial relationship between amateurs and professionals.

The Astronomical Society has its roots at the turn of the Century and I cannot resist giving you an account[5] of its origin, according to R Watson, a distinguished amateur, discoverer of Nova Aquilae 1918 and Nova Pictoris 1925:

Many years ago, there existed in the little town of Beaufort West, a small club. It had neither name, subscriptions nor membership roll. Its headquarters was a tailor's shop and the president was the tailor. There the savants of the town would meet at their own convenience and would discuss with the president and one another the whole riddle of the Universe. Quite a variety of interests were discussed – a train driver wanting to know the best method of boiling water and what to do in the event of a collision, farmers desirous of growing long and yet longer wool, a plumber, a bootseller, a budding architect all desiring to hear the words of wisdom falling from the tailor's lips, as he sat stitching away.

A debate would open, and would last for days or even weeks. It was there where the writer (Watson) learned something about astronomy. The boot seller had taken the matter up and in his vast ignorance, crossed swords with the equally ignorant tailor. Books were consulted, diagrams drawn and a small telescope acquired from somewhere. Then Halley's comet appeared above the clubhouse and stimulated further investigation. I listened in awe (said Watson) but by and by I could see starlight and butted in by explaining the precession of the equinoxes which I had read up in a book.

After that I was admitted to fellowship of the club. Mr Watson goes on to say that he was sure that this club led to the founding of the Cape Astronomical Association, which was formed by a group of Cape Town amateurs involved in Halley observations. The amateurs roped in professionals from the Observatory at the Cape and so eventually, the ASSA came into being.

2 Variable Stars

Variable stars have long been observed assiduously by amateurs in South Africa. In the introduction, I mentioned AW Roberts who did sterling work in the face of great difficulties. Another variable star observer who coped nobly with handicaps was Reginald P de Kock (1902–1980)[6]. Due to birth injuries, de Kock was handicapped to such an extent that he was unable to find regular employment in commerce or industry. He never married or learnt to drive a car. His Majesty's Astronomer at the Cape recognised De Kock's intense interest in observational astronomy and encouraged him to use a six inch short focus refractor at the Observatory for his variable star work. De Kock lived some kilometres from the Observatory and had to commute by train. Often, when his observing run ended late, he had to return to his lodgings on foot. He amassed a total of over 160 000 observations in the period 1934 to 1978. By his example de Kock inspired a number of younger observers, including myself.

The name of AWJ Cousins[7] is well known to all astronomers who are involved in precise photometry. Cousins did sterling work as an amateur variable star observer and Fabry photometrist between 1920 and 1947. The Fabry photometry earned him a PhD degree, after he was invited to join the staff of the Cape Observatory. Some 100 amateurs have made in excess of 750 000 variable star observations in Southern Africa. The table below, based on data supplied by J Hers, Director of the ASSA Variable Star Section lists the names of the more prolific contributors to the ASSA data bank and includes that of Roberts, who did not report observations to the ASSA or the AAVSO:

Name	Observed from
T Cooper	1975
AGF Cousins	1936 to 1947
RP de Kock*	1933 to 1974
GE Ensor	1924 to 1928
C Henshaw	1983
J Hers	1976
HE Houghton	1921 to 1942
RW Jones	1988
B Monard	1991
AFG Morrisby	1949 to 1988
MD Overbeek**	1951
AW Roberts**	1890 to 1920
WF Smith	1922 to 1931
J Smit	1985
SC Venter	1947 to 1965

* Over 100 000 observations
** Over 250 000 observations

Observers' reports are sent to the Variable Star Section of the Royal Astronomical Society of New Zealand (RASNZ) and to the American Association of Variable Star Observers (AAVSO) in digital format. Some amateurs also send observations to the Variable Star Network in Kyoto, Japan.

These bodies function as data clearing houses and serve the astronomical community by supplying raw data and processed information. According to the latest AAVSO report, during 1996/1997, the AAVSO received 366 335 observations including 22 019 from South Africa. Of the 38 foreign countries contributing to the AAVSO, South Africa was the most prolific source after Germany (28769) and Denmark (22388)[8]. The AAVSO acknowledges with thanks the contributions from amateurs in South Africa who have helped to schedule observing programmes and to correlate data for spacecraft such as the Hubble Space Telescope, the ORFEUS mission, the ASTRO-1 mission, the EUVE mission, the Hipparcos satellite, the IUE satellite and the ROSAT satellite[9].

The majority of amateur variable star observers work visually but at least two have functioning photoelectric equipment, built by the amateurs themselves. I feel strongly that the average amateur can contribute best by making variable star estimates visually, because a number of visual estimates can be made in the time that an amateur would take to acquire one PEP data point. Visual estimates can be made when sky conditions are too poor for PEP work. Accurate photoelectric light curves have their uses, however and there certainly is a place for the dedicated PEP worker or amateur who is not comfortable with visual observing techniques.

Amateur produced visual and photoelectric light curves are illustrated in Figure 1[10] and Figure 2[11].

CCD's offer an extremely promising field for those amateurs who like the challenge of advanced work. Two amateurs so far have produced good results with home built CCD cameras.

Another amateur has developed, from first principles, a computer assisted telescope, which is the first small step towards an automatic photoelectric telescope. It is not beyond the reach of a suitably motivated amateur or group of amateurs to succeed in such projects.

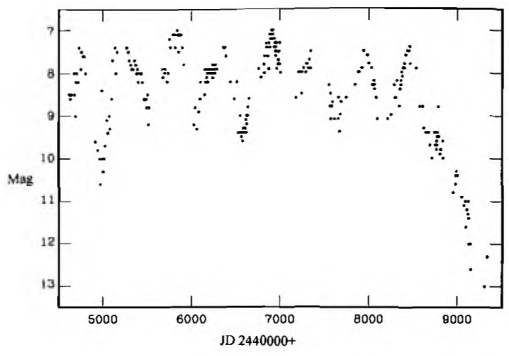


Figure 1: Visual light curve of V Hyi by South African amateurs

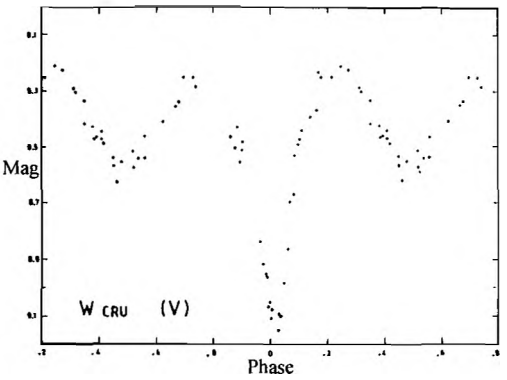


Figure 2: Magnitude (V) against phase for W Crucis

Robotic telescopes equipped with CCD's are in the process of revolutionising variable star observing. I should point out that developer of small APT's overseas was an amateur.

3. Occultations

During the first half of the Century, sporadic observations of lunar occultations of bright stars were made by amateurs who sent their results to the Royal Greenwich Observatory.

In the early 1950's, the late JC Churms, a professional astronomer, introduced a group of amateurs to some of the niceties of positional astronomy and encouraged them to predict the occultations of faint stars and to observe these. This exercise gave great impetus to occultation observers, some of whom continued for many years and made thousands of observations.

In many ways, lunar occultation observing is ideal for beginners who balk at finding faint variable stars.

Starting in 1968 August and working in collaboration with the Republic Observatory, amateurs formed teams to observe grazing occultations. The most spectacular event was the observation, during a total lunar eclipse on 1985 May 4, of the second magnitude Zuben El Genubi. Some 380 observations were made by ASSA members, school groups and other interested individuals. Many successful expeditions were mounted in the 1970's and 1980's but the activity tapered down towards the end of the century, mainly due to reluctance of observers to work in strange, isolated locations at night. Grazing occultations offer a good opportunity for team work and are useful for bringing recruits to systematic observing into the fold of active observers.

South African amateurs and some professionals attempt to observe occultations of stars by minor planets. If a number of observers spanning some tens of kilometres obtain accurate times of both the disappearance and reappearance of a star, then the profile of the occulting body can be synthesised with much higher resolution than could be obtained through direct observation with even the largest of earthbound telescopes.

Observations of planetary occultations of stars have been made since 1952 May 2. After 1980 when a formal observing programme was launched, more than 400 attempts have been made. During this period, sixteen reports have been received of occultations. The more significant events are recorded in MNASSA[12].

The degree of accuracy that can be attained is astounding and this should encourage scientifically minded folk to participate: The observation of Lameia described below is equivalent to determining the size and shape of a R1 coin at a distance of 80km!

The most successful attempt has been the Lameia occultation on 1998-06-27, as described recently in *MNASSA*[12].

Several reports by amateurs overseas implied that minor planets may have satellites of their own. This view was largely discounted by the professional community. One such South African observation, of the occultation of SAO 162357 by 45 Eugenia on 1983 August 6 was reported by P van Blommestein[13]. Another South African amateur (J Smit) reported observations of an occultation of SAO 146524 by 104 Klymene on 1986 January 15, which suggested that the asteroid has a companion or is very oddly shaped[14]. Subsequently, Jet Propulsion Laboratories announced the discovery, by means of a Galileo Spacecraft observation, of a companion of 243 Ida and on 1998 November 1, a natural satellite of Eugenia was discovered by direct imaging with a 3.6m telescope on Mauna Kea[15]. Here, as in some other cases, amateurs showed the way for our professional brethren.

The most prominent minor planet occultation exercise was on 1998 February 14 when the second magnitude star Menkalinan was occulted by 45 Catriona[16]. Because of the brightness of the occulted star and the ease with which it could be found, the Johannesburg Planetarium and the ASSA invited the public's participation in this potentially spectacular event. Thousands of individuals must have watched the star but unfortunately the shadow track missed the observers.

One amateur used a photoelectric photometer and high speed recorder to record occultations of the brighter stars by minor planets. Lunar occultations of bright stars were also recorded photoelectrically. PEP timings are at least an order of magnitude more accurate than visual timings. A good PEP light curve can yield information regarding the shape and size of the occulted star in addition to the usual positional information. See Figure 3[17].

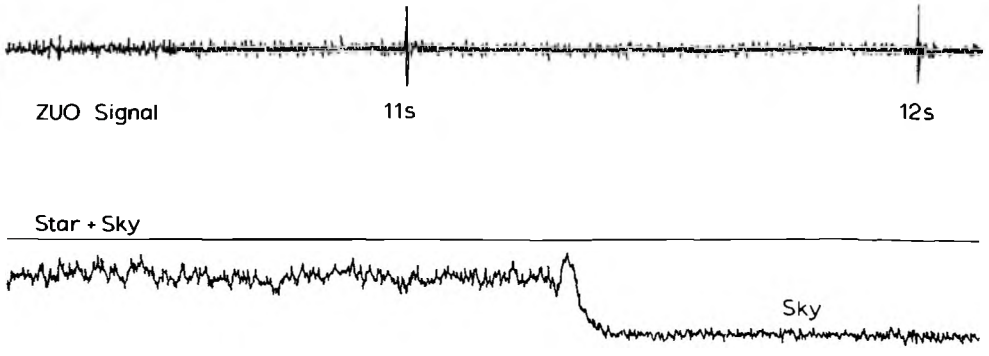


Figure 3: Amateur PEP high speed recording of a lunar occultation of ZC 15677 on 1973 October 1, 1652 UT.

Amateur photoelectric recordings of mutual eclipses of Jupiter's satellites were obtained. The result of such an observation is shown in Figure 4[18]. The flat bottom of the light curve shows that Io is larger than Europa.

In 1989, it was predicted that the star 28 Sagittarii could be occulted by material in Saturn's magnetosphere. All the known users of photoelectric equipment in South Africa were invited by the Indian Institute of Astrophysics to participate in the observation of this event. Due to various difficulties, it was a lone South African amateur who succeeded in obtaining meaningful results, using an uncooled 1p21 photomultiplier and a strip chart recorder. More recently, the same equipment was used by two amateurs to check whether the Jovian satellites Io and Europa would brighten by reflected light during the Comet Shoemaker-Levy impact on Jupiter in 1994 July.

The availability of sensitive video cameras provided another approach to the electronic recording of occultations. A video grazing occultation observation has already been made by an amateur but more needs to be done.

The table below lists the more prolific amateur occultation observers in Southern Africa.

H Cameron
R Fleet
KG Fuhr
J Hers
AC Hilton
J Knight
HC Lagerwey
HE Krumm
G Marshall
AFG Morrisby
MD Overbeek
J Smit
C Turk
P van Blommestein
J Vincent

4. Solar Observations

Amateurs making visual sunspot observations reported their counts to the AAVSO, the BAA and German observing groups.

In addition to visual work, amateurs used electronic devices to monitor solar activity. One amateur used receiving dishes and VHF

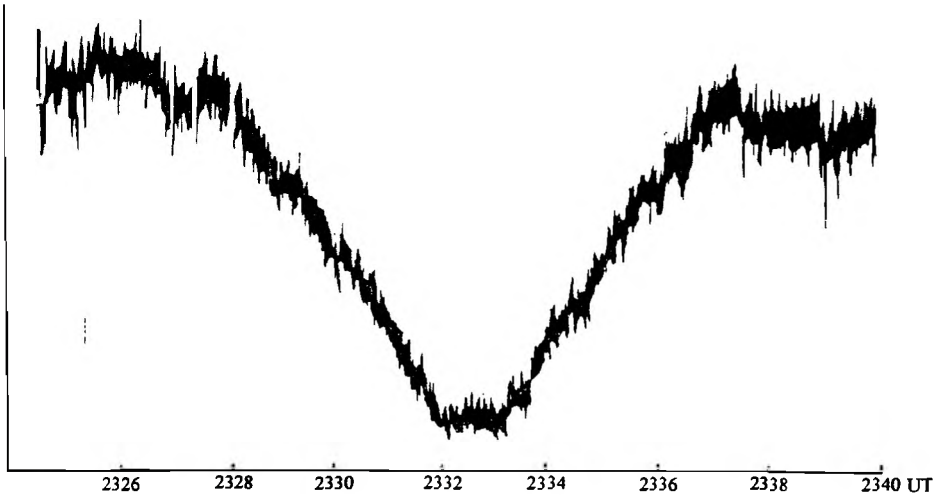


Figure 4: Amateur PEP recording of the occultation of Europa by Io on 1973 September 6.

receivers to record solar noise on two frequencies. Other amateurs operate VLF receivers to monitor the strength of military communications signals arriving from several distant transmitters. When a solar flare erupts, signal strength increases abruptly[19]. See Figure 5.

On 1998 August 27, the equipment detected a gamma ray burst emanating from a neutron star called Magnetar SGR 1900-14. This was the first detection of such an event by amateur equipment, anywhere in the world[20].

One amateur operates a magnetograph in order to record the terrestrial magnetic storms which sometimes follow solar flares. These magnetic storms are associated with aurorae and this amateur was able to inform puzzled observers of the bright red sky on 1989 March 12 that what they saw was in fact a spectacular, extremely rare (in South Africa) Aurora Australis. The trace of a violent magnetic storm is shown in Figure 6.

Much guidance was given by the Solar Section of the ASSA to the public on the occasion of solar eclipses. Demonstrations of sunspots were also given to school children at other times.

5. Comets

As with variable star observing, there has been a tradition of comet searching by amateurs. Today, most comets are discovered as faint smudges on photographic patrol plates or CCD images but the occasional comet still eludes this net and is discovered visually. If this occurs early enough, observatories world-wide can be alerted and a thorough study of the comet can be made with a variety of professional equipment. Comet 1969 I, discovered by J Bennett (1910–1992) was a case in point. Thanks to Bennett's diligence, the comet was discovered while it was still far from Earth, providing an excellent opportunity to study it.

In keeping with modern developments, amateurs have started to make CCD images of comets and have imaged jet emissions from a cometary nucleus.

The table below[21] shows that Southern African amateur comet hunters had a busy century. During the four quarters of the century, eight, nine, two and one discoveries were made visually. This is indicative of deteriorating observing conditions, due to atmospheric and light pollution.

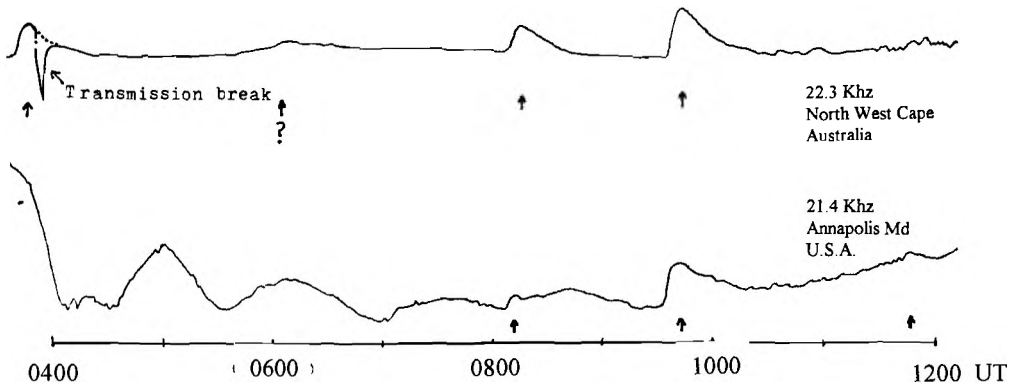


Figure 5: Sudden ionospheric disturbances (SIDs) due to solar flares at Edenvale, 1982-02-14.

1902 Grigg-Skjellerup. Discovered by John Grigg of New Zealand and JF Skjellerup of Cape Town.

1915 P Taylor. Discovered by Clement J Taylor of Cape Town.

1918 II Reid. Discovered by William Reid, Cape Town.

1920 I Skjellerup. Discovered by JF Skjellerup, Cape Town.

1921 II Reid. Discovered by W Reid, Cape Town.

1921 V Reid. Discovered by W Reid, Cape Town.

1923 I JF Skjellerup. Discovered by W Reid and JF Skjellerup, Cape Town.

1924 I Reid. Discovered by W Reid, Cape Town.

1926 I Blathwayt. Discovered by TB Blathwayt, Bloemfontein.

1926 III Ensor. Discovered by GE Ensor, Pretoria.

1926 VII Reid. Discovered by W Reid, Cape Town.

1927 II Blathwayt. Discovered by TB Blathwayt, Bloemfontein.

1929 Forbes. Discovered by AFI Forbes at Rosebank, Cape Town.

1930 V Forbes. Discovered by AFI Forbes at Cape Town.

1932 I Houghton-Ensor. HE Houghton in Cape Town and GE Ensor in Pretoria discovered this comet on the same night when independently observing the variable star T Apodis. So there is something to be said for variable star observing after all!

1932 X Forbes. Discovered by AFI Forbes, Cape Town.

1941 IV de Kock-Paraskevopoulos. Discovered by RP de Kock at Paarl when observing the variable star R Lupi.

1961 V Wilson-Hubbard. This comet was first seen by Miss Anna Ras, a South African Airways stewardess. When I pointed out to her that she could have immortalised her name by reporting the sighting to the right people, she did not seem to be in the least perturbed at losing a chance which most astronomers would have jumped at.

1970 II Bennett. Discovered by John Caister Bennett of Pretoria during a systematic comet sweep. This comet became the fourth brightest (so far) of the 20th Century. Bennett's assiduous work was to reward him with the discovery of an extragalactic supernova and another comet before light pollution and failing health took their toll.

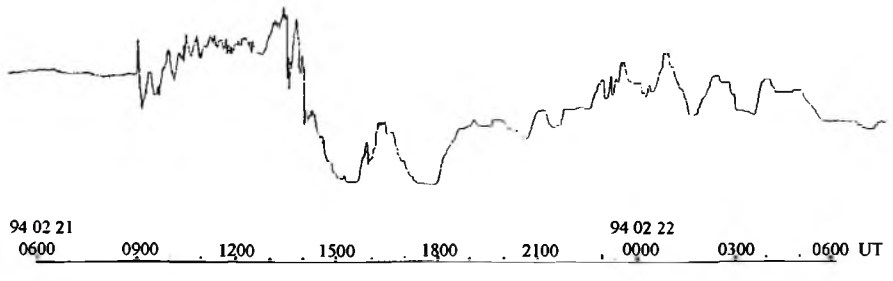


Figure 6: Amateur recording of a magnetic storm, 1994-02-21, at Edenvale.

1974 XV Bennett. The discoverer said that he expected that his first comet, 1970 II would fade rapidly and that he hoped that 1974 XV would brighten. The fact that the opposite happened illustrates once more that with comets, nothing is certain.

1978 P Haneda-Campos. Discovered by Toshio Haneda of Japan and Jose da Silva of Durban. As the first Portuguese national to discover a comet, Campos was made a Comendatore of the Order of Prince Henry the Navigator. This shows that some governments recognise prowess unrelated to sport, politics or entertainment. In this connection it could be pointed out that ASSA Member Albert Jones, amateur comet discoverer and prolific variable star observer, was awarded an OBE by the New Zealand Government in recognition of his amateur work.

6 Meteor Observing

Prolific meteor observers in the middle of the Century were SC Venter and John Botham (the discoverer of Saturn's White Spot)

An enthusiastic Meteor Section mounts watches whenever a prominent meteor shower is expected. The Director of the Meteor Section also collects reports of fireballs seen by amateurs in Southern Africa. Observations are reported to the International Meteor Organisation and Fireball Data Centre in Germany.

7 Education

Amateurs have traditionally been involved in bringing astronomy to the masses. Their boundless enthusiasm, the fact that people do not feel intimidated by a lay person from the next street and their sheer numbers ensure that many members of the public, especially school groups, receive their first exposure to astronomy through amateurs. Amateurs lectured at the Johannesburg and Cape Planetariums regularly. They also conducted classes in astronomy at the Gifted Child Centres established by the Johannesburg College of Education. Lectures were given as part of adult further education courses by amateurs. The amateur Thomas Budge was instrumental in producing a TV series on astronomy. Various Centres of the Society conducted basic astronomy and telescope making classes.

The ASSA has recently embarked on a formal education programme with amateur involvement.

8 Publications

One of the major South African reference works, the collection of Franklin Adams photographic plates of the southern skies, owes its existence to an amateur, John Franklin Adams (1843–1912). Franklin Adams purchased a ten inch (254mm) F4.5 Cooke camera and brought it to South Africa with the intention of making a photographic survey. His health failed and he was unable to fulfil his ambition. The instrument was donated to the then Union Observatory for the purpose of producing a photographic star atlas. Subsequently, the camera was used to make patrol plates for the detection and tracking of minor planets. Some 28 000 plates were obtained before professional astronomical activities in the Transvaal were curtailed. The plates have also proved to be invaluable for variable star investigations.

Following in the Franklin Adams tradition, the amateur Christos Papadopoulos (1910–1992) of Johannesburg produced an atlas which relates image sizes with visual star magnitudes. [22] Papadopoulos found existing atlases frustrating in that he was unable to relate the sizes of the star images with apparent brightness of stars and this motivated him to embark on an ambitious project. He commissioned a 125 mm F6 lens from Zeiss Oberkirchen and started a painstaking investigation into the parameters which relate the sizes of images with the visual magnitudes of

the stars. After he had established these parameters to his satisfaction, he commenced the monumental task of exposing hundreds of plates and processing them into a form ready for printing.

The atlas consists of 456 330X330mm sheets. The limiting magnitude is about 13 and the images are round up to the corners of the sheets. The image size to magnitude relation is so good that the Atlas has often been used to prepare variable star observing chart sequences.

Two astronomy books in Afrikaans were written by amateurs. "Ons wonderlike Heelal" by CW de Villiers[23] is very much a beginner's book but JE van Zyl's "Ontsluier die Heelal"[24] is a major work. The author was not content to copy information from the large body of existing general astronomy works. Instead, he provided his own examples and made independent calculations to illustrate various principles. For example, he used the data on twelve classical Cepheids quoted by A Sandage and GA Tammann[25] to calculate independently the distance of Delta Cephei. His conclusion that the distance must be 1100 light years has now been corroborated dramatically by George Gatewood and colleagues[26] who have increased the distance estimate from 630 to 1100 light years! A completely new edition in English of this work has appeared recently[23].

9 Computing and personal computers.

Before computers came into general use, amateurs working under professional guidance produced predictions of lunar occultations to supplement the small number of predictions supplied by Her Majesty's Nautical Almanac Office. This group also produced tables for the Annual Handbook of the ASSA which is edited by an amateur using a personal computer.

WP Hirst (1903–1994)[27] was an industrial chemist with a penchant for positional astronomy. He published a series of articles describing his method of deriving the orbital elements of a solar system body from three earth based position measurements[28]. He did much useful work on double star orbits. On retiring from the oil company where he was employed, he joined the staff of the University of Cape Town where he impressed staff members and successive generations of students with his expertise.

With the advent of personal computers, the Society found it expedient to form a Computing Section, the Director of which guides Society members in the use of computers. The Director publishes a catalogue of commercial astronomical software together with his assessment of various offerings. Several amateurs are using PCs for non-trivial astronomical work.

It is impossible to over-emphasise the impact of PCs on amateur activities. Amateurs now have at their finger tips, vast stores of astronomical data, including detailed charts of the sky, as well as undreamt-of computing power. The Internet has put amateurs worldwide in touch with each other and with the professional establishment and has added impetus to the observing of rapidly changing variable stars.

Conclusion

Some of the seemingly impressive activities which I have touched on, such as the photoelectric occultation observations and CCD work are not so significant when weighed against the solid achievements of the visual variable star, occultation and comet observers. It is, however, necessary to mention them in order to show that advanced work can be done by amateurs.

I gave prominence to the CCD to illustrate the astounding changes that have occurred in amateur astronomy during this century and because I believe it will dominate our work in the 21st Century. This is not an invitation to buy a CCD and associated equipment without further thought. I urge any budding user of amateur electronic aids to master visual tech-

niques and to become thoroughly familiar with the nuts and bolts of astronomical observing before going digital. I believe that any CCD user would be much more proficient if he or she had served a visual apprenticeship. Meaningful CCD observing is still an esoteric activity and in most cases, the average visual observer can easily surpass the average CCD user in productivity. In the forseeable future, there will be much room for visual work.

Retiring Presidents have the privilege of basking in past glories, contemplating present delights and sketching future triumphs: What awaits amateur astronomers in the 21st Century? The answer is, much rewarding work. There is still much that a visual observer can do and there is tremendous scope for development work in the digital astronomy field. What is needed is motivation. In some countries, amateurs have far surpassed us in advanced work. We need to apply our minds to meaningful activities like observational astronomy. The rewards will be great.

By way of encouragement, I would like to close by quoting from Roberts' somewhat flowery obituary by no less a person than General Smuts – statesman, philosopher and amateur botanist:

"It is an intriguing thought that a schoolmaster, far away in the wilds of the native territories, should as an amateur have started a line of research which has contributed to the complete revolution of the science of astronomy, even of our entire view of the physical nature and origin of this Universe. Without specialist training, without equipment or apparatus, harassed and exhausted by the endless routine of teaching Native children, without helpful stimulus from his fellows, and out of sheer love for his beloved hobby, he struck a vein which has proved to be the most fruitful in modern astronomical science, and pursued it with an insight, and with an ardour and with success, which have given him world wide fame. It is truly an astonishing performance. After Roberts let no amateur despair, and let each cultivate his scientific hobby to the utmost limit of his power and opportunities."

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