



ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA

'NDABA



Monthly Newsletter of the Durban Centre - April 2017

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Chairman's Chatter

By Mike Hadlow

Dear Members,

Another month of relatively poor viewing conditions! However, we are now into April and having passed the autumn equinox on 20 March, the days are getting shorter, nights longer and we are moving into a more stable atmospheric period of clearer skies between the cold fronts that frequent the Western Cape winter rainfall area.

Our March meeting was once again well attended, with our main speaker being Logan Govender giving us a talk titled, Prominent Celestial Objects in the March skies. Again, it would be great feedback to us if our members report back on the viewing experiences during the month.

Once again, our public viewing had to be cancelled because of rainy and cloudy skies on 24 March. However, even if it had been clear skies we would not have been able to see much on the eastern horizon due to large plume of smoke from the factory fire in Old South Coast road. Our next scheduled viewing will be on 28 April and will be hosted by Chanu Chetty, Peter Foster and John Gill.

Our outreach this month included a visit to Paradise Valley. Peter Dormehl, John Gill and Logan Govender manned a Star Party at the Paradise Valley Nature Reserve on Friday 17th March.

Organised by an organisation called "Rocks & Roots," which arranges for children of the Islamic faith to experience a natural environment under canvas for the night.

The evening began with great promise; brilliant skies in a light pollution-free environment with stars blazing in their glory. The gathering assembled for evening prayers and a short talk but by the time they emerged, the Durban astronomers' eternal enemy, a blanket of cumulus clouds shrouded the entire sky.

The children however enjoyed the talk and some enquired about joining ASSA.



... Chairman's Chatter

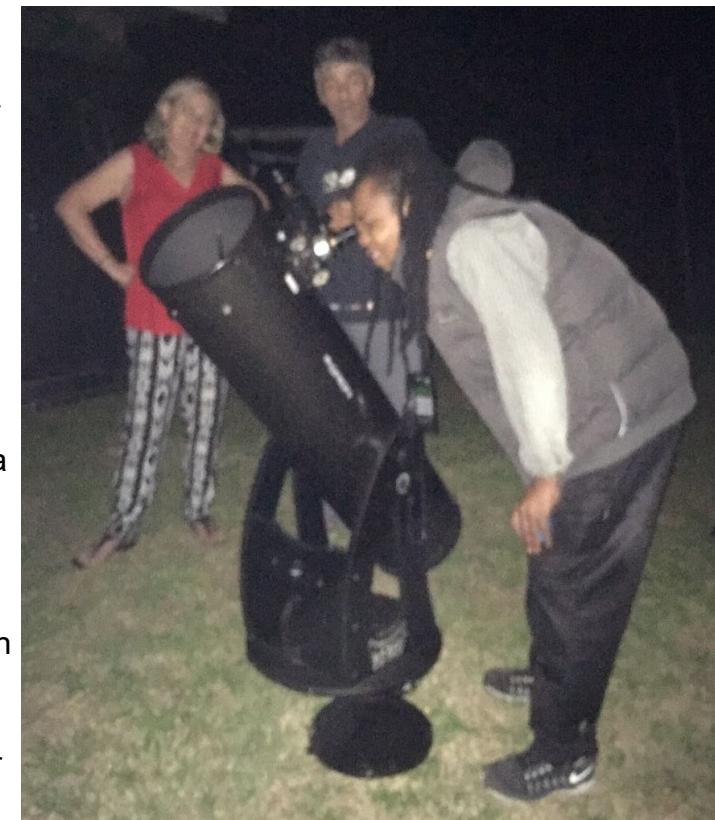
I also took my telescope to Mbotyi in the Transkei on the long weekend and showed some of the locals what was out there on a fantastic clear evening, viewing a clear Milky Way and Jupiter.

Our next general meeting is on 12 April and we are privileged to have a visiting lecturer, Prof Jayant Narlikar of the InterUniversity Centre for Astronomy and Astrophysics, Pune, India, to give us a presentation. The title of the presentation is "How Well Do We Know Our Universe?." I'm certainly looking forward to the presentation and hope to see as many of you as possible there.

As promised at our last general meeting the committee is presenting another Basic Astronomy Course. The course is to run over a period of six weeks commencing on 5 April. It will therefore coincide with two general meetings, 12 April and 10 May.

Due to the clash with Prof Jayants' presentation on the 12th, we have scheduled the second weeks course presentation, "Our Sun and the Birth of Stars & The Earth, the Moon and Other Satellites, Eclipses." for Monday the 10th.

The course is still scheduled for 10 May, with the course presentation being on "Deep Sky Objects & Astrophotography and Navigating the Southern Skies." Members are welcome to attend this meeting on which matters relating to the society will be discussed very shortly, prior to the course content of that week.



This month is also going to be our 'Rock - Star excursion' where we will be going to Matatane River Lodge near Ulundi, together with members of the Geological Society and the 4x4 club, from 27 April to 1 May.

We have also arranged a viewing evening on Saturday, 3 June at Murray McKenzie's smallholding in Cato Ridge, where at this time of the year and this location, we should experience fantastic skies. Details on this will be given in our May nDaba.

Looking forward to seeing you all at our basic astronomy course on the 5th and at Prof Jayant Narlikar presentation at our next general meeting on 12 April.

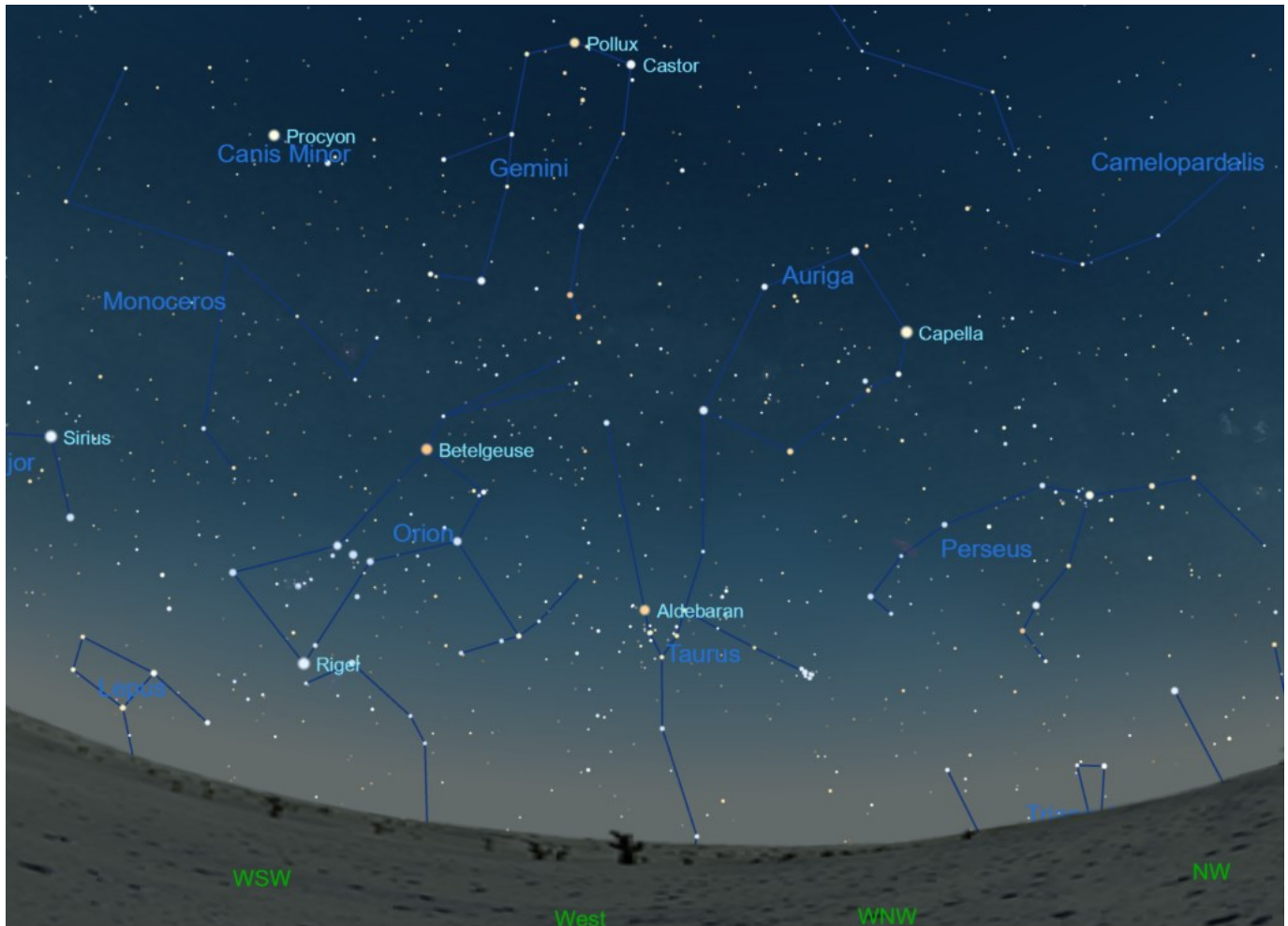
Wishing you clear skies and great viewing.

Mike



Castor and Pollux

By Brian Ventrudo



Gemini is still well overhead, north and east of the constellation Orion, in the evening hours in March. Its brightest stars are Castor and Pollux. Created with SkyX Serious Astronomer edition by Software Bisque.

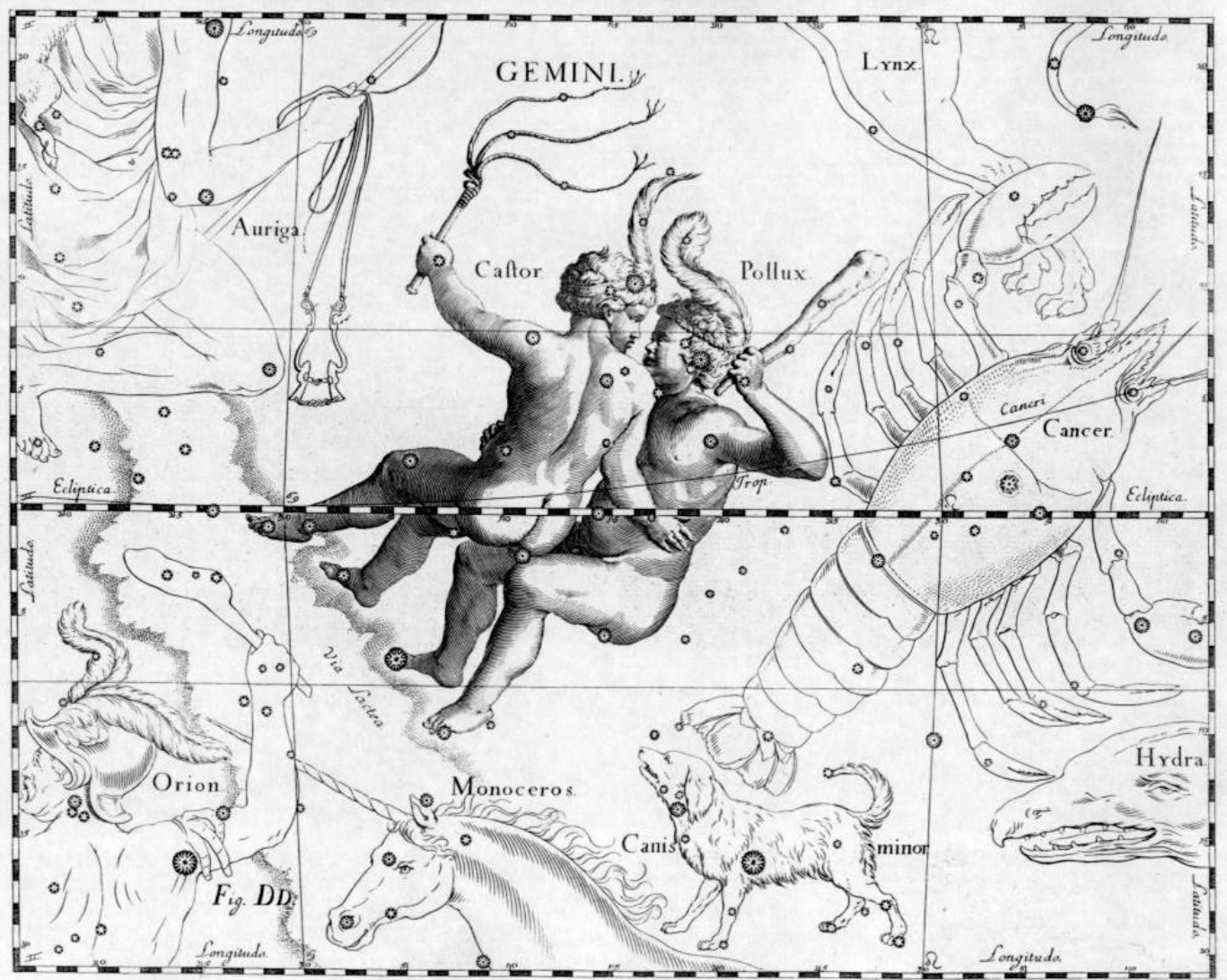
Along with Taurus, Gemini is one of the two most northerly constellations of the zodiac. It lies just east of Auriga and the bright star Capella, and it's marked by the two bright stars Castor and Pollux which lie less than 5° apart (a little less than the width of your three middle fingers held at arm's length).

To find the constellation draw an imaginary line diagonally from Rigel past Betelgeuse in the constellation Orion about a distance equal to the separation of these two bright stars. This will land you smack in the middle of Gemini. In March and April, the constellation lies still well above the western horizon in the early evening hours.

According to Greek mythology, the stars Castor and Pollux take their names from two sons of Zeus who together were known as the Dioscuri. Pollux was a boxer, and Castor a horseman and fierce warrior. The brothers proved their courage by joining Jason and his Argonauts on his quest for the Golden Fleece, among other adventures. Upon returning, Castor and Pollux met their fate during more sordid matters, falling into a murderous grievance with another pair of twins, Idas and Lynceus over rustled cattle. Castor was killed by Lynceus, who was in turn slain by Pollux.

... Castor and Pollux

Pollux grieved for his fallen brother and asked Zeus if the two could share immortality. It pays to have a powerful father: Zeus placed both in the sky as the constellation Gemini.

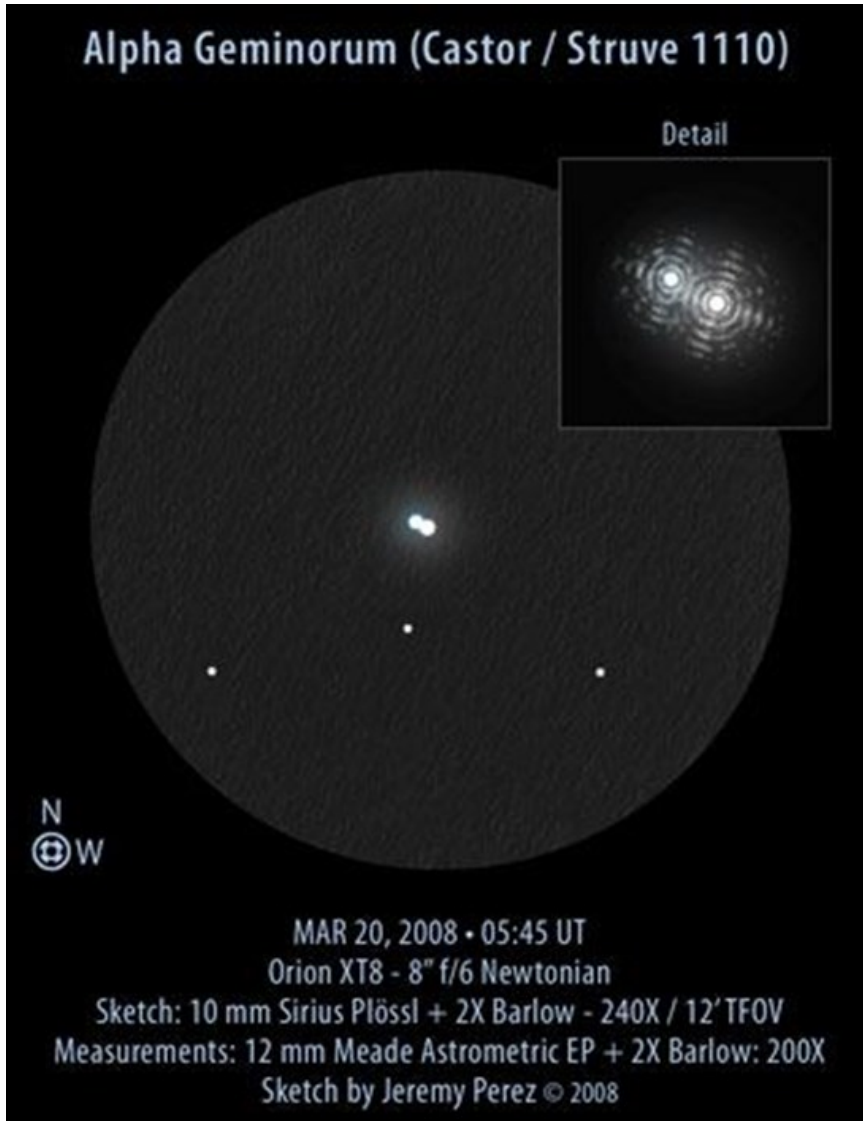


Gemini constellation in a star atlas by Johannes Hevelius, circa 1690.

The brightest star in Gemini, yellow-orange Pollux, makes a lovely color contrast with Castor. If you get these stars confused, as I did for years, simply remember that Castor is closest to Capella.

In a small telescope at 80x or more, Castor resolves into two bright stars. The brighter "A" component lies some 4" from the slightly fainter "B" component. These stars revolve about their common center of mass every 400 years. In 100 years, the stars will increase their apparent separation to about 6". At their closest, the two stars lie only 1.8" apart. Castor A and B are blue-white stars only 45 light-years from the Sun.

... Castor and Pollux



There is a third star in the Castor system: about 72" to the south, you'll see a much fainter red-orange companion in your field of view. This 9th-magnitude third (or "C") component is a small star, much smaller than our Sun, that revolves around the two primary stars every 10,000 years or so.

Each of the three stars in the Castor system is itself a double star... so there are six stars here in all. Castor A and B each have reddish companion stars that hurtle around their brighter primary stars every 9 days. And the fainter C-component has another red-orange companion less than 2 million miles away; the stars revolve around each other in less than 24 hours.

The close companions of Castor A, B, and C are far too close to resolve directly in any telescope, but they can be discerned by skilled astronomers through the motion of their spectra as they move around their brighter companions.



At The Eyepiece

April 2017 by Ray Field

THE MOON is first Quarter on the 3rd, FULL on the 11th, Last Quarter on the 19th and NEW on the 26th. The Moon is furthest from the Earth on the 15th and nearest on the 27th.

The Moon is near M44, the prominent, naked eye and binocular open cluster in Cancer on the 5th, Jupiter on the 11th, and Saturn on the 16th.

MERCURY is between the Earth and the Sun on the 20th when it is too close to the Sun to be seen. It may be glimpsed low over the western horizon in the twilight after sunset at the start of the month and also before sunrise at the end of the month.

VENUS is the brilliant morning star this month. In a telescope it will look like a thin crescent. The Moon is near Venus on the 23rd and 24th.

MARS is near the Pleiades on the 21st and sets about an hour after the Sun. The Moon is near Mars on the 28th. Mars is not well placed for telescopic viewing this month.

JUPITER, in Virgo, is at opposition on the 7th and will be visible nearly all night this month. This will be a good month to observe Jupiter as it will be nearer the Earth at opposition. In a telescope you can see its 4 biggest moons change their positions from hour to hour as they go around their giant planet. Page 23 of SKY GUIDE shows their movements for the month. The Moon will be near Jupiter on the 11th.

SATURN, above the "Teapot" asterism in Sagittarius, looks like a fairly bright "star" to the naked eye. Its lovely ring system and brightest moon Titan are visible in a modest telescope. The Moon is near Saturn on the 16th and 17th.

URANUS, in Pisces, is too near the Sun for observation this month.

NEPTUNE, in Aquarius, is too faint to be seen with the naked eye and is in the morning sky.

COMET C/2015 ER61 (PanSTARRS) should be visible in binoculars in the morning sky this month. (per ASSA SKY GUIDE, which has a map of its path on page 23). Starting off in Capricornus it moves into Aquarius, Capricornus, Aquarius and then Pisces.

METEOR SHOWERS. 4 Meteor Showers are active this month under good or favourable observing conditions. They are (1) THE DELTA PAVONIDS, maximum April 06, ZHR 05 and it is a morning shower, (2) APRIL LYRIDS, maximum April 22, ZHR 15, and it is a morning shower with a northerly radiant, (3) THE PI PUPPIDS, maximum April 23, ZHR <05, and it is an evening shower and (4) THE ETA AQUARIDS, maximum 05 May, ZHR 60, and it is a morning shower.

Pages 86 and 87 of SKY GUIDE have more information on meteors.

... At The Eyepiece



THE STARRY SKY IN APRIL

The bright star ACHERNAR is setting in the SW and THE SOUTHERN CROSS is rising over the SE in the early evening. Nestling below the foot of the Cross is the small constellation of MUSCA, the Fly. The long arm of the Southern Cross points across the sky to the small Quadrilateral of CORVUS, the Crow.

The bright star CANOPUS lies to the right of the Southern Cross with the "THREE CROSSES REGION" in between. This region contains the interesting star ETA CARINA, which was as bright as CANOPUS in the 1800's. SCORPIUS followed by SAGITTARIUS is rising over the SE.

ORION is getting lower over the NW, whilst SIRIUS, in CANES MAJOR, is still almost overhead. LEO, over the NE and the faint constellation of CANCER, the Crab with its big open cluster M44 (known as the BEEHIVE) are over the North. Some of the brighter DEEP SKY objects to look at with a telescope are OMEGA CENTAURI, a globular cluster, THE JEWEL BOX, a bright open cluster near Beta Centauri of the Southern Cross and the ORION NEBULA M41 in the sword of Orion.

REFERENCES include: ASSA SKY GUIDE Africa South 2017, Norton's Star Atlas 2000, Philip's Planisphere for 35 deg. S., Stars of the Southern Sky by Sir Patrick Moore and Star Watching by Anthony Fairall.

The Cover Image - Centaurus A

Image by John Gill, Text from Sky Portal



Centaurus A, also known as NGC 5128, is a peculiar lenticular galaxy in the constellation Centaurus, which appears to be an elliptical galaxy with a huge superimposed dust lane. It is one of the closest radio galaxies, and its active galactic nucleus has been extensively studied.

Discovery and Identity

NGC 5128 was discovered by James Dunlop on August 4, 1826. John Herschel was next to see it, from South Africa in 1834; he cataloged it as h 3501, which became GC 3525 in his General Catalogue of 1864, and NGC 5128 in J. L. E. Dreyer's New General Catalog. Herschel was first to note this galaxy's peculiarity, in 1847.

Halton Arp included NGC 5128 in his 1966 Atlas of Peculiar Galaxies as one of the best examples of a "disturbed" galaxy with dust absorption.

Amateur Observation

Centaurus A appears approximately 4° north of the naked-eye globular cluster Omega Centauri. At magnitude 7.0, this galaxy is the fifth brightest in the sky, making it ideal for observation, although it is only visible from the southern hemisphere and low northern latitudes. Centaurus A has been spotted with the naked eye by expert observers under very good conditions. The bright central bulge and dark dust lane are visible in finderscopes and large binoculars, and additional structure may be seen in larger telescopes.

NGC 5128 is a "lenticular" galaxy, of intermediate type between elliptical and disk (spiral) galaxies. Its main body has all characteristics of a large elliptical, but a pronounced dust belt is superimposed over the center, forming a disk plane around this galaxy.

The only supernova discovered in Centaurus A so far is SN 1986G, a Type Ia event that reached mag 12.5 in May, 1986.

Properties and Evolution

Centaurus A is located about 11 million light-years away, at the center of one of two subgroups within the Centaurus A/M83 Group. Messier 83 (the Southern Pinwheel Galaxy) is at the center of the other subgroup. These two groups are sometimes identified as one, since the galaxies around Centaurus A and the galaxies around M 83 are physically close to each other, and both subgroups appear to be stationary relative to each other. The Centaurus A/M83 Group is part of the Virgo Supercluster.

... Centaurus A

NGC 5128's strange morphology is the result of a merger between two smaller galaxies. The bulge of Centaurus A is comprised mainly of evolved red stars. Its dusty disk, however, has been the site of more recent star formation; over 100 star formation regions have been identified in the disk. As observed in other such "starburst" galaxies, a collision is responsible for the intense star formation. Scientists using the Spitzer Space Telescope have confirmed that Centaurus A is an elliptical galaxy going through a collision, devouring a spiral.

In the radio part of the spectrum, Centaurus A exhibits two vast regions of radio emission, running along the polar axis of NGC 5128's disk and extending hundreds of light years in both directions. A relativistic jet from what is believed to be a supermassive black hole at the center of the galaxy is responsible for emissions in the X-ray and radio wavelengths.

Radio observations of the jet indicate that the inner parts of the jet are moving at about 1/2 the speed of light. X-rays are produced farther out, as the jet collides with surrounding gases, creating highly energetic particles.

Tech Specs

Imaged from Durban on 28 February 2017

Celestron 8" EdgeHD on AVX mount and Canon 600d camera

Auto-Guiding by ZWO Optics

60 Lights @ ISO 800 for 30 seconds

30 Bias & Flats and 10 Darks

Processed with PixInsight



Not So Ancient Astronomers - James Webb

From Wikipedia, the free encyclopedia

Administrator of the National Aeronautics and Space Administration

	In office
	February 14, 1961 – October 7, 1968
President	John F. Kennedy Lyndon Johnson
Deputy	Hugh Dryden Robert Seamans Thomas O. Paine
Preceded by	Hugh Dryden (Acting)
Succeeded by	Thomas O. Paine

United States Under Secretary of State

	In office
	January 28, 1949 – February 29, 1952
President	Harry S. Truman
Preceded by	Robert A. Lovett
Succeeded by	David Bruce

Director of the Bureau of the Budget

	In office
	July 13, 1946 – January 27, 1949
President	Harry S. Truman
Preceded by	Harold D. Smith
Succeeded by	Frank Pace

Personal details

Born	James Edwin Webb October 7, 1906 Tally Ho, North Carolina, U.S. (now Stem)
Died	March 27, 1992 (aged 85) Washington, D.C., U.S.
Resting place	Arlington National Cemetery
Political party	Democratic
Education	University of North Carolina, Chapel Hill (BA) George Washington University (LLB)

Military service

Allegiance	 United States
Service/branch	 United States Marine Corps
Years of service	1930–1932 1944–1945
Rank	 Lieutenant Colonel

... James Webb



James Edwin Webb (October 7, 1906 – March 27, 1992) was an American government official who served as the second administrator of NASA from February 14, 1961 to October 7, 1968.

Webb oversaw NASA from the beginning of the Kennedy administration through the end of the Johnson administration, thus overseeing all the critical first manned launches in the Mercury through Gemini programs, until just before the first manned Apollo flight. He also dealt with the Apollo 1 fire.

In 2002, a planned space telescope, originally called the Next Generation Space Telescope (NGST), was renamed the James Webb Space Telescope as a tribute to Webb.

Biography

Early years

Webb was born in the hamlet of Tally Ho in Granville County, North Carolina. His father was superintendent of the Granville County public schools. He completed his college education at the University of North Carolina at Chapel Hill,

where he received an A.B. degree in education in 1928. He was a member of the Acacia Fraternity. Webb became a second lieutenant in the United States Marine Corps, and he served as a Marine Corps pilot on active duty in 1930–32. Webb then studied law at The George Washington University Law School where he received a J.D. degree in 1936. In the same year he was admitted to the Bar of the District of Columbia.

Career

Webb began his long career in public service in Washington, D.C. by serving as secretary to US Rep. Edward W. Pou of North Carolina in 1932–34. Pou was chairman of the Rules Committee and Dean of the House. With Webb's assistance, Pou was influential in pushing through the first legislation of Franklin Roosevelt's New Deal during the first hundred days of Roosevelt's term. In addition to his secretarial duties, Webb provided physical assistance to the aging and ailing Pou.

He next served as an assistant in the office of O. Max Gardner, an attorney, former governor of North Carolina and friend of President Roosevelt, in 1934–36. Gardner supported Webb in finishing his law degree.

During the Air Mail scandal of 1934, the government halted the carrying of airmail by private airline companies. A group of airline executives led by the Thomas Morgan, the President of the Sperry Gyroscope Company in Brooklyn, New York, hired Gardner's firm to represent them. The successful resolution resulted in the resumption of contracts to private airlines. As a result of their interactions, Morgan hired Webb as the personnel director and assistant to the President of Sperry. Between 1936 and 1944, Webb became the secretary-treasurer and later the vice president of Sperry. During his tenure, Sperry expanded from 800 employees to more than 33,000 and became a major supplier of navigation equipment and airborne radar systems during World War II.

... James Webb

Although he wished to re-enlist in the Marines at the start of the war, he was deferred because of the importance of his work at Sperry to the war effort. By 1944, however, he was allowed to re-enlist in the Marines, where he became the commanding officer, First Marine Air Warning Group, 9th Marine Aircraft Wing, first as a captain and later as a major. He was put in charge of a radar program for the invasion of the Japanese mainland. He had orders to leave for Japan on August 14, 1945, but his orders were delayed, and the Surrender of Japan on September 2, 1945 meant that he did not see combat.

Budget Bureau

After World War II, Webb returned to Washington and served as executive assistant to O. Max Gardner, by then the Undersecretary of the Treasury, for a short while before being named as the director of the Bureau of the Budget in the Office of the President of the United States, a position that he held until 1949. Webb was recommended for the appointment to Truman by Gardner and Treasury Secretary John Snyder. During the appointment announcement, Truman forgot Webb's name and had to look it up. Because of Webb's association with the Treasury Department, his appointment was seen as subordinating the BoB to the Treasury. His appointment surprised Webb, who had not been told of the final decision to appoint him.

The Bureau of the Budget prepared the President's proposed budget each year for presentation to Congress. Truman's objective for the budget was to bring it to balance after the large expenditures of World War II.

State Department

President Harry S. Truman next nominated Webb to serve as an undersecretary of state in the U.S. Department of State, a position he began in January, 1949. Webb's first assignment from Secretary Dean Acheson was to reorganize the Department, adding 12 new Presidential appointees and reducing the power of subordinate officers. Webb also consolidated the flow of foreign policy information and intelligence through the secretariat. When the new organization became law in June 1949, the Department, which had been losing power and influence to the military, strengthened its ties to the President.

Webb joined the State Department during the Era of McCarthy, and the Department was under considerable pressure from Congress to root out Communists, Anarchists and others deemed Un-American and a security risk. Webb met with Truman in 1950 to discuss the administration's response to the Congressional hearings. Webb testified to a Senate committee that most of the people removed from the government for moral turpitude were homosexuals. Although the White House was not politically able to quell the Congressional fervor, they implemented a strategy to emphasize the medical aspects and downplay the security concerns of homosexuals in government.

One of the biggest questions facing the Department of State at the time was whether the Soviet Union could be contained through diplomatic means or whether the military would be needed. Paul Nitze, as Director of Policy Planning, wrote a classified memo, NSC-68 that argued for a military build-up of NATO forces. Although Secretary of Defense Louis A. Johnson opposed an increase in the Defense budget, Webb got Truman to convince him to support the recommendations of NSC-68.

On Sunday, 25 June 1950, the North Korean Army invaded South Korea. Webb and Secretary Acheson and devised three recommendations: involve the United Nations, send the Navy Pacific Fleet into the Yellow Sea, and authorize an Air Force strike on the Korean tanks. Truman implemented the first two recommendations immediately, but delayed the use of force by several days. The Defense Department was blamed for lack of US preparedness, and Johnson tried to blame Acheson. Webb worked with his contacts in Congress and others to convince Truman to replace Johnson, and George Marshall was called out of retirement to become the new Secretary of Defense.

... James Webb

Pursuing his scientific interest, Webb sought to increase the propaganda role in the US-USSR conflict. He set up an alliance with university scientists called Project Troy to study radio propagation behind the iron curtain.

With the attention of the Department focused on the Korean War, Webb's influence weakened. As the author of NSC-68, Paul Nitze became the principal advisor to Secretary Acheson, and a misunderstanding between Webb and Nitze led to Nitze outwardly calling for Webb's resignation. Although the rift blew over, Webb started suffering from migraine headaches, and resigned in February 1952.

Webb left Washington for a position in the Kerr-McGee Oil Corp. in Oklahoma City, but he was still active in government circles, for instance serving on the Draper Committee in 1958.

NASA

On February 14, 1961, Webb accepted President John F. Kennedy's appointment as Administrator of NASA. Webb directed NASA's undertaking of the goal set by Kennedy of landing an American on the Moon before the end of the 1960s through the Apollo program.



Webb presents NASA's Group Achievement Award to Kennedy Space Center Director Kurt H. Debus, while Wernher von Braun (center) looks on.

Webb, Vice President Lyndon Johnson, Kurt Debus, and President John F. Kennedy receive a briefing on Saturn I launch operations during a tour of Launch Complex 34, September 1962.



For seven years after Kennedy's May 25, 1961 announcement of the goal of a manned lunar landing, through October 1968, Webb lobbied for support for NASA in Congress.

As a longtime Washington insider, and with the backing of President Lyndon B. Johnson, he was able to produce continued support and resources for Apollo. During his administration, NASA developed from a loose collection of research centers into a coordinated organization. Webb had a key role in creating the Manned Spacecraft Center, later, the Johnson Space Center, in Houston, Texas. Despite the pressures to focus on the Apollo program, Webb ensured that NASA carried out a program of planetary exploration with the Mariner and Pioneer space programs.

... James Webb

After the Apollo 1 accident in 1967, Webb told the media, "We've always known that something like this was going to happen sooner or later. ... Who would have thought that the first tragedy would be on the ground?" Webb went to President Johnson and asked that NASA be allowed to handle the accident investigation, and to direct its recovery, according to a procedure established following the in-flight accident on Gemini 8. He promised to be truthful in assessing blame, and he pledged to assign that to himself and NASA management, as appropriate. The agency set out to discover the details of the tragedy, to correct problems, and to continue progress toward the Apollo 11 lunar landing.

Webb reported the investigation board's findings to various congressional committees, and he took a personal grilling at nearly every meeting. Whether by happenstance or by design, Webb managed to deflect some of the backlash over the accident away from both NASA as an agency and from the Johnson administration. As a result, NASA's image and popular support were largely undamaged.

Webb was a Democrat tied closely to Johnson, however, and with Johnson choosing not to run for reelection, he decided to step down as administrator to allow the next president, Republican Richard M. Nixon, to choose his own administrator.

Webb was informed by CIA sources in 1968 that the Soviet Union was developing its own heavy N1 rocket for a manned lunar mission, and he directed NASA to prepare Apollo 8 for a possible lunar orbital mission that year. At the time Webb's assertions about the Soviet Union's abilities were doubted by some people, and the N-1 was dubbed "Webb's Giant".^[15] However, later revelations about the Soviet Moonshot – after the collapse of the USSR – have given support to Webb's conclusion. Webb left NASA in October 1968, just before the first manned flight in the Apollo program.



In 1969, Webb was presented with the Presidential Medal of Freedom by President Johnson. He is a 1976 recipient of the Langley Gold Medal from the Smithsonian Institution.

Personal life

After retiring from NASA, Webb remained in Washington, D.C., serving on several advisory boards, including serving as a regent of the Smithsonian Institution. In 1981, he was awarded the Sylvanus Thayer Award by the United States Military Academy at West Point for his dedication to his country.

Webb was married to Patsy Aiken Douglas in 1938, and they had two children: Sarah Gorham Webb (b. 1945), and James Edwin Webb, Jr. (b. 1947).

Webb died in 1992, and was buried in Arlington National Cemetery.

Legacy

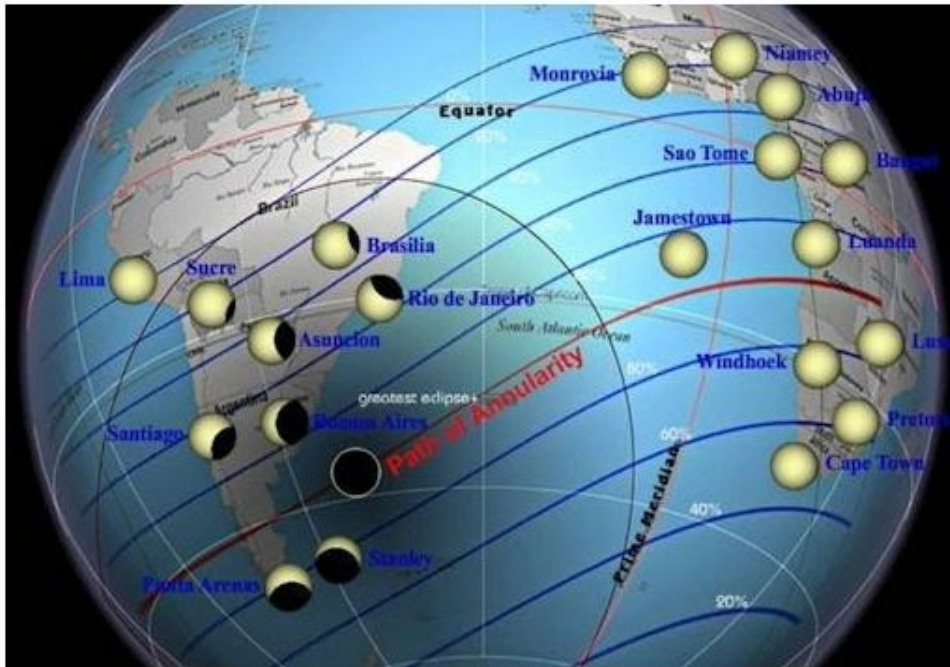
Webb was played by Dan Lauria in the 1998 miniseries, *From the Earth to the Moon*.

Webb was played by Ken Strunk in the 2016 film, *Hidden Figures*.

NASA's planned James Webb Space Telescope was renamed in Webb's honor in 2002. This telescope, to be launched in October 2018, is referred to as "the Hubble successor".

Ring of Fire - Solar Eclipse

Something strange is about to happen to sunbeams in the southern hemisphere. On Sunday, Feb. 26th, the Moon will pass directly in front of the sun, covering as much as 99% of the solar disk. This will turn the sun into a "ring of fire" over parts of South America and Africa. Crescent-shaped sunbeams and thin rings of light will dance across the ground of more than a dozen countries. Visit Spaceweather.com for more information and photos.



ASTRONOMY

THE SECRETS OF THE UNIVERSE

Term of the Day...

T Tauri Stars

Field: Stellar Classification

T Tauri stars are type of variable stars that change their brightness periodically. These stars are quite young. Infact they have not even started nuclear fusion in their core. Such stars are known as pre main sequence stars. They're still undergoing gravitational contraction. These stars will have to wait for 100 million years before their core gets hot enough to sustain nuclear fusion. The period of rotation is between 1-12 days.

Photometry

Photometry is a technique of astronomy concerned with measuring the flux, or intensity of an astronomical object's electromagnetic radiation. When photometry is performed over broad wavelength bands of radiation, where not only the amount of radiation but also its spectral distribution is measured, the term *spectrophotometry* is used. The word is composed of the Greek affixes *photo-* ("light") and *-metry* ("measure").

Methods

The methods used to perform photometry depend on the wavelength regime under study. At its most basic, photometry is conducted by gathering light in a telescope, sometimes passing it through specialized photometric optical bandpass filters, and then capturing and recording the light energy with a photosensitive instrument. Standard sets of passbands (called a photometric system) are defined to allow accurate comparison of observations.

Historically, photometry in the near-infrared through long-wavelength ultra-violet was done with a photoelectric photometer, an instrument that measured the light intensity of a single object by directing its light onto a photosensitive cell. These have largely been replaced with CCD cameras that can simultaneously image multiple objects, although photoelectric photometers are still used in special situations, such as where fine time resolution is required.

CCD photometry

A CCD camera is essentially a grid of photometers, simultaneously measuring and recording the photons coming from all the sources in the field of view. Because each CCD image records the photometry of multiple objects at once, various forms of photometric extraction can be performed on the recorded data; typically relative, absolute, and differential. All three will require the extraction of the raw image magnitude of the target object, and a known comparison object. The observed signal from an object will typically cover many pixels according to the point spread function (PSF) of the system. This broadening is due to both the optics in the telescope and the astronomical seeing.

When obtaining photometry from a point source, the flux is measured by summing all the light recorded from the object and subtract the light due to the sky. The simplest technique, known as aperture photometry, consists of summing the pixel counts within an aperture centered on the object and subtracting the product of the nearby average sky count per pixel and the number of pixels within the aperture. This will result in the raw flux value of the target object. When doing photometry in a very crowded field, such as a globular cluster, where the profiles of stars overlap significantly, one must use de-blending techniques, such as PSF fitting to determine the individual flux values of the overlapping sources.

Calibrations

After determining the flux of an object in counts, the flux is normally converted into instrumental magnitude. Then, the measurement is calibrated in some way. Which calibrations are used will depend in part on what type of photometry is being done. Typically, observations are processed for relative, or differential photometry. Relative photometry is the measurement of the apparent brightness of multiple objects relative to each other.

Absolute photometry is the measurement of the apparent brightness of an object on a standard photometric system; these measurements can be compared with other absolute photometric measurements obtained with different telescopes or instruments. Differential photometry is the measurement of the difference in brightness of two objects. In most cases, differential photometry can be done with the highest precision, while absolute photometry is the most difficult to do with high precision. Also, accurate photometry is usually more difficult when the apparent brightness of the object is fainter.

... Photometry

Absolute photometry

To perform absolute photometry one must correct for differences between the effective passband through which an object is observed and the passband used to define the standard photometric system. This is often in addition to all of the other corrections discussed above. Typically this correction is done by observing the object(s) of interest through multiple filters and also observing a number of photometric standard stars. If the standard stars cannot be observed simultaneously with the target(s), this correction must be done under photometric conditions, when the sky is cloudless and the extinction is a simple function of the air mass.

Relative photometry

To perform relative photometry, one compares the instrument magnitude of the object to a known comparison object, and then corrects the measurements for spatial variations in the sensitivity of the instrument and the atmospheric extinction. This is often in addition to correcting for their temporal variations, particularly when the objects being compared are too far apart on the sky to be observed simultaneously. When doing the calibration from an image that contains both the target and comparison objects in close proximity, and using a photometric filter that matches the catalog magnitude of the comparison object most of the measurement variations decrease to null.

Differential photometry

Differential photometry is the simplest of the calibrations and most useful for time series observations. When using CCD photometry, both the target and comparison objects are observed at the same time, with the same filters, using the same instrument, and viewed through the same optical path. Most of the observational variables drop out and the differential magnitude is simply the difference between the instrument magnitude of the target object and the comparison object ($\Delta\text{Mag} = \text{C Mag} - \text{T Mag}$). This is very useful when plotting the change in magnitude over time of a target object, and is usually compiled into a light curve.

Applications

Photometric measurements can be combined with the inverse-square law to determine the luminosity of an object if its distance can be determined, or its distance if its luminosity is known. Other physical properties of an object, such as its temperature or chemical composition, may be determined via broad or narrow-band spectrophotometry. Typically photometric measurements of multiple objects obtained through two filters are plotted on a color-magnitude diagram, which for stars is the observed version of the Hertzsprung-Russell diagram. Photometry is also used to study the light variations of objects such as variable stars, minor planets, active galactic nuclei and supernovae, or to detect transiting extrasolar planets. Measurements of these variations can be used, for example, to determine the orbital period and the radii of the members of an eclipsing binary star system, the rotation period of a minor planet or a star, or the total energy output of a supernova.

Software

A number of free computer programs are available for synthetic aperture photometry and PSF-fitting photometry. SExtractor (www.astromatic.net/software/sextractor) and Aperture Photometry Tool (www.aperturephotometry.org) are popular examples for aperture photometry. The former is geared towards reduction of large scale galaxy-survey data, and the latter has a graphical user interface (GUI) suitable for studying individual images. DAOPHOT is recognized as the best software for PSF-fitting photometry.

... Photometry

Organizations

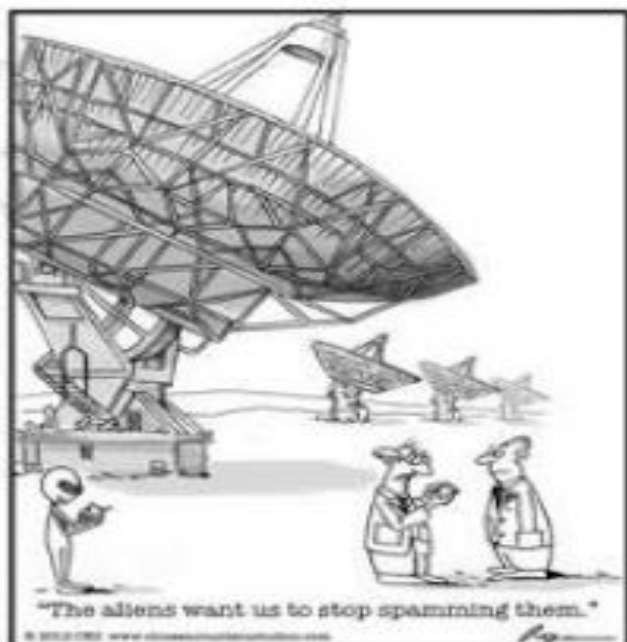
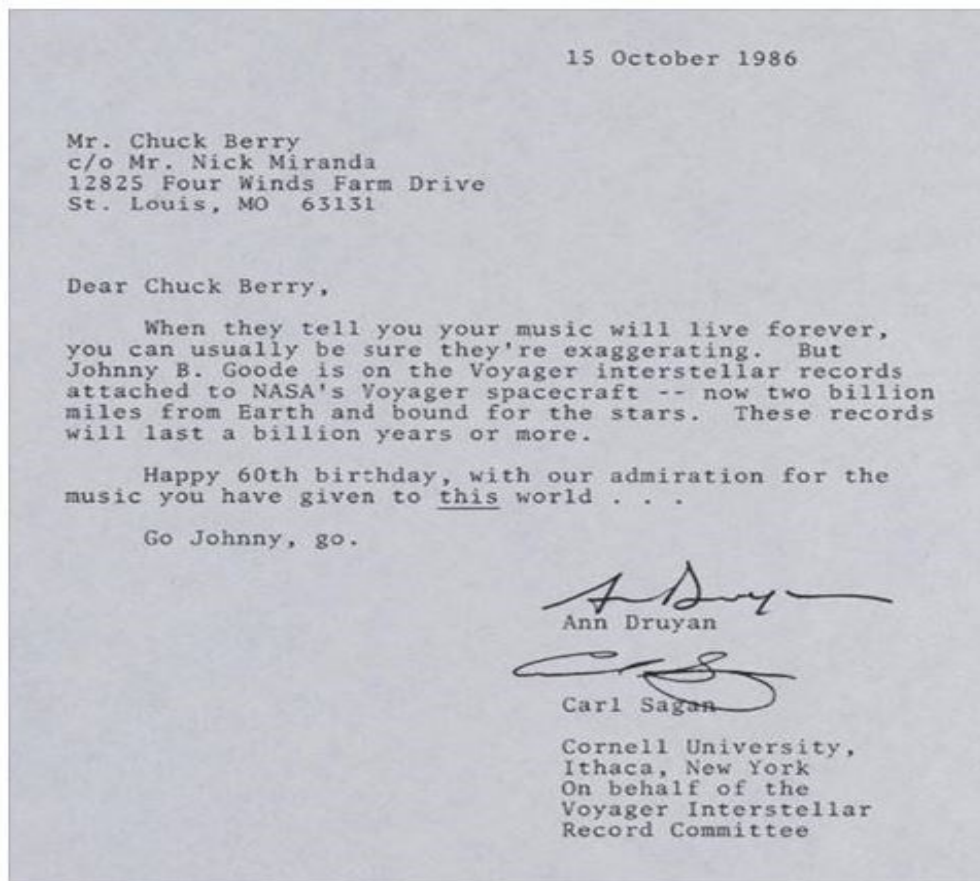
There are a number of organizations, from professional to amateur, that gather and share photometric data and make it available on-line. Some sites gather the data primarily as a resource for other researchers (e.x. AAVSO) and some solicit contributions of data for their own research (i.e. CBA):

American Association of Variable Star Observers (AAVSO). www.aavso.org

Center for Backyard Astrophysics (CBA). www.cbastro.org

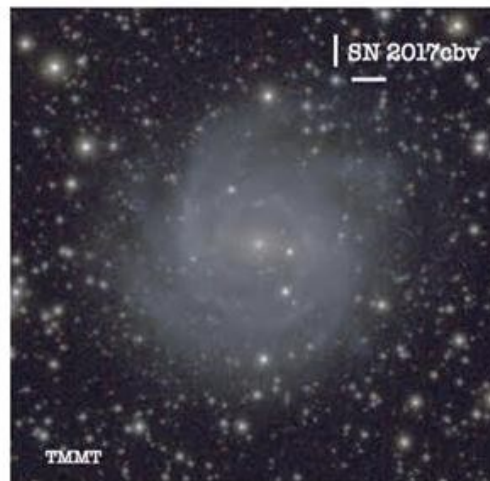
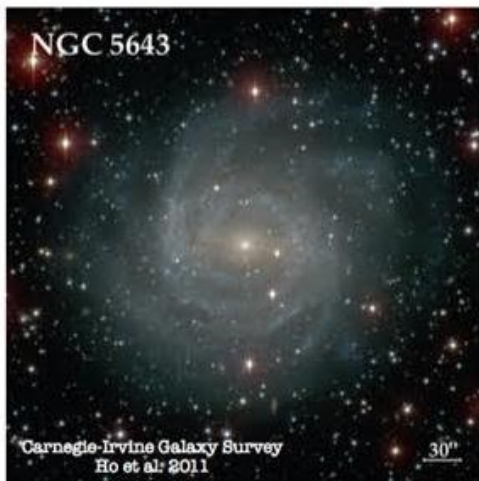
Digital-SF Cataclysmic Variable Database (DSF-Wiki) www.digial-sf.com/dsf-wiki

Astronomyonlin.org. <http://astronomyonline.org/Exoplanets/AmateurDetection.asp>



Supernova in NGC 5643

By Alison Klesman



Meet “Bob,” the second Type Ia supernova in the galaxy since 2013

Racheal Beaton / Carnegie Institution for Science

When most people hear the word supernova, they envision a massive star reaching the end of its life and exploding outwards to leave a ghostly remnant in its place. This is called a Type II supernova — the spectacular Supernova 1987A, which recently celebrated its 30th anniversary, was a Type II.

Alternatively, a Type Ia supernova occurs when a white dwarf, the remnant of a Sun-like star, grows too massive after stripping a binary companion star of its outer layers. When the white dwarf reaches a critical mass, a runaway fusion reaction occurs in its core and the star explodes in a Type Ia supernova. Such a supernova has just been spotted occurring in a galaxy about 55 million light-years away.

The supernova which was officially announced via Astronomer's Telegram after an excited tweet by Rachael Beaton at the Observatories of the Carnegie Institution for Science in Pasadena, CA, and known as 2017cbv (though Beaton has nicknamed it Bob), the explosion was spotted in NGC 5643, a spiral galaxy in the constellation Lupus. The area of the sky it inhabits is also part of the area covered by the Carnegie-Irvine Galaxy Survey, a project aimed at gathering optical and near-infrared images of bright Southern Hemisphere galaxies. NGC 5643 was also the home galaxy of SN 2013aa, which occurred in early 2013.

Type Ia supernovae play an extremely important role as rungs on the astronomical distance ladder that allows astronomers to measure the distance to faraway galaxies. They've also played a critical role in measuring the accelerating expansion of the universe. Because they occur in white dwarfs of exactly the same mass every time (that critical mass mentioned earlier: about 1.4 times the mass of the Sun), Type Ia supernovae are always the same brightness, which means astronomers can use them as standard candles. Knowing how bright the explosion is in terms of absolute luminosity allows astronomers to then work backwards to calculate the distance to the object based on how bright it appears.

But the word “exactly” is perhaps a bit misleading. Not every star system in which a Type Ia supernova occurs can be exactly the same. Moreover, events in the real world do not always reflect the precise nature of theoretical calculations — as in, some white dwarfs might explode at a mass slightly under 1.4 solar masses, while others might grow a little heavier than this limit before exploding. The fact that 2017cbv is the second recorded Type Ia supernova to occur in NGC 5643 is thus extremely valuable. By comparing the distance to the galaxy as calculated from each supernova, astronomers can better characterize the real-world variance in supernova Type Ia magnitudes that occur, which in turn will improve the accuracy of using these events to measure distance.

... Supernova



Imaged by John Gill - 20 March 2017

Celestron 8"EdgeHD on AVX mount and Canon 600d

ZWO Optics Autoguiding Processed in Pixinsight

20 Lights @ ISO 800 for 120 sec 30 Bias & Flats 10 Darks



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For more information contact:
Contact Peter on 084 4021 107
email: petergd@tiscali.co.za

A Little Cluster in the Big Dog

By Brian Ventrudo

The constellation Canis Majoris, the 'Big Dog', is home to many fine open clusters of blue-white stars along the stubby Orion Arm of the Milky Way. There are some real gems here, including the modest but delightful open star cluster NGC 2362, a group that hosts some of the youngest-known stars. Centered on the bright star τ (tau) Canis Majoris, this cluster, in a telescope, looks like a large diamond set among many smaller blue-white gems.

Here's how to find and enjoy this little star cluster, along with a fine double star just to the north that too few stargazers seem to know about...

With a diameter of 8 light years, NGC 2362 is about the same size as the Pleiades cluster. But it's about 4,500 light years away, some ten times farther than the Pleiades, so it's much fainter and spans just 1/4 degree of sky. Still, this cluster is fairly easy to find, at least with a finder scope or pair of binoculars. Look for a triangle of bright stars to the southeast of Sirius. These stars are Wezen, Aludra, and Aldhara in the 'hindquarter' of the Big Dog. NGC 2362 is 3° northeast of the northernmost star, Wezen.

In binoculars or finder scope, NGC 2362 looks like a fuzzy appendage to the 4th-magnitude star τ CMa. A small telescope at 50-60x resolves the cluster into about two dozen glittering blue-white suns. At 100x, the cluster expands into a beautiful array of stars arranged in a distinct pyramidal pattern.

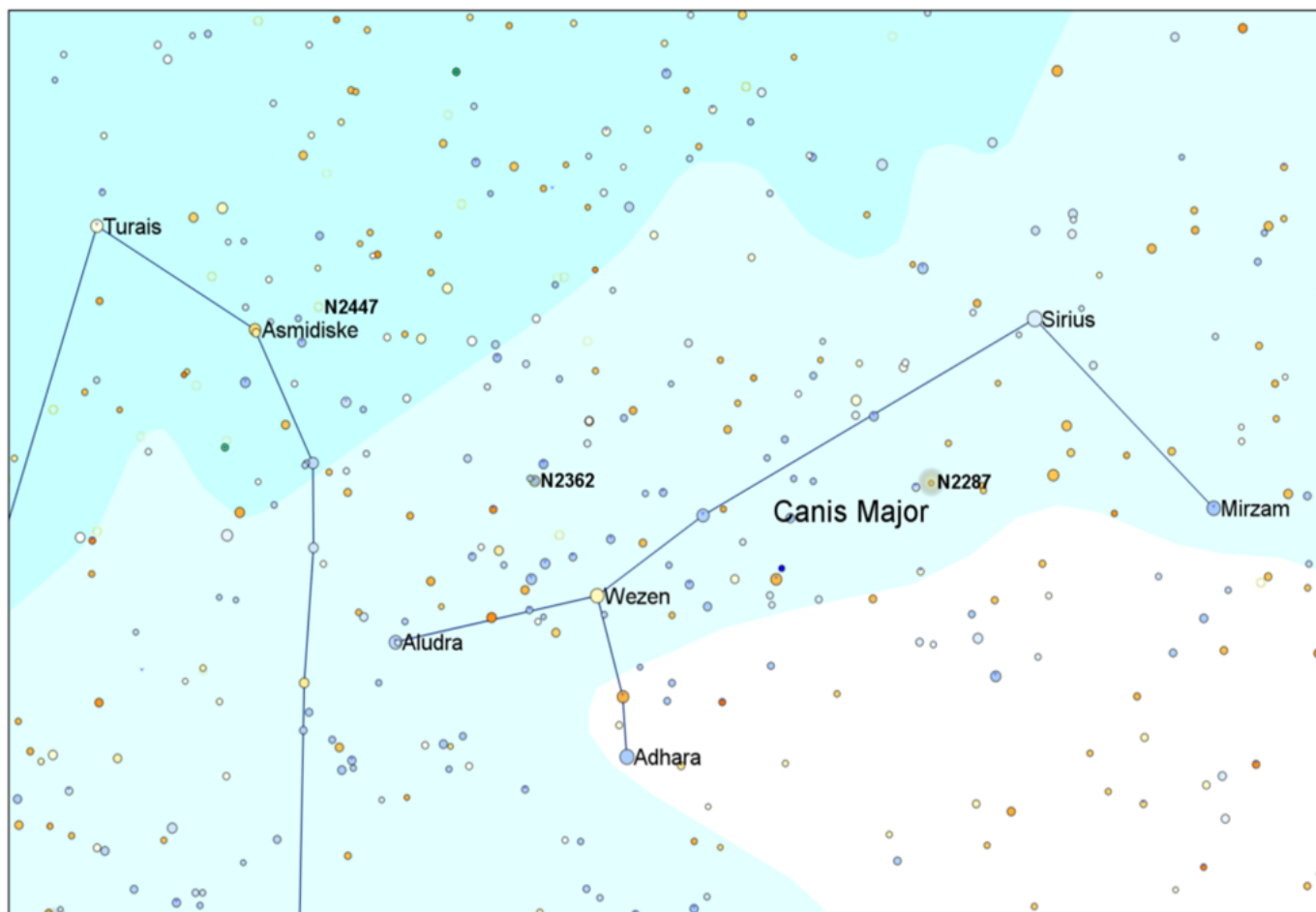


Tech Specs: Imaged by John Gill from Durban on 30 October 2015.

Celestron 8"EdgeHD on AVX mount and Canon 600d

30 Lights @ ISO 1600 for 30 seconds, 15 Bias & Darks and 20 Flats. Processed in PixInsight

... Cluster in the Big Dog



The location of NGC 2362— shown here as N2362— in the constellation Canis Major

Most of the stars you see in NGC 2362 are massive blue-white O and B stars, all of which are 1000-1500x brighter in real terms than our Sun. Because of their mass, O and B stars evolve quickly into red supergiants as they furiously burn through their store of fuel. But as you can see for yourself, there are few red supergiants in NGC 2362 which means it's likely a very young cluster... less than 5 million years old.

In fact, astronomers have used the Chandra X-Ray space telescope to determine many stars in NGC 2362 are still surrounded by primordial disks of gas and dust that fall onto the central stars as they settle down into stellar middle age.

Because of its mass and greater gravitational pull, this pleasant-looking cluster will hold itself together longer than the Pleiades before its stars disperse into the galaxy. Like many stars in this part of the sky, several members of NGC 2362 will one day detonate as supernovae, each putting on a fleeting but spectacular show in our skies in the coming millennia.

And here's a bonus object... just north of NGC 2362, you'll find a fine double star that's sometimes called "the Winter Albireo". Known as Herschel 3945 (or h3945), this binary has reddish and yellow-white components that look lovely in a telescope. Although this star is visually fainter than the real Albireo—the components are magnitude 5.0 and 5.8—its proximity to NGC 2362 makes it easy to find.

The Month Ahead

MEETINGS:

The next meeting will be on Wednesday 12 April @ 19:30

MNASSA:

Monthly Notes of the Astronomical Society of Southern Africa. Go to www.mnassa.org.za to download your free monthly copy.

MEMBERSHIP FEES:

Members - R 145 Family Membership - R 160 Joining Fee - R 35

Payment by cheque, made payable to **The Astronomical Society of Southern Africa - Natal Centre** and either posted to:

P O Box 20578, Durban North, 4016 or handed in to the treasurer.

EFT: **The Astronomical Society of Southern Africa - Natal Centre.**

Nedbank Account No. **1352 027 674** Durban North Branch Code **135 226**

Please include your initial and surname in the reference line.

CONTACT US:

Chairman & Observatory: Mike Hadlow (+27) 83 3264 085

Vice Chairlady & Events Co-ordinator: Debbie Abel (+27) 83 3264 084

Secretary: Logan Govender (+27) 83 2286 993

Treasurer: Richard Rowland (+27) 82 9203 377

PR & Publicity: Logan Govender (+27) 83 2286 993

Liason and PR: Sihle Kunene (+27) 83 2788 485

Librarian: Brian Finch (+27) 82 9241 222

Meet & Greet: Logan Naidoo (+27) 83 7772 459

Equipment Curator & Teas: Robert Suberg (+27) 73 2324 092

Public Relations: Sheryl Venter (+27) 82 2022 874

Meet & Greet and School Liaison: Maryanne Jackson (+27) 82 8827 200

'nDaba Editor & Webmaster: John Gill (+27) 83 3788 797

All other contact information is available on our website: www.astronomydurban.co.za



ASSA Durban - Minutes of the General Meeting

8th March 2017

Present: 31 Members and 3 visitors attended.

Apologies: Clinton Armitage, Peter Dormehl, Dave Ellinger, Dr Peter Foster, Jameela Motala, Ayesha Paruk & Anne Wiersma tendered their apologies.

Welcome: Chairman Mike welcomed everyone and extended an invitation to all to the observatory which would be opened for the evening.

Minutes of the Previous Meeting: Proposed for adoption by Maryanne Jackson and seconded by Dr Stuart Hogg and accepted by the meeting.

Matters Arising from the Previous Minutes: The partial solar eclipse on the 26th February was clouded out completely and the viewing had to be cancelled. Daytime viewing of Venus on the 01st March was a great social event but it was not possible to see Venus due to its proximity to the sun.

Treasurer's Report: Richard Rowland reported on the bank balances as follows:

Current Account	R 41 670.00
Savings	R 27 600.00
Telescope Fund	R 51 441.50
Cash on Hand	R 2 000.00

Rock Star Party: Was well supported by the membership. A total of 44 people were expected to attend from ASSA Durban, the Geological Society and The 4 X 4 Club.

Basic Astronomy Course: A beginner's course to be held weekly on a Wednesday evening was to commence on the 05th April. Volunteer models were requested for the photo shoot to advertise the course. Thanks to Dave Ellinger were recorded for volunteering to take the required professional press-quality photographs.

Contributions for MNASA: The Chairman called for contributions to MNASA and highlighted the guidelines for same. ASSA National had announced their intention to hold a symposium in Cape Town in March 2018.

Observatory: Public viewings had to be cancelled due to inclement weather.

The Science Report was done by Debbie Abel and Piet Strauss presented the highlights for the month of March.

Logan Govender presented the main talk on the Celestial Objects visible during March.

The meeting ended at 20:45.

Public Viewing Roster

2016-2017	Phone		Phone	Assistant	Date start	Public viewing	Date end
Mike Hadlow	0833264085	Kira Wisniewski	0741034724	Brian Finch	12/10/16	28/10/16	09/11/16
M Jackson	0828827200	Brian Jackson	0828867100	Debbie Abel	09/11/16	25/11/16	14/12/16
John Visser	0823573091	John Gill	0833788797	Peter Foster	14/12/16	30/12/16	11/01/17
David Ellinger	0837639519	Marcia George	0734288394	Mike Hadlow	11/01/17	27/01/17	08/02/17
Mark Hardie		Kirsty Pirie		Kira Wisniewski	08/02/17	24/02/17	08/03/17
Brian Finch		Debbie Abel	0833264084	Maryanne Jackson	08/03/17	24/03/17	12/04/17
Chanu Chetty		Peter Foster	0826555445	John Gill	12/04/17	28/04/17	10/05/17
Navi Naidoo	0844660001	O Rambilass	0837783931	John Visser	10/05/17	26/05/17	14/06/17
Mike Hadlow	0833264085	Kira Wisniewski	0741034724	Sheryl Venter	14/06/17	23/06/17	12/07/17
M Jackson	0828827200	Brian Jackson	0828867100	-	12/07/17	23/07/17	09/08/17
John Visser	0823573091	John Gill	0833788797	-	09/08/17	18/08/17	13/09/17
David Ellinger	0837639519	Marcia George	0734288394	-	13/09/17	22/09/17	11/10/17
Mark Hardie		Kirsty Pirie		-	11/10/17	20/10/17	08/11/17
Brian Finch		Debbie Abel	0833264084	-	08/11/17	17/11/17	15/12/17
Chanu Chetty		Peter Foster	0826555445	-	13/12/17	15/12/17	10/01/18

ASTRONOMY THE SECRETS OF THE UNIVERSE

Term of the Day...

Spiral Galaxy

Field: Galactic Astronomy

A spiral Galaxy is one of the three types of the galaxies cataloged by Edwin Hubble. A spiral galaxy is known for its spiral arms that extend from the center into the disk of the galaxy. The arms contain hot blue stars of O and B type. These are the brightest & hottest types of stars. Almost all the spiral galaxies contain a supermassive black hole at their center. Milky Way is also a spiral galaxy, the second largest in local group.

Matatane River Lodge

27th April – 1 May 2017

Join us for a rock-star party in the bush.

This is an extra-long weekend, incorporating 2 public holidays: Thursday 27th to Monday 1st (4 nights, 5 days). It is a combined trip inviting the 4 Wheel Drive Club (the bush), the KZN Geological Society (the rocks) and the Durban Branch of the Astronomical Society of Southern Africa (the stars). Dr Riaan Botha will guide geological drives / walks to various interesting geological features in the area while some of the amateur (but very clued up) astronomers will bring their telescopes along for evening viewing. I have already put in the requisition for terrific weather.

It will be new moon on 26th so nice and dark & miles from nowhere; fingers crossed for no cloud. You don't need a telescope to see the stars; eyes and binoculars can do the job too so bring a good pair of binocs (doubles for those birds). Mars and Jupiter will be loitering about then so maybe you'll get to see some of Jupiter's moons.

The rock-star side of things will be very informal – there is no fixed programme and folks are free to come and go, join us or not, cruise the reserve, go game viewing or bird watching, swim, sit under a tree and veg, whatever.

They have 7 open plan chalets – 1 double bed + 2 singles (all in one room) with a bathroom (there is only a curtain as the bathroom door so ideally you need to know the people you are sharing with well). Bed linen is provided – bring own towels. Use the communal kitchen and other facilities. Non-designated camp sites accommodate caravans or tents. There are some electrical connections. You are welcome to camp for shorter periods over the weekend if you can't get away for the full time.

Email bookings to Debbie.Abel@nashuaisp.co.za with your contact number. Once availability of a chalet has been confirmed a 50% deposit secures your booking; deposits paid by 28 February, balance of payment for chalets by 31 March 2017.

Please indicate your intention to camp as soon as possible – if there is a big response from the 3 groups we may need to limit numbers. Full camping fees to be paid by 31 March 2017.

Contact Debbie (cell 083 326 4084) with queries.

All payments made to :

Four Wheel Drive Club of SA

First National Bank

Branch Code 220426

Account No. 62065808150

Reference : Matatane + name

Email proof of payment to

Debbie.Abel@nashuaisp.co.za





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DURBAN

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210 Mazisi Kunene Road (South Ridge Road),
Durban**

Contact Richard Rowland at

Richard@astronomydurban.co.za

Telephone: 082 920 3377

Seats limited to first 50 people

ASSA Symposium 2018

It is planned to have the 11th ASSA Symposium in Auditorium at the SAAO in Cape Town from Friday 9 to Sunday 11 March, 2018. The theme is:

Amateur Astronomy in the Digital Data Age – *how Amateurs can do real Science*

The aim being to try and recreate the link between professional and amateur astronomers. The advance of astronomical technology with large surveys has robbed the amateur community of many of the niche areas where it used to contribute to science: variable and double star work, comet discovery, SNe for example.

Several ASSA members are collaborating with professionals and it is hoped that the ASSA Symposium 2018 will make for new links and understanding by bringing one or two prominent experts to the Symposium with ideas as to where and how amateurs can contribute and collaborate – much of the needed technology is now within reach of the amateur community.

Some examples of this could be:

- monitoring particular objects and/or variable stars
- using robotic telescopes for educational and scientific purposes
- photometry
- spectroscopic SNe follow ups
- participating in various Citizen Science projects, like “**Zooniverse**”

The reasons for choosing Cape Town in March 2018 are the following:
 there is a critical mass of both professionals and amateurs
 it has several nearby institutions SAAO, UCT, Stellenbosch, UWC, AIMS and SKA HQ
 the SAAO has a good accessible venue with catering facilities, good, cheap access by air/bus/car
 weather in March usually OK – no SE!!

So before anyone plans to go away on Holiday next year, consider a visit to the fairest Cape – its closer to home, cheaper and also a good opportunity to visit friends and relations. Also remember that booking early saves lots of money that you can then spend in Cape Town!

There is a website, which will be regularly up-dated with the latest news, requests, costs and deadlines etc. Please check it weekly!

This will be a major event that will hopefully give direction to many ASSA members and forge new links

<http://symposium2018.assa.saao.ac.za/>

It will help the LOC* enormously to let us know if you are thinking of attending, by simply sending me an e-mail (case@saao.ac.za) saying that you are interested in coming or that you will be coming. Sending me an e-mail does NOT commit you to coming – it’s merely information. Knowing how many people we need to cater for helps.

Many thanks for your support and look forward to seeing many of you here next year.

* LOC Case Rijdsdijk – Chair
 Dr Ian Glass
 Eddy Nijeboer
 Auke Slotegraaf