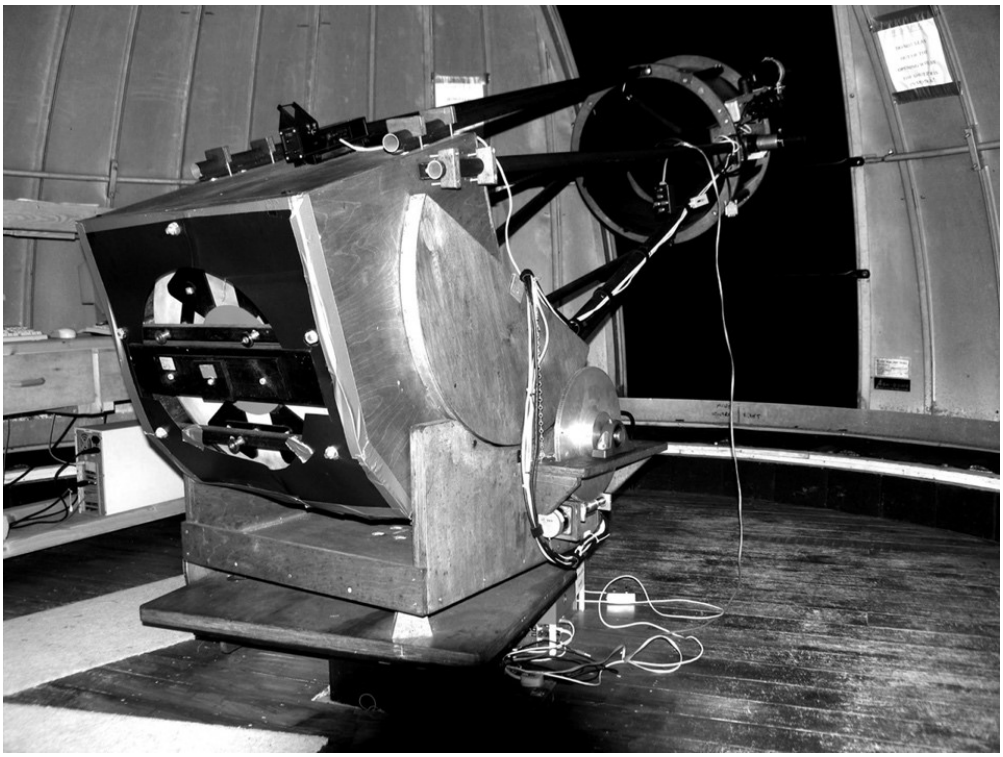
Breckland Astronomical Society

Affiliated to the British Astronomical Association and the Federation of Astronomical Societies

EXTRA TERRESTRIAL

Newsletter May 2022



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Copy is always needed for this newsletter. Articles with an astronomical theme are welcome but anything of likely interest to the membership will be considered. Text or Word documents preferred but handwritten submissions also welcome.

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Mick Ladner is visitor organiser. **visitors@brecklandastro.org.uk**

Chairman's Notes, May/June 2022

Dear Astronomers

March and April have given us a few brighter skies. The coming months are going to be a bit too light.

Sky notes

We have a new comet C/2021 O3 PANSTARRS visible at the start of May in the North west fading as it sails up towards the Celestial North Pole.

We have a total eclipse of the moon that is barely visible at moonset in a dawn sky on May 16. You may see the start of the partial phase. The moon is fairly low in Scorpius. As with all total eclipses the moon lies almost on the ecliptic line, as this is the line the Sun traces across the background stars, and the moon has to be opposite Earth to be eclipsed. The size of Earth's shadow at the Moon's distance is about 2 lunar diameters.

The Moon then tucks itself out of the way from about May 17 or 18.

Another lesser spoken about solar system object, Asteroid 10 Hygiea is visible in southern Virgo near Libra in May. It is just past opposition and around 9.7 magnitude. It needs a chart or a good app to find, but not such a big telescope. You will either need to plot it night to night or watch it drift over the course of hours to see the movement. It is 1.84 AU away on the 18th May, 434 km across and fairly large, at about 3% of the mass of the asteroid belt. It is the 4th largest asteroid in the solar system and fairly spherical, some consider it a dwarf planet. It is a particularly dark C-type asteroid and hasn't been visited yet, so it could still hold many mysteries. On average it has about half the reflectivity as the moon. It is in the outer part of the asteroid belt, beyond the Kirkwood gap at 2.82AU. There is a bright spot in its southern hemisphere – that's about all that can be seen so far as it is only 0.3 arc seconds across at opposition.

For some double stars, one of which we tried unsuccessfully to see the other night, have a look in Boötes. https://astronomynow.com/2019/04/30/seeing-double-and-triple-in-the-spring-sky/ Zeta is also a double but at 0.1" separation impossible http://www.dibonsmith.com/boo_con.htm

The BAA (British Astronomical Association) of which we are members, had a spring observing challenge. One of their members have seen an actual dwarf galaxy Leo I. It is ½º N of Regulus so not hard to find, just very, very hard to see! It is 800,000 light years away and orbiting our Milky Way – probably the most distant of our dwarves. It is magnitude 9.8, spread over a 9.8' by 7.4' area.

https://www.cloudynights.com/articles/cat/column/phil-harrington-s/cosmic-challenge-leo-i-r3099

https://britastro.org/observations/observation.php?id=20220308_164437_a80c33153d8ad990

Maybe one for Tuesdays on the 20 inch? Members (and prospective members by arrangement) are welcome to come along Tuesdays to view through the telescope.

By June, it is worth turning your telescope and cameras to the milky way and Sagittarius, the Lagoon and trifid nebula rise in the south east late at night. 1am is best to observe. We welcome the return of the planets from their poor UK showing in the morning.

Talks

I hope you got your AGM documents ready for the meeting after Jerry Workman's talk in May. We almost balanced the books in 2021 despite the pandemic. We have a new speaker for June, who I couldn't get for March due to her commitment to International Women's Day at Cambridge University. She has authored some very complex and varied papers and specialises in Cosmic Ray research. We hope to hear about some detail about this topic from a working scientist, namely Dr Vanessa Lópes Barquero from IoA in Cambridge. It is fortunate to have such a renowned institution world leading academics close to our society.

In March we had Dr Stuart Clark the author visit us.

Stuart is very wordy.
And profound.
There is a kind of poetry to his speech pattern.
Carl Sagan-*esque*.

His approach to this new book and its tour, was reminiscent of Van Gogh, whose picture '*Starry Night'* Stuart displayed at the opening of his talk. He lost his sense of religion under the starry sky, but in its place gained an equal sense, that of a newfound spiritual experience. Those swirls in the sky were possibly inspired by the drawings of M51 the Whirlpool Galaxy by Lord Rosse.

Stuart had found various examples of astronomical references created by ancient civilisations. Many constellations as we join them up now are 10,000 years old! Gilgamesh spoke of "The bull ripped in half and thrown up in to the heavens" – this is exactly as we see Taurus the bull now, it being half a bull, the hind legs were apparently separated and appear in Ursa Major and Ursa Minor. I may go and try to spot this. However strange these representations ("therianthropomorphisations") are, Stuart theorises, they only ever served as an aid to remember and catalogue the stars. Constellations were more practical rather than the sky being a glorious storyboard.

The Sumerians, Mesopotamians and Babylonians spoke of the Argo Navis, the ship in the southern sky. This appeared at their latitude limit. Atlas is depicted holding a globe with a blank bottom, so it was known the Earth was round millennia ago.

It wouldn't be complete without speaking of the caves at Lascaux, which show a 19000 year old Orion's belt and Taurus and the Pleiades, which rose in a different position back then.

In the age of enlightenment, a portrayal of Zodiac Man was shown with links to musical scales as a way of finding meaning and patterns in nature. Astrology and Astronomy were mixed up as one. Astronomers were attempting to explain the world based on the mystery of the huge heavens above. Because of this since ancient times, astronomers had prestige in society. Egyptians had decans that kept hours. Patterns that

are drawn on various relics and artefacts are not necessarily accurate positionally but are drawn from memory, with all its human flaws, but they are still recognisable to us now. What else could have been expected prior to the use of accurate measurement tools and techniques?

The day before the talk, Stuart had had a realisation that he wished he had put in his book. The Romans called Venus “Lucifer” – meaning ‘light’ or ‘luminous’. Venus always plunges down toward the sun after dark or emerges from it at dawn. The sun is hot and fiery. It is always trapped, bound to the fiery ball as it sinks or rises from the underworld, trapped in twilight. It explains well the motif of heaven going down to hell.

The names of planets are still personalities – Jovian for example, Mercurial, Martial. This leads to characters and astrology he suggests. Pythagoras looked at notes on a plucked string and tried to relate them to music of the planetary spheres. There were ratios, cycles, consonant intervals; maths and beauty were in both.

Thanks Stuart. In September 2020, the University of Hertfordshire awarded him a DSc for services to astronomy and the public understanding of science. And he certainly fulfilled the role of Science Populariser that he spoke of in his talk.

…

In April we had Dr Richard Miller talk to us about the origin of the elements in the Universe. He is a chemist who has created an innovation support service for green domestic technology. It was a good night of education, chat followed by an impromptu observing session where we saw the Lunar X by chance in the 20 inch telescope, through a thin veil of high cloud.

At the start of time, there was a big bang and only Hydrogen, Helium and a little Lithium were made. So how did we get the 94 elements that lay on planet Earth when we came to exist here?

He came up with the analogy of how to produce an elementary nucleus. “Fill a Canon with Cake. Fire it at a bowl of custard and expect a trifle to

be made." ie very unlikely but it does *occasionally* happen. I'm guessing the electrons are the jelly and dream topping.

Other astounding facts were that we have 0.1g of Copper in our body, although each of us requires about 120kg of Copper mostly as wiring, to function in todays society – it is an element we are very short of as a planet. It takes 22 minutes for half of Francium atoms to decay, hence none of it really exists, only as a short supply from Uranium. Please check out the YouTube channel 'Periodic Videos' if you haven't already. 2/3 of all elements are in our mobile phones. Prehistoric man discovered C, S, Fe(Iron), Cu(copper), Ag(silver), Au(gold), Hg(Mercury), Sn(Tin) and Pb(lead), hence these all have latin abbreviations. In 1850s Humphry Davy hosted N_2O (laughing gas) parties and once he tried 4 quarts of Carbon Monoxide for a laugh and ended up nearly dying.

We got a story of Bottinger, a porcelain company founder, who mined at Ytterby in the Stockholm Archipelago. This mine led to many rare earth elements being discovered all at once. The pottery, however, was hideous*.

The first three elements came from the Big Bang, and only 2% of the Hydrogen and Helium have been converted since then into heavier elements. Main ways are via Supernovae Type II or Ia. This only reaches Fe-56, and Nickel then stops, a few slightly heavier elements are formed in smaller quantities, but how? Well there is also the neutron capture process. This leads to a chain of nuclear reactions where neutrons strike existing nuclei, this even happens in big stars, and leads to unstable isotopes that undergo radioactive decay from neutrons to protons, thus creating new elements.

Some elements stop this process as they are unstable with all those neutrons. The majority of the later elements in the periodic tables come from Neutron star mergers, such as that one spotted by LIGO in 2017. It came from galaxy NGC 4993, of which I have taken a picture in this edition. It is a very dull faint galaxy optically. Also black hole accretion disks are a place where crazy energies can occur. Cosmic rays from these places are incredibly high energy enough to back this argument up.

So this explains most of the elements up to Uranium or Plutonium and could even explain elements up to atomic number 250. They don't seem to exist as they haven't lasted the millions of years it would take to transport them across the galaxy. Leaving Andy for one wondering if there is an island of stability among elements that were stable enough for us to ever make a lump of super heavy element. Richard was pessimistic.

Thanks Richard.

*subject to opinion.

If you know anyone who you would like to speak in our September or December slots please send details to chairman@.....

Events

We are planning a solar outreach day at RSPB Lakenheath Fen on Father's Day Sunday June 19th "International SUNday" where we will be safely trying to view the sun. Fingers crossed for good weather. This is to be confirmed but likely.

The Webb Deep Sky Meeting is on Saturday June 18th and back at the IoA – Institute of Astronomy and is a great day for the tours and talks and books and general information, encouragement and networking. Book in advance ideally to get a lunch at www.webbdeepsky.com . It is a day before we plan an outreach solar session on June 19th. Venue not been confirmed yet though so watch the facebook group.

Dan Self

BRECKLAND ASTRONOMICAL SOCIETY

http://www.brecklandastro.org.uk

The Moon in Detail

+ AGM

Jerry Workman

Jerry, our regular May guest speaker is a very knowledgeable science educator

Friday May 13th 7:30pm start

Great Ellingham Recreation Centre
Watton Road (B1077) NR17 1HX
£2.50 entry £1 under 18s

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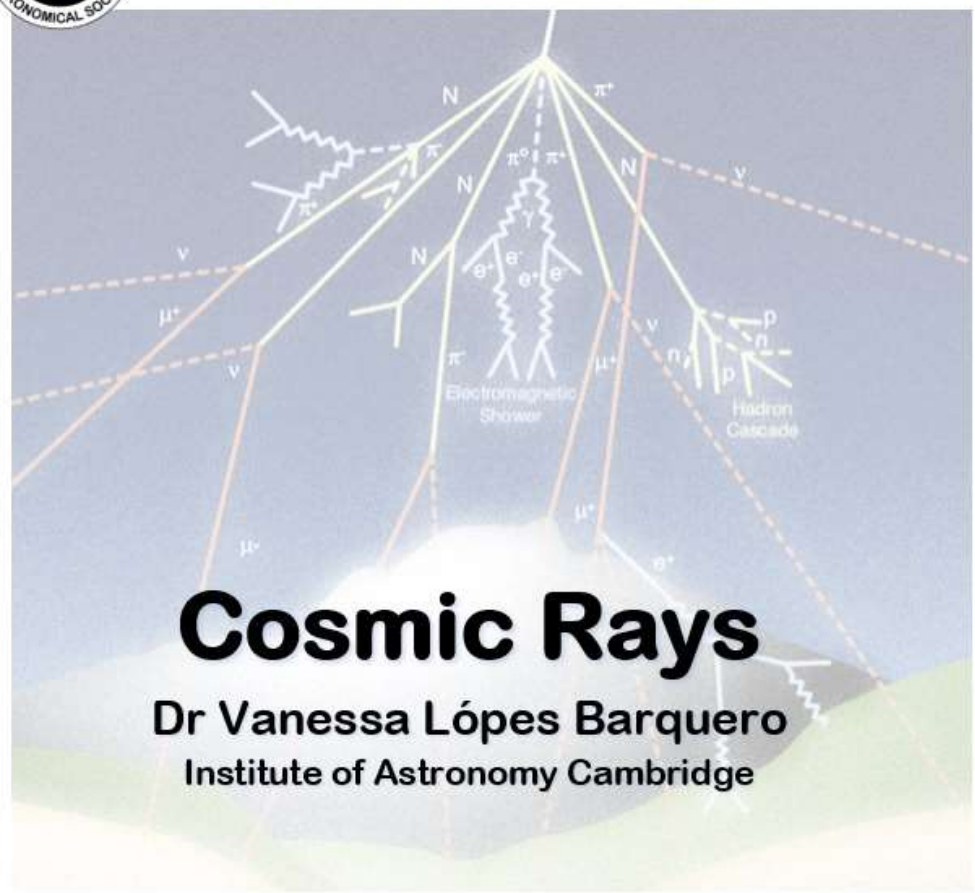


Cosmic Rays

Dr Vanessa Lópes Barquero

Institute of Astronomy Cambridge

Friday June 10th 7:30pm start

Great Ellingham Recreation Centre
Watton Road (B1077) NR17 1HX
£2.50 entry £1 under 18s

JOHN'S NEWS BITS
May 2022

Sci-news.com and other sources report that astronomers using the VISTA telescope in the Paranal observatory in Chile, have detected the most distant galaxy ever seen. HD1 existed when the universe was only 330 million years old and was measured with the highest ever redshift of 13.27! It would contain some of the oldest stars (population III) in the universe. Also, its extreme luminosity could result from a supermassive black hole at its centre.
On a cautious note, the data has still to be spectroscopically confirmed.

The Artemis1 unmanned Moon mission with the SLS and uncrewed Orion capsule has been delayed to around end of May for technical reasons.

The director of Roscosmos, the Russian space agency, has threatened to end Russia's involvement with the ISS in less than 2 years as a result of sanctions. This will leave NASA to keep the ISS operational (reported in livescience.com).

ESA's Advanced Telescope for High Energy Astrophysics, 'ATHENA' mission is an X-ray observatory with state-of-the-art scientific instruments for studying the hot energetic universe and, in particular, how galactic clusters are formed. Launch is schedule for 2028.

Reported in sciencedaily.com, Hubble has detected the furthest star ever seen, some billion years from the Big Bang. Its light took 12.9 billion years at a redshift of 6.2 to get to Earth. There's still life in Hubble!

JWST update, the team has now aligned all 18 primary segment mirrors and focused them on a single star. As of March 11, every optical parameter has been checked and tested, the 'fine phasing state'. More on www.nasa.gov/webb.

The ExoMars 2022 mission launch has been scratched as a result suspending co-operation with the Russian Roscosmos over the Ukraine sanctions.

Reported in ScienceDaily, MIT and Max Plank Institute scientists have developed the largest and most detailed model of the early universe to study how the universe unfolded during this pivotal period. Focus will be on the cosmic re-ionization.
The project has ben named 'Thesan' after the Etruscan goddess of dawn.

Reported by NASA, a 40 trillion-mile-long matter and anti-matter beam was imaged by the Chandra x-ray observatory. It appears to come from a tiny pulsar, no more than 10 miles across, and some 1,600 light years away, PSR J2030+4415

Researchers from the University of Barcelona, UCL and IFAE proposed using the variation in the distance between the Moon and Earth, which can be measured to less than one cm,, as a new gravitational wave detector. This would pave the way to detecting signals from the early universe (sciencedaily.com).

Reported in space.com, scientists at the U.S. Fermi Tevatron Collider have studied the W boson, a sister particle of the Higgs Boson, and found it is heavier that expected after going through 10 years' worth of data. Apparently this is quite a big deal as it is at odds with the Standard Model and could end up rewriting particle physics and the 'grand theory of everything'.

The Mars Ingenuity helicopter is still active, the 4.8 kilogram flying bug has just s set a new record. On its 25th flight it broke the speed and distance records travelling some 704 metres at 5.5 metres per second according to NASA's Jet propulsion Lab.

Latest from NASA, the Hubble telescope confirms largest comet nucleus ever seen.
The estimated diameter is 80 miles across with an estimated mass of 500 trillion tons. C/2014 UN271 (Bernardinelli-Bernstein) is heading our way at 22,000 mph. but will never get closer than 1 billion miles from the Sun. Hubble took the photos with Wide Field Camera 3 in January 2022. The comet has been heading towards the Sun for some 1 million years from the direction of the Oort cloud..

After 3 years of intense upgrade work, the CERN Large Hadron Collider is now back in action. Two beams of protons are now circulating in opposite directions and is expected to reach 13.6TeV by this summer. It will be looking for the 5th force of nature and the invisible particles that make up Dark Matter.

John Gionis

50 Years since Apollo 16

Apollo 16 was the tenth crewed mission in the United States Apollo space program, administered by NASA, and the fifth and next-to-last to land on the Moon. It was the second of Apollo's "J missions", with an extended stay on the lunar surface, a focus on science, and the use of the Lunar Roving Vehicle (LRV). The landing and exploration were in the Descartes Highlands, a site chosen because some scientists expected it to be an area formed by volcanic action, though this proved to not be the case.

Apollo 16 mission patch

Credits: NASA

The mission was crewed by Commander John Young, Lunar Module Pilot Charles Duke and Command Module Pilot Ken Mattingly. Launched from the Kennedy Space Centre in Florida on April 16, 1972, Apollo 16 experienced several minor glitches en-route to the Moon. These culminated with a problem with the spaceship's main engine that resulted in a six-hour delay in the Moon landing as NASA managers contemplated having the astronauts abort the mission and return to Earth, before deciding the problem could be overcome. Although they permitted the lunar landing, NASA had the astronauts return from the mission one day earlier than planned.

The Apollo 16 landing site was selected to obtain samples of two highland geologic units, the Descartes Formation and the Cayley Formation, which are widespread on the lunar nearside. Prior to the mission, it was thought that both were of volcanic origin, but the returned samples demonstrated that this is incorrect.

Three of the first four Apollo Moon landings were in mare regions and the fourth was in ejecta from the Imbrium impact. When selecting the Apollo 16 landing site, the highest priority was given to landing at a site in the lunar highlands, which occupy more than five times the surface area occupied by mare units.

Two locations were given primary consideration, the Descartes region west of Mare Nectaris and the Alphonsus crater. In Descartes, the objectives were to sample the Descartes Formation and the Cayley Formation. Based on the interpretations of telescopic and orbital imagery, it was thought that both units were volcanic in origin, although formed of magmas that were more viscous than mare lavas. Samples obtained by Apollo 16 proved that these units are breccias

produced by impacts rather than volcanic features. From the density of impact craters, the Cayley Formation was thought to be comparable in age to the Imbrium impact. These particular geologic studies suggested that these two formations covered about 11% of the lunar nearside, making them important for the overall understanding of the Moon's history. Also, the large distance between the Descartes site and previous landing sites was helpful for the network of geophysical instruments created by the Apollo 12 through to Apollo 16 missions.

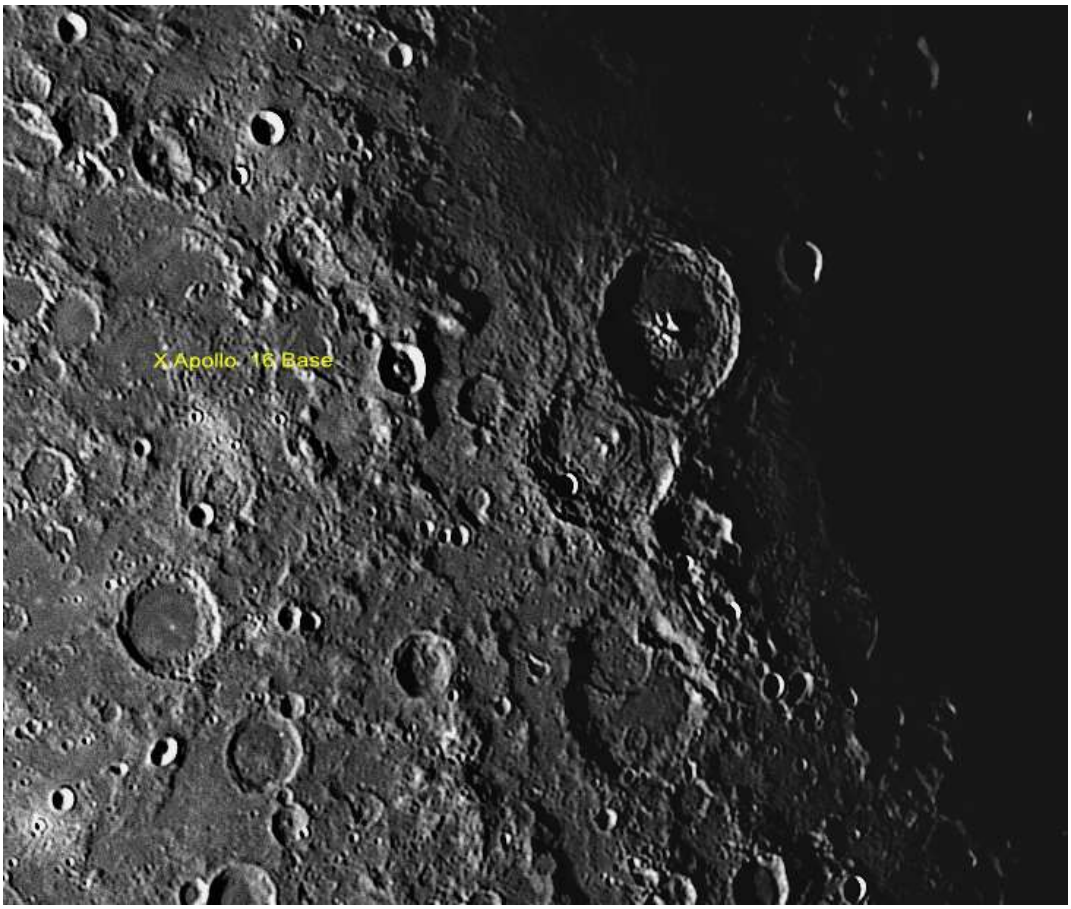


Image Chris Bailey Jan 2022

There were three sampling objectives for the Alphonsus crater site: the crater fill itself, possible pre-Imbrium material from the crater wall, and possible young volcanics at some so-called dark halo craters on the floor of Alphonsus. However, some geologists felt that the Alphonsus site had been contaminated by ejecta from the Imbrium Basin impact. Also, at the time the Apollo 16 landing site was selected in June 1971, the Apollo 14 samples had been incompletely analysed and the Apollo 15 samples had not yet been obtained. It was considered possible that the objective of obtaining samples of old highland material (older than the Imbrium impact) might be met with some of the Apollo 14 or 15 samples.

Accordingly, it was decided that Descartes would be the landing site for Apollo 16. The Alphonsus site was considered at the time to be the primary candidate for the Apollo 17 landing site, although this was later rejected. The Descartes site was certified as safe for landing on the basis of Apollo 14 orbital photography. The specific landing site was selected between two fresh, young impact craters, North Ray Crater (1000 meters in diameter) and South Ray Crater (680 meters in diameter). These craters provided natural drill holes through the regolith at the site, exposing samples of the underlying bedrock in ejecta fragments for sampling by the Apollo 16 crew.

Lunar module, or LM, carrying John Young and Charles Duke, touched down at Descartes about 276 meters northwest of the planned point (8 degrees 59' 29"S, 15 degrees 30' 52"E) at about 9:24 p.m. EST April 20, about five hours, 43 minutes late. During 71 hours 2 minutes surface stay, astronauts explored the region on three EVAs totalling 20 hours 14 minutes. The first EVA included Lunar Roving Vehicle setup and ALSEP deployment. The heat flow experiment was lost when Young tripped on an electronics cable, breaking it. Rover traverse took astronauts west to Flag Crater where they collected samples and photographed the area. The return drive was south of their outbound track to Spook Crater where astronauts took their first measurements with the lunar portable magnetometer, gathered samples, and took both panoramic and 500 mm telephotography images. Just before returning to the lunar module, they deployed the solar wind composition experiment at the ALSEP site. EVA duration was about 7 hours 11 minutes with 2.5 miles driven in the rover.

John W. Young on the Moon during Apollo 16 mission jumping about 42 Centimeters high. Charles M. Duke Jr. took this picture. The LM Orion is on the left. April 21, 1972

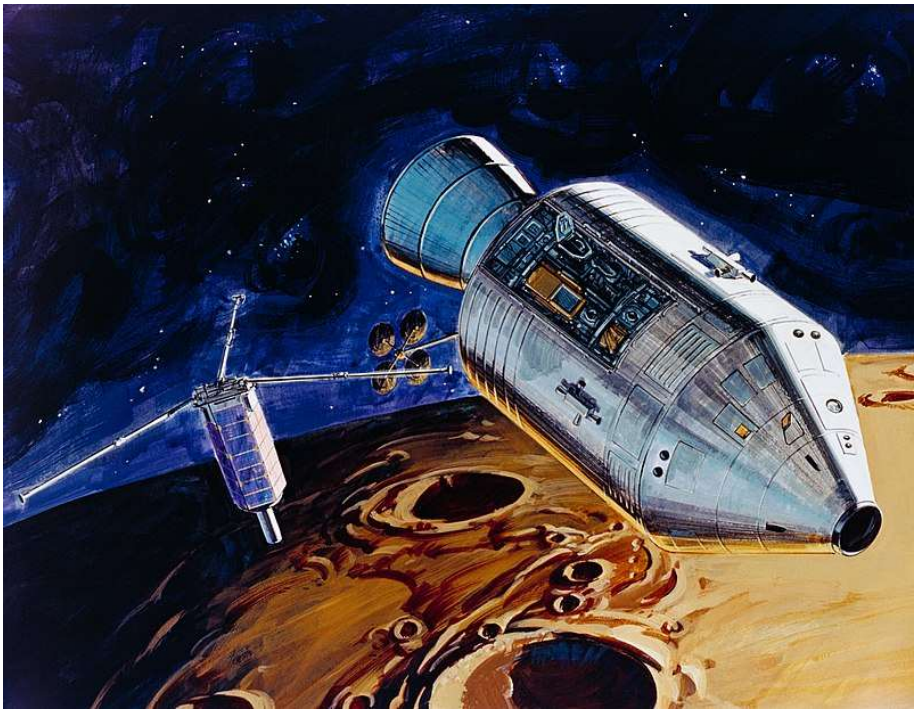
C Duke/NASA

Second EVA began with drive south to Stone Mountain, where surface and core samples were collected at two stations in the area of Cinco Craters, along with a trench sample, penetrometer measurements and photography. Traverse continued west, then north with stops at five additional stations for similar work. One station was deleted from the EVA plan because of time factors. Lunar portable magnetometer, or LPM, measurements were taken near Cinco. The crew returned to the lunar module and ended this second EVA after 7 hours 23 minutes and 6.9 miles on the rover.

Real-time flight planners deleted four stops from the third and final EVA because of time constraints in meeting the ascent schedule. Astronauts drove north to North Ray Crater where "House Rock," inside the crater rim, was sampled. Returning south, the crew stopped at "Shadow Rock" for additional sampling, photography and LPM measurement. The final stop near the lunar module added samples and core tubes to the collection. Last LPM readings were taken at the rover parking site along with final rock samples. Closeout, including retrieval of solar wind composition, or SWC, and film from a far ultraviolet camera/spectroscope, completed EVA after 5 hours 40 minutes. Rover distance was 7.1 miles.

Thomas Mattingly orbited the moon with cameras and SIM bay instruments operating during the surface stay of Young and Duke. The results verified Apollo 15 data and provided information on lunar terrain not previously covered. Lunar lift-off came on time at 8:26 p.m. EST April 23, in full view of the rover television camera. After normal rendezvous and docking, and transfer of crew samples and equipment, the lunar module was jettisoned. Attitude control was lost, eliminating the usual deorbit manoeuvre and planned impact. Because of problems noted earlier, planners elected to return the mission one day early.

The Apollo 16 Particles and Fields Subsatellite (PFS-2) was a small satellite released into lunar orbit at 4:56 p.m. EST April 24 from the service module. Its principal objective was to measure charged particles and magnetic fields all around the Moon as the Moon orbited Earth, similar to its sister spacecraft, PFS-1, released eight months earlier by Apollo 15. The two probes were intended to have similar orbits, ranging from 89 to 122 kilometres (55 to 76 miles) above the lunar surface.

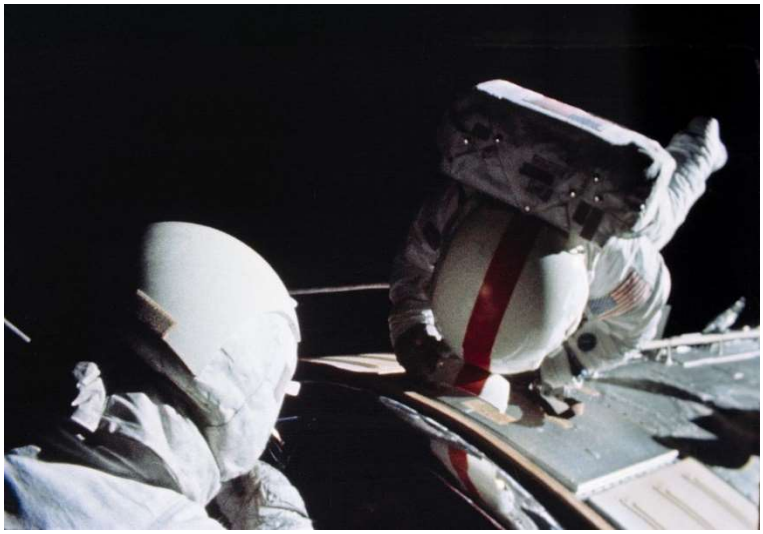


Artist's concept showing TRW's small lunar subsatellite being ejected into lunar orbit from the SIM bay (Credit NASA)

Like the Apollo 15 subsatellite, PFS-2 was expected to have a lifetime of at least a year before its orbit decayed and it crashed onto the lunar surface. The decision to bring Apollo 16 home early after there were difficulties with the main engine meant that the spacecraft did not go to the orbit which had been planned for PFS-2. Instead, it was ejected into a lower-than-planned orbit and crashed into the Moon a month later on May 29, 1972, after circling the Moon 424 times. This brief lifetime was because lunar mascons were near to its orbital ground track and helped pull PFS-2 into the Moon.

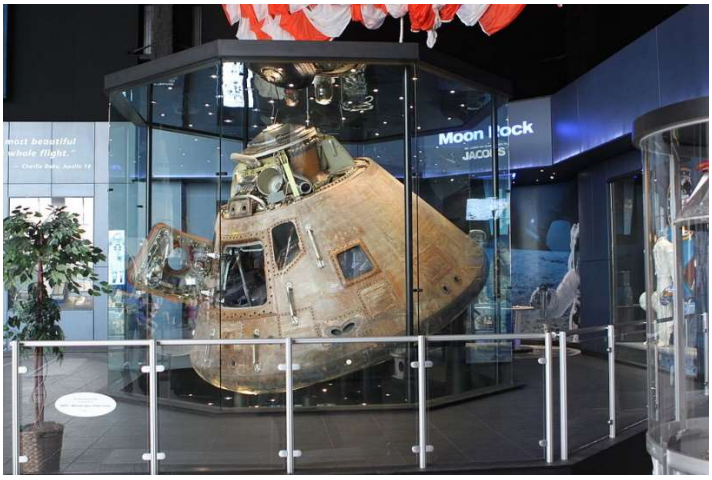
The satellite carried three experiments: S-Band Transponder; Particle Shadows/Boundary Layer Experiment; and Subsatellite Magnetometer Experiment. The subsatellite was housed in a container resembling a rural mailbox, and when deployed was spring-ejected out-of-plane at 4 fps with a spin rate of 140 rpm. After the satellite booms were deployed, the spin rate was stabilized at about 12 rpm. The subsatellite was 31 inches long and had a 14 inch hexagonal diameter. The exact weight was 78.5 pounds. The folded booms deployed to a length of five feet. Subsatellite electrical power was supplied by a solar cell array outputting 25 watts for dayside operation and a rechargeable silver-cadmium battery for nightside passes.

During trans earth coast, Mattingly took an 83-minute spacewalk to retrieve film cassettes from the SIM bay.



Astronaut Thomas K. Mattingly II, command module pilot, performs an extravehicular activity (EVA) during the Apollo 16 trans-Earth coast. Mattingly is assisted by astronaut Charles M. Duke Jr., lunar module pilot. Mattingly inspected the SIM Bay or Service Module (SM), and retrieved film from the Mapping and Panoramic Cameras (Credit NASA)

Normal entry and landing resulted in splashdown at 0 degrees 42' 0" S, 156 degrees 12' 49" W, just before 3 p.m. EST April 27. The Recovery Ship was USS Ticonderoga. Total mission time was 265 hours, 51 minutes, five seconds. Young and Duke collected 209 pounds of samples including Big Muley, the largest Moon rock collected during the Apollo missions.



The Apollo 16 command module Casper with the recovery parachute above it is on display at the U.S. Space & Rocket Centre in Huntsville, Alabama

Observatory Dome Automation.

The holy grail for this seasoned and now somewhat lazy astronomer is total automation in the imaging process. Long gone are the days of lugging the heavy mount from the shed, desperately avoiding the cat and power cables as you carry the scope across the lawn. On bended knee with one eye open trying to figure out the hour angle of Polaris, balancing, connecting, aligning everything to no avail as the clouds roll in.

151a is now my fourth observatory build and the most challenging.

Atop of my observatory I have a 6ft fiberglass dome manufactured

by American Company Technical Innovations. It has a motor drive system controlled by 2 motors that are set 180 degrees apart around the domes edge. As this power supply is located inside the dome, control is only possible in the observatory. This created issues on a number of levels from pausing an imaging run, going outside and setting off the neighbor's security lights, moving the dome and returning inside to set things in motion again. With a shutter opening of 60cm the scope has a limited field of view before movement is required when observing or imaging. Doing this every half hour is a little frustrating but what else could I do..

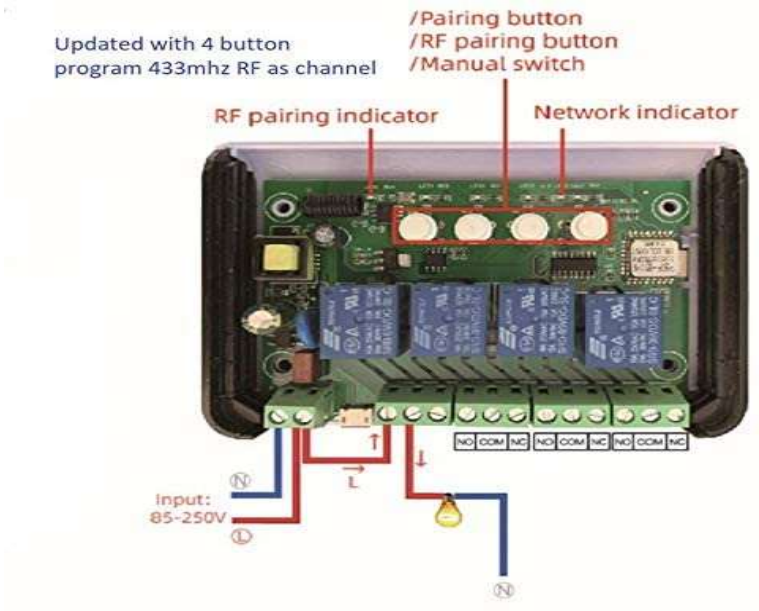
I follow quite a few youtube channels following astronomers as they battle their own journey of learning and improving in their hobby. One in particular is "Astrobloke" an astronomer who's interest is creating a fully automated imaging set up with his roll on / off roof observatory. Over a few episodes he eluded to a the

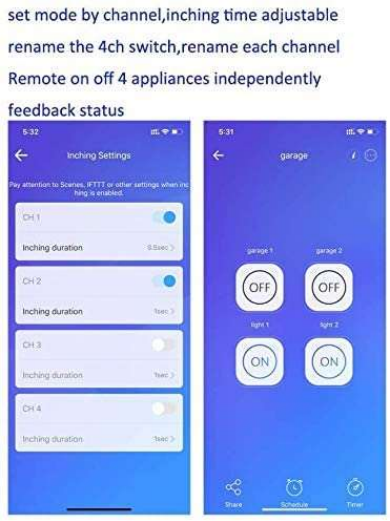
possibility of controlling his roof by the means of a APP using a simple wireless relay. A simple and cheap little box purchased from Amazon for currently £26.

[MHCOZY Ewelink WiFi Relay Switch,Self-Locking/Momentary Timer WiFi Switch Module,Compatible with Alexa Google Assistant (4CH WiFi RF 220V) : Amazon.co.uk: DIY & Tools]

It seemed a little to easy to be true and sure enough he got it to work. So I thought I would have a go too.

A few months passed and convinced myself I could not make this work as the internal wiring of the power supply looked just a mass of wires and struggled with getting my head around what was what at what wire went where. So I stripped it all back and rewired sending a supply to the module and outputs to each motor.





I downloaded an App EweLink and paired via the wifi and pushed the button…It works. After adjusting a few settings the dome moves by itself for 3 seconds whenever it's needed to move. The next step is to automate this with a programme like Nina or SGP. Astrobloke now says he has developed with another youtuber some open source software that does indeed work via Nina so it is now truly intergrated into his imaging process. This is something I will certainly like to look at but for now I am happy and content with pushing a button every 30 minutes,

The next and final part of the project will be dome shutter control open and close but for now no more getting up, going outside, no more accidental triggering of the neighbours lights, Lazy or what..

Malcolm Dent

Book Review

Martin Kaye

The Greatest Adventure – A history of human space exploration

Colin Burgess

This book does pretty much what is says on the cover. It traces the triumphs and tragedies of space travel from the early years through to the recent exploits of Elon Musk and Jeff Bezos. The book traces the events of this extraordinary period with a chronological journey through the last seven decades. Throughout there is a host of detail, including statistics on launch dates, the payloads, the names of all the cosmonauts / astronauts and a fair number of photographs.

The author starts by describing the initial string of Soviet achievements from the first experiments with sending satellites, animals and then the first humans into space culminating with Yuri Gagarin's historic single orbit of Earth. This early competition between the Soviet and USA programmes is well documented. The decision of President Kennedy to land men on the Moon by the end of the 1960s swung the race in favour of the Americans which led to the Apollo programme and the first landing on the Moon in July 1969. Later Apollo, shuttle and space labs programmes are all described. The tragedies on both sides are not forgotten and in general are well handled.

A criticism of the book is that the early decades are covered in more detail than the latter, with less information on more recent programmes such as the ISS which is a shame.

If you want to be reminded of human space flight from the 1950s to the present and the initial rivalry between the two superpowers at the start of this period, then this is a good read.

A HALF-HOUR WITH A TELESCOPE

PART 2

LYRA, HERCULES, CORVUS

R A Proctor

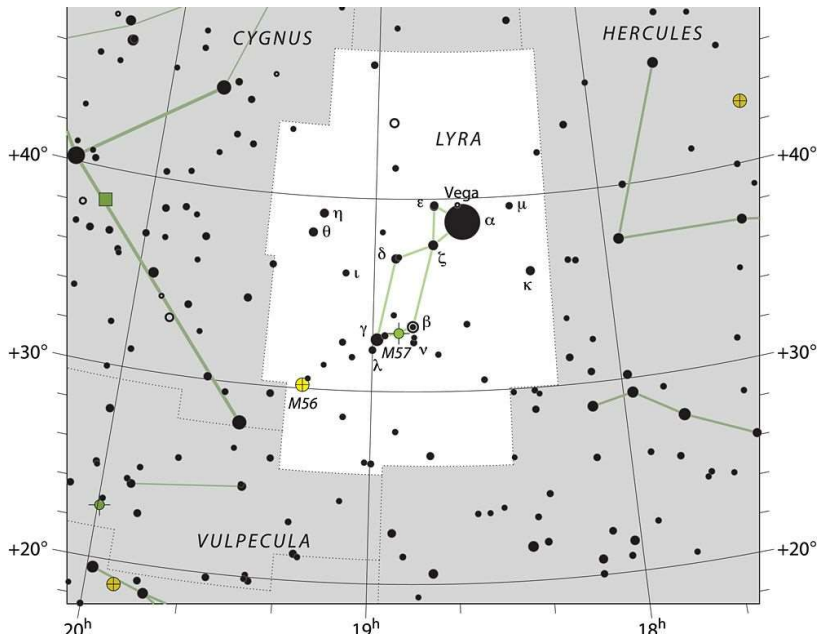
The observations now to be commenced are supposed to take place during the second quarter of the year, at ten o'clock on the 20th of April, or at nine on the 5th of May, or at eight on the 21st of May, or at seven on the 5th of June, or at hours intermediate to these on intermediate days.

We again look first for the Great Bear, now near the zenith, and thence find the Pole-star. Turning towards the north, we see Cassiopeia between the Pole-star and the horizon. Towards the north-west is the brilliant Capella, and towards the north-east the equally brilliant Vega, beneath which, and somewhat northerly, is the cross in Cygnus. The Milky Way passes from the eastern horizon towards the north (low down), and so round to the western horizon.

In selecting a region for special observation, we shall adopt a different plan from that used in the preceding "half-hour." The region on the equator and towards the south is indeed particularly interesting, since it includes the nebular region in Virgo. Within this space nebulæ are clustered more closely than over any corresponding space in the heavens, save only the greater Magellanic cloud. But to the observer with telescopes of moderate power these nebulæ present few features of special interest; and there are regions of the sky now well situated for observation, which, at most other epochs are either low down towards the horizon or inconveniently near to the zenith. We shall therefore select one of these, the region and the neighbouring part of the celestial sphere.

At any of the hours above named, the constellation Hercules lies towards the east. A quadrant taken from the zenith to the eastern horizon passes close to the last star ([eta]) of the Great Bear's tail, through [beta], a star in Bootes' head, near [beta] Herculis, between the two "Alphas" which mark the heads of Hercules and Ophiuchus, and so past [beta] Ophiuchi, a third-magnitude star near the horizon. And here we may turn aside for a moment to notice the remarkable vertical row of six conspicuous stars towards the east-south-east; these are, counting them in order from the horizon, [zeta], [epsilon], and [delta] Ophiuchi, [epsilon], [alpha], and [delta] Serpentis.

Let the telescope first be directed towards Vega. This orb presents a brilliant appearance in the telescope. Its colour is a bluish-white. In an ordinary telescope Vega appears as a single star, but with a large object-glass two distant small companions are seen. A nine-inch glass shows also two small companions within a few seconds of Vega. In the great Harvard refractor Vega is seen with no less than thirty-five companions. I imagine that all these stars, and others which can be seen in neighbouring fields, indicate the association of Vega with the neighbouring stream of the Milky Way.



Let our observer now direct his telescope to the star [epsilon] Lyræ. Or rather, let him first closely examine this star with the naked eye. The star is easily identified, since it lies to the left of Vega, forming with [zeta] a small equilateral triangle. A careful scrutiny suffices to indicate a peculiarity in this star. If our observer possesses very good eye-sight, he will distinctly recognise it as a "naked-eye double"; but more probably he will only notice that it appears lengthened in a north and south direction.[4] In the finder the star is easily divided. Applying a low power to the telescope itself, we see [epsilon] Lyræ as a wide double, the line joining the components lying nearly north and south. The southernmost component (the upper in the figure) is called [epsilon]^{1}, the other epsilon]^{2}. Seen as a double, both components appear white. Now, if the observer's telescope is sufficiently powerful, each of the components may be seen to be itself double. First try [epsilon]^{1}, the northern pair. The line joining the components is directed as shown in Plate 3. The distance between them is 3"·2, their magnitudes 5 and 6-1/2, and their colours yellow and ruddy. If the observer succeeds in seeing [epsilon]^{1} fairly divided, he will probably not fail in detecting the duplicity of [epsilon]^{2}, though this is a rather closer pair, the distance between the components being only 2"·6. The magnitudes are 5 and 5-1/2, both being white. Between [epsilon]^{1} and [epsilon]^{2} are three faint stars, possibly forming with the quadruple a single system. Let us next turn to the third star of the equilateral triangle mentioned above--viz. to the star [zeta] Lyræ. This is a splendid but easy double. It is figured in Plate 3, but it must be noticed that the figure of [zeta] and the other nine small figures are not drawn on the same scale as [epsilon] Lyræ. The actual distance between the components of [zeta] Lyra is 44", or about one-fourth of the distance separating [epsilon]^{1} from [epsilon]^{2}. The components of [zeta] are very nearly equal in magnitude, in colour topaz and green, the topaz component being estimated as of the fifth magnitude, the green component intermediate between the fifth and sixth magnitudes.

We may now turn to a star not figured in the map, but readily found. It will be noticed that the stars [epsilon], [alpha], [beta], and [gamma] form, with two small stars towards the left, a somewhat regular hexagonal figure--a hexagon, in fact, having three equal long sides and three nearly equal short sides alternating with the others. The star [eta] Lyræ forms the angle next to [epsilon]. It is a wide and unequal double, as figured in Plate 3. The larger component is azure blue; the smaller is violet, and, being only of the ninth magnitude, is somewhat difficult to catch with apertures under 3 inches.

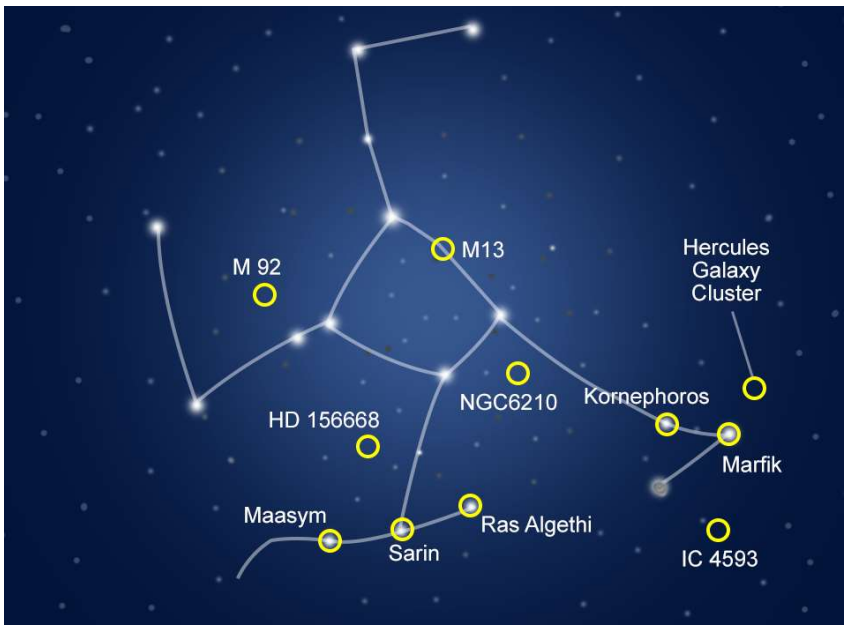
The star [delta]^{2} Lyræ is orange, [delta]^{1} blue. In the same field with these are seen many other stars.

The stars [gamma]^{1} and [gamma]^{2} may also be seen in a single field, the distance between them being about half the moon's mean diameter. The former is quadruple, the components being yellow, bluish, pale blue, and blue.

Turn next to the stars [beta] and [gamma] Lyræ, the former a multiple, the latter an unequal double star. It is not, however, in these respects that these stars are chiefly interesting, but for their variability. The variability of [gamma] has not indeed been fully established, though it is

certain that, having once been less bright, [gamma] is now considerably brighter than [beta]. The change, however, may be due to the variation of [beta] alone. This star is one of the most remarkable variables known. Its period is 12d. 21h. 53m. 10s. In this time it passes from a maximum brilliancy--that of a star of the 3·4 magnitude--to a minimum lustre equal to that of a star of the 4·3 magnitude, thence to the same maximum brilliancy as before, thence to another minimum of lustre--that of a star of the 4·5 magnitude--and so to its maximum lustre again, when the cycle of changes recommences. These remarkable changes seem to point to the existence of two unequal dark satellites, whose dimensions bear a much greater proportion to those of the bright components of [beta] Lyræ than the dimensions of the members of the Solar System bear to those of the sun. In this case, at any rate, the conjecture hazarded about Algol, that the star revolves around a dark central orb, would be insufficient to account for the observed variation.

Nearly midway between [beta] and [gamma] lies the wonderful ring-nebula 57 M, of which an imperfect idea will be conveyed by the last figure of Plate 3. This nebula was discovered in 1772, by Darquier, at Toulouse. It is seen as a ring of light with very moderate telescopic power. In a good 3-1/2-inch telescope the nebula exhibits a mottled appearance and a sparkling light. Larger instruments exhibit a faint light within the ring; and in Lord Rosse's great Telescope "wisps of stars" are seen within, and faint streaks of light stream from the outer border of the ring. This nebula has been subjected to spectrum-analysis by Mr Huggins. It turns out to be a gaseous nebula! In fact, ring-nebulæ—of which only seven have been detected--seem to belong to the same class as the planetary nebulæ, all of which exhibit the line-spectrum indicative of gaseity. The brightest of the three lines seen in the spectrum of the ring-nebula in Lyra presents a rather peculiar appearance, "since it consists," says Mr. Huggins, "of two bright dots, corresponding to sections of the ring, and between these there is not darkness, but an excessively faint line joining them. This observation makes it probable that the faint nebulous matter occupying the central portion is similar in constitution to that of the ring."



The constellation Hercules also contains many very interesting objects. Let us first inspect a nebula presenting a remarkable contrast with that just described. I refer to the nebula 13 M, known as Halley's nebula (Plate 3). This nebula is visible to the naked eye, and in a good telescope it is a most wonderful object: "perhaps no one ever saw it for the first time without uttering a shout of wonder." It requires a very powerful telescope completely to resolve this fine nebula, but the outlying streamers may be resolved with a good 3-inch telescope. Sir W. Herschel considered that the number of the stars composing this wonderful object was at least 14,000. The accepted views respecting nebulæ would place this and other clusters far beyond the limits of our sidereal system, and would make the component stars not very unequal (on the average) to our own sun. It seems to me far more probable, on the contrary, that the cluster belongs to our own system, and that its components are very much smaller than the average of separate stars. Perhaps the whole mass of the cluster does not exceed that of an average first-magnitude star.

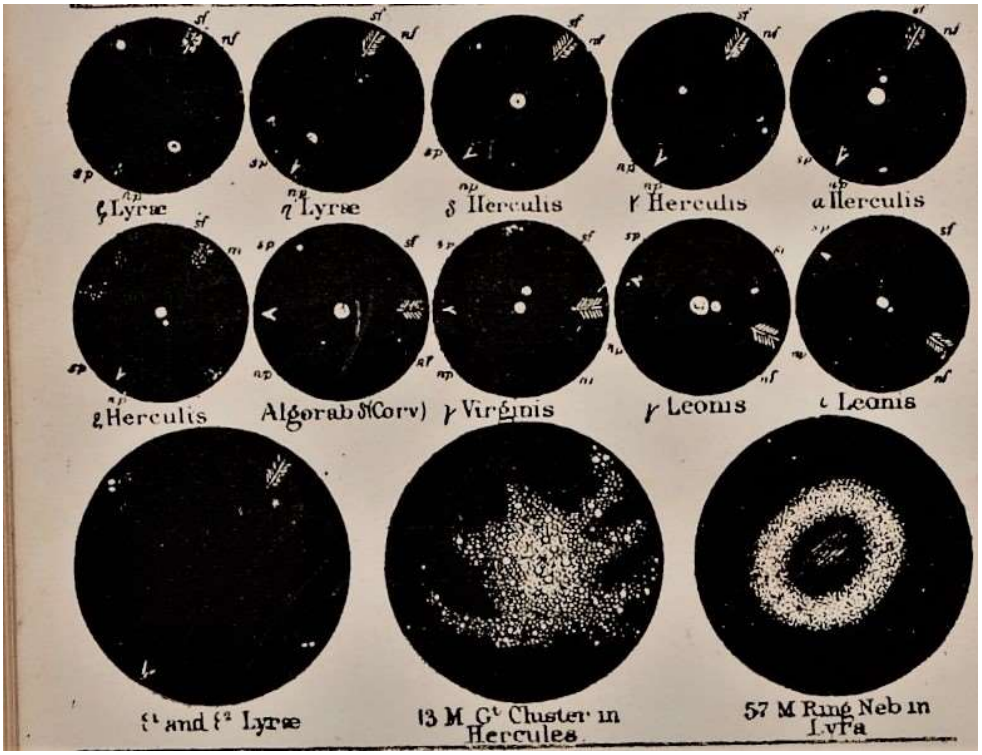
The nebulæ 92 M and 50 H may be found, after a little searching, from the positions indicated in the map. They are both well worthy of study, the former being a very bright globular cluster, the latter a bright and large round nebula. The spectra of these, as of the great cluster, resemble the solar spectrum, being continuous, though, of course, very much fainter.

The star [delta] Herculis (seen at the bottom of the map) is a wide and easy double--a beautiful object. The components, situated as shown in Plate 3, are of the fourth and eighth magnitude, and coloured respectively greenish-white and grape-red.

The star [kappa] Herculis is not shown in the map, but may be very readily found, lying between the two gammas, [gamma] Herculis and [gamma] Serpentis (_see_ Frontispiece, Map 2), rather nearer the latter. It is a wide double, the components of fifth and seventh magnitude, the larger yellowish-white, the smaller ruddy yellow.[5]

Ras Algethi, or [alpha] Herculis, is also beyond the limits of the map, but may be easily found by means of Map 2, Frontispiece. It is, properly speaking, a multiple star. Considered as a double, the arrangement of the components is that shown in Plate 3. The larger is of magnitude 3-1/2, the smaller of magnitude 5-1/2; the former orange, the latter emerald. The companion stars are small, and require a good telescope to be well seen. Ras Algethi is a variable, changing from magnitude 3 to magnitude 3-1/2 in a period of 66-1/3 days.

The star [rho] Herculis is a closer double. The components are 3"·7 apart, and situated as shown in Plate 3. The larger is of magnitude 4, the smaller 5-1/2; the former bluish-white, the latter pale emerald.



There are other objects within the range of our map which are well worthy of study. Such are [mu] Draconis, a beautiful miniature of Castor; [gamma]^{1} and [gamma]^{2} Draconis, a wide double, the distance between the components being nearly 62" (both grey); and [gamma]^{1} and [gamma]^{2} Coronæ, a naked-eye double, the components being 6' apart, and each double with a good 3-inch telescope.

We turn, however, to another region of the sky. Low down, towards the south is seen the small constellation Corvus, recognised by its irregular quadrilateral of stars. Of the two upper stars, the left-hand one is Algorab, a wide double, the components placed as in Plate 3, 23"·5 apart, the larger of magnitude 3, the smaller 8-1/2, the colours pale yellow and purple.

There is a red star in this neighbourhood which is well worth looking for. To the right of Corvus is the constellation Crater, easily recognised as forming a tolerably well-marked small group. The star Alkes, or [alpha] Crateris, must first be found. It is far from being the brightest star in the constellation, and may be assumed to have diminished considerably in brilliancy since it was entitled [alpha] by Bayer. It will easily be found, however, by means of the observer's star maps. If now the telescope be directed to Alkes, there will be found, following him at a distance of 42·5 s, and about one minute southerly, a small red star, R. Crateris. Like most red stars, this one is a variable. A somewhat smaller blue star may be seen in the same field.

There is another red star which may be found pretty easily at this season. First find the stars [eta] and [omicron] Leonis, the former forming with Regulus (now lying towards the south-west, and almost exactly midway between the zenith and the horizon) the handle of the Sickle in Leo, the other farther off from Regulus towards the right, but lower down. Now sweep from [omicron] towards [eta] with a low power. There will be found a sixth-magnitude star about one-fourth of the way from [omicron] to [eta]. South, following this, will be found a group of four stars, of which one is crimson. This is the star R Leonis. Like R Crateris and R Leporis it is variable.

Next, let the observer turn towards the south again. there are to be seen five stars, forming a sort of wide V with somewhat bowed legs. At the angle is the star [gamma] Virginis, a noted double. In 1756 the components were 6-1/2 seconds apart. They gradually approached till, in 1836, they could not be separated by the largest telescopes. Since then they have been separating, and they are now 4-1/2 seconds apart, situated as shown in Plate 3. They are nearly equal in magnitude (4), and both pale yellow.

The star [gamma] Leonis is a closer and more beautiful double. It will be found above Regulus, and is the brightest star on the blade of the Sickle. The components are separated by about 3-1/5 seconds, the larger of the second, the smaller of the fourth magnitude; the former yellow-orange, the latter greenish-yellow.

Lastly, the star [iota] Leonis may be tried. It will be a pretty severe test for our observer's telescope, the components being only 2"·4 apart, and the smaller scarcely exceeding the eighth magnitude. The brighter (fourth magnitude) is pale yellow, the other light blue.

Members Astro-photographs.

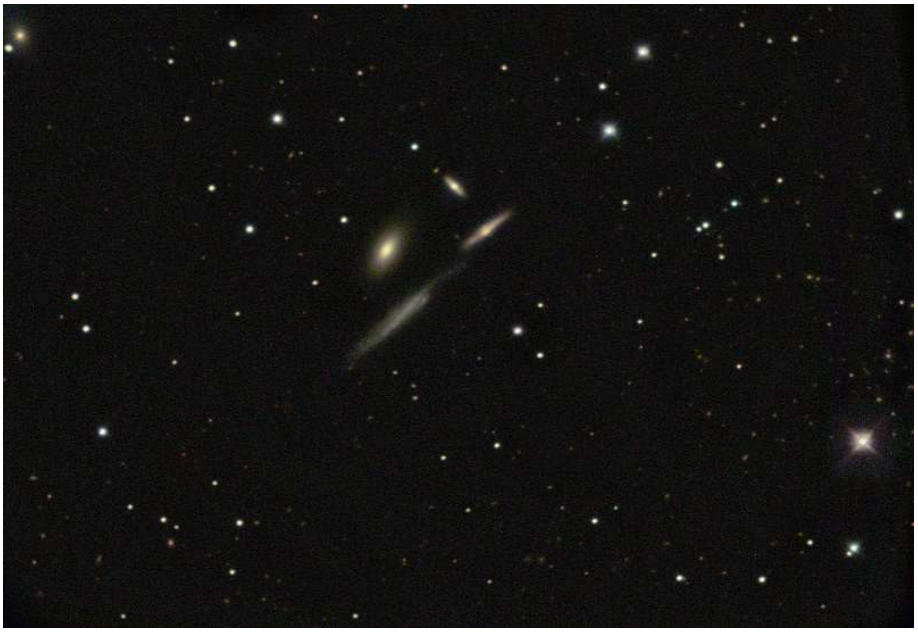
Dan Self

NGC4302 and NGC4298 Virgo Cluster

Canon 1000D 20” Observatory telescope

NGC 4993 (Kilonova Galaxy) LRGB ATIK Camera 20” Observatory telescope

NGC 4361 in Corvus ATIK RGB



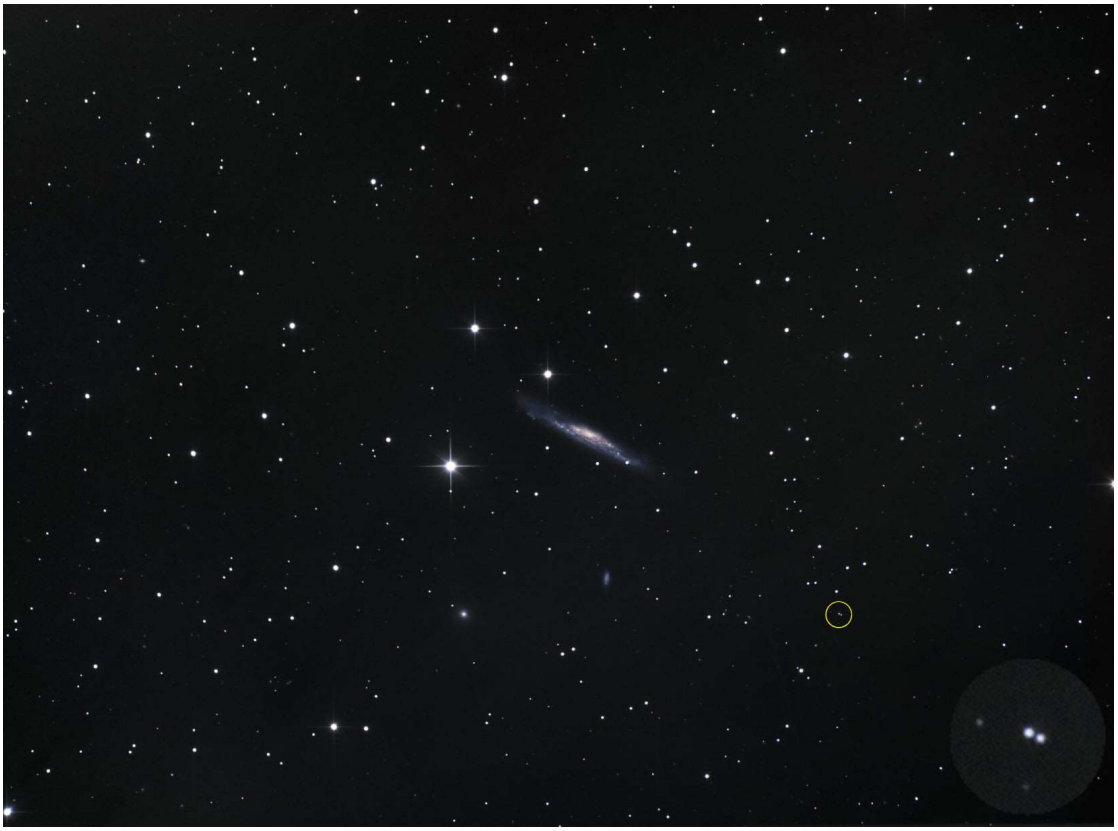
Hickson 61, sometimes called "The Box", is a very tight grouping of four galaxies that form a nearly perfect rectangle. Contained within a field of just 3.8'

ATIK Camera L 10mins, R 6mins, G 6mins, B 6mins 20” Observatory telescope.

Luke Broom Lynne

M101 ATIK 383L+, 200PDS Newtonian. 65 x 5 minute exposures Luminance.

22 x 2 minute exposures for R & B, binned 2x. Sythesised Green channel,



Here's a capture of the so-called Twin Quasar, near the galaxy NGC3079, a result of the gravitational lensing effect causing warping of space-time by an intervening (invisible here) galaxy, as described by general relativity, forcing the quasar's light to take two separate routes to reach us. These individual light paths travel on different sides of the foreground galaxy so that one traverses extra mileage. Thus, any flickering or change in one image of the quasar is followed by the same change in the other image 417 days later.

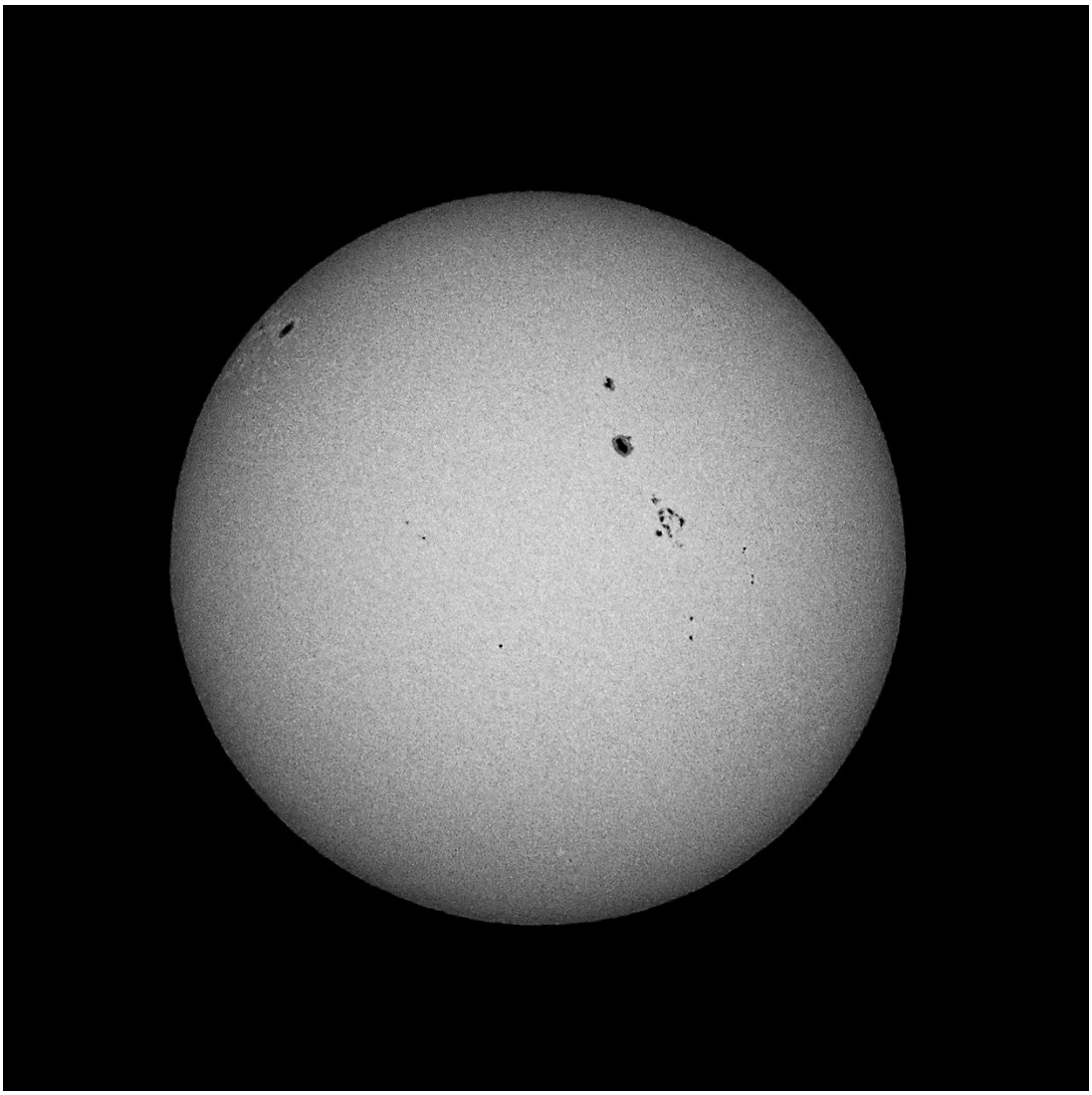
Apparently 174 times further from us than NGC3079, 8.7 billion light years away!

Atik 383L+, 250mm f/4.8 Newt. 52 x 300s exposures luminance, 18 x 300s R & B binned 2x, synthetic green channel, 12 x 600s HA binned 2x

NGC5364 at the top, the lenticular galaxy NGC5363 to its lower right and the edge-on spiral NGC 5356 near the bottom, plus lots of fainter galaxies. 250mm f/4.8 Newtonian, Atik 383L+ cam, 58 x 300s exposures.

NGC5364 (lop left), NGC5363 (right)

Peter Farmer



Canon 60Da with 400mm lens and a 2x extender. Tripod mounted.

Neil Wilson

Hickson 44 in the constellation of Leo.

Roger Hyman

10% Moon. GT71 with ZWO ASI462MC camera with UV/IR cut filter. SharpCap Pro 4 and stacked in AS!3 (best 25 % from 2,000 frames)

Messier 94 (M94), (Cat's Eye Galaxy or Croc's Eye Galaxy,). 120 x 60 second exposures. ZS126 and Altair 183C Pro camera. Cap. SharpCap Pro 4.

Processed in APP. Photoshop and Topaz DeNoise and Sharpen AI.

Messier 51 (M51) Whirlpool Galaxy in Ursa Major. (125 x 30 second exposures at 1600 gain). ZS126 and Altair 183C Pro camera and unguided. I used 30 flats and dark flats and no darks. Captured in SharpCap Pro 4 and stacked in APP. Adjusted in Photoshop.

The Owl Nebula (also known as Messier 97, M97 or NGC 3587)

William Optics Zenithstar 126. Altair 183C Pro camera. Celestron CGX mount 550 x 30 second exposures (around 4 ½ hours). Captured in SharpCap Pro 4 and processed in APP, Photoshop 2022 and Topaz DeNoise and Sharpen AI.

M97 (Owl Nebula) and M108

Captured with GT71 and Altair 183C Pro camera. 70 x 120 seconds, 20 x darks, flats and dark flats. Processed with APP and Photoshop.

The Sombrero Galaxy

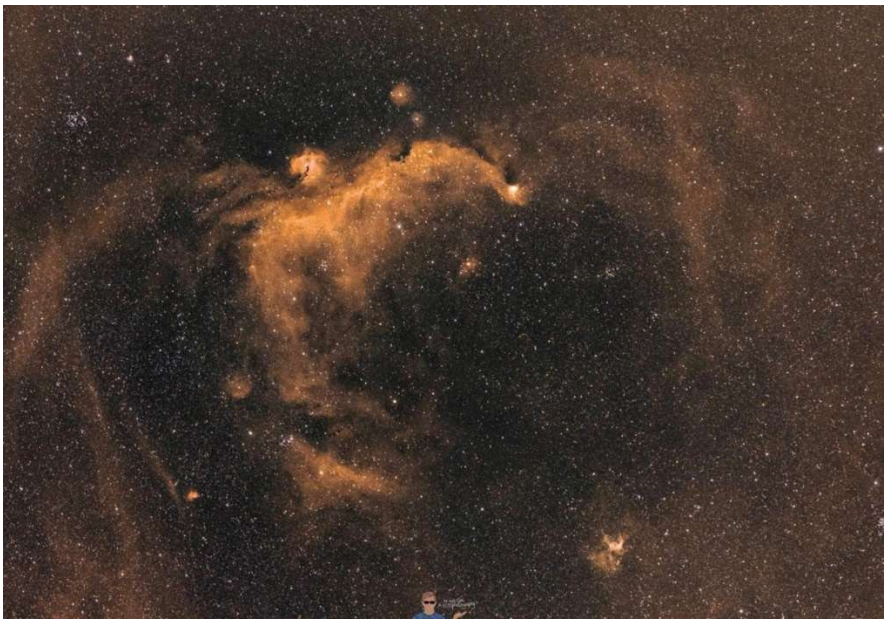
William Optics ZS126 and Altair 183C Pro camera. 250 x 30sec SharpCap Pro 4 ,AstroPixel, Adobe Photoshop, Topaz DeNoise and Sharpen AI.

Whale Galaxy

WO ZS126, Altair 183C Pro camera. 90 x 60 second frames, SharpCap 4 AstroPixel Processor. Photoshop, Topaz Sharpen/ DeNoise AI

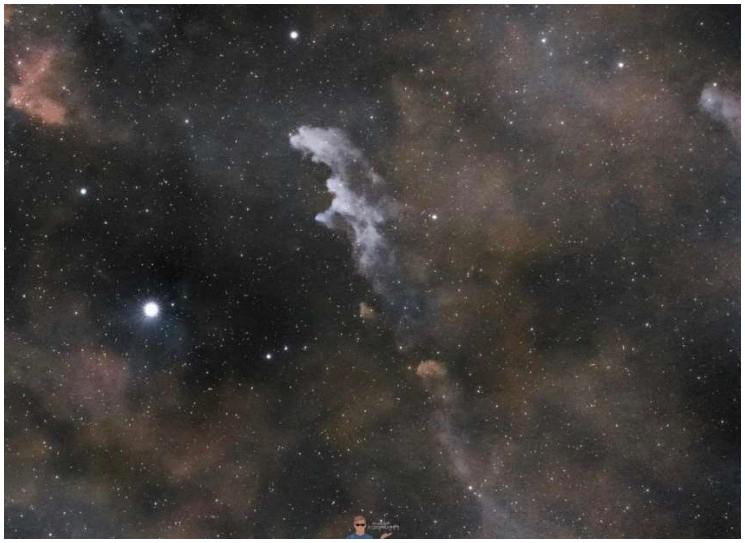
Andrew Luck

Michael Wilson



Canon 6D UV/IR cut filter mod. Astronomik 12nm Ha clip filter. Samyang 135mm F/2.8. Sky Watcher Star Adventurer star tracker. Manfrotto 055 tripod.

Total combined integration time of 4 hours and 12 minutesStacked in DSS. Edited in Starnet++V2, Photoshop/Lightroom

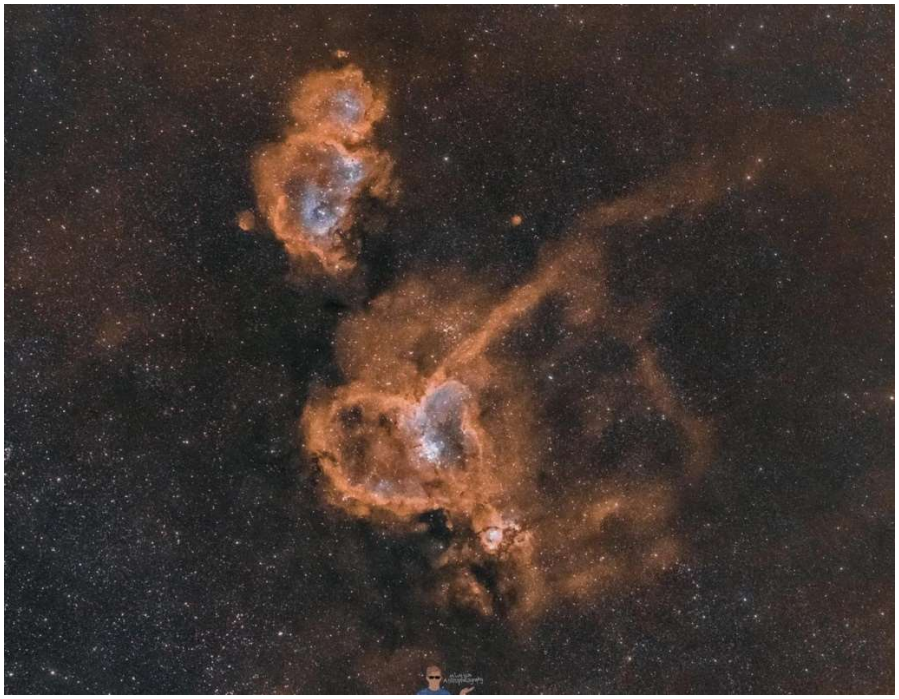


Canon 6D UV/IR cut filter mod. Astronomik 12nm Ha clip filter. Samyang 135mm F/2.8. Sky Watcher Star Adventurer star tracker. Manfrotto 055 tripod.

Total combined integration time of 1 hours and 56 minutes Stacked in DSS. Edited in Starnet++V2, Photoshop/Lightroom

Jellyfish and Monkey Head nebulas in HOORGB.

Total combined integration time of 8 hours and 22 minutes

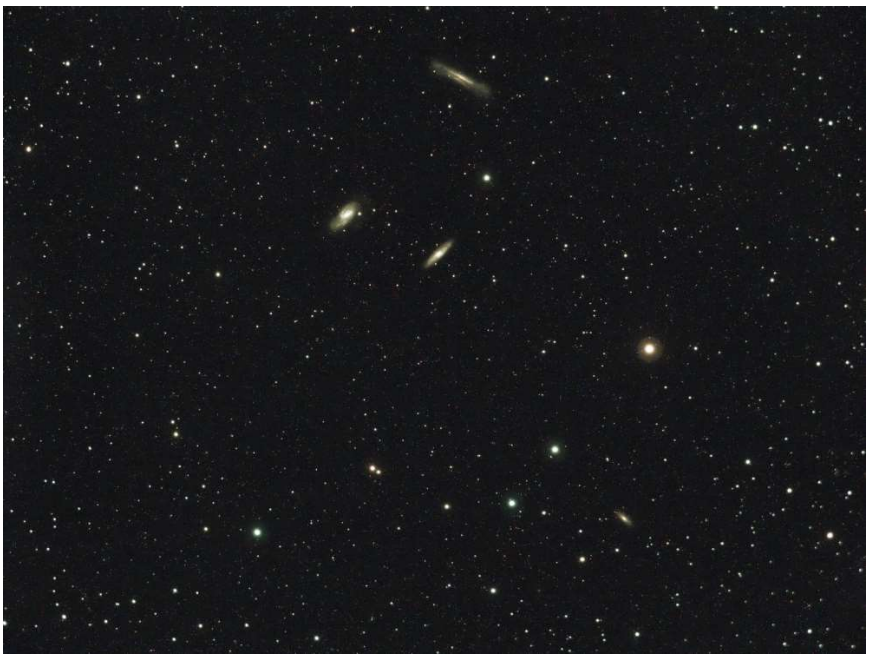


Heart and Soul nebulas in HOORGB

Total combined integration time of 4 hours and 33 minutes

Mick Ladner

Lobster Claw Nebula Sh2-157 last night. 40 x 180 second lights plus cal frames

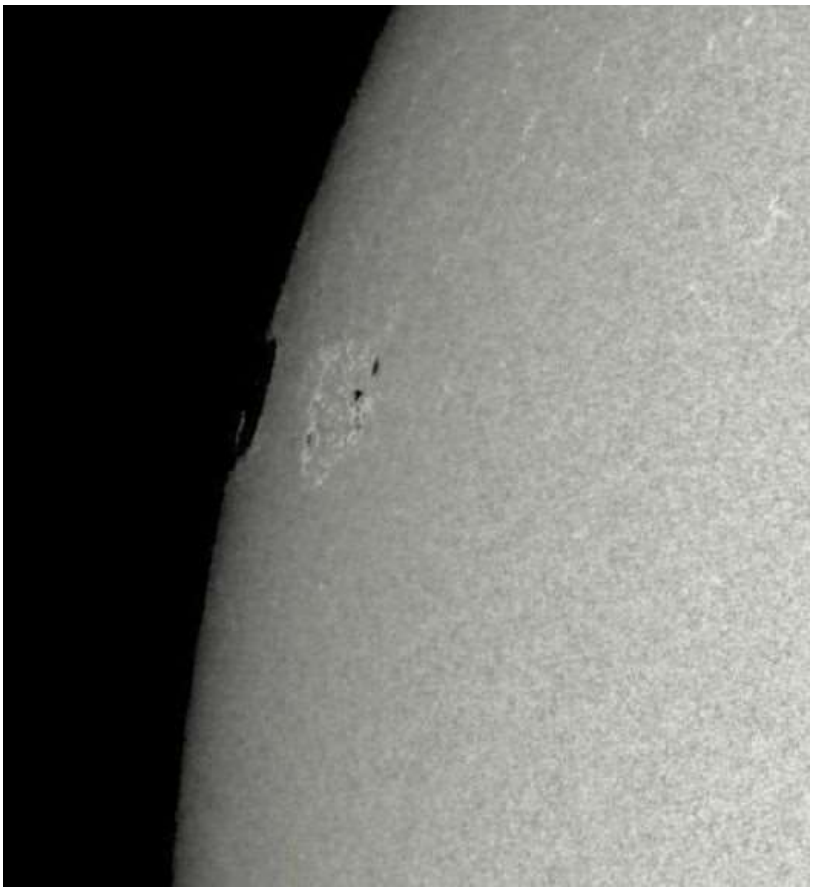


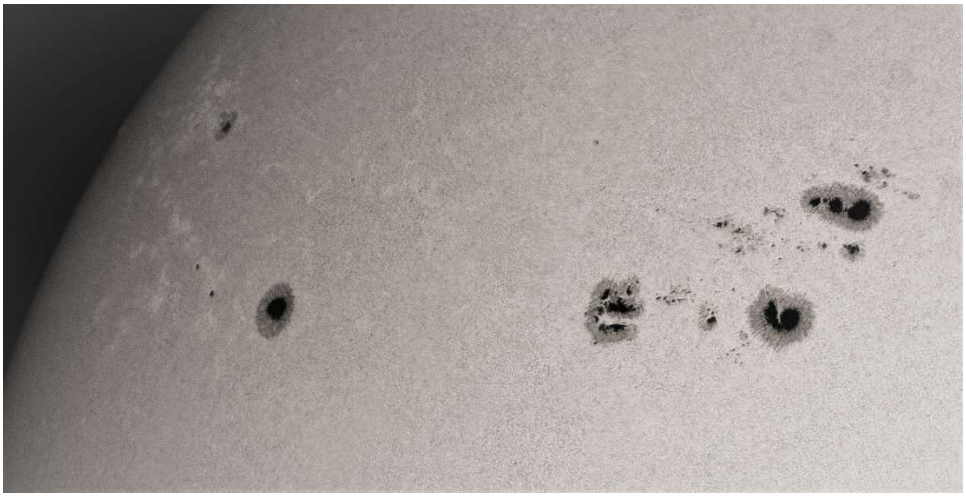
Leo Trio. 20x180 sec sub. Processed in PI LR & Topaz De-Noise.

Malcolm James Dent

99.7% full "Worm" moon.

Chris Bailey





BRECKLAND ASTRONOMICAL SOCIETY

Charity No.1044478
www.brecklandastro.org.uk
Affiliated to the British Astronomical Association and the Federation of Astronomical Societies
Dr Dan Self, Chairman, 56 Lindley Street, Norwich, Norfolk, NR1 2HF.
07734 364667 chairman@brecklandastro.org.uk

OBSERVATORY RISK ASSESSMENT 2022

This policy document applies to the aforementioned charity and covers all instances of normal use of the observatory building and equipment within it. All other statements of intent are laid out in the society's constitution.

The purpose of the society (Breckland Astronomical Society) is to promote and to advance public education in the Science of Astronomy and all branches of scientific research and in so doing the following policy statements are necessary.

Persons visiting are members and public of all ages by pre-arrangement, or on public open nights.

Section 2 - Risk Assessment

Hazards (*visit leaders must identify any additional hazards where applicable)*	**Risk Control Measures**	**Outcome risk rating**
For external parties: Safety whilst travelling to observatory.	Responsibility is with individual regarding transport.	Low
Lost people	A nominal roll should be available for parties with minors. Stay in groups and count in and out, especially risky when young children running around on dark field. Responsibility with teachers/akelas.	Tolerable
Pre-existing medical conditions	Visitors have been asked to bring with them anything they need with regard to medicine/ first aid training. DS is first aid trained as part of job.	Tolerable
In the Observatory: Moving the telescope dome - Mechanical hazard from cogs and metal clips on dome motors and sliding parts. Falling from dome.	Supervision is necessary to prevent visitors' fingers being caught in dangerous places before moving. Train supervisors. Gears are located in inaccessible places. Signs to keep head out of opening while moving it. Failure of clips holding very difficult due to strong fastening.	Tolerable Tolerable
Electrical hazards	All electrical circuits are protected by RCD trip switches, which have been checked. Equipment should only be used by trained demonstrators as PAT testing is not viable.	Tolerable
Light intensity from laser pointer, bright LEDs	A low power class 2 laser can be used to collimate scope, this should not be used during visits. An upper end- class 2 green laser is sometimes used for pointing out stars outside. This should NOT be pointed	Low

	near people, or planes, only switched on briefly and used by supervisors/demonstrators only. Laser is currently broken.	
Skin contact with dangerous chemicals	Fly spray, propanol, and cleaning fluid kept in cupboard in small quantities. Keep cupboards shut when visitors are present and supervise.	Tolerable
Standing in dome - Falling (height is 7 feet)	Shutter opening is guarded by 2 bars at child / adult heights. Limit numbers in dome 7 + supervisors can easily fit.	Tolerable
Standing in dark places - Stumbling in low light	Use dim red lights on floor to preserve night vision. Dim lights gradually.	Low
Climbing ladder in dark - Falling while viewing through telescope.	Ladder must be shown to people first, but enough light is available. Check for mobility difficulties.	Tolerable
Ascending stairs - Falling or being hit with trap door	Be sure demonstrator to go up first and lock door open. A knocking procedure is known if the door is shut.	Tolerable
Fire risk	Large items are not flammable. Mainly metal fixtures and fittings. Sources of ignition (sparks) are contained in electrical equipment. Flammable gases are not kept in building. Radio linked smoke alarms installed. Fire extinguishers available and annually checked. Call 999 in emergency. Can exit via dome opening in emergency	Tolerable
Standing in dark cold field - frostbite	Weather could be freezing in most months. Warm clothes to be advised to visitors. Heaters indoors if cold and keep a blanket at the observatory.	Tolerable
Trips and slips	Trip hazard in dark. Torch guidance will be provided but is limited because	Tolerable

	of dark sky observing. Advised to dip and dim lights.	
Child protection risks (under 18s)	Two adults should be available at all times. DBS checks should be in place for group supervisors. The organisation that runs the observatory, Breckland Astronomical Society, operates a child protection policy. The committee are vigilant with regard to risks.	Low
Airborne viral transmission indoors	The place is fairly well ventilated with vents in toilet and loose fitting door and dome and dome floor hatch. Open internal doors Physically Distance 1m+ between groups Limit numbers to what any national guidelines state at the time. Space is quite limited. Provide outdoor activities, e.g. electronically assisted astronomy. Telescopes outdoors.	Tolerable – as we have very good ventilation.
Outdoor transmission	Risk is found to be low outdoors. Follow national guidelines. Be mindful of face to face breath transmission.	Tolerable
Surface transmission	Sanitisers are available. Wipe surfaces. Limit one to use of kitchen/bathroom area. Offer people option of using own mugs and washing up. Clean toilet regularly.	Low
Reporting	Not needed, ask permission, but a record of visitors names is good to keep a for any future possible information purposes. It will be destroyed before 5yrs (GDPR).	N/A

Trustees as of 17/04/2022 are: Dr Dan Self *+(Chairman), Andy Jones*+ (Treasurer), Richard Harmon. Committee members (acting trustees): Rebecca Greef*, John Copsey. Trusted supervising members: Mick Ladner, John Gionis, Peter Farmer, Andrew Luck, Chris Bailey.

*DBS checked for day job. [+]Frist Aid trained for day job

Signed……  ……
……
Chairman, Breckland Astronomical Society, UKCC 1044478.

Invitation to Gresham Lectures

I'd like to invite your members to some free, hybrid lectures by Sir Roger Penrose, Professor Katherine Blundell and Professor Roberto Trotta at Gresham College/ online in May 2022 and June 2022. You can register for any of these lectures to watch online or in-person via the links below.

With best wishes

Lucia Graves

The Future of Life on Earth

Roberto Trotta, Visiting Professor of Cosmology, Gresham College

1pm, Mon 9 May Barnard's Inn Hall/ Online/ Watch Later

https://www.gresham.ac.uk/whats-on/future-life

Although life is probably widespread in the universe, our pale blue dot, Earth, is the only known place harbouring intelligent life. Even if we manage to stave off extinction by climate change, avoid a nuclear apocalypse and the dangers of runaway AI, biological life on our planet will eventually come to an end in about 5 billion years' time. What are the astrophysical dangers to life on Earth, and the prospects for life's survival into the distant future?

Life in the Universe

Katherine Blundell, Gresham Professor of Astronomy, Gresham College

6pm, Weds 1 June Museum of London/ Online/ Watch Later

https://www.gresham.ac.uk/whats-on/life-universe

How can life form in the Universe, and what are the necessary ingredients for habitability so that planets can sustain life? Can we expect life elsewhere in the solar system, or on exo-planets?

This lecture offers a broader perspective from astrobiology, astrochemistry, and astrophysics on the habitability or otherwise of other planets beyond Planet Earth.

[The Journey from Black-Hole Singularities to a CyclicCosmology]

Sir Roger Penrose

6pm, Thursday, 9 Jun 2022 The Old Library, Guildhall / Online/ Watch Later

https://www.gresham.ac.uk/whats-on/thomas-gresham-22

The “singularity theorems” of the 1960s demonstrated that large enough celestial bodies, or collections of such bodies, would, collapse gravitationally, to “singularities”, where the equations and assumptions of Einstein’s general relativity cannot be mathematically continued. Such singularities are expected to lie deep within what we now call black holes. Similar arguments (largely by Stephen Hawking) apply also to the “Big-Bang” picture of the origin of the universe, but whose singularity has a profound structural difference, resulting in the 2nd law of thermodynamics, whereby “randomness” in the universe increases with time. It is hard to see how any ordinary procedures of “quantization” of Einstein’s theory can resolve this contrasting singularity conundrum,

For Sale or Wanted

This section is for the sale of Astronomical items and any wants from members. Details of items for sale (With photographs where applicable) should be forwarded to the newsletter editor at newsletter@brecklandastro.org.uk

It is suggested that a donation of 5% of the final sale price be given to the Society to assist with funds. If sellers do not wish to make their contact details public then please make this known to me and I will field any enquiries on a box number system. Please send any sales details to me before the 26th of the month for inclusion in the next issue.

Please ensure that if any item is sold by another means prior to publication that I am advised so it can be removed to avoid confusion.

Celestron NexStar Evolution 925 Telescope

A great opportunity to purchase a high-grade automated telescope and accessories. The telescope was purchased in 2015 and has never been taken out of the boxes. It would be best for it to go to a good home where it would be used to the equipment's full potential. The current model of this scope alone has a recommended retail price of over £3000. So, this is a great opportunity for someone.

The price also includes the Celestron 1.25” eyepiece and accessory kit.

Price £1500 ono.

Contact Roy Frost (roy.frost1@btopenworld.com)

Meade 2045 4" Schmidt Cassegrain telescope

Specifications:

Optical design: Schmidt Cassegrain Catadioptric

Clear Aperture: 102mm

Focal Length: 1000mm

Focal Ratio: f/10

Near Focus: 15 feet

Resolution: 1.1 arc secs

35mm angular film coverage: 1.38’x1.96’

Telescope mounting: Fork type, double tine

Electronic motor: 12Vdc Pulse motor

Setting Circle diameters: Dec- inches; R.A. - 6 inches

Manual Slow motion controls: Dec and RA

Optical tube size: 4.6 inches dia x 10 inches long

Secondary mirror obstruction: 1.8 inches Dia; 20%

Telescope size swung down: 7x10x11 inches

Net weight: 12 pounds

Includes all equipment shown including tripod, wedge, and case.

£150 ono.

Reply to rmt18@btinternet.com

12” Skywatcher, Flex Tube, Go To, Dobsonian

Only used a few times over the last two years….

To heavy (getting too old) so there is a wheeled base.

Just testing the waters looking for £1000

Contact Jim Slight (j.slight@btopenworld.com)

Equipment available for loan to Members

As well as our fantastic library members of the society can borrow our equipment. Here is an equipment list that can be used or borrowed by members, subject to personal responsibility for replacement value. Discuss your plans with one of the regulars first, as it is not easy for beginners to use some of this kit. We are here to help show you how to use it, when the weather holds up, then you will need to sign it out and get approval by a member of the committee. We can discuss a reasonable term.

Refractors:

William Optics Megrez 102 S.V. F7 D102mm f/7 and reducer to f/5.6 – this may be unavailable soon.
William Optics GT-102 2019 D102mm F703mm f/6.9
Vixen 4" Refractor f/9

SCT/Maks:

Celestron C925 Starbright F10 SCT FL D234.95mm F2350mm f/10 Refractor – preferably this should not be taken off the premises.
Celestron C8 SCT D203.2mm F2000mm f/10 Refractor (orange tube)
Meade LX200R SCT D203.2mm F2000mm f/10
Konus Motormax-90 Maksutov-Cassegrain 90mm F1200mm f/13 #1795
Meade ETX125 D127mm F1900mm f/15 Maksutov-Cassegrain Reflector
Mak-Newt:
Skywatcher 190MN DS Pro Maksutov-Newtonian Optical Tube Assembly D190mm F1000mm

Dobsonians:

Skywatcher Skyliner 200mm F1200mm Dobsonian Reflector
Helios D200mm F1000mm Dobsonian Reflector
8-inch Dobsonian (turquoise tube, hand-made)

Solarscope:

Coronado Solarmax 40

Meade 8x50mm Guide Scope

Binoculars:

Vanguard KR-7500 7X50mm Field 7 degrees Binoculars – a little out
Konus #2253 7x50 Field 6.8º Binoculars
Chinon RB Optics 8-20 x 50 HB Zoom Binoculars
Prinzlux 10x50 Binoculars – needs optically cleaning

Mounts:

Berlebach Planet Tripod with Double Clamps
Orange EQ4 telescope mount
Skywatcher SynScan EQ5 Equatorial Mount & Tripod
SynScan mount controller
Meade LXD German Equatorial Mount & Autostar Controller
SynScan mount controller
iOptron IEQ45 Mount and Pier
iOptron Go2Nova mount controller

Eyepieces:

Tele Vue Delos 17.1mm 2"
Antares Speers-Waler 4.9mm SWA Series 2 2"
Antares Speers-Waler 9.4mm SWA Series 3 2"
Meade Ultra Wide Angle 14mm 1.25/2"
Antares W70 Series 8.6mm
Meade Super Wide Angle 18mm 1.25"
Celestron 32mm Plossl 1.25"
Celestron 26mm Plossl 1.25"
Antares 17mm Plossl FMC 1.25"
Intes-Micro Q74 WA 21mm 1.25"
Orion (Or) Circle-T 9mm 1.25"
Vixen K 18mm 1.25"
Fullerscope K 25mm 1.25"
66 Ultrawide 20mm Long Eye Relief 1.25"
Or 6mm 1.25"
Plossl 40mm Multi-coated
Plossl 17mm Multi-coated
14mm (7mm 21mm) 1.25"
Super 20mm 1.25"
Soligor PE-6mm 1.25"
Super Plossl 32mm 1.25"
Lanthanum LV 2.5mm 45 degree 20mm 1.25"
Televue 2x Barlow 1.25"
Televue 2.5x Barlow Powermate 1.25"
2x Barlow Lens
Meade Telenegative 2x Barlow 1.25"

Telescope accessories:

William Optics AFR-IV Adjustable Flattener Reducer
Meade Zero Image-Shift Microfocuser
Meade 4000 Series f6.3 Focal Reducer
Meade 4000 series f3.3 CCD Focal Reducer with T-Adapter
Celestron Reducer/Corrector f6.3 (Model: 94175)
Tamron Adaptall-2 Custom Mount

Eyepiece accessories and filters:

Meade Electronic Eyepiece
Meade Illuminated Reticle MA12mm
Celestron Radial Guider (#94176)
Light Pollution Filter 1.25"
Meade #908 O-III Nebular Filter
Variable Polarizing Filter #3
Baader Planetarium Contrast-Booster Filter (#2458360) 1.25"
Celestron Colored Eyepiece Filters (#25 Red, #38A Blue, #47 Violet, #53 L Green)
Baader G-CCD Filter 1.25" (Cat: 2458470G)
Baader R-CCD Filter 1.25" (Cat: 2458470R)
Baader B-CCD Filter 1.25" (Cat: 2458470B)
Baader UV/IR Cut/L-Filter 1.25" (Cat: 2459207A)
Baader H-alpha 7nm CCD Narrowband-Filter 1.25" (Cat: 2458382)
Baader O-III 8.5nm CCD Narrowband-Filter 1.25" (Cat: 2458435)
Baader S-II 8nm CCD Narrowband-Filter 1.25" (Cat: 2458430)
Baader H-beta 8.5nm CCD Narrowband-Filter 1.25" (Cat: 2458425)
Astronomik L-RGB Type 2c Filterset 1.25" (4 filters, Cat: 10220125)
Astronomik CLS-Filter 2" (Cat: 10213200)
Astronomik CLS-Filter 1.25" (Cat: 10213125)
Astronomik CLS CCD-Filter 1.25" (Cat: 10208125)
Star Analyser 100 (Model: PHEL-SA100) – produces spectra

Cameras:

Atik Focal Reducer 58mm
Atik 383L + FW 11/4"+Filters
Atik Infinity Camera
Atik 314L+ CCD Camera (SNI1003041)
Atik One 6.0 Monochrome CCD Camera (SN: 1191452-0093)
Atik 460EX Color (SN21223-26)
ZWO ASI290MM Mini USB 2.0 Monochrome Small Format CMOS Camera
Imaging Source DBK21AU618.AS 640x480 USB2 planetary camera
STV (‘vintage video CCD AV camera) and Filter Wheel
Astrovid 2000 (‘vintage’ CCD camera)
Nikon D100 DSLR
Sigma EX DG Macro 105mm 1:2.8 DLSR Lens
Geoptik CCD Adapter x Canon (Model: 30A189)

CONTACTS

Chair Dan Self
Contact **chairman@brecklandastro.org.uk**

Observatory/Visits Mick Ladner
Contact **visitors@brecklandastro.org.uk**

Webmaster Andrew Luck (temporary)
Contact webmaster@brecklandastro.org.uk

Newsletter Chris Bailey
Contact newsletter@brecklandastro.org.uk

Membership/Treasurer Andy Jones
Contact treasurer@brecklandastro.org.uk

Secretary Rebecca Greef
Contact secretary@brecklandastro.org.uk

Please check with any of the contacts in bold before visiting the observatory. Please ensure you are wearing appropriate footwear and clothing and bring a torch (preferably one showing a RED light)

Breckland Astronomical Society Events – 2022 7:30pm Great Ellingham Recreation Centre, Watton Road, Great Ellingham, Attleborough, Norfolk **Hall entry £2.50 £1 U18s**		
Friday, May 13th	**The Moon in Detail**	Jerry Workman
Friday, June 10th	**Cosmic Rays**	Dr Vanessa López Barquero, IoA
Sunday, June 19th	**Event: International SUNday**	RSPB Lakenheath Fen
Friday, July 8th	**Eclipses past and future**	Sheridan Williams
Friday, August 12th	**Astro Photography Image Processing using Affinity Photo**	Dave Eagle FRAS
Friday, August 27th	**Public open night**	Observatory
Friday, September 9th	**TBA**	-
Friday, September 30th	**Public open night**	Observatory
Friday, October 14th	**Citizen Science**	Prof Chris Lintott
Friday, October 28th	**Public open night**	Observatory
Saturday, October 29th – Wednesday, November 2nd	**External Event: Star Party***	Haw Wood Farm*
Friday, November 11th	**Quiz Night**	Dan Self
Friday, November 25th	**Public open night**	Observatory
Friday, December 9th	**TBA**	-
Friday, December 30th	**Public open night**	Observatory
* Haw Wood Farm Caravan Park, Hinton, Saxmundham, IP17 3QT. www.hawwoodfarm.co.uk to book: info@hawwoodfarm.co.uk 01502 359550 Dan & Georgina. £16 per pitch per night.		