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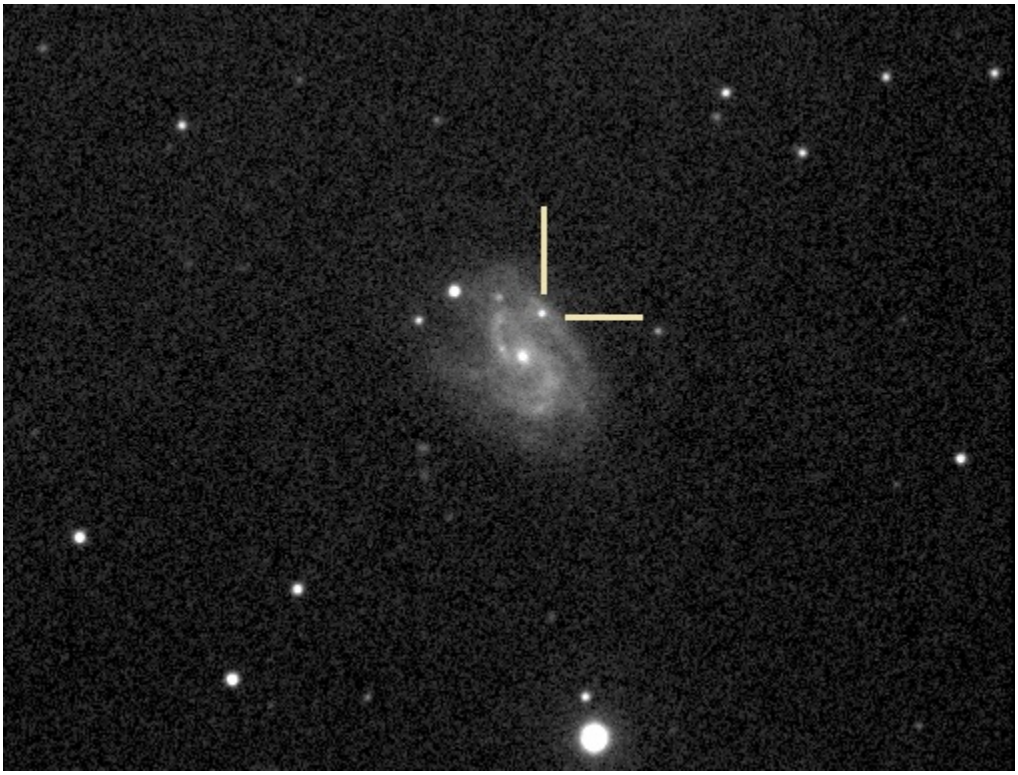

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Cover: SN2022jli in nearby galaxy NGC 157, discovered by Berto Monard at Kleinkaroo Observatory in Calitzdorp on 5 June 2022. See article on page 67

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News Note: SN2022jli in nearby galaxy NGC 157, constellation Cetus

Berto Monard - Kleinkaroo Observatory, Calitzdorp

At last another supernova discovery from the Kleinkaroo Observatory in Calitzdorp.

SN searching efforts at KKO have been reduced since 2012 to occasional short sessions often just before dawn and observing low towards the East.

These are the forbidden observing zones for the large survey telescopes that are often unable to look that close to the horizon and where air mass prevents quality images. As luck would have it, I did discover a bright nearby SN in one of the beautiful spiral galaxies near the equator. SN 2022jli was discovered on 5.17 June 2022, in galaxy NGC 157; a spiral galaxy of type Sbc. It is viewed face-on, showing spiral arms with the bright knots of star formation regions. That galaxy had just come into view, after its move of two months behind the sun. This is the first SN find at KKO in more than six years since SN 2016jbu and a serendipitous one, not for the first time.

It all happened on the predawn of May 5. CCD observations were ongoing and the target CV (cataclysmic variable) of the night was running out of horizon. The telescope was re-adjusted to observe some other CV targets first and then, just before dawn, it was aimed at some of the brighter and nearby galaxies near the eastern horizon. About a dozen galaxies were observed, aiming the telescope ever closer to the horizon and into dawn light. Images taken in such conditions are of a low quality and show gradually less detail and contrast. The ad hoc visual inspection of images during those observations doesn't show much.

Ten hours later those observations were remembered and started in a rather 'late' hurry to process and stack those morning images. On inspection there was a nice surprise; there was a bright new star on the NGC 157 image!

Fig 1. SN 2022jli in NGC 157

Frankly, many such 'discoveries' were made since 2015 only to find out that the alleged find was due to artefacts (often imprints on images from bright stars taken just preceding) or they were real but had already been reported by others.

Only after a thorough check of its authenticity can the find be reported on the Transient Name Server (TNS), the present IAU authority to name and deal with astronomical discoveries. They have taken over that part of the duties of the Central Bureau of Astronomical Telegrams since several years ago.

The report is done online on the TNS (Transient Name Server) site. It requires details regarding the exact time of the discovery, the derived celestial position, the objects brightness and the observing instrumentation used. The reference number given to my reported transient was AT 2022jli (Astronomical Transient of 2022 with a sequential number).

Despite the rather low quality of the discovery image it was possible to do photometry of the new object and to get a reasonable estimate of the position. As it turned out there was a mistake in the latter and the posted coordinates were faulty, something that was later corrected with astrometry applied on the confirmation image taken the next morning. However it would have some consequences as coordinates in the original report cannot be overwritten.

The confirmation image with a much better quality shows that the SN is localized in a spiral arm North of the galaxy centre, a place where new stars are formed and where many supergiant stars live their relative short lives. A SN found at such a location is very likely the result of a core collapse event, a SN of type II, Ib, or Ic.

Spectra were taken by a Polish observer soon after my report showed this transient to be a SN of type Ic. It is a type of core collapse SN, located in a region of high pollution, mostly a result from previous eruptions of the progenitor star in its end stage. The previous SN found in NGC 157 was SN 2009em. It was a type Ic too.

Regarding the distance to galaxy NGC 157: the literature cites estimated distances between 30 and 80 million lightyears with a value of 52 mly assumed as a compromise. This is a large uncertainty on the distance to this galaxy, which despite the mind boggling distance, is a relatively nearby one as is shown by the detail that can be seen on the CCD images, taken by small telescopes.

In order to sort out the distance problem we need to observe a clear SN there, one without much light attenuation and of a well characterized type, like a type Ia or an unobscured type II.

Type Ia SNe would likely occur well away of the spiral arms and star formation regions. Its light would likely be less attenuated by its galactic surroundings and the light curve and absolute peak brightness of a type Ia are well studied and known to be quite the same in all cases.

If such a type Ia were to be found in NGC 157, the distance could be derived to well within a couple of million light years of its exact value.

News Note: New robotic telescope gives UFS the edge

Leonie Bolleurs

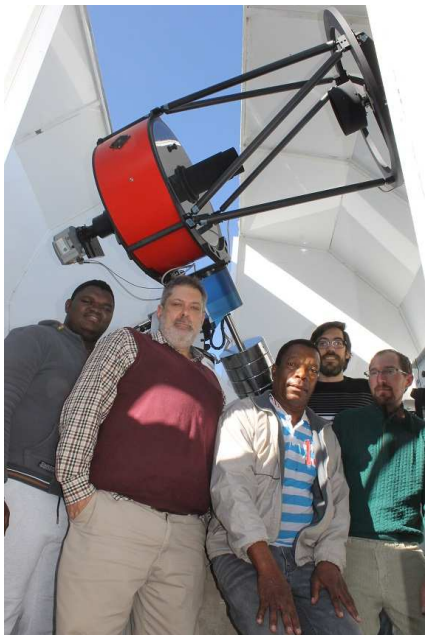
The Astrophysics Research Group in the UFS Department of Physics recently collaborated with the Institute of Astrophysics of Andalusia (IAA) in Spain and University College, Dublin (UCD), in Ireland, to install a robotic telescope at the Boyden Observatory, as pictured here:

Fig 1. From bottom, Teboho Rakotsoana and Simon Rakotsoana (UFS); Emilio J Garcia from (Institute of Astrophysics of Andalusia); Prof Pieter Meintjes (UFS); Prof Antonio M Carrillo (UCD).

The Astrophysics Research Group in the Department of Physics at the University of the Free State (UFS) is part of an international collaboration with the Institute of Astrophysics of Andalusia (IAA) in Spain and the University College of Dublin (UCD) in Ireland, which focuses on measuring the brightness of transient sources. Knowledge gained from studying these cosmic X-ray sources, which seem to appear in the sky for a short time before disappearing, will lead to a more complete and better understanding of the universe, according to Prof Pieter Meintjes, Professor of Physics and Head of the Astrophysics Programme in the Department of Physics.

To facilitate these observations, a robotic telescope network has been established, with the Boyden Observatory selected as one of the sites for BOOTES 6 (a Burst Observer and Optical Transient Exploring System).

The UFS and the IAA started working on this project more than two years ago. The foundation and pier were built through a local tender, and in January 2020, part of the dome of the structure housing the telescope arrived by ship. Due to the COVID-19 pandemic there were some delays, resulting in the crew from Spain only arriving in South Africa with the telescope and hardware in November 2021, but having to return to their country without completing the installation. They returned in April, and in early May and completed assembling the telescope in collaboration with UFS researchers and technicians.



The Robotic telescope as an opportunity to further own research

The main scientific objective of the robotic telescope is to observe and monitor the optical counterparts of gamma-ray bursts as quickly as possible when detected from space or other ground-based observatories.

Fig 2. From left to right: Teboho Rakotsoana, UFS Prof Pieter Meintjes; Simon Rakotsoana, UFS; Prof Antonio M Carrillo from UCD and Emilio J Garcia from the Institute of Astrophysics of Andalusia; and

Prof Meintjes, the local coordinator of the project who is overseeing the whole operation locally, said they will use the telescope to observe those transient sources that go into an eruptive phase for a short span of time. BOOTES has an enormously fast slew rate, so it can start observations of erupting sources within a few seconds, which allows the Astrophysics Research Group to get data very quickly. This will certainly give us an edge over other international astronomy groups that are also involved in the same type of research.

He explained the importance of monitoring these packets of enormous energy. Observing the optical afterglow of a gamma-ray burst, we can establish its point of origin in space. Furthermore, the shape of the optical afterglow light curve gives insight into the type of mechanism behind the gamma-ray burst, i.e., whether the burst is produced by a collision between two neutron stars or by the explosion of a hypernova. The knowledge gained with research made possible by the robotic telescope should therefore lead to a more complete and better understanding of the universe.

The UFS Astrophysics Research Group, with its research focus on high-energy astronomy and the physics behind gamma-ray bursts, has a particular interest in this project. As the local custodians of the project and in terms of a memorandum of

understanding, the group is guaranteed a certain amount of telescope time for its own in-house observation programmes.

Project expands UFS' international research footprint

Besides the opportunity for knowledge exchange, this project establishes Bloemfontein as a region where research of international quality is being done and will help to attract talented learners to the UFS. The successful operation of the robotic telescope may also draw more international groups to bring robotic telescopes to Boyden, thus expanding our international research footprint.

"The fact that the Boyden Observatory is in the Southern Hemisphere and has access to the galactic centre region with its host of very interesting astronomical objects and the Magellanic Clouds, makes it a very attractive site for astronomical research" said Prof Meintjes.

Fig 3. Dr Pat van Heerden from the UFS Department of Physics, provided valuable assistance to our IAA and UCD collaborators.

Boyden Observatory also has a number of years of experience in robotic telescopes in the sense that they have been hosting the **Watcher Telescope**, operated by the University College Dublin in Ireland, since 2001. The new BOOTES telescope, once mounted in middle May 2022, will then be Boyden's second robotic telescope.

News Note: Strange neutron star spinning every 76 seconds discovered in stellar graveyard

An international team of scientists have discovered a strange radio emitting neutron star, which rotates extremely slowly, completing one rotation every 76 seconds. The team, led by members of the ERC-funded MeerTRAP (More Transients and Pulsars) group at The University of Manchester say it is a unique discovery as it resides in the neutron star graveyard where they do not expect to see any radio emission at all. The discovery was made using the MeerKAT radio telescope in South Africa.

The source was initially found from a single flash, or pulse, by the MeerTRAP instrument whilst piggybacking on imaging observations being led by a different team, ThunderKAT. MeerTRAP and ThunderKAT then worked closely together to puzzle out its origin. Combining the data from the two teams, it was then possible to

confirm the pulsations and get an accurate position for the source, enabling detailed and more sensitive follow up observations.

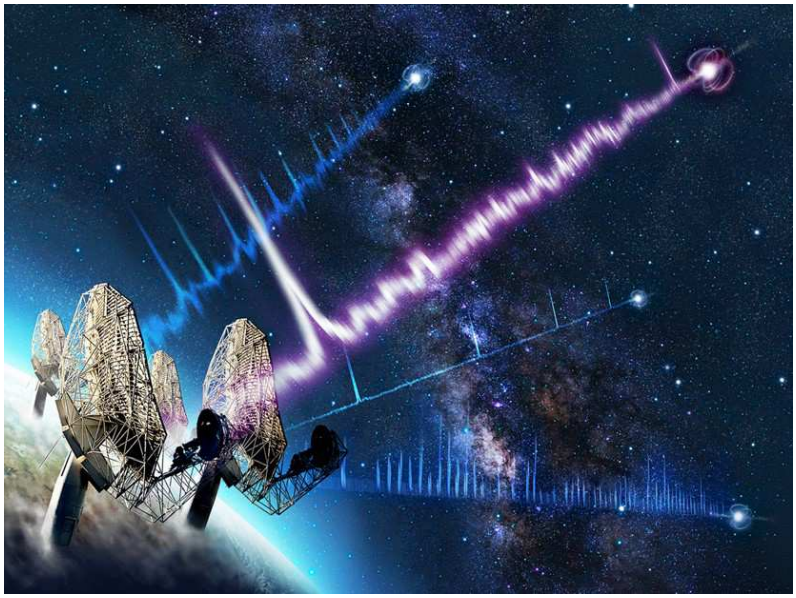


Fig 1. Artist impression of the 76s pulsar (in magenta) compared to other more rapidly spinning sources. Credit: Danielle Futselaar (artsource.nl).

Neutron stars are extremely dense remnants of a supernova explosion of a massive star. They can produce beams of radio waves which sweep around the sky as the neutron star spins, producing regular flashes like cosmic lighthouses. Scientists currently know of about 3000 of these in our own Galaxy. However, the new discovery is unlike anything seen so far. The team think it could belong to the postulated class of ultra-long period magnetars with extremely strong magnetic fields.

Dr Manisha Caleb, formerly from The University of Manchester and now at the University of Sydney, who led the research, said that amazingly we only detect radio emission from this source for 0.5% of its rotation period. This means that it is fortuitous that the radio beam intersected with the Earth. It is therefore likely that there are many more of these very slowly spinning sources in the, which has important implications for how neutron stars are born and age.

The majority of pulsar surveys do not search for periods this long and so we have no idea how many of these sources there might be. In this case the source was bright enough that we could detect the single pulses with the MeerTRAP instrument at MeerKAT.

The newly discovered neutron star is named, PSR J0901-4046, and shows characteristics of pulsars, (ultra-long period) magnetars and even fast radio bursts. While the radio energy produced suggests a pulsar origin, the pulses with chaotic sub-pulse components and the polarization of the pulses are reminiscent of magnetars.
While the spin period of PSR J0901−4046 might be more consistent with a white dwarf, another less extreme type of stellar remnant, scientists do not see any multi-wavelength support for this. It is presently unclear how long this source has been emitting in the radio. It was discovered in a well-studied part of the galaxy, but radio

surveys don't usually search for periods this long, or pulses that last more than a few tens of milliseconds.

Professor Ben Stappers at The University of Manchester and Principal Investigator of the MeerTRAP project explained that the radio emission from this neutron star is unlike any we have ever seen before; we get to view it for about 300 milliseconds, which is much longer than for the majority of other radio emitting neutron stars. There seem to be at least 7 different pulse types, some of which show strongly periodic structure, which could be interpreted as seismic vibrations of the neutron star. These pulses might be giving us vital insight into the nature of the emission mechanism for these sources.

"The sensitivity that MeerKAT provides, combined with the sophisticated searching that was possible with MeerTRAP and an ability to make simultaneous images of the sky made this discovery possible. Even then it took an eagle eye to recognise it for something that was possibly a real source because it was so unusual looking!" said Dr Ian Heywood from the ThunderKAT team and the University of Oxford who collaborated on this study.

Detecting similar sources is observationally challenging, which implies that there may be a larger undetected population waiting to be uncovered. This new discovery adds to the possibility of the existence of a new class of radio transients, the ultra-long period neutron stars, suggesting a possible connection to the evolution of highly magnetized neutron stars, ultra-long period magnetars, and fast radio bursts.

The Centres of the Astronomical Society of Southern Africa.

Chris de Coning – ASSA Archivist

The "Astronomical Society of Southern Africa" (ASSA) will be One Hundred years old on 1st July 2022. We wish ASSA a happy centenary and a prosperous future!

ASSA was preceded by the founding of the "Cape Astronomical Association" (CAA) in 1912. One of its members moved to Johannesburg and started the "Johannesburg Astronomical Association" (JAA) in 1918. The two astronomical associations decided to amalgamate and on the 1st of July 1922 the "Astronomical Society of South Africa" (ASSA) was officially founded. The CAA became the Cape Centre and the JAA became the Johannesburg Centre of ASSA. More information can be found in an article titled "History of the Cape Astronomical Association" [*MNASSA* **71** Nos 11 & 12, Dec 2012, pp.235-245])

The society consists of a number of Centres scattered throughout Southern Africa. It also hosts observing sections that cater for specific interests, such as the Comet and Meteor Section and the Deep Sky Section. All these activities are overseen by a Central National Council. In this article we will focus only on the Centres of ASSA.

An important aspect comes into play that affected the founding of Astronomical Societies, namely proximity to professional observatories. As already mentioned the first two centres were the CAA and JAA. Both of these societies started in close proximity to professional observatories. The third astronomical society also started in close proximity to a professional observatory but with a twist.

Fig 1. An unusual view of the Royal Observatory at the end of a lane of trees. Sketch by C. Piazzi Smyth. Original in the possession of the Durban City Library. Source: Warner (1979).

The Royal Observatory at the Cape of Good Hope (ROCGH) was not only the first professional observatory in Southern Africa but also the first permanent Scientific Establishment in the Southern Hemisphere. The second professional Observatory was founded in Durban. This was known as the Natal Observatory, created in order to observe the Transit of Venus in 1882. However, due to a lack of funds this observatory closed down in 1911. The third professional observatory started in 1903 as the Transvaal Meteorological Observatory, and from 1909 functioned as an Astronomical Observatory. By the time the JAA was founded, the Observatory was known as the "Union Observatory" and later the name was changed to the "Republic Observatory".

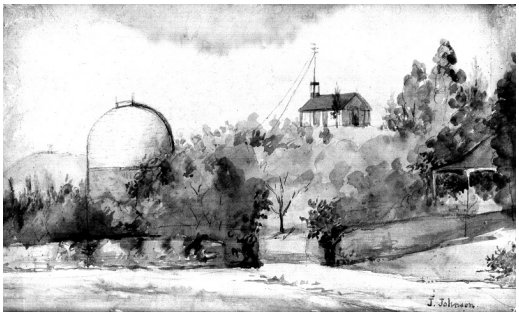
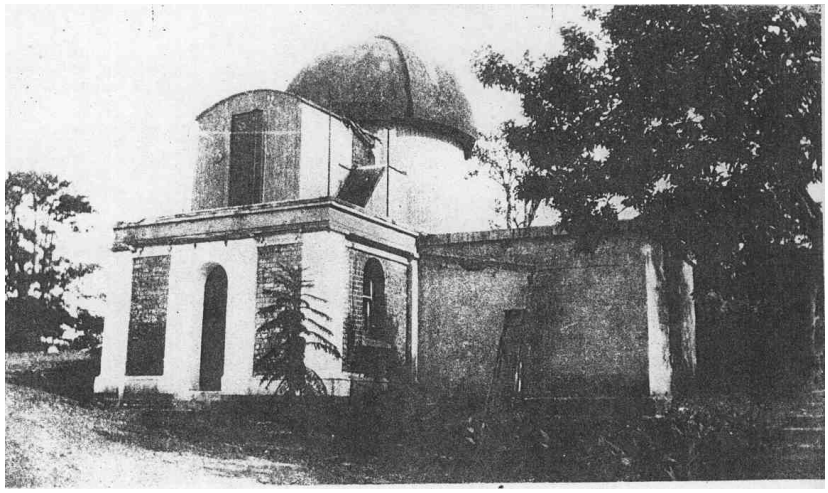


Fig 2. A painting of the Union Observatory at Johannesburg. Artist: Mrs Joan Johnson Source: Vermeulen (2006).

Thus the first Astronomical Society, the CAA, was founded in the proximity of the ROCGH (1st Observatory). The second society, the JAA, was founded in the proximity of the Union Observatory (3rd Observatory). The third

astronomical society in South Africa was known as the "Natal Astronomical Association" (NAA), and was founded in the proximity of the Natal Observatory (2nd Observatory).

Fig 3. Natal Observatory circa 1895. Taken from North East. Courtesy of the Local History Museum, Durban. (Source: Gray [unpublished])



We do not really know when the NAA was founded, but we suspect it was in 1922 (*Minutes of Council* co_19221222). If correct it means that it was founded 10 years after the professional observatory closed down but that the members possibly had access to the telescopes. The NAA only joined ASSA in 1932 to become the Natal Centre (co_19320919), and in 2000 changed its name to the Durban Centre (*ASSA Handbook*, 2000).

All the Centres went through good and bad times. However the Johannesburg Centre was particularly badly affected by the Financial Depression of 1929 and ceased to exist before World War Two. The Centre was revived around 1947 and was referred to as the "Transvaal Centre" (sometimes as Witwatersrand Centre": *MNASSA* **6**, 77, 1947, *MNASSA* **8** 94, 1949, *MNASSA* **18** 77, 1959. In 1994 the Government changed the number and layout of the Provinces of South Africa. The Transvaal Province ceased to exist and in 1996 the name of the Centre reverted to "Johannesburg Centre" (*ASSA Handbook*, 1996).

The Constitution of ASSA states that there must be at least 10 members of ASSA in a geographical area in order to establish a Centre. In 1947 Mr Bentley managed to get enough members together to establish a Centre at Port Elizabeth. (co_19461030 / co_19470514) This Centre existed until 1965 when, for unknown reasons, they opted to cease being a Centre of ASSA. They continued as an independent society known as the Port Elizabeth Peoples Observatory (*Minutes of Council* co_19650505).

In 1950 a Mr Linton applied to establish a Centre of ASSA in Bloemfontein but there were not enough ASSA members in the area. A visiting astronomer to Boyden Observatory (6th Observatory), Dr Haffner, was a very popular public speaker and caused a surge of interest in astronomy in the area. Because of Dr Haffner the required te- member limit was reached and in 1959 the Bloemfontein Centre was

established. (*Minutes of Council* co_19501113, co_19590220, co_19590420) (In 1971 it was referred to as the Free State Centre (*ASSA Handbook*, 1974). Early in the 1990's the Centre was allowed access to Boyden Observatory, which caused a great surge in its membership.

Fig 4. Boyden Observatory in 1952, with all the domes opened and the telescopes proudly "exposed" for the camera. Source: Friends of Boyden.

The Transvaal Centre had a problem in that its members were spread over more than one city. To alleviate distance and traffic problems, the "Pretoria Centre" was established in 1966. The Centre acquired a 30cm (12-inch) telescope which they set up at the Radcliffe Observatory. Once the Radcliffe closed down, the military took over the terrain. The Centre moved their telescope to the Christian Brothers College School ground, but during the Covid Epidemic could not gain access to their own instrument (*Minutes of Council* co_19660630_AGM)

It was not only the members of Johannesburg and Pretoria Centres that experienced problems with distances. In 1975 the Natal Midlands Centre, based in Pietermaritzburg, split off from the Natal Centre. The Natal Midlands Centre had an active but brief existence and closed down in 2010 due to low membership numbers.

In 1956 the name of ASSA changed from the "Astronomical Society of South Africa" to "South**ern** Africa" due to a growing membership from individuals outside of the borders of South Africa. (*Minutes of Council* co_19560725_AGM) In 1975 a Centre of ASSA was established in Salisbury, Rhodesia. Due to the changing political situation the Centre was renamed the Harare Centre, Zimbabwe in 1982 (*ASSA Handbooks*, 1977 to 82). The Centre ceased to function in the mid 2000.

In 1992 the constitution of ASSA was changed to reduce the minimum numbers of members required in a geographical area in order to establish a Centre from ten to five. (*MNASSA* **51,** 1992 October) The Helderberg Centre was established in 1993 but it lasted only until 1996.

The newest Centres of ASSA to be established were the Garden Route Centre (7 Feb 1998: *MNASSA* **57, 9,** 1998) and the Hermanus Centre (21 April 2009: *MNASSA* **68,** 85, 2009)

This is a very brief synopsis of the establishment of ASSA Centres over the last Century. Unfortunately not many documentary sources exist to give us insight about the Centres. For this reason a request was made to individual centres to research their histories and submit articles for publication *in MNASSA* as part of the Centenary Celebrations of the Society. Hopefully each Centre will be able to track down its minutes of Committee meetings, membership lists, newsletters and other important documentation. The Historical Section operates an archive and can assist the Centres to store their "memories".

Note: The count of Observatories is of Professional Observatories in Southern Africa. It exclude John Herschel's Observatory.

References

ASSA Handbook: Digital copies of the Handbook can be viewed at http://assa.saao.ac.za/sections/history/assa-archive/publications-of-the-astronomical-society-of-southern-africa/
Minutes of Council: References that start with "co", followed by a date (co_yyyymmdd), refer to Council Minutes of meeting and can be viewed at http://assa.saao.ac.za/sections/history/assa-archive/national_council/
MNASSA: *Monthly Notes of the Astronomical Society of Southern Africa*. Digital copies of the printed publications before 2010 can by viewed through Sabinet: https://journals.co.za/journal/mnassa Since 2010 MNASSA are published digitally and
Vermeulen, D.J. (2006*). Living amongst the stars at the Johannesburg Observatory*, Chris van Rensburg Publications, Johannesburg.
Warner, Brian, 1979. *Astronomers at the Royal Observatory, Cape of Good Hope,* Balkema, Cape Town.

History of the Cape Centre

Dr Wynand Beukes, current editor of The Cape Observer

"In the light of Mons Mensa – the story of the Cape Observers"

The inception of the ASSA Cape Centre's predecessor, the Cape Astronomical Association, in 1912, was characterised by ardent and enthusiastic meetings. This ardour and keenness remained inseparable components of the Centre in the course of time. Astronomy knowledge was shared with fervour and passion between

members. The wonderful lore of the night sky was beamed forth to the public by means of outreach events. The Centre's Cape Town and Table Mountain association is illustrated with its logo containing the words "Mons Mensa". The members conveyed their discernment and insight in a newsletter with a profoundly appropriate name – *Cape Observer* (later titled *The Cape Observer*).

The conception of the Cape Astronomical Association, first astronomical society in South Africa, was made known on 3 October 1912 by an invitation in the Cape Argus: "A meeting of those interested in amateur astronomy, with a view to the formation of a local Astronomical Association will be held in the rooms of the Cape Town Photographic Society, Old Town House, this evening."

The new association was founded a bit more than two months later on 8 November when it received its name and on 13 December when it was inaugurated.

The beginning years – lanterns and black boards

Not much information is at hand until 1928 as the minute books are unavailable. However, preserved documents provide small glimpses of the activities in those years.
On 10 April 1918, for instance, the members listened to a speech by a Dutch Reformed minister from Cradock who created a private observatory at the town. Two months later, on 12 June, the members were informed about a Mr Watson, a co-member from Beaufort West, who discovered "the nova in Aquila".
During the start of the twenties, the members struggled with the expression "what's in a name?" – they felt that the title of the association was a misnomer as the members were from all over the country and even the then Rhodesia. This resulted in the altering of the name to the Astronomical Society of South Africa on 1 July 1922. The local association lived on as the Cape Centre.

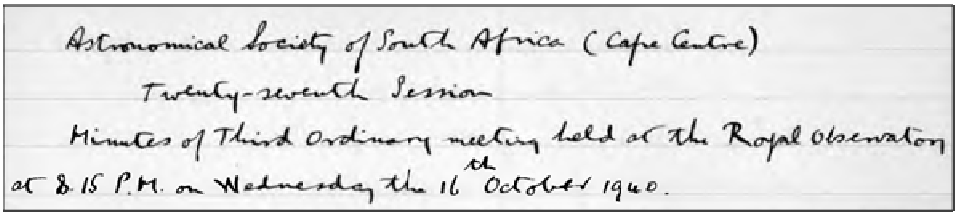
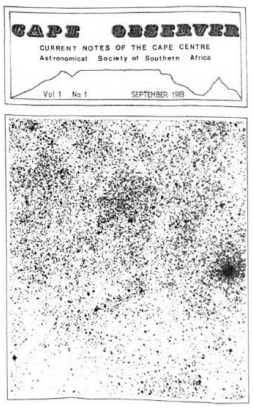

Astronomical Society of South Africa (Cape Centre)
Twenty-seventh Session
Minutes of Third Ordinary meeting held at the Royal Observatory
at 8.15 P.M. on Wednesday the 16th October 1940.

Fig 1. The introduction in the minutes of the Cape Centre's first regular meeting at the Royal Observatory.

The focus on resources played an important role from the start. As early as 1912, there is a reference to a lecture on spectroscopy which was illustrated with the aid of lantern slides. In the rules of the Centre, compiled in 1922, much space is allocated to lantern slides. The slides were on loan to members at two pennies per slide.

Figs 2-4.The evolution of the logo



Figs 5-9. The evolution of the Cape Observer

Other early years' resources were black boards to convey information, as indicated in a March 1930 report. Six years later in 1936, it was announced that the Centre's telescope fund was utilised to purchase a telescope for sixty pounds and that any member could use it. Precisely seventy years later, in 2006, another precious resource, the Cape Centre Web Page, was launched.

Clouds and dust, not stars, in the eyes!

The minutes from 1928 until the last part of the century are handwritten and here and there very difficult to decipher due to fading through the years. Subjects discussed in 1928 purveys an insight about the then conversational themes among Centre members:

Great daylight meteor of July 8th 1928.

Bright meteor of July 27th 1929.

The possibility of the navigation of space.

Outreach to the general public was boosted with Centre articles in Cape Town newspapers. The minutes in June 1929 summarises this venture as follows: "Monthly notes with charts of the sky have been published in the Cape Times as in previous years […] and articles in Afrikaans by Mr. T MacKenzie continue to be published *in Die Burger."*

Also in 1929, a factor that constantly played an immense role in the Centre's observing was expounded: the unpredictable Cape Town weather! "The night unfortunately was cloudy. Several attempts were made to observe through breaks in the clouds, these however proved unsatisfactorily and the meeting dispersed."

Before the great rush to Calvinia to observe the total solar eclipse on 1 October 1940, Centre members were warned about a factor not conducive to good observing – dust.

“The great trouble at Calvinia was the dust storms, as the dust played havoc with the delicate clock-work of instruments,” it was declared on 17 July 1940. Other defective elements were (this time the weather was not guilty!): ‘’The train service to Calvinia was very slow, while the motor route was quicker but uncomfortable owing to corrugated road surfaces.”

Between two pandemics – Spanish Flu (1918) to Covid-19 (2020 – 2022)

Many international events which affected millions of people, occurred during the existence of the association and Centre; and, naturally, its members were influenced too.

In 1918, the members were confronted by the deadly Spanish Flu. Their experience is summarised with the following minutes excerpt: “Owing to the prevalence of the influenza epidemic, no meetings were held during the period October-November.”

The presence of the Second World War (1939 to 1944) comes alive in the Centre’s minutes:
“Dr. Jackson informed members that the Annual General Meeting of the Society had been postponed […] owing to disorganisation due to the War” (17 July 1940).
“It was decided not to accept Miss Robinson’s resignation […] that she would not be liable to pay subscriptions for the duration of the war” (17 March 1943).
“At a meeting […] the name of Corporal J.D. Leask, R.E., Middle East Forces was considered and passed for election” (21 April 1943).
“The effect of the Bus Curfew on the times of meetings was discussed […]” (17 November 1943).
The visit of Halley’s Comet in 1986 not only gave rise to a photographic competition, but also caused the Centre to alter its meetings schedule. “Due to Halley's Comet being at its best during the second week of April, there will be no formal meeting on Wednesday April 9.” The Centre also reached out to the Brackenfell Pick ’n Pay “assisting the public viewing the comet”.

The external occurrence that had the most extensive consequences for the Centre was without doubt the Covid-19 pandemic. Marius Reitz, who became chairman in 2019, describes the next two years as a most challenging time to keep the Centre going. All physical monthly meetings were suspended. Reitz summarises the Centre’s Covid-19 experience as: “The era of digital astronomy had truly arrived!”

MNASSA started as the Cape Centre’s Monthly Notes

The Cape Centre played a founding role in ASSA’s current *MNASSA* (The Monthly Notes of the Astronomical Society of Southern Africa) journal. The first two words in

the journal's title were in fact terms in the Centre's vocabulary more than a decade before the actual establishment of the journal. This is exposed in the minutes of 29 June 1929: "Monthly notes with charts of the sky have been published . . ."

In the same month, April 1940, that the journal was instituted, the following excerpt appears in the Centre's minutes: "Dr. Stoy reported that astronomical data had been incorporated in the monthly notices [...] and that it was hoped to make this a monthly feature" (30 April 1940).

A June 1940 minute entry serves as a confirmation that the journal started as a Cape Centre publication: "The chairman asked for any suggestions that might be offered for the improvement of the Cape Centre's Monthly Notes" (19 June 1940).

1940 – Centre makes the Royal Observatory its home

In the first three decades of the Centre's existence, meetings were held at several venues in the city, inter alia in club rooms in Strand and Wale Streets and private residencies.

During this time, several instances of interaction between the Centre and the Royal Observatory were noted. One of many examples is an observational meeting in the MacLean Observatory on 23 February 1930. The Victoria Telescope was placed at the disposal of the members.
In February 1939, a minutes excerpt indicates that activities were started to make the Royal Observatory the Centre's permanent home. The note contains an announcement that the Centre's postal address "change to the Royal Observatory, instead of PO Box 2061".
The move to Observatory took place in 1940. This important event in the Centre's history is highlighted in the minutes:
"The Committee left the Hon. Secretary to make arrangements for monthly meetings of the Cape Centre to be held at the Royal Observatory starting at some future date" (24 June 1940).
"The Chairman informed members of the decision of the Committee to hold the meetings of the Centre at the Royal Observatory, with the kind permission of H.M. Astronomer, as soon as convenient" (17 July 1940).
"Volunteers were called for [...] the transfer of the Centre's library from the Mountain Club room to Dr. Stoy's and Mr. Hirst's motor-cars in transit to the Royal Observatory" (21 July 1940).
The first regular meeting in this new dispensation took place on 16 October 1940.

The 1950s – member's age checked and non-payers named and shamed

The Centre's total number of members fluctuated through the years – from as low as 43 in the mid-fifties to nearly 120 in 1985. In the fifties, the Centre kept focusing on outreaches to attain more members and to drastically tackle the old problem of non-payment of subscriptions.

The outreach was in line with the Centre's endeavour through the years to acquire young members – in this instance under the age of 21. And the age stipulation was strictly adhered to, as is witnessed from the case of P White of Paarl who was proposed as a student member on 21 July 1954. This was subject to confirmation that he was indeed under 21. On 8 September 1954 it was stated that White passed the test with flying colours - he was indeed 15 years of age!

At the end of the fifties, the outreach activities were extended with the establishment of the Amateur Telescope Makers group as a sub-section of the Centre.

The old issue of members not paying their subscriptions was tackled with a radical decision on 10 October 1956: "It was resolved that the names of members who had not paid their subscriptions to the Centre, should be read out at the next ordinary meeting." Six years later in 1962, the other side of the coin came to the fore when it was announced that a member had paid his subscription for four years in advance!

The 1960s – feeling at home. A storm in a teacup?

Accommodating new members was a thorny issue through the years. In July 1961, for instance, it was stated at a Centre committee meeting that "little had been done in recent years making members, particularly new members, feel at home". A committee member suggested that the provision of refreshments at meetings could enhance the social side of the Centre.

Two years later, this problem was still not resolved. This time, on 8 May 1963, the idea of tea being served at meetings was addressed. No conclusion was reached: "The issue was held over for a more opportune time, and, eventually, on 9 October 1963: "The Committee authorised the provision of tea at monthly meetings . . ."

But then, on 10 February 1964: "The Committee after some discussions, decided a fixed charge of 5c a cup be levied for tea."

And finally, on 24 March 1964: "The Chairman stated that a list of instructions in connection with the preparation of tea had been typed and placed in the tea-cupboard."

The big issue of members' involvement was a regular item for discussion:
"A list of the members of the Cape Centre will be published in the next issue of the Cape Observer […]
The purpose of the list is to allow members living close to one another to communicate and further their astronomical interests" (December 1983)."The question one should really ask is are we trying to run a Centre with a high membership or an active membership?" (December 1985)
"[…]let us see some action from the members themselves […] the Centre will become a social tea club" (December 1985).

1970 - the Centre's own telescope put in use

9 September 1970 is a major milestone day in the Centre's history. On this day the Centre committee announced that its own telescope on the Cape Observatory terrain was completed by Centre members and ready for use. Work on the foundation of a building to house the telescope started precisely six years earlier, in August 1964.

The frame of an old dome at the Observatory was dismantled, scraped and repainted. Rollers were fitted to this frame and the whole assembly was mounted on the ring. Early in 1968, the reinforced concrete pier was cast on a separate foundation block let into the dome floor.

Work on the mechanical and electrical parts of the mounting assembly progressed steadily until the final figuration of the mirror. The telescope was named "The Ron Atkins Telescope" in recognition of Atkins' personal contribution.

The 1980s – renewal with a newsletter and logo

The entire communication environment of the Cape Centre changed in September 1983 with the establishment of a members' newsletter. Maciej Soltynski, chairman in those days, together with Peter Mack, the Centre's first director of observations, played a decisive role in the installation of Cape Observer, the name of the new conversation tool.

Soltynski says that no colour images were used in those days. The distribution of the newsletter was carried out by collection at meetings in addition to delivery via the postal system.
The newsletter serves as an excellent source regarding the Centre's history. However, shortcomings exist too, since issues from certain periods could not be tracked down.
From the available issues, it is evident that the newsletter underwent four comprehensive layout changes through the years. The first layout alteration was in the nineties. The publish period was atoned from quarterly to monthly. The second

restyling was in 2004 when colour pictures were published for the first time. The third transformation took place in 2010.
The last metamorphosis was in January 2020 with the renaming of the newsletter to The *Cape Astronomer* and the conversion into a full-colour publication. This new reproduction appeared monthly, but was changed to quarterly as a result of Covid-19 and other factors.
At the end of 1987, the Centre's first own logo was introduced, containing an image of Table Mountain as well as the words Mons Mensa. "This is produced as a motor-car license holder, available from 'Joe' or 'Audrey' at a cost of R1 each. Take your car away from the common herd of insurance company advertisers!"

Into the new millennium with golf shirts and "bus cards"

In the second week of the new millennium, on 12 January 2000, a Cape Centre "Think Tank" made it clear that the Centre wants to continue on precisely the same fashion as their founding predecessors nine decades ago regarding eagerness and excitement when dealing with sharing astronomy and assuring the involvement of members.

In this regard, it was decided that committee members should wear identifying tags, that members should give talks to their children's schools and that the Centre should arrange more "bring and braai" gatherings.

These decisions were adhered to in the following years, by means of inter alia:
March 2004, golf shirts: Golf shirts with the Centre's logo embroidered on the pocket were made available to members and the committee was convinced that "At a cost of R70 per shirt, they are a bargain."
January 2010, Sutherland: "How many astronomy societies can boast a trip like this? We went to see not one but two centres of astronomy containing some of the most advanced hardware in the world, incorporated two nights of unparalleled star gazing, conducted by a professional tour guide and astronomer, accompanied by expert astronomers, and all for a tiny cost."
March 2017, "bus cards". So-called "bus cards" with the Centre's contact information were printed for outreach purposes.

These are only a few examples of the undertakings by the Cape Centre through the years to ensure an environment wherein enthusiasts were enabled to share their interest in astronomy. It also ascertained that, in 2022, the Cape Centre is still characterised by the vehemence and intensity that identified the founding meetings at Greenmarket Square nearly 110 years ago.

History of the Durban Centre

Debbie Abel – Durban Centre Vice Chair.

Natal's (now Kwazulu Natal's) 'official' contribution to astronomy began on Sunday 6 December 1882 when it was one of a handful of locations around the world to formally observe the transit of Venus from the specially built observatory at 230 Currie Road, Durban. Sadly, rather than growing from strength to strength on the back of this auspicious occasion, local astronomy limped along, its fortunes waxing and waning, until the Government Astronomer, Mr Edmund Nevill, who had carried out the transit recordings and managed the observatory against all odds for 30 years, returned to Britain in 1912. These 30 years could fill a volume all on their own, which unpublished volume was compiled by a Mr. M.A. Gray, Secretary and PRO of the Natal Centre of ASSA in 1980 (his volume was modestly revised in 1998), called *Raindrops, Test Tubes and Galaxies.* Much of the information used in this summary of the past 100 and something years is sourced from this tome. Other 'google' sources often appear to be sourced from the same document so we owe Mr Gray a great debt of gratitude for recording this history for us.

Without going into great detail of these initial years, a major bone of contention that Edmund Nevill had to deal with has not changed in the slightest in the century since. Durban weather is NOT conducive to observational astronomy, whether it is the incessant cloud cover, humidity or the torrential rainstorms. While the face of Durban has no doubt changed considerably in this time, the climate, not so much.

Nevill's senior assistant was earmarked to take over the observatory from Edmund when he returned to Britain but, sadly, he passed away just before Edmund left Durban on 12 March 1912. On 16 March 1912, the *Mercury* newspaper published an article about the observatory closing due to there being no replacement astronomer. Since much of the equipment had been paid for by private donation (including city founding fathers such as Escombe, Greenacre, Randles & Currie), distributing the assets was 'sensitive'. Some went to the Durban Corporation, the Transvaal Observatory, Government Laboratories and the Natal University College (Pietermaritzburg). The main 8" telescope then fell under the control of the Technical Institute (now DUT) who was responsible for its maintenance via the Astronomical Section of the Natal Society for the Advancement of Science and Art.

A dedicated 'Durban Astronomical Society' was suggested in 1917 but only finally got off the ground in early 1922. The observatory was cleaned and repaired (a never-ending task) and the meeting to form the society was held on 8 May 1922, attended by 50 – 60 people. The name was soon changed to the Natal Amateur Astronomical Association. By year end they were hosting school and college groups and held regular lectures, but the observatory facility was still closed to the general public. The

association was plagued by the ‘short observing season’ and even that was regularly interrupted. True to form, there was a thunderstorm for the total eclipse of the Moon on 8 December 1927 but they were blessed with clear skies for the partial Solar eclipse on 19 May 1928. In 1928/29, the local Boy Scouts requested a ‘Starman’s Badge’ course which is still in effect today.

By 1929, the wood and iron observatory building had again deteriorated (wood rot and hail damage) but the College did not have the funds to repair it. It was agreed to lapse the maintenance agreement and, as of 1 April 1930, control passed to the Astronomical Association with the College a minor funder. The 1930’s brought the Great Depression. Money was short, membership plummeted, older members were dying and few younger members joined; there was little motivation to keep going. By 1931, Natal was urged to amalgamate with the Cape group and join the Astronomical Society of Southern Africa (ASSA). This was agreed to and the name changed again to The Natal Centre of the Astronomical Society of Southern Africa somewhere between 1931 & 1935. Private donations were again sought to repair the buildings.

There were no records of the society from 1938 and it is rumoured the Natal Centre collapsed completely. Annual reports cannot be found until 1944. Certainly, the blackout conditions of the World War 2 would have brought night-time activities to a halt. The society revived in April 1944 but again the buildings desperately needed major repairs – the roof leaked, it needed painting and, in 1947, major damage to the dome was reported (cause not given). The College understandably complained the facility maintenance was a constant drain on its resources and wanted the telescope transferred to the Natal University Survey Department.

No records were found in the university archives until 1953. Apparently, the Survey Department used the telescope (still housed in Currie Road) to teach trigonometry; the astronomical society appears to have gone back into hibernation. A call for a mirror grinding class in 1953 seems to have kickstarted the society again, however, the observatory building was almost past saving. The floor and steps were so rotten it was declared unsafe to enter; neither the City, nor Department of Works had the £800 needed to repair it. The decision was taken to move the 8” scope to the Natal University (at an even greater cost of £1530 for cleaning, moving and housing). Since there was no astronomical department, it would have ‘entertainment’ value only; hence the expense could hardly be justified. Before it could be moved, the 3” sighting scope was stolen from the observatory along with some eyepieces. After 72 years, Harry Escomb’s gift to the citizens of Durban left its home, in bits and pieces, in 1954.

The 8” lens was apparently put in a cupboard and forgotten, suspected sold with the cupboard years later. It may have ended up with a scrap dealer in Zambia as a similar piece of equipment was briefly advertised then withdrawn. Other parts of the

telescope were apparently wrapped in sacking and eventually sold as scrap. Similarly, the lead dome was dismantled by members of the Natal Centre and sold as scrap. Bits and pieces, including wheels and ribs off the dome, allegedly ended up as decorations in the chairman's Bluff garden.

In quick succession, the Natal Centre restarted as the Natal Amateur Society which then agreed in 1956 to cede all assets to the 'new' Natal Centre. By August 1957, the *Daily News* published an article to the effect that "all attempts by the Society to save the observatory have failed". It was probably dismantled by November 1957. After the removal of the 8" and demolition of the observatory, members used their private scopes for public viewings and tried raising funds for a new observatory; the princely sum of £39 was achieved. Telescope making classes were held; member numbers climbed and fell. In 1959 the Natal Centre met at the Shell Oil Company cinema theatre and used the nearby yacht mole for viewing. The 8" telescope (sans fittings) was still at Natal University and efforts were made to replace the lens, however, the replacement would have to come from Germany and there were no funds.

Mr Gregory Roberts (later of Cape Town SAAO) was instrumental in keeping the Natal Centre ticking over and helped resuscitate it in the late 1960's. The City allowed a monthly tenancy at Burman Bush for viewing but this fell away as member numbers dropped further. A short term lease on life was provided by the University Rocket Society tracking artificial satellites but it appears the Natal Centre again wound up in 1962 due to lack of support.

Dates become a little confused at this stage but it appears that Mr Roberts held on to the books and accounts until 1966 when the Daily News reported he wanted to revive the society. He obtained an old membership list from ASSA Cape Town and managed to track down some local members. In July 1969, with the launch of Sputnik causing a stir, the society revived with its first meeting held at Shell House where they showed a space film (twice due to demand); as a result 23 people joined. For the first time, fees are quoted in Rands, not Pounds; R2 for adults and R1 for juniors.

The Durban public seemed less interested in observing so the society tried to convince authorities to purchase a planetarium for Durban. This fell on deaf ears. They tried a few years later with the same result. Little has changed in this regard in 2022.

The Natal Centre flourished through the mid-1970's with almost 100 members, meeting at Teacher's Training College. March 15, 1974, saw the inaugural meeting of the Natal Midlands Centre in Pietermartizburg; those remaining in Durban become the Durban Centre. From the late 1970's through to the 90's, there are records of (more or less) biennial "Izinkhanyezi" long weekends away when members and

families enjoyed astronomical talks, viewings and other social activities at locations including the Natal Midlands, Drakensberg and the Wild Coast. These appear to have been well attended with up to 70 delegates, the more dedicated of whom rose at 3am for morning meteor shower viewing according to some programmes.

A ceremony was held at the Currie Road site of the original observatory site on 5 December 1982 (commemorating the centenary of the Venus transit) to declare the observatory a national monument; sadly only a small wall section of the original building still remains. Edmund Nevill's daughter, Maud, was a guest of honour.

1985 saw a visit by internationally renowned astronomer and TV personality, Dr (later, Sir) Patrick Moore to the then University of Natal. He gave very well attended talks at the university, including one on comets, and attended functions hosted by the Durban Centre of ASSA.

It appears that after Shell House and the Teaches Training College, the society met for some years at St Thomas' church in Essenwood Road. In about 1987, a committee member, Mr Bill Sutherland, offered to donate a 10" Newtonian telescope to the society and the hunt was on to find a home for this instrument. Many sites across greater Durban and as far out as Bothas Hill were considered and set aside for various security (South Africa in the late 80's) or other reasons. The same Bill Sutherland happened to live behind Marist Brothers school on the Berea and noticed the flat roofed pool pump building; he approached the school principal, Mr Tony Akal, for permission to build a dome above the pool pump. After assessing the structure to ensure it could accommodate the added mass, the project was underway. Later that year, the 'Jimmy Barker Observatory', housing the 'Bill Sutherland Telescope' commenced duty. Meetings also moved to the school premises. A short while after the 10" scope was installed, Mike Lipshitz bequeathed his 12" mirror to the society on his passing. The telescope tube was lengthened, resulting in a 44% increase in light gathering capabilities. That 12" telescope remained in use for over 30 years.

As with any voluntary society, member numbers wax and wane but the Durban Centre has been going strong for the past decade, with a much larger public presence than in times past. Largely developed by then committee member Logan Govender, Basic Astronomy courses were held at intervals which were well attended by the public and garnered a couple new long-term members each time. Mr Govender was also instrumental in putting the Durban Centre on the media map (harkening back to the days of Edmund Nevill who turned to the press on occasion to garner support for his efforts); giving interviews for print and radio for interesting international astronomical events or providing articles to local newspapers for local events. The committee and volunteers put together stands at public shows like Hobby-X and Sustainable Living which enhanced public awareness of the society and what it does.

Star parties were held at Botanic Gardens or other venues such as the Marist Brothers' school or a farm in Cato Ridge, far from the maddening light pollution of greater Durban. An attempt was made to break the world record of 'most people viewing at the same time' – true to form, the Durban weather thundered and well-and-truly rained us out, in winter. The Durban Centre has shared hugely popular weekends away with the KZN Geological Society and 4 Wheel Drive Club; diverse people with a shared love of hard-to-get-to-places during the day and the stars at night. Members have also been on three organised tours to Sutherland Observatory and a once-in-a-lifetime trip to Norway for the northern lights.

After many dedicated fund raising events, the Durban Centre recently installed an 11" Celestron CGE telescope, retiring the well-used and loved 12" Newtonian reflector donated by Bill Sutherland & Mike Lipshitz more than 30 years ago. It had been hoped to get an even larger telescope with a possible move to the Westville campus of University of Kwazulu Natal which had advanced plans for a planetarium for Durban (at long last). Sadly, finances didn't allow and the planetarium plans have stalled, along with the larger telescope. We haven't given up on the planetarium just yet.

As of 2022, the Astronomical Society of Southern Africa, Durban Centre, has 134 paid-up members. The monthly newsletter, *nDaba,* has become quite a publication under the direction of John Gill and, latterly, his other half, Corinne Gill; these newsletters are sent to members, society friends around the country and even internationally. Through the Covid lockdowns and general life disruptions of 2020 - 2021 membership has actually grown, maintaining contact with monthly online meetings, often in association with other centres such as Johannesburg or Cape Town. If anything, the on-line option has allowed distance members from other parts of KZN to join us on a more regular basis. A What's App group is also active and shares events or relevant interesting articles. Astro-photography offerings (typically from those northern members who are further from the Durban weather) are posted on the group and appreciated by all. It is hoped to be back in-person soon.

History of GRASSA – The Garden Route Centre of the ASSA

Peter Hers

The Garden Route Centre of the ASSA was established on 7 February 1998 and we find the following in the ASSA Council Minutes of 16 March 1998: “Mr Jan Hers reports that a new Garden Route Centre has been established in the Knysna/ Sedgefield area. C Turk attended the inaugural meeting on behalf of Council and reported that there were 28 founder members including two former ASSA Presidents, namely Mr P Smits and Mr J Hers.” Subsequently we read that Mr P Smits was selected to represent the Centre on Council.

By the end of June 2000 the membership had increased to around 50, and the average attendance at monthly meetings was about 24 members and 6 visitors.

The topics for discussion at the meetings cover much the same as we find today (“Star charts – How to use and understand them”; “Colour in astronomy”; “Is there life out there?”; Etc) but one topic stands out: “Computers in astronomy and the internet” – Who would have believed the enormous advances over the next 20 or so years and how this has dramatically changed astronomy?

We also pick up many consistent themes of running a small interest group or club: Collecting subscriptions; maintaining contact with members; finding subjects and speakers for monthly meetings; Persuading people to serve on the committee; etc. Some things never change.

Today The Garden Route Centre, or GRASSA, boasts a membership of around 25 fee paying members plus some 2-5 visitors at each monthly meeting. The Covid pandemic caused meetings to be cancelled for most of 2020 and well into 2021 and numbers have dropped somewhat; a not uncommon happening!

The major activity remains the monthly meeting at which we strive to always have interesting and current presentations; the committee avoids using YouTube and DVD presentations Recent topics have included: “Update on the James Webb telescope”; “Gravity”; “The Periodic table”; “Update on current astronomy news”; “The Event Horizon Telescope”; “Are we alone?”; “A visit to the SKA”; “The Higgs Boson”; Etc.

In 2008 members Lucas Ferreira and Case Rijsdijk participated in “an observation campaign for high school and undergraduate students with the purpose of measuring both the Moon’s and Mars’ parallax. To have a basis large enough, we took simultaneous pictures of these celestial bodies from Italy and South Africa. Then we estimated the apparent shift relative to background stars and, via trigonometry, we worked out the Moon’s and Mars’ distances.”

This resulted in the paper “An international parallax campaign to measure distance to the Moon and Mars” published in the *Eur. J. Phys.* 30 No 1 (January 2009) 35-46 (https://doi.org/10.1088/0143-0807/30/1/004) (Available for download via sci-hub...)

GRASSA has few members who own telescopes and almost none do any observing. Recently Peter Hers has presented a couple of talks describing his experience in setting up an 8” telescope and observing with the challenges of being so close to the sea. Hopefully this will encourage some members to venture out at night. GRASSA has two telescopes; an 8” SCT and a 6” Dobsonian and a pair of 12 x 60 Celestron binoculars that can be mounted on a tripod and can be “borrowed” for reasonable periods.

Lucas Ferreira, our Observing officer returned to Bloemfontein and sadly left a serious hole in our observing occasions, as few members actually do any observing or practical Astronomy.

Members of GRASSA paid several visits to Sutherland, the last one in 2019.

Fig 1. Our first visit to Sutherland

Fig 2. Explaining to members how the 74-inch works.

Fig 3. Our last visit - smaller group

A double visit to both Sutherland and Carnarvon is being considered and will hopefully take place in 2023/4.

Some highlights of more recent presentations:

- SN 1987A was first presented in 2009 and a more recent detailed analysis of this SN was presented in 2022.
- A visit to Cola Beach in 2009 where there was a presentation for local residents followed by a "Touching the Stars" show using a green laser.
- In 2012 "Space disasters" including a look, especially, at the Challenger mission and the demonstration of the faulty ring by Richard Feynman.
- Also in 2012 the "Discovery of the Higgs Boson and its impact on Cosmology".
- In 2015/6 member Eric Bult gave two talks on "Poetry and Stars", where he would read out one of his poems on Astronomy or related topics and Case Rijsdijk would then show a series of related slides. These were well received.
- In 2016 members observed the partial solar eclipse by projecting an image of the eclipse onto the flip chart, using the 6" Dobsonian, in the Garden Route Botanical Gardens (George) as a public outreach exercise.
- Most recently a talk on the James Webb telescope and its complexity.

History of the Hermanus Astronomy Centre

Pierre de Villiers, Hermanus Centre

John Saunders retired to Hermanus in 2007 and joined the Cape Centre as the closest astronomy club, but he found the fortnightly trips to Cape Town onerous. After one of these meetings, Tony Jones asked John "Why don't you form your own astronomy club in Hermanus?" and gave him Steve Kleyn's name and "a guy with a telescope" that can be found at the Golf Club. This turned out to be Danie van der Spuy. John placed an advertisement in the *Hermanus Times* inviting anyone interested in

astronomy to contact him. Pierre de Villiers responded and, together with John and Irene Saunders, Steve Kleyn and Danie van der Spuy, they formed the first committee of the fledgeling Hermanus Astronomy Club, which was formerly established on 10th January 2008 by 30 attendees. The HAC became an ASSA Centre on 21 April 2009.

Regular activities

Monthly HAC meetings were held every month except December at various venues until lockdown-induced Zoom meetings were instituted in August 2020. The guest speakers included a select list of who's-who in SA astronomy and their talks addressed a wide range of up-to-date and astronomically relevant topics. One of the speakers was David Trilling, the discoverer of asteroid 260 824, who kindly agreed to have it renamed "Hermanus".

Since January 2009, there were also separate fortnightly/monthly meetings of *Special Interest Groups* (Beginners, Cosmology, Astrophotography, Telescope Skills, Relativity/Study Group) to cater for members special interests on a fortnightly/monthly basis. The bulk of the HAC's activities take place in the Special Interest Groups.

Outings

The HAC arranged numerous outings to *Sutherland* (April 2008 being the first) with three subsequent visits), the *Cederberg* (February 2010 being the first) with three subsequent visits). KAT7 (*SKA*), near Carnarvon, was visited shortly after installation of the 7th antenna and MeerKAT was visited two weeks after its completion - the first group to do this. Day trips to *Cape Town* (Science Centre, Noon Gun, Iziko Planetarium & SAAO) were conducted in 2012, 2013 and 2019. The *Palmiet Hydro-electric* plant was an interesting visit in November 2015.

Sidewalk Astronomy

Whenever the notorious coastal town weather and the Moon permitted, numerous public stargazing evenings were arranged at various venues, starting in Fisherhaven and Hermanus High School in February 2009. Attendees varied from barely double digits to triple digits in number and ages from 5-year olds to octogenarians. One of the most interesting was for delegates to SANSA's Space Science workshop where at least 15 of 23 Northern Hemisphere attendees (PhD, Postdoc ages) had NEVER before seen the Milky Way or its three distinguishable arms in Sagittarius! The presenters always probably had more fun than the observers and young children's reaction unforgettably priceless. Notable observations were:

- The Partial Solar Eclipse on 13 September 2015 was clouded out in Hermanus but Jay Pasachoff and 6 other members of the IAU Eclipse Committee

photographed it at Struisbaai and then Jay gave a talk on his lifetime observations of eclipses.

- The Mercury transit on 9th May 2016 was successfully observed from Hawston, Curro and Gearings Point. Public and schools viewing of the 11 Nov 2019 transit was clouded out, but a few members got some photos during a brief break in the clouds.
- The disappearance and re-appearance times of prominent craters during the partial lunar eclipse of August 2008 were recorded and submitted as part of an international exercise to measure the Moon's diameter. The total eclipse of 27 July 2018 was well attended but clouded out.
- Several telescopes were donated to the HAC: Steve Kleyn's 13.1" (2008), Dudley Field's 11" (ATM-ed by Chris Forder), an 8" Newtonian Celestron, a 6" Skywatcher refractor by Pete Scully, a Celestron C14 by UCT, a 10" Meade by Mike Sander and smaller telescopes by local residents.

Fig 1. Planetary Highway along the coastline.

Outreach

In terms of long-term impact, the HAC's Educational Outreach initiatives are noteworthy:

- Hermanus Youth Astronomy & Space Club was co-founded with SANSA in April 2013 for learners at Lukhanyo Primary School. Three trips to Cape Town (Science Centre, Noon Gun, Iziko Planetarium & SAAO) were arranged, the first in Oct 2013. The Youth Club was disbanded in 2015 after John Saunders moved back to the UK.
- The Hawston Space Cadets was started at Hawston Sekondere Skool by Johan Retief in Feb 2015. The learners were given weekly talks on Astronomy in Afrikaans until 2019.They also participated in the Cape Town outings.
- Daytime Introductory Astronomy presentations at various schools were started in 2009 and night-time stargazing for various schools, scouts and youth camps in 2010.

- Amanda Sikafoose arranged access to the 1.8m MONET NORTH telescope strictly for outreach in June 2010. Learners thoroughly enjoyed the experience of planning an observation session, controlling the telescope and dome, watching the weather, taking and downloading photos and finally processing their images. Notable targets were NG2601 (a lucky first shot!), M1, comet Hartley 103P and the supernova SN2011c in UG631 *only 8 hours after its explosion!*
- National Science Week in 2013 and 2014 reached 1,000+ attendees and built confidence.
-

Fig 2. A workshop at the Hermanus High School.

- Case Rijsdijk conducted the first of several rounds of workshops at local schools in 2013. In cooperation with the Overberg Circuit Manager, HAC members then arranged workshops for science teachers and learners in Hermanus, Grabouw, Stanford and Gansbaai. The topics varied from curriculum-based topics like the Solar System and Seasons to How Sundials Work, SAAO cardboard telescopes and Moon images assembly.
- These were followed by workshops helping learners to practically design and mark out Analemmatic sundials for their school at 7 schools. Sadly, most were not completed.

Projects

- The first HAC project was the design, laser-engraving and installation of the Swallow Park Polar and 15° Inclining sundials in 2014 as part of the park's upgrade partially funded (R20,000.00) by the Ward Committee's Discretionary Fund.
- The next was the Armillary & Bifilar sundials designed, laser-engraved and constructed at Gearings Point in 2015, once again partially funded by a R20,000.00 Ward Committee allocation. The inauguration of the sundials was attended by David Trilling, the discoverer of Asteroid 260 824 who agreed to its being renamed to "Hermanus". The Minor Planetary Committee citation states that "This minor planet is named in recognition of the Hermanus Astronomy

Centre's enthusiasm for astronomy and their dedication to educational outreach in South Africa". Similar sundials were installed at SANSA and at private residences in Pretoria, Johannesburg and Nature's Valley.

- In terms of long-term impact, the most successful project of the HAC was the design, fabrication and construction of a True Scale Solar System model over 3 867 meters along Hermanus' iconic Cliff Path. This model, the best of its kind in the country, was sadly vandalised for three consecutive years and repaired by HAC members. The project was partially funded by a R20,000.00 Ward Committee allocation and inaugurated in July 2016.

Fig 3. Display in the local Municipal Offices.

The most ambitious project to date has had a long and frustrating history:

A. Steve Kleyn donates his ATM self-made 13.1" to the HAC (May 2008)

- Decide to permanently house it in an observatory
- Generic design and costing by HAC members
- Submit Observatory Management Plan to Overstrand Municipality ("OSM") in February 2009
- Conditional approval of Management Plan, subject to DEADP approval of EIA
- DPAED received (Dec 10)
- Insufficient funds to proceed
- Funding proposal submitted to the National Lotteries Board ("NLC") in January 10
- No feedback despite repeated contacts

B. Receive a grant of R1,182,920.00 from NLC (Mar 14)

- Revised Consent Use application submitted to OSM under new development zoning scheme (Jul 16)
- Incorporated into Fernkloof Nature Reserve Management Plan
- Formally NOT approved in Nov 19

C. Alternative Gearings Point Astronomy Education Display ("GPAED")

- submitted to OSM and formally approved (Mar 19)
- Covid-delayed revised proposal submitted to NLC (Dec 21)
- NLC approval received in Apr 22, with completion in December 2022

GPAED is designed to affix 40+ astronomy education topics chemically etched onto SS tablets against the inner walls of the Whale Watching Ring at Gearings Point – a 250 m^2 spot that receives more tourist feet than any other in Hermanus. It will also include an analemmatic sundial and cardinal directions sunrise & sunset slots in the wall. Once completed, the GPAED will have the largest impact of any HAC project.

The first project was designed by Steve Kleyn and subsequent ones by Pierre de Villiers, with technical reviews from Deon Krige and Johan Retief.

The HAC is a young club whose membership peaked at 100+ before settling at 50+. Covid-induced virtual meetings did cause a noticeable drop in membership. The club has settled into a *modus operandi* that meets the needs of its membership.

History of the Johannesburg Centre

Carmel Ives, Johannesburg Centre

ASSA (The Astronomical Society of Southern Africa) came about in in 1922 with the amalgamation of the Cape Town and Johannesburg/ Transvaal Astronomical Associations.

The histories of The Johannesburg Observatory and The Astronomical Society of Southern Africa Johannesburg are deeply interwoven. The Johannesburg Meteorological Observatory began in 1902 when the then Transvaal government established headquarters in Johannesburg. The site of the Johannesburg Observatory was purchased in 1903 and was first occupied in 1904.

Initially the main purpose of the observatory was meteorology and seismologyIn 1906, Dr Oskar Backlund of the Imperial Observatory in Pulkhovo Russia asked RTA Innes (the head of the Observatory) for assistance in the International program of latitude variation, caused by slight but significant changes is the Earths axial tilt. To this end they supplied a $2^5/_8$" Bamberg Transit telescope, the first at the Johannesburg Observatory. This is now on display at the SAAO offices in Cape Town. ASSA Johannesburg has in its library Archives the Pulkhovo Catalogues.

The Johannesburg Astronomical Association was founded in 1916, with RTA Innes as the first president and when it was amalgamated in with the Cape Association to become the Astronomical Society of Southern Africa, he continued to serve as the president until 1923.

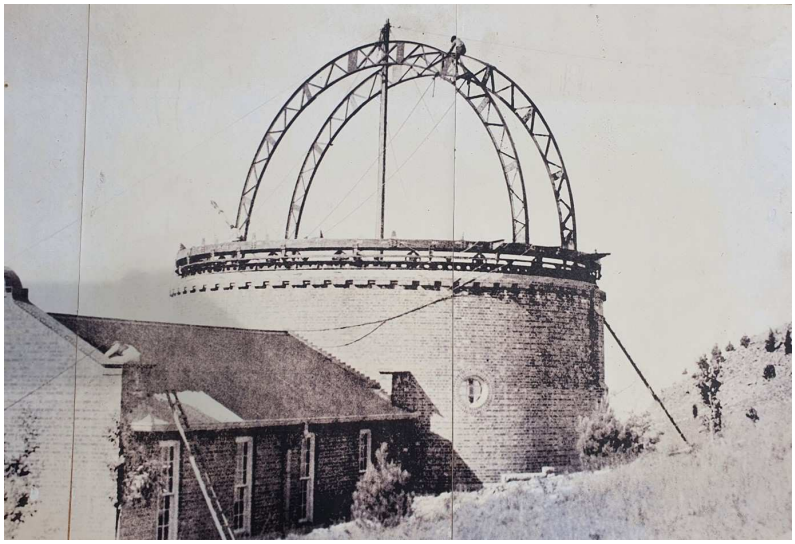


Fig. 1 Construction of the dome (approx. 1910). (Photo: ASSA Johannesburg Archive)

The 26½" (673mm) Innes Telescope, designed especially for double star observing, was commissioned in 1909 but its lens finally arrived and was installed in 1925. In the second half of 1925 it discovered 303 new double stars and 887 pairs were measured. The Innes Telescope is credited with the discovery of 6555 double stars and 579 asteroids or minor planets (The greatest number of discoveries of any terrestrial telescope). Many of the discoverers were members of ASSA Johannesburg. This telescope is still in use during Star Parties held at the Observatory by ASSA Johannesburg. It has been fundamental to the observational operations of ASSA Johannesburg and has influenced the relationships between ASSA Johannesburg and the landlords. ASSA Johannesburg continues to be involved in care and maintenance.

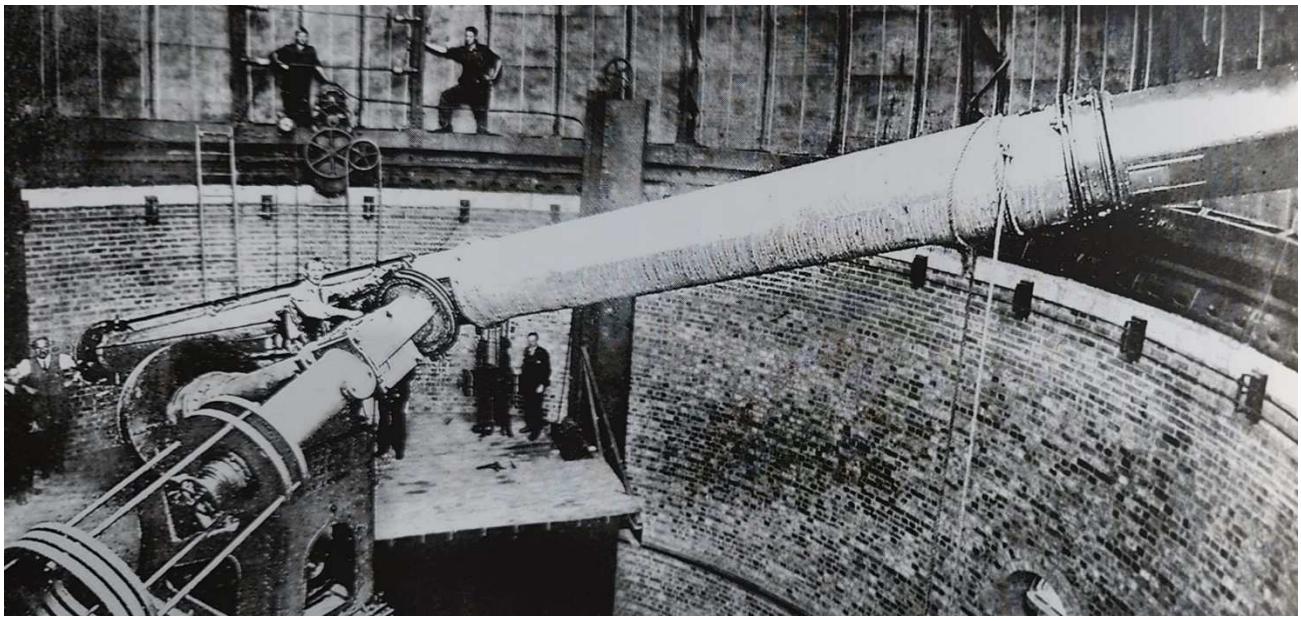


Fig 2. 26½" Grubb Telescope, (approx. 1924). (Photo: ASSA Johannesburg Archive)

In 1915 Innes discovered Proxima Centauri using a blink comparator to examine photographic plate of an area around Alpha Centauri (1910 and 1915). This is the nearest known star to the Sun, located 4.2465 light years away.

In the Journal of the astronomical Society of South Africa Nov 1926, two of the Transvaal members, Mr G.E. Ensor (Pretoria) and Mr T.B. Blathwayt (Johannesburg) are recognized for identifying two new comets. Also honored was Mr H Woods who discovered a minor planet. The ASSA Gill Medal is awarded for services to astronomy with special consideration to services in southern Africa. It was established in 1955 April and commemorates Sir David Gill, HM Astronomer at the Cape (1879–1907), renowned in positional and Mathematical Astronomy and Geodesy, and for his part in consolidating Astronomical science in Southern Africa. This Medal has been awarded to several ASSA JHB members.

The two domes on the top of the hill at the Johannesburg Observatory, namely the Papadopoulos dome and the Jacobs dome, house the ASSA Johannesburg Telescopes. The Papadopoulos dome was built in 1974 by the CSIR with a donation from the late Christos Papadopoulos, a member of ASSA JHB. This dome houses the 6 & 7" twin refractor, previously housed in a building lower down the hill and was donated by the CSIR to ASSA JHB. The Tinsley 12½" Cassegrain owned by Papadopoulos was fitted to the twin refractor and was bequeathed to ASSA Johannesburg on his death in 1992. The Jacobs Telescope is a 12½'"and has a 2.22m focal length (F7) and its founder was Cornelis Jacobs. It was completed in the early 1960s. After he passed away in 1977, his sons Gil and Derek donated the telescope to the then Transvaal Centre of ASSA. We have several fine smaller mobile telescopes that have been donated to ASSA Johannesburg, that are used at outreach star parties and are loaned to our members.

ASSA Johannesburg has an extensive library of science, mathematic and astronomy books, magazines and star catalogues, many of them donated or bequeathed by members or past members, including Jan Eben van Zyl (a long standing ASSA member, who on 2 occasions was awarded the Papadopoulos Memorial trophy for his contributions to the advancement of astronomy) .

An interesting snippet gleaned from the old correspondence was that the attractive, leaded glass library shelf units were made from the packing crates used to transport the 2 ½" main observatory telescope to site in the 1920's.

ASSA Johannesburg has had working relationships with all landlords of the Observatory, including the CSIR, NITR, ASTSSA, SAASTA and now SKA, for access and continued use of the space for meeting, archives and library, observation and outreach Star Parties.

As part of its outreach program, ASSA Johannesburg has been running Telescope Mirror making classes since 1960, at the observatory, the planetarium, in Danie Overbeek's garage (Danie Overnbeek was ASSA Johannesburg member from the 1950's and received the Gill Award and was twice the president of ASSA, according to his son Andy- who is currently still a member - was an incredible Astronomy mentor and mentored Prof. David Block). These ATM (Amateur Telescope Makers) classes continue to date at Parktown Boys High under the tutelage of Chris Stewart and Johan Smit.

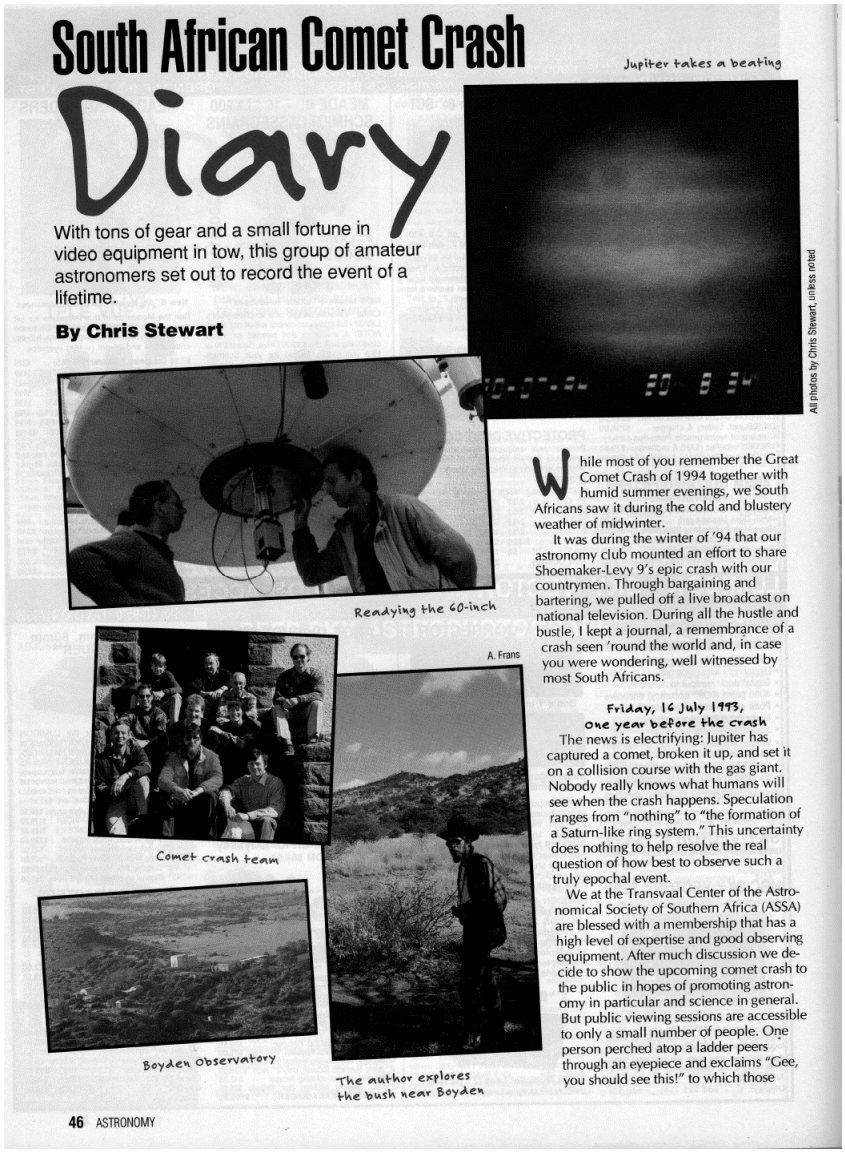
ASSA Johannesburg and the Wits Planetarium have had a long standing relationship, including the mirror making classes as June 1966, presentations detailing the Astronomical co-ordinate systems (May 1994) and most recently the sad goodbye to the Zeiss Projector when it retired after 63 years or service (June 2022).

Fig 3. Current ASSA Johannesburg Committee and Members say goodbye to the Zeiss Projector at the Wits Planetarium (18 June 2022) (L to R, Back): Frans Van Nieuwkerk, Giulia Barr, Rajeev Gopal, Giulia Barr, Michelle Freeman, Chris Stewart, Gillian Stewart, (Front): Carmel Ives, Alison Coulter, John Lindsay-Smith.

The Transvaal Centre (Johannesburg) took part in "Operation Moonwatch", conceived by Harvard astronomer Fred Whipple. There were teams all over the world that recorded and tracked satellites in 1958. In SA, there were teams in Cpt, JHB and Pta. The Johannesburg team was led by Dr CN Williams and was very successful. Dr Finsen developed a 3D model which worked very well in predicting satellite positions. Johannesburg had a team of 16 observers and they observed from the grounds of the Union Observatory. Jan Hers: "Moonwatch in South Africa 1957-1958".

In April 1986 Brian Fraser the then chairman and organized for free viewings of Halley's Comet. This attracted members such as Melvyn Hannibal, who says " I knew very little about the science of Astronomy, but it was a hands- on education for me as there were people like Danie Overbeek, Chris Papodopoulos, Brian Fraser, Eben van Zyl and other local pillars of astronomy all willing to share their knowledge." This seems to have always been the culture of ASSA Johannesburg branch, the inclusive sharing of knowledge.

ASSA Johannesburg members contributed to the Mars Watch in September 1988, during an extremely favourable opposition (a close approach that occurs approximately every 17 years). Although studied for centuries, Mars was not well understood. Organisations involved included IMP (International Mars Patrol), ALPO (Association of Lunar & Planetary Observers), The Terrestrial Planets section of the BAA (British Astronomical Association), and the Mars section of OAA (the Oriental Astronomical Association). The ASSA contribution was coordinated by Monty Northam. In Johannesburg, the 6" refractor in the Papadopolous dome was used for observations. Observations were made in white light and using three coloured filters (Red Wratten #29, Orange Wratten #15, Blue Wratten #49) to highlight various features through improved contrast. Observations were recorded as pencil sketches with comments on a standardised template. Observers were Chris Stewart, Jacky Oglethorpe, A Welgemoed, Peter van Laun, Howard Grattan, H du Preez, Monty Northam, Nigel Wakefield, DJ Buttress, Wenman and Borgess.



South African Comet Crash

Diary

With tons of gear and a small fortune in video equipment in tow, this group of amateur astronomers set out to record the event of a lifetime.

By Chris Stewart

Jupiter takes a beating

All photos by Chris Stewart, unless noted

Readying the 60-inch

A. Frans

Comet crash team

Boyden Observatory

The author explores the bush near Boyden

While most of you remember the Great Comet Crash of 1994 together with humid summer evenings, we South Africans saw it during the cold and blustery weather of midwinter.

It was during the winter of '94 that our astronomy club mounted an effort to share Shoemaker-Levy 9's epic crash with our countrymen. Through bargaining and bartering, we pulled off a live broadcast on national television. During all the hustle and bustle, I kept a journal, a remembrance of a crash seen 'round the world and, in case you were wondering, well witnessed by most South Africans.

Friday, 16 July 1993, one year before the crash

The news is electrifying: Jupiter has captured a comet, broken it up, and set it on a collision course with the gas giant. Nobody really knows what humans will see when the crash happens. Speculation ranges from "nothing" to "the formation of a Saturn-like ring system." This uncertainty does nothing to help resolve the real question of how best to observe such a truly epochal event.

We at the Transvaal Center of the Astronomical Society of Southern Africa (ASSA) are blessed with a membership that has a high level of expertise and good observing equipment. After much discussion we decide to show the upcoming comet crash to the public in hopes of promoting astronomy in particular and science in general. But public viewing sessions are accessible to only a small number of people. One person perched atop a ladder peers through an eyepiece and exclaims "Gee, you should see this!" to which those

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Fig 4. Extract of Article by Chris Stewart from Astronomy magazine regarding the Shoemaker-Levy Comet crash into Jupiter in 1994.

In 1994 Chris Stewart and other ASSA Johannesburg member, undertook to film comet Shoemaker-Levy impact with Jupiter including having this broadcast live on National TV, the first of its

kind in South Africa. Trevor Gould, the then chairman, negotiated the use of the Boyden Observatory in the Free State for this event and in conjunction with the ASSA Pretoria branch. This was not a minor undertaking and involved the loan from the CSIR of then cutting edge 3-chip CCD camera (and the loan of Tim Cooper as well). After extensive negotiations with SABC (and through them Sky news), the crash was broadcast live across Africa and Europe.

ASSA Johannesburg has provided has outreach to the general public in the form of its monthly meetings, observational meetings/star parties and other exhibitions. In 1975 for instance, they held "The Grand Astronomical and Scientific Exhibition" on Sat 17 May 1974 at St Benedicts College, the main purpose of which was to attract young scientifically minded to the field of Astronomy. From 2002-2019, ScopeX flourished at the Military Museum in Johannesburg. Primarily established as a platform for the Amateur Telescope Makers (ATM) to show their Telescope, it went on to become a general Astronomy and Science Expo. It is hoped to revive ScopeX in the near future.

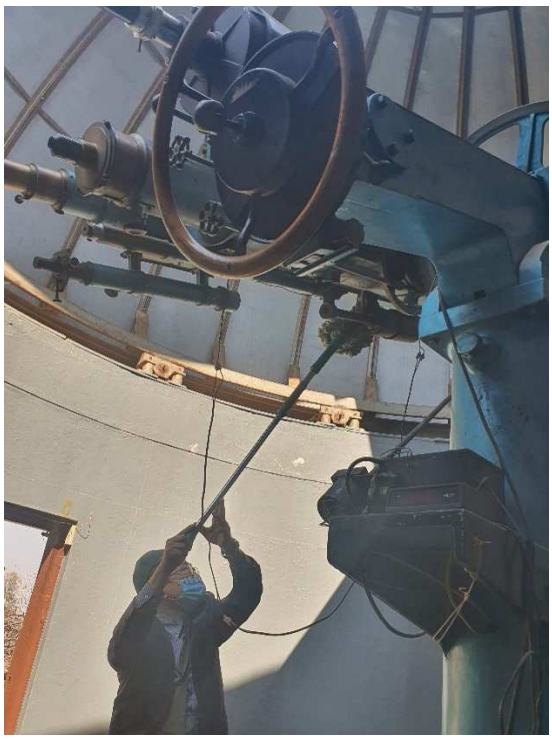

Fig 5. Our members include internationals Etsuo Takayanagi (Japan) seen here engaged in cleaning the Papadopoulos Telescope during Covid September 2020.

ASSA Johannesburg took advantage of the COVID lockdown in 2020/2021 to initiate online meetings and this gained great popularity as international speaker that are normally inaccessible were engaged. These included Dr J Nall (UK RAS), Dr Robin Catchpole (UK Institute of Astronomy Cambridge), Prof David Valls-Gabaud (Observatoire de Paris), Prof Anupamaand Prof Banerjee (India) and Prof D Veras. But these were by no means our fist international speakers, who in the past included Dr Ann Savage (CSIR Australia Sep 1976), Dr JL Climengae (Dean of Science, Uni of Victoria, British Columbia, Feb 1973) and Mrs M Wiesse (Holland, Nov 1974) amongst others.

History of ASSA Pretoria Centre

M Poll – Pretoria Centre

A group of members of the then Transvaal Centre of ASSA, in Johannesburg who were living in Pretoria were quite active round about 1960. These members included

Messrs Jooste, SC Venter and JC Bennett. During a period of stagnancy Karel Sterling became the Pretoria representative of the Transvaal Centre Committee. The idea of the Pretoria group acquiring "institution status" was discussed with the Transvaal Centre Committee and the National Council of ASSA and approved. The new Centre was to be known as the Pretoria Centre of ASSA and had 40 members initially.

In 1967 the centre acquired a 12.5 inch Newtonian reflector which was installed at the then Radcliffe Observatory. The Radcliffe Observatory closed in May 1974, and an agreement was made with Christian Brothers College to erect the telescope on school grounds, a move which was completed in 1977. The telescope is now known as the Bennett Telescope and is still there.

The relocation of the Radcliffe telescope to Sutherland was a loss for the Centre and seemed to lead to a loss of interest amongst members, and the arrival of television around that time may also have had a negative effect. In 1984 the Centre was meeting at UNISA, but meetings were only held on alternate months. Shortly afterwards, the meeting venue was moved. Membership declined from about 60 after the move to CBC and by 1985 it was only 20. Maybe it was Halley's Comet, but from then on membership grew – it was 64 in 1990 and reached 100 in 1995, and for some years into the 2000s the membership still stood at more than 100. Numbers have declined in recent years, at present it is 40+. CBC remains as the meeting venue, and there is a monthly observing evening next to the Bennett Telescope dome.

Fig 1. Danie Barnardo's Crux I opens up the night sky for a lady during one of the Centre's outreaches in a local Centurion mall.

The centre has frequently hosted various educational or other interested groups e.g helping Voortrekkers, Scouts and Guides and Brownies to obtain their astronomy badges, and also presenting to school groups and school functions, science groups, church groups. For some years the Centre has been involve with the Science Club at Menlo Park Primary School.

A number of conducted tours to the Tswaing Meteor Crater have been arranged, and the Centre has also mounted static displays at shopping centres, for example, at The Kollonade, Jacaranda Centre, Faerie Glen and Wonderboom Junction. Several members have given guest talks on radio stations.

Many out-of-town dark sky events have been held – including at Broederstroom, Buffelspoort, Tiegerspoort, Nylsvley, Shekina (near Bela-Bela) and currently at Deelfontein, near Parys. Since 2009 the Centre has organised annually a National Star Party at a venue near Britstown.

In 2005 a telescope making class started which was combined with the existing one at the Johannesburg Centre This meant a single class instead of two within 40 Km of each other. Many telescopes have been completed, and a number have won awards at ScopeX

Notable events

In 1986 the Centre was involved in the Exhibition that was set up at UNISA in anticipation of the return of Halley's Comet. Some of the members' telescopes were hauled up to the UNISA roof for observing sessions.
On July 16th 1994 about 200 people attended at the CBC observatory to see the impact of Comet Shoemaker-Levy 9 on Jupiter.
The Centre organised and hosted the **2002 and 2010 editions** of the ASSA National Symposium (see below).
The theme of the 2002 ASSA Symposium was the total eclipse of the Sun on December 4th 2002. Centre members were in the Kruger National Park with African Itch Tour Group, Tim Cooper gave some lectures on behalf of Messina town council, Michael Poll was commentator for a group of overseas visitors organised by Kwa Nyathi Tours.
At the **end of August 2003** there was an exceptionally close approach of Mars. A public viewing evening was held at Fort Schanskop. It is estimated that upwards of 750 people attended. Tim Cooper gave lecture about Mars in the amphitheatre with images projected onto a big screen. The talk was repeated later that evening for latecomers. A total of 24 telescopes were available for visitors to view Mars and other objects, including the Moon, Uranus, and Neptune. It was learned that many people had to be turned away, because the venue was full, so the presentation was repeated the following week.
Pleiades Occultation : December 13th 2005
About 30 or 40 people attended at the CBC fields for this marvellous event. The press was also present, and a picture appeared in the Pretoria News.
Transit of Venus June 6th 2008
In the week prior to this event talks were given at Fort Schanskop by Neville Young, Michael Poll and Tim Cooper. On the day the centre hosted "hundreds" of people on the Pretoria University campus. There was also a webcast, which was an amazing success with nearly 900 000 hits on the site.

The Centre hosted the **ASSA Symposium 2010.** As well as papers being presented the program included a morning visit to HARTRAO and a guided tour through the Tswaing meteorite impact crater during the afternoon.

2014 Two **Astronomy in the Mall** events were held at each of 2 venues – at the Centurion Lifestyle Centre and Wonderboom Junction.

Fig 2. Danie Barnardo's Crux I opens up the night sky for a lady during one of the Centre's outreaches in a local Centurion mall.

Astronomy at the Zoo. In 2015, 2016, 2017 2018 and 2019 the Centre hosted an observing evening for the public at Pretoria Zoo. These events were very popular and very well attended with 200 – 300 or more people each time. Talks were given and telescopes were set up for viewing. At some of these events SAASTA provided a mobile planetarium

June 22nd 2017 Matariki event at the New Zealand High Commission.

Matariki is the Maori name for the Pleiades, and the event is a celebration of the heliacal rising of the cluster, as seen from New Zealand (although the actual date of the celebration varies slightly from year to year). Some members, with telescopes attended a function at the New Zealand High Commission, where there was a talk and viewing.

August 18th 2018 The Centre was privileged to give a presentation and viewing at the Japanese School, Johannesburg.

SMU (Sefako Makgatho) Health Sciences University. (Formerly MEDUNSA)

For a number of years the Centre hosted at one or two of our observing evenings for some 3rd Year Students who were doing Astronomy as an interest course. For three years, 2018 -2020, Neville Young has arranged and presented (at the University) a formal course for these students and they have been regular visitors at our observing evenings where they have done practical exercises related to their course.

July 27th 2018 Lunar Eclipse at CBC.

This eclipse received much publicity because it was exceptionally long, at 1 hour 43 minutes, (only four minutes short of the longest possible). Also, Mars was at its perihelic opposition next to the Moon and Jupiter and Saturn were also shown. The Centre held a viewing evening at CBC for the students and parents. The event was very successful with a great deal of appreciation from the teachers.

March 2019: Covid

This paper was prepared by Michael Poll, but for events recorded before 1996 information was drawn extensively from a paper published in the *Pretoria Centre Newsletter* by G J Vrey in November 1996.

The History of *MNASSA*

I.S. Glass (South African Astronomical Observatory)

Before the existence of ASSA

Before ASSA and its predecessor the Cape Astronomical Association started in 1912, the news about astronomical events in South Africa was rather sporadic. There were only a few amateur astronomers such as LA Eddie (1845-1913), AFI Forbes (1871-1959) and AW Roberts (1857-1938) and they published in *JBAA*, *MNRAS* and certain other journals.

Two books of cuttings now at SAAO, compiled by HE Wood of the observatory in Johannesburg, which started as a meteorological institution, give an indication of what got into the press. There were meteorological reports from the "Government Observatory, Johannesburg". There were reports of bright meteors, even one about rain-making activities from the *Marico Chronicle*, in 1906! There is a bitter attack on Innes because he did not approve of a parliamentary proposal to put Cape Town time on 22½ degrees East of Greenwich! There were notes about comets and an earthquake in 1908. A report from *The Leader* of 13 April 1909 of a deputation from the SA Association for the Advancement of Science to the Minister of Lands (Rissik) advocated the equipping of the Transvaal Observatory with a visual telescope. There was a report (no reference given) of a ministerial inspection of the recently donated Franklin-Adams camera. Comet 1910 A1 – "The Daylight Comet" – was discovered in Johannesburg, possibly by some railway workers at Kopjies in the Free State and mine workers on the Premier Mine! It created international attention and was thought by many to be the much-anticipated return of Halley's comet. An "aerolite" fell on a house in the Waterberg (1911).

Cape Astronomical Association

The CAA was formed 8 Nov 1912. It held monthly meetings, supported by the few professionals from the Royal Observatory as well as by the local amateurs. Some meetings were reported in the sporadic *Circulars* that began to be published in 1918 and also contained items such as lists of officers, Council members and a list of ordinary members (69 in 1921). They included "Rules" and a list of the lantern slides collection. Eight *Circulars* were published in total, ending in 1921. There were a few

articles of general interest also, such as “Saturn” by AW Long and “The Equatorial Sundial at the Castle” by Joseph Lunt.

Journal of the ASSA

The Astronomical Society of South(ern) Africa was formed in July 1922 by the union of the Cape Astronomical Association and the Johannesburg Astronomical Association (formed in 1918), according to the first issue of *The Journal of the Astronomical Society of South Africa*, dated February 1923. It was stated that “The *Journal* will be published at irregular intervals, as funds permit”. Eventually 20 issues were to be published, in 4 volumes, the last being in April 1939.

The contents of *JASSA* included didactic-type articles by members, presidential addresses, annual reports of the two Associations (now Centres of ASSA), reports of Sections, lists of lectures given, obituaries, correspondence, Council and committee members etc. At the date of the last issue, ASSA had 89 members.

MNASSA

Up till 1939, according to an article by WP Hirst (1970), himself an active amateur member for many years, AW Long had been publishing a monthly article in the Cape Argus, giving what was to be expected in the heavens and announcing Society meetings. However, with Long’s death, this series came to an end.

Money being short, Hirst suggested that a short monthly publication printed on a duplicating machine could take the place of the newspaper articles. His wife offered to type the stencils and Harold Krumm, another keen member, borrowed a duplicator from his church. These two offered to be joint editors and it was decided to call the publication *Monthly Notes* to avoid clashing with *Monthly Notices of the Royal Astronomical Society.*

Thus 1940 April can be regarded as the start of *MNASSA*, though at the top of the first page was “ASTRONOMICAL SOCIETY OF SOUTH AFRICA, CAPE CENTRE”.
The first issue contained the warning “The notes that follow are in the nature of an experiment…”

Features of the early issues were reports on meetings of the Cape Centre and
a kind of “Sky Guide” for the following month. There were lists of new members and various serious didactic articles by the local professional astronomers and serious amateurs. Also occasional advertisements of telescopes for sale. Comet discoveries such as de Kock 1941a were reported.

The second issue had an article on preparations for the Calvinia eclipse of 1 Oct 1940. In fact there were several articles about the Calvinia Eclipse observations and their results during the year 1940. It is clear that this event stimulated a great deal of local interest in astronomy.

The November issue included in the title "MONTHLY NOTES: No. 8", the first use of the phrase.

The 16th issue, in July 1941, starts with the remark "As the *Journal* of the Society is unlikely to appear for some little time …", indicating that it was not yet considered dead, though it never appeared again.

In March 1941 the "Cape Centre" was dropped from the title, reflecting the national outlook now adopted.

In July 1942 HE Krumm's name appears as editor.

The December 1942 issue was marked "Vol. II, No. 1., the volume designation being given for the first time.

January 1943 a line drawing of the Royal Observatory's Main Building appears at the top of the title page.

Post-WWII, various original papers began to appear in *MNASSA.* They were nearly all written by the professional astronomers from the Cape, Radcliffe, Boyden, and the other foreign-owned observatories that had been established in the 1920s and '30s. An interesting example was the reporting of Proxima Cen as a flare star by AD Thackeray (1949). Publication of an article in *MNASSA*, often effectively as a preprint before the final version in, for example, *MNRAS*, was a way of establishing priority of discovery.

In its middle years, *MNASSA* published large numbers of original papers, mainly from South African authors. AWJ Cousins, in particular, contributed many frequently cited papers over the years.

Before about 1990 astronomical publication was quite a slow business. Journals were frequently distributed by surface mail. The more startling news was distributed in concise "Astronomical Telegrams" and people working in the same field sent "preprints" to each other. But with the advent of the Internet, at first preprints and later complete journals have been distributed electronically. Paper journals that required metres of library shelving each year have become things of the past.

Since about 1984, pressure has grown on South African scientists to achieve a high degree of international recognition. They are "rated" by the National Research Foundation (NRF), based on the opinions of a number of referees. The availability of funding and indeed of academic promotion is based on these ratings. It has become more-or-less essential for scientists to achieve as much self-publicity as possible, mainly by publishing in journals with a high "impact factor". The latter is based on the number of references to each article published. This has worked to the disadvantage of small-circulation journals such as *MNASSA* that deal for the most part with a subject that is inherently international.

In recent years, the original material in *MNASSA* has therefore lent towards observational papers published by amateurs, historical papers, news of the Society etc. Other matters of local interest, such as obituaries and reports of developments in the various observatories also find an important place.

It used to be that the various observatories published Annual Reports. The Royal Observatory published theirs in *MNRAS* or the *Quarterly Journal of the Royal Astronomical Society,* understandably since it was a British owned institution. The SAAO issued a separate report from 1974 to 2003 but this ceased until 2018, although a summary of the years 2004-2009 was published by Charles & Glass (2011) in *MNASSA*. For many years various South African astronomy departments and even private observatories published reports in *MNASSA* but this has now ceased. It appears to the editors of *MNASSA* that publication in this journal would serve a useful purpose in drawing the attention of the community to what is happening in the professional area.

It is important to recognise, however, that *MNASSA* papers are listed on the NASA-ADS data system, so that papers on particular subjects or on particular astronomical objects are likely to be found quite easily by people researching them.

Though available freely on NASA-ADS, *MNASSA* articles are also well-indexed and are made available on Sabinet, as are many other South African journals.

Editors and Editorial Board members:[1]

1941-1968 RH Stoy*	1979-1981 DL Block*
1941-1942 JBG Turner*	1980-1985 PAT Wild
1942-1949 H Krumm*	1982-1989 JHS Jones
1942-1943 WP Hirst*	1984- IS Glass*

[1] An asterisk denoted that this person was editor for at least some of the time range quoted.

1951-1985 DS Evans*
1967-1977 PAT Wild*
1969-1984 J Churms*
1970-1972 H Lagerwey
1972-1973 AP Fairall*
1972-1975 RF Hurly
1975-1978 AD Thackeray*
1976-1985 RH Stoy*
1976-2002 MD Overbeek
1985-1989 WL Combrinck
1986 -2019 MW Feast
1986- B Warner
1990-1993 J Churms*
1994-2005 A Slotegraaf*
2000- M Soltynski
2006- W Koorts*
2011- C Rijsdijk*
2015 L Labuschagne

Production and Distribution

The format of *MNASSA* has been improved over the years. The earlier volumes produced on the duplicator were foolscap-sized but a smaller format was used later, until 1968. At that time the format changed to slightly bigger than A5 and a grey cover was introduced. Later this was changed to green.
The original was typed and the UCT Printing Department lithographed and bound each issue. At some point, possibly when PAT Wild became Editor, Mrs Penny Dobbie, Secretary of the Astronomy Department typed the originals.
In 1974 the headings were generated by a photo typesetting machine and applied to the typewritten text. In 1985 a daisy-wheel printer was used to produce justified text. In 1994 a typesetting programme was introduced. Offset printing continued at UCT Printing Department (later privatised as Koerikai Document Solutions)

The "look" of *MNASSA* changed further over the years. Because of printing limitations, early copies were limited to text, illustrated with graphs and line illustrations. Since 1983, black & white pictures started appearing, initially mostly in the "Centre Piece" section that had been introduced mainly to report on amateur activities. In February 1986 a yellow cover with a photograph replaced the plain green one then used. In June 1986 Glass and Catchpole wrote a colour pamphlet about SAAO and made its page size similar to that of *MNASSA*, so that it could be included as a "colour supplement". When Auke Slotegraaf took over editorship in 1994, production was fully computerised and the layout changed to a cleaner, more professional look, with a white cover. Another slight change in layout happened when Willie Koorts assumed editorship in April 2006 and he gave it another facelift in 2013. Since the switch to digital printing in about mid-2010, full colour pictures have been used quite frequently.

PDFs of issues since February 2010 (Vol 69) are available for free download online at www.mnassa.org.za.

At the present time Case Rijsdijk edits the material received for *MNASSA* and IS Glass formats and prepares the layout in MS WORD. Willie Koorts finalises the material, prepares the PDFs and places the issue on-line. He also advertises when each issue is published.

In spite of the original intention, *MNASSA* has not been published every month but has since the mid-1970s been been fairly consistently a bi-monthly, with a few exceptions when production difficulties arose!

International circulation

It is not very clear when *MNASSA* began to circulate internationally but the numbers subscribed to eventually reached about 150. Various people were involved as Business Managers in maintaining the subscribers' lists which also involved the Treasurer and the Membership secretaries of ASSA. H Krumm, WC Bentley, Cliff Turk, Pat Booth and IS Glass undertook this activity for various lengths of time.

Since becoming on-line only, *MNASSA* is no longer printed and is made available freely on the Internet as described. It is presented in two formats, as a plain PDF and as a version that can be printed on a double-sided printer to form a booklet.

Acknowledgment

ISG thanks Willie Koorts, Case Rijsdijk and Auke Slotegraaf, for corrections and comments.

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ASSA instrumentation section

Chris Stewart

Instrumentation has for centuries been a necessary component for the advancement of astronomy. In the main, this relates to optical equipment - predominantly telescopes, but also binoculars, eyepieces, mounts, photometers, spectroscopes, imaging equipment, and more.

In ASSA the requirement for people to have access to relevant information on the subject was recognised in 2013, through the formation of an Instrumentation Section led by Chris Stewart.

The purpose of the section is to provide people with the information necessary to be able to progress their interest in astronomy, and conduct any programs they may wish to advance. Advice is provided regarding selection, use, maintenance/repair and notably construction of equipment.

The primary vehicle for this has been the Amateur Telescope Making (ATM) class, which has been in continuous operation since 1991. Initially it was for a small group of people, members of the ASSA Johannesburg Centre, and took place in the historic library building designed by Herbert Baker on the site of the old Union observatory in Johannesburg. Intended to be a one-off event, the class attracted newcomers on a continuous basis, and was thus simply extended into an open-ended workshop.

Fig 1. Typical collection of telescopes made at the ATM section.

The observatory had no convenient permanent workspace. Instead, chairs were cleared from the meeting hall prior to each work session, then restored at the end of the session. At one point Tony Voorveldt, of the Wits University Physics department, secured the use of the defunct SA weather service radar station in Kya Sands, north of Randburg, and invited the class to move there. Known as SPARC (for Space and Atmospheric Research Centre), the premises were a boon. There was good workshop space, with separate rooms available for grinding, polishing and testing optics. Eventually the CSIR sold the property, which now houses commercial storage units. At and vice Principal of Parktown Boys' High school joined the class and offered the use of the school's Design Technology Centre, which was gratefully accepted.

Fig 2. Simple Dobsonian telescope

At around that stage, a separate ATM group in Pretoria led by Johan Smit wanted to restart an ATM class formerly run by the late Louis Barendse of ASSA Pretoria. They chose to join forces with the Johannesburg team instead of going it alone, a fortunate and fruitful collaboration.

In 2002 Lerika Cross joined the class and remarked that it should have an “open day”. Such small-scale events had previously taken place sporadically, but it was deemed that something larger was necessary to showcase the work products. And thus, the ScopeX telescope and astronomy exhibition was born. This ran annually for 18 years, from 2002 to 2019. ScopeX attracted visitors, exhibitors and speakers from around the country, and as far afield as Scotland, France, Australia and the USA. The format included scheduled talks on astronomical topics, telescope making exhibits and mirror-making demonstrations. Prizes were awarded for high quality handiwork. The youth in particular were targeted, with special programs including lectures, workshops and an inflatable planetarium being attractions. Notable visitors include: Francis O’Reilly of the Stellafane convention, renowned author and editor of *Astronomy* Magazine, Richard Berry, Mike Melville (ZA-born pilot of Scaled Composites’ Spaceship One) [all from the USA]; David Malin (doyen of astrophotography technology) from Australia]; Olivier Thizy (of Shelyack spectroscopy) and famed astrophotographers Thierry LeGault [of France]; as well as many local scientists and educators.

Fig 3. Brian Fraser grinding a 20” mirror

Advanced work products from the ATM class (and its contributions to ScopeX) include telescopes of Newtonian, folded Herschelian, Kutter Schiefspiegler, Dall-Kirkham, Cassegrain, and achromatic doublet refractor designs, with a Yolo started. More niche instruments such as spectroscopes, white light and Hydrogen-Alpha solar telescopes, cooled cameras and the like have also been completed, together with some exotic mounts and tracking platforms, plus various electronic and software aspects. A great deal of ingenuity has been applied to solving common problems such as mount, drive, focuser, mirror cell and finder scope bracket design, with materials ranging from wood and aluminium to carbon fibre.

Members of the class refurbished a second-hand teaching vacuum chamber, making it suitable for aluminising small mirrors - a service that was run by the late Des Fourie. Walter Bacchio then built a professional aluminising plant capable of handling mirrors up to 12.5” / 305mm. The expertise and ingenuity of the ATM class were recognised

globally, with Chris Stewart being invited to speak at Stellafane (the Mecca of amateur telescope making) in 2017.

Apart from the ScopeX website https://scopex.co.za/, communication was initially conducted via mail groups. Once the platform came of age, the group was moved to the Telescope Making SA FaceBook page https://www.facebook.com/groups/ScopeX . Through that medium, amateurs across the globe have been assisted by "remote control". As of February 2022, the group had 1010 members and is globally well known. Whilst the main topics of the Instrumentation Section have naturally been telescopes and ancillaries (notably eyepieces, mounts and tracking tables), diverse subjects such as filters and astrophotography requirements are frequently addressed. Additional email correspondence with people around the globe complements the FaceBook group, to provide detailed advice and guidance.

The Johannesburg Observatory Glass Plate Story

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Abstract

The article begins with a "My Diary" styled account of the rescue of the astronomical photographic plate collection stored in the Archive of the Council for Scientific and Industrial Research (CSIR) in Pretoria, South Africa. It continues with an outline of the work required to scan and calibrate the plates, some of them over a hundred years old. The final objective is to make the plate data available online for long time-scale astronomical research.

Introduction

For most of the past 13 years, efforts have been in hand to re-house and scan the photographic legacy of the Johannesburg Observatory, formerly known as the Transvaal Observatory, Union Observatory and Republic Observatory. Old correspondence and records will show these names for the Observatory.

This article focuses on the plates listed in four plate registers entitled John Franklin-Adams I to IV. John Franklin-Adams was a British amateur astronomer who had acquired a series of photographic telescopes and used them in the early days of astrophotography to map the northern and southern skies. Due to failing health he donated his improved star camera to the Transvaal Colonial Government on condition that his previous southern star maps be repeated with his improved star camera (Vermeulen 2006). In 1917 the plate numbering series was advanced to 1000. Although listed in the first Franklin-Adams register, I am not certain if several hundred

15 x 15 inch (381 x 381 mm) plates with numbers less than 1000 were made with the Franklin-Adams star camera or not.

While serving on the Johannesburg ASSA committee as librarian, I became aware of a collection of glossy prints of astronomical plate exposures, some of which were glued to hardboard backing for easy handling. The set was about 80% complete and consisted of 556 prints (Innes 1926) covering the southern sky from -19° to -90°. Posting these prints to other observatories world-wide was the method of distributing plate information in the pre-digital era.

At a later meeting of the Johannesburg ASSA committee, Chris Stewart put forward the idea of finding the original glass plates, scanning them, and making them accessible online. The suggestion caught my attention because it would make the plates much easier to access and provide valuable comparison with later observations. The snag was that we did not know where the glass plates were stored or if they had been discarded.

2009 Mission start

A brief notice by an astronomer at the South African Astronomical Observatory (SAAO) in Cape Town, drew attention to the fact that many astronomical glass plates were stored in the Archive of the CSIR in Pretoria, and that the CSIR needed the space for other purposes (Glass 2009).

A visit to the Archivist at the CSIR to inspect the plate collection revealed immediately that the collection of glass plates came from the Johannesburg Observatory, and the number of plates far exceeded the several hundred prints of glass plates in the Johannesburg ASSA library. A rough estimate of ten thousand plates was made, based on averaging the number of plate jackets visible on selected shelves and the numbers of plates stored in selected boxes (with the plates separated by tissue paper) and multiplying by the number of shelves and visible plate boxes. This estimate took no account of plate sizes ranging from 15 by 15 inches (381 by 381 mm) to 200 by 200 mm due to the far greater number of small plates than large plates. I put a small plate in the archive photocopier to see what sort of copy it would make. The exposure was not right, and the plate was broken!

In the next few months, I spent time finding out more about the preservation and scanning of astronomical photographic plates with help from astronomers in the USA, Canada, the UK, and South Africa. I was amazed at the scanning resoluton in the region of 2000 dots per inch achieved by a modified scanning microdensitometer intended to scan the half million plates belonging to the Harvard College Observatory (HCO) at the rate of 400 plates per day. Allowing for the greyscale definition of each pixel, the data storage requirement was about 740 MB per plate (Simcoe ca 2005).

Whilst at the CSIR Archive, I met Dr Keith Snedegar, Professor of History, Utah Valley University, USA who was doing historical research on the lives of early astronomers in South Africa. He was well acquainted with plate preservation work in the USA and kindly sent information to me on the project known as the Digital Access to a Sky Century @ Harvard (DASCH) to digitize the HCO plate collection (Snedegar 2009).

2010 First temporary storage for the plates

The immediate concern was ALTERNATIVE STORAGE for the plates. I knew of a disused, open-plan office on the second floor of a company's offices in Johannesburg (3rd floor if you count ground floor as 1st floor), but no lift. I requested permission to store homeless astronomical plates laid out in order on the floor of the open plan area for a period of at least 6 months. Permission was granted and brought the task of moving the plates a step closer.

Although many hands make light work, unless you know what you want to achieve and how to achieve it, it is best not to have too many well-meaning helpers for a Big-Bang approach until you do know what you want to achieve and how it must be done. The reason is simple, any learning curve mistakes will be smaller mistakes. My wife and I made a nice little team to start on the job of moving the plates from the CSIR in Pretoria to the alternative storage site in Johannesburg, about 50 km away. At this point another Chinese proverb provided sound advice, "the longest journey begins with the first step".

So, there we were at the CSIR archive with eight stackable plastic crates, a generous supply of bubble-wrap and our seven-seater Toyota people mover that was now a packed crate mover. With advice from Anette Joubert, the archivist, on handling and packing the glass plates, we decided to start with the jacketed plates in their specially made storage cabinets and worked from there. Most of the route to the temporary storage location was on a multi-lane highway with only about 1 km of ordinary streets at each end of the journey, so there was little risk of jarring the contents of the crates due to rough road conditions. The shortest access route from the parking area to the second floor of the building was by a spiral fire-escape ladder and it was a plodding task to carry the packed crates up to the second floor. I soon enlisted the help of the building janitor and some of his friends on a casual basis to assist with the task of carrying crates up the stairs. Once on the second floor there was a lengthy walk to the storage area, and a two-wheel trolley made the movement of crates on a level floor much easier and quicker.

During the plate relocation process, the CSIR archivist produced some old correspondence from the 1980's showing that certain plate logbooks were listed as "in use at the SAAO" in Cape Town. This was of great interest because the jacketed

plates had the plate metadata written on the jackets while thousands more plates stored in plate boxes were marked only with a plate number inscribed on the emulsion side. The priority was to complete the removal of the plates from the CSIR and then investigate the whereabouts of the plate registers. The cabinets storing the jacketed plates could not be moved to Johannesburg without emptying them first. We produced a scheme to mark the jackets with a stick-on label bearing cabinet shelf and pigeonhole number so that the plates could be returned to their original positions in the cabinets later. This was necessary because the interior of the cabinets contained a lot of labels relating to the items stored in the cabinets.

The transport of the plates was completed with ten carloads during the month of September 2010. Another advantage of a small team effort is setting a day for a task to be carried out. Finding a sustainable pace for doing something and sticking to it can enable a small team to achieve quite a lot.

There was one episode where the Big-Bang approach proved its worth. The archivist advised us that in addition to the glass plates there was documentary material that the National Archive had declined to accept, and this material could be removed by Johannesburg ASSA in addition to the glass plates. Johannesburg ASSA members set off in several vehicles, some with trailers, to retrieve the material and deliver it to space at the Johannesburg Observatory. Mission accomplished in half a day.

2011 Inspecting plate registers in Cape Town

When the SAAO librarian confirmed that the plate registers were available for inspection in the SAAO library, it provided me with an additional incentive to take a time-share holiday in Cape Town that included a visit to the SAAO library. When I inspected the registers, I could see what had been recorded for each plate number in the register, regardless of whether it was a jacketed plate or not. I had photocopies made of a few register pages to show what information was recorded for each plate.

2012 Efforts to secure permanent storage space

Despite letters of support for Johannesburg ASSA's plate preservation project from well placed people in astronomy and plate preservation, we were not able to reach finality with the management of the Johannesburg Observatory on the permanent relocation of the glass plates to the Johannesburg Observatory. In the absence of a decision either way on the matter, the issue remained unresolved.

2013 Second temporary storage for the plates

Nearly two years after moving the plates to the office building in Johannesburg, I received three months notice to vacate the storage space due to the sale of the building. This led to an intensive round of discussions and motivation for permanent storage in a building at the Johannesburg Observatory. We were granted permission

to store the plates temporarily at the former Observatory Library, used for many years by Johannesburg ASSA for other society purposes. Built in 1904, it had a wooden strip floor supported above ground on pillars, not ideal for heavy cabinets and shelves, packed with glass plates instead of paper files and books. There were windows all round and heritage considerations limited alterations that could be done to improve security against burglary and vandalism.

Beggars cannot be choosers and we set about moving the plates for the second time. Once more, the "many hands make light work" approach or "the longest journey begins with the first step" approach. We decided on the "many hands make light work" approach. When the team felt the weight of the bundles (especially the 15 by 15 inch bundles) that had to be carried down to the ground floor, and they saw how many bundles there were, grumbles soon turned into debates about the need for a mobile crane and other expensive schemes for bringing the plates down from two floors up. Soon the team said that they would come back to help when suitable equipment for doing the job was available. With that, the team took off, except for Melvyn Hannibal, probably the most senior-citizen member of Johannesburg ASSA and I, not far behind Melvyn in age.

We decided to put a load of plates in each of our cars and offload them at the Observatory. Then we would come back the next day to see how many plates we could move in a day without rushing the job. We finished the job in three more days at the cost of a few Cokes, some sandwiches, and some extra travelling expense. In fairness to the team, Melvyn and I are retirees, while the rest of the team had day jobs and could not spend days lugging glass plates.

As an example of how tenuous our new temporary storage arrangement was at the Johannesburg Observatory, I was once given two hours notice to remove the plates from the Observatory Library building to allow a military detachment to be billeted in the hilltop building for a few days while carrying out a communications exercise. I had to refuse as it was physically impossible for me to comply with the instruction. Site management then taped off certain areas as NO GO areas and I was relieved to find afterwards that the military personnel had not disturbed the plates.

For a while the outlook for the preservation of the plates looked very bleak – then things abruptly changed. South Africa's role in the Square Kilometer Array (SKA) project was announced. The University of the Witwatersrand (WITS) in Johannesburg saw the need for a shift towards astrophysics in the WITS School of Physics.

2014 Further, significant developments

As part of this reorganization, the WITS School of Physics took over the the management of the Planetarium on the WITS campus.

A member of Johannesburg ASSA on the staff of the Planetarium, Constant Volschenk, mentioned to his new management the difficulty that Johannesburg ASSA was having with the preservation of the photographic plates from the Union/Republic Observatory eras.
Professor John Carter, then Head of the WITS School of Physics and the late Professor Sergio Colafrancesco, then Professor of Radio Astronomy and DST/NRF SKA Research Chair, requested a meeting at the Johannesburg Observatory to view the plate collection and discuss its future.

2015 WITS Astronomical Plate Archive of the South African Sky

Things moved quickly from then on. I remember Prof Colafrancesco's words "Days count!". WITS provided a windowless, air-conditioned, ground-floor room with floor area of about 34 m^2 (360 ft^2) containing redundant X-ray apparatus. I provided a floor plan and after some renovation to repurpose the space, we moved the plates into their new home.

We arranged all the plates into order in the cabinets and the plate boxes into order on the shelves and started on scanning a 3% sample of the plates with a Canon 5D Mk IV camera instead of a flat-bed scanner.

Prof Colafrancesco was aware of this approach to scanning astronomical plates and recommended its use for the project. The principal advantage of using a DSLR camera is the elimination of precision-controlled movement during scanning as required by flat-bed scanners. Combined with years of improvements in CCD camera technology since the construction of the HCO scanner in 2005, the DSLR method has been shown to deliver research grade results for long time-scale astronomy (Hudec, R & Hudec, L 2014) (Skala, P & Hudec, R 2014).

Fig 1. WITS Astronomical Plate Archive of the South African Sky.

We started scanning the jacketed plates that had the plate metadata written on the jackets, so at that stage we did not need the plate registers that I had seen in the SAAO library in Cape

Town in 2011. However, we realised that the plate registers would have to be reunited with the plate collection when we started scanning plates stored in boxes with no plate information other than the plate number inscribed on the emulsion side. The boxes were the same light-proof boxes in which unexposed plates were supplied.

2016 A temporary threat

Email correspondence with the SAAO revealed that the Librarian had only taken up the position a few months previously and was unaware of the history of the plate registers on loan from the CSIR. When further email correspondence confirmed that the plate registers could not be found, I recognised it as a major threat to the plate rescue project.

Without the plate registers that linked plate number to all other recorded data for each plate in box storage, we would have thousands of plates with no information about what was on the plates. Plate-fitting software and planetarium software were tried to see how easily the centre coordinates of an unidentified plate could be found. The methods tried were not quick enough and would not provide information such as the telescope used, exposure, date/time, or the reason for making the plate.

In Table 1, I was surprised to see that no time-of-day data was recorded with the exposure duration. In Tables 2a and 2b, subsequent register layouts were changed to accommodate a sounder which signalled the sidereal hours minutes and seconds for the beginning and end of plate exposures.

In April 2016 I was on my way to Cape Town again for personal reasons and another visit to the SAAO library. On the 5th day of searching and the day of our departure from Cape Town, I went back to the library for a last look around and found the plate registers tucked between books on a bookshelf only a couple of metres from the photocopier where my copies of register pages had been made five years before. Should have looked there first!

Table1. Single page plate register layout

Regis-ter	Pg. no.	Plate no.	RA	Declin-ation	Year	Mth	Day	Exp. min.	Remarks
JFA1	**1**	6	19h00’	+15° 00’	1910	06	30	20	Chart
JFA1	**135**	8076	13h42’	-76° 00’	1932	04	02	05	Comet Houghton

On Prof Carter’s next visit to Cape Town, he was able to officially take possession of John Franklin-Adams Registers I to IV. This excluded a fifth register that was not located during the 2011 library visit either. He then couriered them safely to the

Plate Archive at WITS. These plate registers are irreplaceable, and priority must be given to copying them to provide backups and reduce the need to access the originals.

Table2a. Left-hand page of double page plate register layout

Register	Pg. no.	Plate no.	RA	Declin-ation	Year	Mth.	Day	Exp. min.	Obser-ver
JFA2 LH	**001**	8276	15h31’	+10° 08’	1932	06	23	30	HEW
JFA2 LH	**183**	19603	18h40’	-78° 00’	1947	12	13	06	J
JFA3 LH	**001**	13482	14h45.4’	-13° 52’	1937	05	05	30	CJ
JFA3 LH	**148**	23533	13h55’	-20° 00’	1961	04	19	15	Br
JFA4 LH	**005**	23261	18h30’	-23° 00’	1959	07	25	10	Br
JFA4 LH	**096**	26004	14h50’	-28° 00’	1976	05	25	15	Br
JFA4 LH	019	**26221***	11h05’	-21° 00’	1978	04	11	10	Br

*Last plate on p 19 of 96 due to its declination. This shows the register access difficulty.

Table2b. Right-hand pages of double page plate register layout

Register	Obser-ver	Sounder		Remarks	Plate no.
		Exp. start	Exp. end		
JFA2 RH	HEW	-	-	Map	8276
JFA2 RH	J	-	-	Comet Honda	19603
JFA3 RH	CJ	13:21:30	13:51:30	MP	13482
JFA3 RH	Br	24:12:00	24:27:00	MP	23533
JFA4 RH	Br	20:32:00	20:42:00	MP thin cloud	23261
JFA4 RH	Br	23:20:00	23:35:00	MP	26004
JFA4 RH	Br	20:45:00	20:55 00	MP’s	26221

2017 to 2019 Trial scanning of a sample of the plate collection.
About half of the 3% sample was scanned during this period. Difficulty was experienced with the scanning of the remainder of the sample which is stored with no metadata other than plate number.

2020 to 2021 Various pandemic lock-down levels.
During this period, we chose not to access the plate archive on the WITS campus. However, we were able to learn more about the techniques available for scanning plates and calibrating the resulting image files, as well as making the plate data accessible online.

Future Work

Archive Database
A database is essential for overcoming the fact that the plate registers are laid out in sections of declination typically 5° wide, and the plates are stored in plate number order. Some register declination sections fill up with plate data more quickly than others and continue to blank pages further ahead in the register, or in the next register. This makes it very difficult to manually locate plate numbers in the registers.

If we enter all plate numbers from the plate registers into our Excel plate index, the entered plate numbers will be linked to pre-calculated register page and line numbers. If the Excel index is then sorted into plate number order, the index can be used to read off the linked register page and line numbers giving the position of any plate number and its metadata in the registers. This augmented plate index will become our "Rosetta Stone" for finding plate metadata in the plate registers, especially for plates stored with no identification other than plate number.

Plate Scanning
Feedback on the quality of the scanning done on our sample run is needed before scanning the whole archive. During the sample run no plate annotations were removed and no plates were cleaned to remove dust. Our scanning procedure must be finalised to cater for items such as these when scanning the whole plate collection.

Post processing of the camera images
The DASCH project uses software to obtain accurate astrometric and photometric calibration of the camera images by reference to the Hubble Guide Star Catalogue 2.2 (updated to 2.3.2). This and other catalogues have sufficient density of guide stars to provide an adequate range of on-plate calibration stars for all resolvable objects on any plate in the collection (Laycock, et al. ca 2005, 2008 & 2018).

The collaboration known as Archives of Photographic Plates for Astronomical USE (APPLAUSE) has developed open-source software for astrometric and photometric calibration of plates from many European observatories (Tuvikene 2014). The APPLAUSE collaboration has also developed open-source software for online publication of plate data (Tuvikene 2016).

Online publication of accurate astronomical plate data is the most important aspect of the whole plate preservation exercise. It makes plate data freely available worldwide when previously, astronomical plate archives were seldom used due to the difficulty of accessing widespread archives, and the time-consuming work of manually extracting data from the plates.

Conclusion

Due to the improvement in the Covid pandemic situation, it is likely that work in the WITS Plate Archive will resume soon. The priorities are indicated by the order of the tasks listed below: -

Copies of the original plate registers for their backup and protection.

Creation of the augmented database in the short term to link any plate number to its metadata in the plate registers.

The sample scanning run must be completed with input from the augmented database, and the results assessed before scanning the whole archive.

Calibration of the camera images produced in the sample run is an opportunity for input from professional astronomers in South Africa. There are similarities between the CCD image processing required for current astronomical work and the image processing required for DSLR camera images of astronomical glass plates up to 100 years old.

Acknowledgements

The foresight and initiative of the WITS School of Physics to create an archive for the photographic plates produced at the Johannesburg Observatory was a key development in efforts to preserve and utilise this scientific heritage.

Funding from WITS alumna, Mrs Hilary Veale, the ASSA Endowment Trust (ASSET) and Johannesburg ASSA is gratefully acknowledged for enabling the creation of the WITS Astronomical Plate Archive of the South African Sky. The Archive has provided secure storage for this under-represented, southern hemisphere, photographic plate collection produced between the mid 1890's and the mid 1970's.

Provision of temporary storage space for the plates free of charge for extended periods of time by Tenova Pyromet Pty Ltd and the Johannesburg Observatory management, were critical to the successful relocation of the plate collection.

Further reading

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Colloquia

Case Rijsdijk (Editor, MNASSA)

Colloquia and Seminars (now Webinars) form an important part of a research facility, often as a sort of pre-publication discussion or a discussion of an individual's current research, and as such it is virtually impossible to "publish" this material. However by recording the topics discussed in the form below does indicate to those, who are unable to attend, what current trends are and who has visited to do research: it keeps everyone 'in the loop' so to speak

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With the advent of CV19, these Colloquia and Seminars are being presented to wider audiences via Zoom and other virtual platforms. The editor has started by identifying what would originally been "local" Colloquia and Seminars; not easy as there are now Webinars on interesting topics from around the globe! In time we will either return to the traditional Colloquia and Seminars or many will become Hybrid session.

Title: Understanding X-ray emission from blazar

Speaker: : Dr. Pranjupriya Goswami, Postdoc, Astronomy & Astrophysics Centre for Space Research, North West University Potchefstroom

Date: 5 May

Venue: SAAO - Zoom

Time: 11h00

Abstract: Blazars are the most powerful active galactic nuclei (AGNs) that show rapid variability, high luminosity, jet dominated non-thermal continuum and strong gamma-ray emissions which make these sources the ideal objects for studying physics of the ubiquitous but poorly understood astrophysical jets. The spectral energy distribution (SED) observed from radio frequencies up to very high energy gamma-rays is divided into two broad emission humps. Different flavours of leptonic and hadronic models have been implemented to explain the broadband SED with varying degrees of success.

In this talk, I will give a brief overview of blazar emission properties and various SED models. Measurement of the spectral curvature in blazar jets can throw light on the underlying particle spectral distribution, and hence, the acceleration and diffusion processes at play. I will also discuss how simultaneous measurement at hard and soft X-ray energies can be crucial in understanding the underlying particle spectrum.

Title: Young massive clusters in a sample of nearby interacting systems and southern collisional ring galaxies
Speaker: Dr. Zara Randriamanakoto, Staff Astronomer, SAAO
Date: 2 June
Venue: SAAO – Auditorium/Zoom
Time: 11h00

Abstract: Initially thought to only form in the extreme environments of interacting galaxies, young massive star clusters (YMCs) have also been seen in more quiescent environments, such as gas-poor normal spirals and in nearby dwarf galaxies. With their masses spanning between 10^4 - 10^8 solar masses, these peculiar objects represent the most massive and extreme form of star formation (SF) in nearby galaxies and hence they are a good tracer of small-scale SF mechanisms. This talk will highlight recent results from our ongoing YMC studies in different galaxy environments with the aim to determine the impact of the host galaxy environment on the formation and evolution of the YMCs using near-infrared adaptive optics imaging and multi-band HST observations.

Title: SALT's Latest Addition: The Near Infrared Integral Field Spectrograph
Speaker: Dr. Marsha Wolf, Senior Scientist, Department of Astronomy, University of Wisconsin-Madiso. USA
Date: 23 June
Venue: SAAO – Auditorium/Zoom
Time: 11h00

Abstract: Washburn Astronomical Laboratories of the University of Wisconsin-Madison Astronomy Department has developed a near infrared (NIR) integral field spectrograph for the 11-meter Southern African Large Telescope (SALT). This instrument will be the first to extend SALT's capabilities into the NIR, providing medium resolution spectroscopy at R = 2000-6000 over the wavelength range of 0.8 to 1.7 microns. Its integral field unit (IFU) is an elongated hexagonal bundle of 212 fibres, each of which subtends 1.3 arcsec on the sky, approximately matching the median site seeing. The IFU has on-sky dimensions of 29 x 18 arcsec, ideally suited for resolving nearby galaxies. A separate 38-fiber bundle simultaneously samples the sky. It can be adjusted to distances ranging from 48 to 159 arcsec from the object IFU with a gimbaled jaw in the Fiber Instrument Feed (FIF) that maintains telecentricity and common field angles for the object and sky bundles. Sky fibres are interleaved with object fibres along the 8-arcmin long spectrograph slit for optimizing sky subtraction. The spectrograph is cooled to -40 C in an enclosure beneath the telescope, with the cryogenic dewar inside this enclosure operating at 120 K via a separate closed cycle cooler. The spectrograph uses volume phase holographic gratings with an articulated camera, similar to RSS, for setup versatility. The spectrograph has been fully tested in

the laboratory and is currently being installed and commissioned on SALT. I will present an overview of the instrument capabilities, some design highlights, performance results from laboratory characterization in Wisconsin, and the status and timeline of commissioning on the telescope**.**

Title: SALT's Latest Addition: The Near Infrared Integral Field Spectrograph
Speaker: Dr Marsha Wolf, Senior Scientist, Dept of Astronomy, University of Wisconsin-Madison USA
Date: 23 June
Venue: Zoom
Time: 11h00

Abstract: Washburn Astronomical Laboratories of the University of Wisconsin-Madison Astronomy Department has developed a near infrared (NIR) integral field spectrograph for the 11-meter Southern African Large Telescope (SALT). This instrument will be the first to extend SALT's capabilities into the NIR, providing medium resolution spectroscopy at R = 2000-6000 over the wavelength range of 0.8 to 1.7 microns. Its integral field unit (IFU) is an elongated hexagonal bundle of 212 fibres, each of which subtends 1.3 arcsec on the sky, approximately matching the median site seeing. The IFU has on-sky dimensions of 29 x 18 arcsec, ideally suited for resolving nearby galaxies. A separate 38-fiber bundle simultaneously samples the sky. It can be adjusted to distances ranging from 48 to 159 arcsec from the object IFU with a gimbaled jaw in the Fiber Instrument Feed (FIF) that maintains telecentricity and common field angles for the object and sky bundles. Sky fibres are interleaved with object fibres along the 8-arcmin long spectrograph slit for optimizing sky subtraction. The spectrograph is cooled to -40 C in an enclosure beneath the telescope, with the cryogenic Dewar inside this enclosure operating at 120 K via a separate closed cycle cooler. The spectrograph uses volume phase holographic gratings with an articulated camera, similar to RSS, for setup versatility. The spectrograph has been fully tested in the laboratory and is currently being installed and commissioned on SALT. I will present an overview of the instrument capabilities, some design highlights, performance results from laboratory characterization in Wisconsin, and the status and timeline of commissioning on the telescope.

Streicher Asterisms

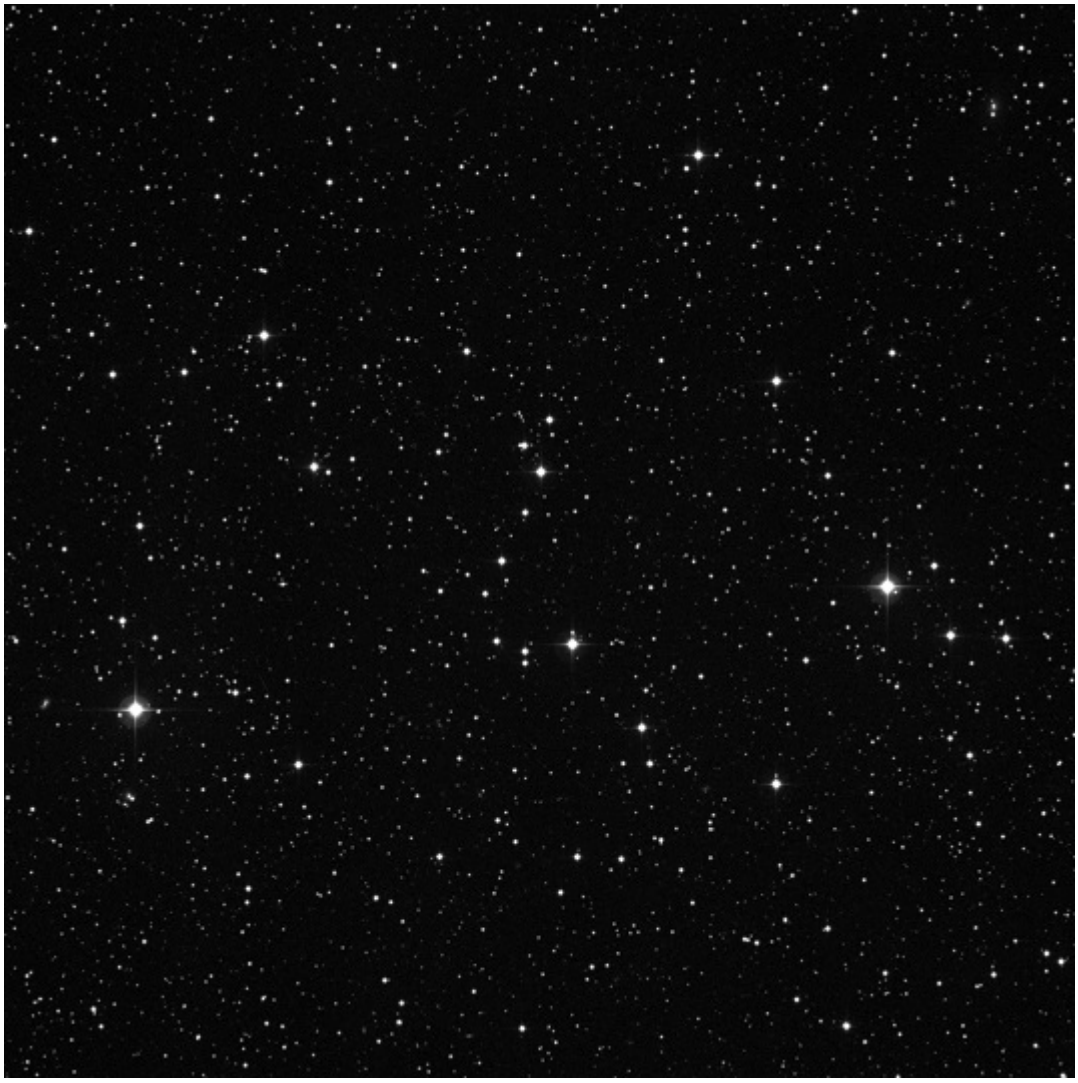
Magda Streicher

STREICHER 81 – DSH J0717.8+1108
Canis Minor

The stars in this group vary between 9-11 magnitude and form a lovely hook with its open end towards west. The galaxy NGC 2350 is situated 1.5° north-west of this unusual but interesting grouping.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER 81 DSH J0717.8+1108	Asterism	07h17m.52	+11°08'.54	9.3	7'

Picture Credit: http://archive.stsci.edu/cgi-bin/dss



STREICHER 82 – DSH J1229.4-7004
Musca

Barely a few steps south-west from alpha Muscae, a relatively large very faint grouping can be discerned against a sprinkled star field. Although the close concentration can be described as a nebulous cloud, it is however slightly defined and can be seen clearly, but with difficulty, in a wide field of view. A few brighter stars seem to take their stand on the eastern side, with much fainter stars stringing along west.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER 82 DSH J1229.4-7004	Asterism	12h29m.24	-70°04'.57	9	8.5'

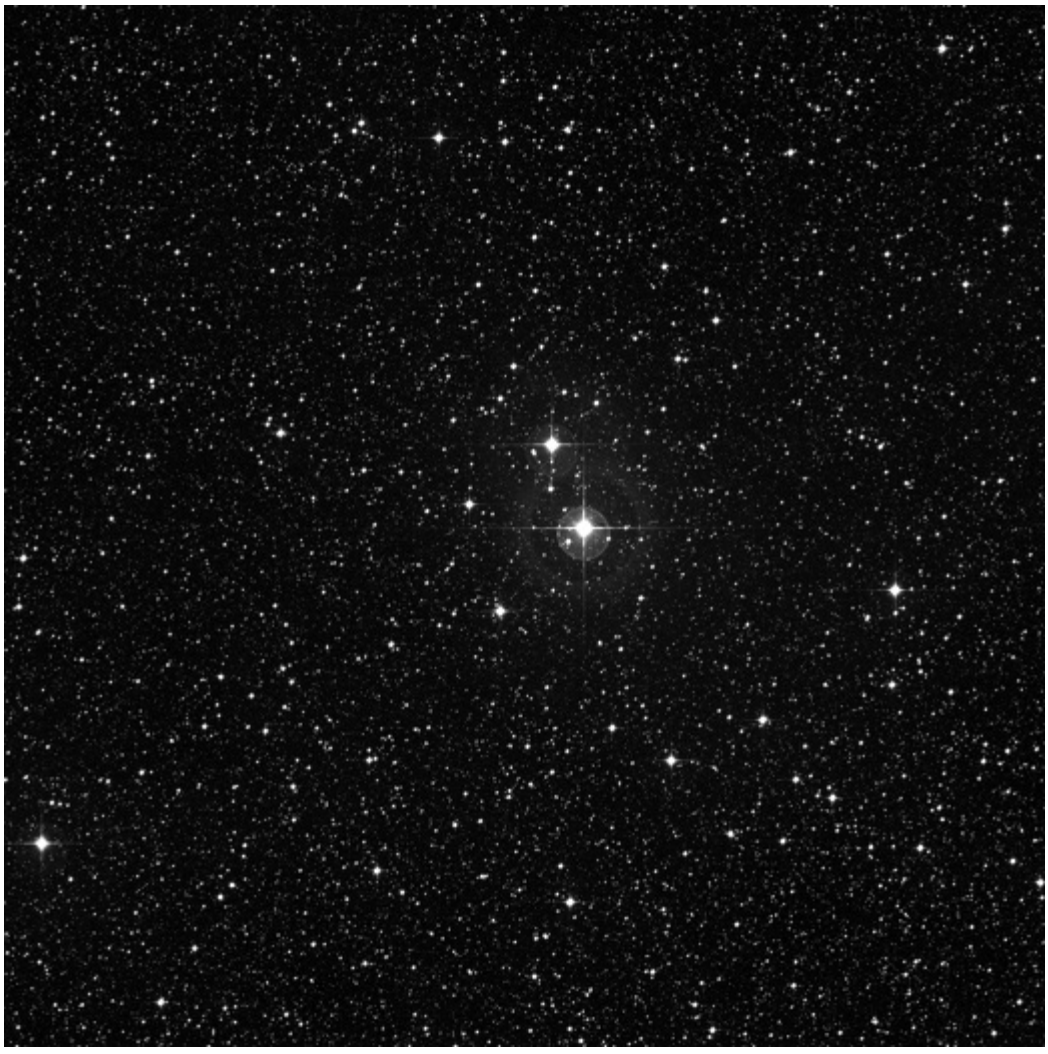
Picture Credit: http://archive.stsci.edu/cgi-bin/dss

STREICHER 83 – DSH J1604.8-3751
Lupus

Four relatively bright stars can be picked up, forming a prominent square shape situated between eta and theta Lupi. The brightest member is the magnitude 5.8 situated on the western end also catalogued as HD 143928. It is a very faint busy star field, bringing the bright stars much more to the fore. Perhaps the look of a mini Crux constellation.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER 83 DSH J1604.8-3751	Asterism	16h04m.47	-37°51'.42	7	6'

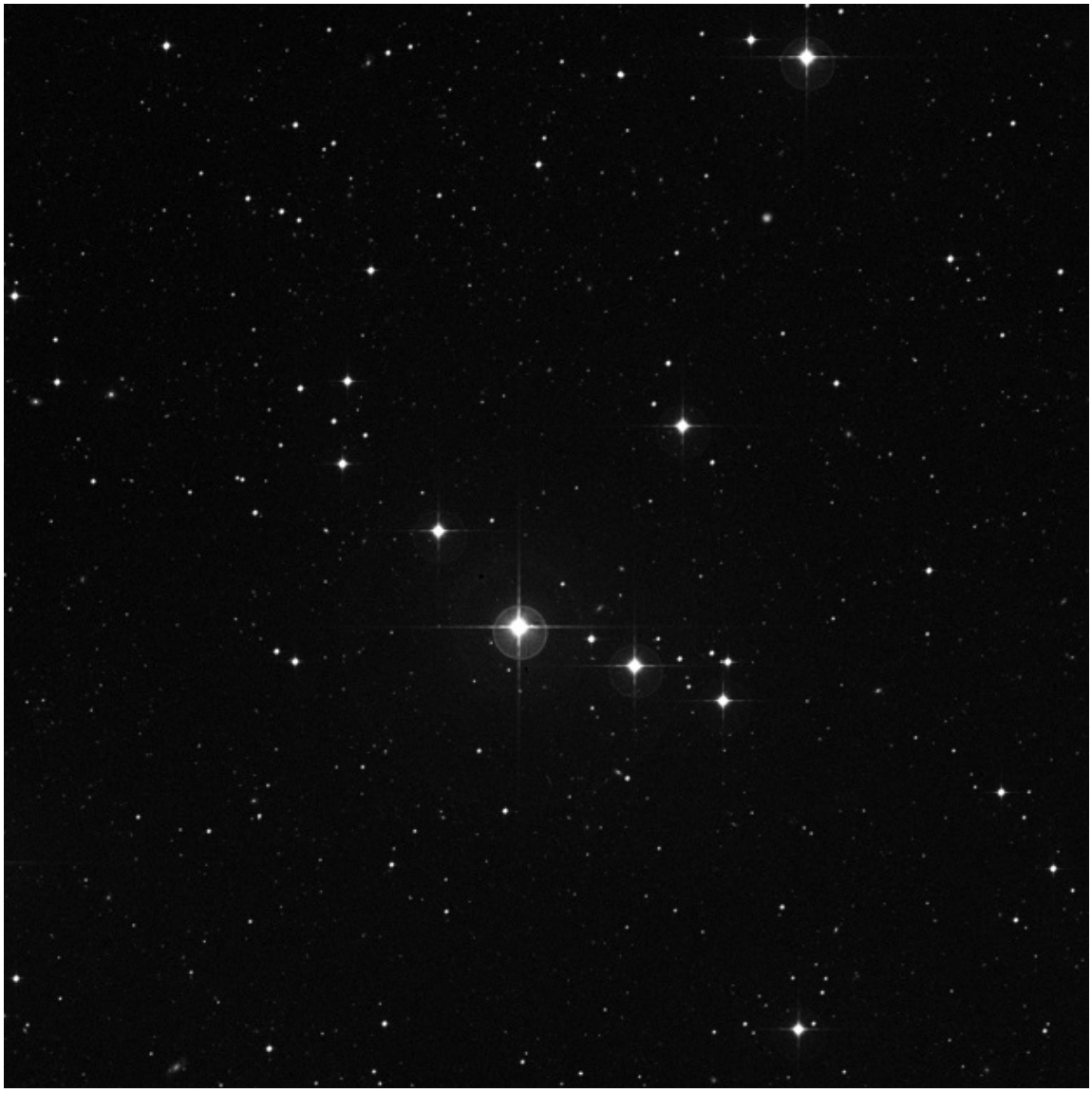
Picture Credit: http://archive.stsci.edu/cgi-bin/dss



STREICHER 84 – DSH J0005.1-3223
Sculptor

A lovely bright outstanding curved string in a north-east to south-west direction contains various magnitude stars. The brightest magnitude 7 middle star shines brilliantly in a slightly yellow colour. The large open spiral galaxy NGC 7793 with a magnitude of 9.7 is situated only 1.5° towards the west.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER 84 DSH J0005.1-3223	Asterism	00h05m.06	-32°23'.30	8.5	18'

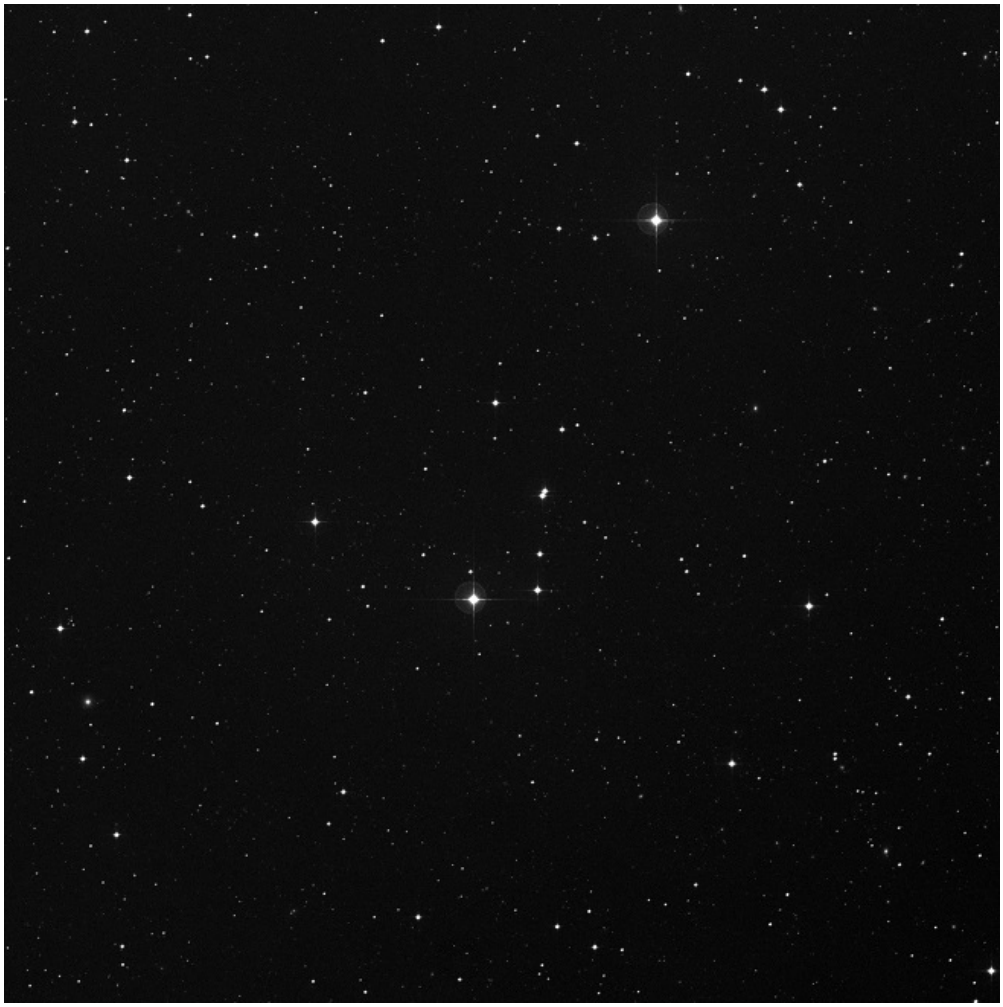


Picture Credit: http://archive.stsci.edu/cgi-bin/dss

STREICHER 85 – DSH J0014.8-3604
Sculptor

Five relatively bright stars take on the shape of a reversed letter L, with a faint double star a few arc-seconds apart above the northern end. The brightest slightly yellow-coloured star is a magnitude 8.8, situated towards the south. Lovely magnitude 5 theta Sculptoris can be seen a degree north-west.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER 85 DSH J0014.8-3604	Asterism	00h14m.53	-36°04'.18	8	12'



Picture Credit: http://archive.stsci.edu/cgi-bin/dss

The **Astronomical Society of Southern Africa** (ASSA) was formed in 1922 by the amalgamation of the Cape Astronomical Association (founded 1912) and the Johannesburg Astronomical Association (founded 1918). It is a body consisting of both amateur and professional astronomers.

Publications: The Society publishes its electronic journal, the *Monthly Notes of the Astronomical Society of Southern Africa (MNASSA)* bi-monthly, the annual *Sky Guide Africa South* and *Nightfall*.

Membership: Membership of the Society is open to all. Potential members should consult the Society's web page : http://assa.saao.ac.za for details. Joining is possible via one of the local Centres or as a Country Member.

Local Centres: Local Centres of the Society exist at Bloemfontein, Cape Town, Durban, Hermanus, Johannesburg, Pretoria and the Garden Route Centre; membership of any of these Centres automatically confers membership of the Society.

Internet contact details: email: assa@saao.ac.za Home Page: http://assa.saao.ac.za

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