Cover image - Tarantula Nebula acquired data with the ASIAIR PRO 294MC Pro, 120mm mini guide camera and ZWO 60mm scope, TS Optics 130mm refractor, 41 x 300 seconds, Optolong L-Extreme Filter. The Nebulosity is astounding. *Nik Axaris*

SCORPIUS

THE JOURNAL OF THE
MORNINGTON PENINSULA ASTRONOMICAL SOCIETY INC.

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The Mornington Peninsula Astronomical Society (formerly the Astronomical Society of Frankston) was founded in 1969 with the aim of fostering the study and understanding of astronomy by amateurs and promoting the hobby of amateur astronomy to the general community at all levels.

The Society holds a focused general meeting each month for the exchange of ideas and information. Regular public and private observing nights are arranged to observe currently available celestial objects and phenomena. In addition, the Society encourages the service of its members for on-site or off-site educational presentations and observing nights for schools and community groups.

MPAS - https://www.facebook.com/mpas0/

MPAS Members - https://www.facebook.com/groups/MPAS1/

Scorpius MPAS - https://www.facebook.com/Scorpius-MPAS-1694951307446763/

Mornington Peninsula Astronomical Society

SOCIETY NEWS

Hi all, I'm sure you will all be pleased to hear that we're ready to reopen the MPAS Observatory for member viewing!!

On Saturday 5th December from 7:30pm the site will be open to those who would like to visit. And hopefully it won't be cloudy...

Our COVID Safe-Plan is in place, and therefore there are rules we must all follow when visiting the site.
Here are the basic rules which are required and are mandatory for all MPAS Members:

1) BOOKING. No site entry unless you have a confirmed email booking (welcome@mpas.asn.au) showing date/times, name and phone of all persons.

2) SICK. If slightly unwell or with cold/flu symptoms DO NOT enter the site any further. Go home.

3) SIZE. Max of 50 people outdoors. Max of 20 people or 1 per 4m² (plus speaker/usher) in auditorium, 2 in kitchen, 2 in reception, 1 in toilet, 4 in observatory, 1 in warm room, 1 in observatory entrance room, 1 in dome, 1 in BBQ shed, 1 in container, 1 in garden shed.

4) CHECK-IN. All attendees must check in using the MPAS QR code (or log book as last resort) upon arrival to assist with any contact tracing.

5) CLEANLINESS. All touched surfaces and handles must be carefully cleaned after your use. Wipes and cleaning agents provided. Cleaning checklist on site.

6) DISTANCING. Min 1.5 metres between people anywhere on-site. 1 person per 4 sq. metres indoors.

7) HANDS. Wash often. Never assume someone else has already cleaned the surface. Hand sanitiser provided.

8) MASKS. Masks must be worn inside the observatory, kitchen, reception & auditorium.

There will be COVID Marshals onsite to ensure the rules are followed, and they will train members to ensure we comply with our plan, which enables us to be open.

So if you would like to call in, or have any questions, please send an email to welcome@mpas.asn.au

Looking forward to seeing everyone again soon! *Kind regards, Nerida & MPAS Committee*

MPAS has committed to having an information booth for this event, which is held on the long weekend in March 2021. The show is held at Sandown Racecourse where we will be provided with both an undercover and outdoor area. We can setup a static display (like our Coolart stall) or weather permitting, solar, moon or even planetary viewing.

This event works well with MPAS's goals of educating the public, fostering interest in astronomy, as well as helping to generate enthusiastic new members into the society. In previous years, this event has attracted over 100,000 attendees through the turnstiles during the 3 days, making it a major event in our region. I have volunteered previously with my ham radio club and had a great day out. Activities include Large and Small Model Railways, Arts & Crafts, Ham radio, Electronics, Lego, Drones & RC Planes/Boats.

We now need to find members to help cover the 3 days from Saturday March 6th through Monday the 8th. There should be plenty of time to have a wander around yourself. Members helping will get free entry to the event & food vouchers. If you can help out, please email d.rolfe@mpas.asn.au with your availability. Either full or half day volunteers welcomed. *Regards, Dave Rolfe*

https://www.trainandhobbyshow.com.au

Society Meeting November - https://www.mpas.asn.au/mpas-meeting-november-2020/

Society Meeting December 16th - saw about 12 members in attendance. Peter Skilton (President) chaired the meeting updating members on past and future events. Then Ross Berner MPAS & ASV member gave a talk on Supernovae. Highlights were interesting new information on the size of star and what happens when they get to the end of their life. Mark Stephens (Vice President) did Sky for the Month and mainly talked about the planets. 10 minute tea break. Sky Murphy talked about the number 12. Peter played some videos of recent events, the collapse of the Arecibo telescope, Japanese space capsule with asteroid sample return at Woomera, why glass is clear, and brief history of the universe to song "Dust from a Million Stars" by Cadence Choir. Meeting finished at 11pm. You can watch it on the MPAS site (and on MPAS Youtube channel) soon: https://www.mpas.asn.au/meeting-recordings/

Society Xmas party December 19th - It was a wonderful evening at The Briars yesterday with about 50 people in attendance for the special, free Christmas roast dinner. Special thanks go to several members for getting the site swept, dusted and back up and almost running like new, behind the scenes over the preceding days. This year it wasn't a free-for-all buffet, but rather Jamie, Nerida, Dave & Leanne served up the food from the servery area so as to help avoid any potential for cross-contamination. Similarly, tea and coffee were all sachets. It was a superb fare for the evening from Reddy Roast, care of Jamie's ordering; and Nerida and her elves had set up the socially-distanced tables adorned with Christmas star lights inside the auditorium area. All the doors were left open for ventilation. Sadly, due to the cap on attendance numbers, not everyone who might have come along was able to, but hopefully next year's will allow a further increase. Attendance was logged by QR code, just in case of the hopefully unlikely scenario that contact tracing becomes necessary over the coming fortnight. A group photo was snapped by John Cleverdon outside by the small dome, all with 1.5 metre distancing of course, except for those living together. Around twilight, the clouds started to part, and gave views of Jupiter and Saturn and several of their moons, about 0.2 degrees apart, ahead of the so-called Grand Conjunction of these two massive planets on Monday evening. Because of the altitude in the West, and the early evening, the sky conditions weren't brilliant for seeing planetary detail, but nevertheless were enjoyed by all on the site. These conjunctions occur about every 20 years as Saturn and Jupiter align in their orbits, as seen from Earth, but less frequently than that they approach each other more closely, and this year's conjunction is the tightest bunching in the sky since the 13th century. A similar one won't occur again until about 2080. And so, as this pandemic year draws to a close and the planets align, may I wish you all the best of greetings for the season, and a safe and promising 2021. *Regards, Peter Skilton (President)*

Jupiter with Saturn members viewing night at the Briars 20th December 2020 - Last night at the Briars I took this image of Jupiter with Saturn using the 350mm Meade in the observatory and my Pentax K30 and 2 times convertor, giving a focal length of 7 metres. It was a tight squeeze but I got them to fit corner-wise. There were about 10 members viewing Jupiter with Saturn through the 8-inch refractor outside. All Jupiter's moons were on one side with Io almost touching Jupiter. We saw Titan just above Saturn which was quiet easy to spot. Once Jupiter disappeared behind the trees we had a quick look at Mars and Uranus.
Regards, Greg Walton

Below - Jupiter and Saturn taken with Vixen VC200L telescope + Pentax K1 SLR camera. Single shot on 14th December 2020.
By Dave Rolfe

Left - 1/50 sec , iso 400, 90mm f5 Sky 90 Takahashi thru 5mm Nagler at 10pm. Imaged with handheld Samsung S7 on 20th December 2020. *By Mark Hillen*

Right - Getting closer.... this was with my Nikon last night.. Taken on the 19th December *By Tara Shepherd*

Well done Tara, I see you captured Titan just below Saturn. Greg

Left - Jupiter and Saturn from the Briars tonight through my ED80, 2X Barlow on the 18th December 20. *By Chris Costokanellis*

Right - Just about managed to fit them both on the sensor today. They looked great in a 9mm wide-field eyepiece (8" f/6) on the 18th December 2020. *By Guido Tack*

MEMBER PROFILE

An astrophotography set-up. *By Stephen Gilmore*

I have primarily been a visual observer of the night sky, but this year I thought I would try my hand at astrophotography. Since I was building a system from scratch, and with the recent availability of innovative astro products, I was excited about the possibilities. Indeed, I found that it was possible to meet the following expectations:

1. *Portability*
The equipment should easily fit in the back seat of a car and everything should be able to be carried by one person without risking injury (Fig. 1).

Fig. 1. Two cases and a tripod bag only occupy one rear passenger seat, and all equipment can be carried easily by one person.

2. *Ease of assembly and disassembly*
The tripod, mount, telescope, guidescope and cameras should all connect quickly and reliably, preferably without needing to balance the telescope. Cabling should be minimal.

3. *Simplicity in preparation for imaging*
Polar alignment, plate solving, image scheduling and the initiation of guiding should be a simple and relatively quick procedure.

4. *Short integration times*
The telescope should be capable of generating sufficiently deep images with total exposure times limited to around 2-3 hours maximum.

5. *High-quality out-of-camera data*
The set-up should yield unprocessed data of excellent quality, limited only by the signal-to-noise ratio and the skill of the user. This implies state-of-the-art optics and excellent tracking and guiding performance.

6. *Minimal time and frustration while at the computer image-processing*
Software should be intuitive and easy to use. It should process files rapidly. Final image quality should only be limited by the skill of the user.

How to proceed? I started with the telescope. Given the requirements above, I wanted something fast, compact, and relatively light. It needs decent aperture. And the solution is the *Officina Stellare RH-200.* This telescope is a moderately wide-field 600mm focal length Riccardi-Honders design. It is fast (F3), has eight inches of aperture, and is compact (Figs. 2, 3). It is slightly on the heavy side when compared with eight-inch Cassegrains or Newtonians, but is easy to carry in its dedicated case with one hand (Fig. 1). Its optical and mechanical performance is second to none.

Fig. 2. The RH-200 and a closer view of the RST-135 in EQ mode. Note that there is no counterweight!

The second most important item is the mount. In this case, I chose the *Rainbow Astro RST-135*. Why? Well, it is compact, light, and does not need a counterweight, thus avoiding the need to balance the telescope at set-up. (Figs. 2, 3). It has built-in GPS and Wi-Fi, can be used in either AZ or EQ mode, and, with its harmonic drive, it is strong – it can throw the RH-200 around like a rag doll – and is very smooth, quiet and accurate in operation with zero backlash.

The third most important item is the tripod. In this case I chose the *LeoFoto* carbon fibre *405C* (Fig. 3). It is extraordinarily light, compact when folded (the legs break down to five telescoping lengths), and it has a rated capacity of 50kg. It is very stable.

Fig. 3. Telescope, camera, guidescope, mount and LeoFoto 405C tripod.

Finally, there are the extras:

1. *The cameras*
For my main camera, I decided to buy a second hand Canon 6D. The 6D is a full-frame camera with good sensitivity at the red end of the visible spectrum. The image circle generated by the RH-200 is 44mm in diameter, so it seemed a little disingenuous to use a standard astronomical camera with a typically small sensor. Of course, cooled and low-noise full-frame astronomical cameras are available, but I will leave that for another day. For the guide camera I will use the ZWO ASI 120MM Mini Guider, a compact and reliable instrument (which I need to buy).

2. *The guidescope*
Here I will use my Takahashi 7x50 finder (at least there's something I can use that I already own!) attached to a third-party helical focuser (Figs. 2, 3).

3. *The control software*
Here I opted for the ZWO ASIAIR Pro. This compact and elegant box facilitates polar alignment, plate solving, image scheduling and guiding with minimal fuss. It communicates seamlessly with the RST-135, the Canon 6D and the ZWO guide camera. Everything is controlled via Wi-Fi using the ASIAIR app running on an iPad Mini (Fig. 4).

Fig. 4. The ASIAIR Pro app controls all telescope and camera functions via Wi-Fi on an iPad Mini.

4. *The power supply*
All the items above are powered by two lightweight and compact Xiaomi 20,000 mAh power banks (Fig. 5). The RST-135 and ASIAIR are powered via USB-C, while external power to the Canon 6D (hopefully to keep the sensor a bit cooler) is via a special cable connected to one of the two standard 5V USB-A output ports on one of the power banks. The guide camera is powered directly from the ASIAIR. The batteries and ASIAIR (the latter is not shown) all sit conveniently in the stone bag attached to the tripod (Fig. 5).

Fig. 5. Two compact Xiaomi power banks sitting in the stone bag attached to the tripod legs, and the Optolong 2" filter screwed into the Officina Stellare camera adapter.

The back-focus of the RH-200 is not extensive, so I have modified the original Officina Stellare camera adapter to accommodate the Canon at one end, and a two-inch filter at the other end (the Optolong L-Pro light-pollution filter is shown attached – see Fig. 5). The central larger diameter M72 thread screws into the focuser of the telescope.

I have had success using *Mathematica* as image-processing software. While it may not seem as sophisticated (from an astrophotography point of view) as many dedicated programs, this view is wrong-headed: it will perform operations of arbitrary complexity on large data sets and do so efficiently. It does a wonderful job of image registration, stacking, improving contrast, bringing out details, and in creating HDR images by blending images captured at different exposure lengths (Fig. 6). And because I use *Mathematica* extensively in other applications, my familiarity with it means that I find it easy and intuitive to use.

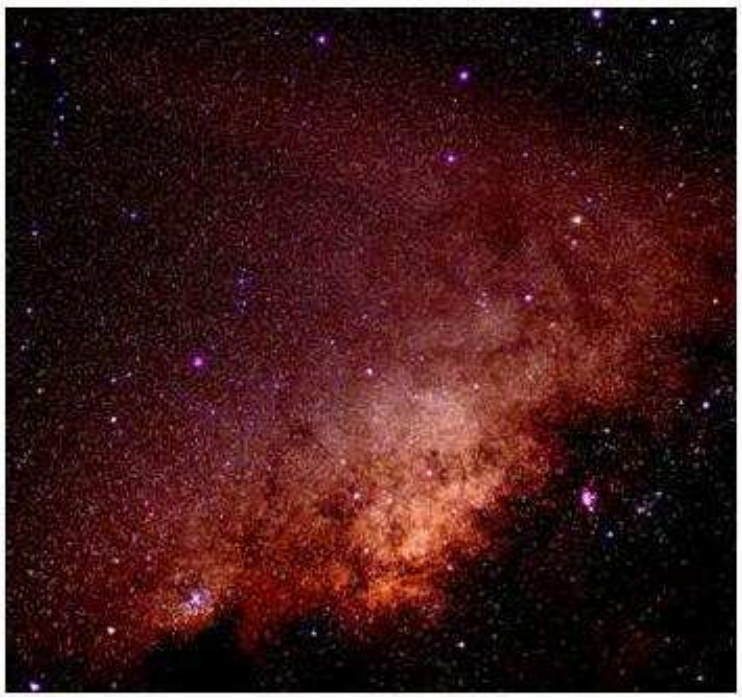


Fig. 6. Towards the centre of the Milky Way – processed in *Mathematica*.

Well, that's it! I hope the discussion above has given you some food for thought! As a new member, I am looking forward to visiting The Briars when (or if) the COVID restrictions are lifted, meeting some of the members, and getting this stuff out under the night sky.

OBSERVATORY UPDATE

Working bee on the 12th December - Small group worked very hard to get the Briars MPAS site up and running. Telescope have now been reinstalled in the Briars main observatory and the small dome. Lawns were cut, branches pruned, building swept out and cobwebs removed. Covid signage put in place.

Then finishing off with a small BBQ and a quick look at Jupiter with Saturn though the clouds with the 8-inch refractor (Big Blue).

The computers have been updated in the observatory warm room. Thanks to Anders Hamilton (Observatory Manager).

New Members Welcome

Paul Giusti
Graham & Roslyn Head
Inez, Peter, Clare & Martin Dussuyer
Marcelle, Peter, Clare & Martin McConchie
Becca, Simon, Jemima & Pippi Smith
Jacqui Duffee
Peter Aldenhoven

MPAS SUBSCRIPTIONS 2021

Each ticking over of the New Year also means that Society fees are due to be paid. The committee has worked hard to ensure that 2021 fees are still the same as the previous many years' prices. So to assist the society in maintaining the facilities and services we provide and share, we appreciate your prompt payment for each and every year ahead.

As a reminder, the following structure of the 2021 fees is:

SOCIETY FEES

$50 – Full Member
$45 – Pensioner Member
$65 – Family Membership
$60 – Family Pensioner Membership
See more options on-line

Subscriptions can be paid in a number of ways:

- **On-line (preferred, see at right)**
- **Cash payments to a committee member**
- **Send a cheque, made out to "Mornington Peninsula Astronomical Society", to MPAS. P O Box 596, Frankston 3199**
- **Make a direct electronic payment into the society working bank account (state your name clearly).**

The account details are BSB 033-272 Account 162207. Remember to add your name and details to the transfer so we can identify the payment in the bank records. If you have any concerns please talk to a committee member.

Click on the link for further information - https://drive.google.com/file/d/0ByvkxzZGI9g_NXZ4cWxHbERTdEE/view?usp=sharing

JOIN NOW

Full Member	$50
Pensioner	$45
Family	$65
Family Pensioner	$60

You can now renew your membership online. See link below. Click on Members then JOIN NOW at the bottom of the page. Then just fill in your detail on Try-booking.
http://www.mpas.asn.au/members.html

CALENDAR — January / 2021

Red Days indicate School Holidays

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
31					1	2 **Public night 8pm**
3	4	5	6 **Last Quarter**	7	8 **Public night 8pm**	9 **Moon at 357,837km**
10	11	12	13 **New Moon**	14	15 **Public night 8pm**	16 **Working bee 4pm** **Observatory Training 8pm**
17	18	19	20 **Society Meeting 8pm**	21 **First Quarter**	22 **Moon at 405,894km**	23
24	25	26 **Australia Day**	27	28	29 **Full Moon**	30

Monthly Events

Public night - 8pm to 10pm on the 2nd, 8th & 15th @ the Briars
Society Meeting - 8pm to 10pm on the 20th @ the Briars
Working bee & BBQ - 4pm on the 16th @ the Briars
Observatory/telescope Training - 8pm on the 16th @ the Briars

CALENDAR — February / 2021

Red Days indicate School Holidays

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4 **Last Quarter**	5 **Public night 8pm**	6
7	8	9	10	11	12 **New Moon**	13
14 **Valentine's Day** **Moon at 361,773km**	15	16	17 **Society Meeting 8pm**	18	19 **First Quarter**	20 **Telescope Learning Day 4pm**
21	22	23	24 **Scorpius Deadline**	25	26 SCAG	27 **Full Moon**
28						

Monthly Events

Southern Comets website - http://members.westnet.com.au/mmatti/sc.htm

Public night - 8pm to 10pm on the 5th @ the Briars
Society Meeting - 8pm to 10pm on the 17th @ the Briars
Members Night BBQ - 6pm on the 20th @ the Briars
Telescope Learning Day - 4pm on the 20th @ the Briars (Public event)
Scout, Cub & Guide viewing night - 8pm to 10pm on the 26th @ the Briars

Mornington Peninsula Astronomical Society - 2021 Calendar

Day	January	February	March	April	May	June	July	August	September	October	November	December	Day
1	**F**	M	M	Th	S	T	**Th**	Su	W	**F** 8pm Public Night	M	W	1
2	**S** 8pm Public Night	T	T	**F** 8pm Public Night	Su	W	**F** 8pm Public Night	M	Th	**S** Vastroc	T Cup Day	Th	2
3	**Su**	W	W	**S** Easter Vastroc	M	Th	**S**	T	F 8pm Public Night	**Su** Daylight Savings Starts	W	F 8pm Public Night	3
4	**M**	Th	Th	**Su** Daylight Saving Ends	T	F 8pm Public Night	**Su**	W	S	M	Th	S	4
5	**T**	F 8pm Public Night	F 8pm Public Night	**M** Easter	W	S	**M**	Th	Su Father's Day	T	F 8pm Public Night	Su	5
6	**W**	S	S Hobby Show	**T**	Th	Su	**T**	F 8pm Public Night	M	W	S Vic South	M	6
7	**Th**	Su	Su Hobby Show	**W**	F 8pm Public Night	M	**W**	S	T	Th	Su Vic South	T	7
8	**F** 8pm Public Night	M	M Labour Day Hobby Show	**Th**	S	T	**Th**	Su	W	F	M Vic South	W	8
9	**S**	T	T	**F**	Su Mother's Day	W	**F**	M	Th	S	T	Th	9
10	**Su**	W	W	**S**	M	Th	**S**	T	F	Su	W	F	10
11	**M**	Th	Th	**Su**	T	F	**Su**	W	S APWS 1pm	M	Th Remembrance Day	S Members Xmas Party	11
12	**T**	F	F	**M**	W	S	M	Th	Su	T	F	Su	12
13	**W**	S	S	**T**	Th SPSP	Su	T	F	M	W	S	M	13
14	**Th**	Su Valentines Day	Su St Patricks day	**W**	F SPSP	M Queen's Birthday	W	S NSW	T	Th	Su	T	14
15	**F** 8pm Public Night	M	M	**Th**	S SPSP	T	Th	Su NSW	W MPAS Meeting 8pm	F	M	W	15
16	**S** OT 4pm Members	T	T	**F**	Su SPSP	W MPAS Meeting 8pm	F	M NSW	Th	S	T	Th	16
17	**Su**	W MPAS Meeting 8pm	W MPAS Meeting 8pm	**S**	M	Th	S	T NSW	F	Su	W MPAS Meeting 8pm	F	17
18	**M**	Th	Th	**Su**	T	F	Su	W MPAS Meeting 8pm	**S** 4pm Members	M	Th	**S**	18
19	**T**	F	F	M	W MPAS Meeting 8pm	S Solstice party 4pm	M	Th NSW	**Su**	T	F L/E 9:00pm	**Su**	19
20	**W** MPAS Meeting 8pm	S TLD 4pm Members	S 4pm Members	T	Th	Su	T	F NSW 8pm Public Night	**M**	W MPAS Meeting 8pm	S 4pm Members	M Scorpius Deadline	20
21	**Th**	Su	Su Pt Leo Geo	W MPAS Meeting 8pm	F	M	W MPAS AGM 8pm	S NSW	**T**	Th	Su	**T**	21
22	**F**	M	M	Th	S 4pm Members	T	Th	Su NSW Coolart	**W**	F	M	**W**	22
23	**S** 8pm Public Night	T Scorpius Deadline	T	F	Su	W Scorpius Deadline	F	M	**Th**	S TLD 4pm Members	T	**Th**	23
24	**Su**	W	W	S 4pm Members	M	Th	S 4pm Society Dinner	T	**F** G/F Holiday	Su	W	**F**	24
25	**M**	Th	Th	Su Scorpius Deadline	T	F	Su	W Scorpius Deadline	**S** Grand Final	M	Th	**S** Xmas Day	25
26	**T** Australia Day	F SCAG	F	M ANZAC Day	W L/E 9:20pm	**S**	M	Th	**Su**	T	F	**Su** Boxing Day	26
27	**W**	S	**S**	T	Th	**Su**	T	F	**M**	W Scorpius Deadline	S	**M** Xmas Holiday	27
28	Th	Su	**Su**	W	F SCAG	**M**	W	S	**T**	Th	Su	**T** B/D Holiday	28
29	F		**M**	Th	S	**T**	Th	Su	**W**	F SCAG	M	**W**	29
30	S		**T**	F	Su	**W**	F SCAG	M	**Th**	S	T	**Th**	30
31	Su		**W**		M		S	T		Su Halloween		**F** New Years Eve	31

Colour code
Green Boxes - Public nights @ the Briars 8pm
Yellow Boxes - MPAS Meeting @ the Briars 8pm to 10pm
Blue Boxes - Members BBQ nights @ the Briars 6pm, working bee starts 4pm
SCAG - Combined Scout, Cubs & Guides @ the Briars 8pm to 10pm
Grey Boxes - Weekends & Public Holidays
Bold Underlined Days - School Holidays
L/E - Lunar eclipse

VicSouth Star Party - 5th to 8th November @ Nhill Victoria

MPAS Calendar 2021 - *by Greg Walton - Version 2020-20-dec*

Autumn Equinox - March 20
Winter Solstice - June 21
Spring Equinox - September 23
Summer Solstice - December 22

Full Moon ○ New Moon ●

OT = Observatory/telescope Training 16th Jan 8pm after w/bee & BBQ
TLD = Telescope Learning Day 23rd February @ the Briars 4pm (Public)
Hobby Show - 6th to 8th March Sandown Racecourse
Pt Leo = Geo & Fossil hunt 21st March @ Point Leo (Booking required)
Sol = Solstice party 19th June @ the Briars 4pm
Society Dinner - 24th July @ the Briars 6pm
NSW = National Science Week 14th to 22nd August (Public)
APWS = Astrophotography Workshop - 11th September @ the Briars 1pm
TLD = Telescope Learning Day 23rd October @ the Briars 4pm (Public)
Vastroc = Victoria amateur Convention. 2nd/3rd October @ Ballarat observatory.
SPSP = South Pacific Star Party - 13th to 16th May @ Ilford NSW

The Briars Sky

By Greg Walton

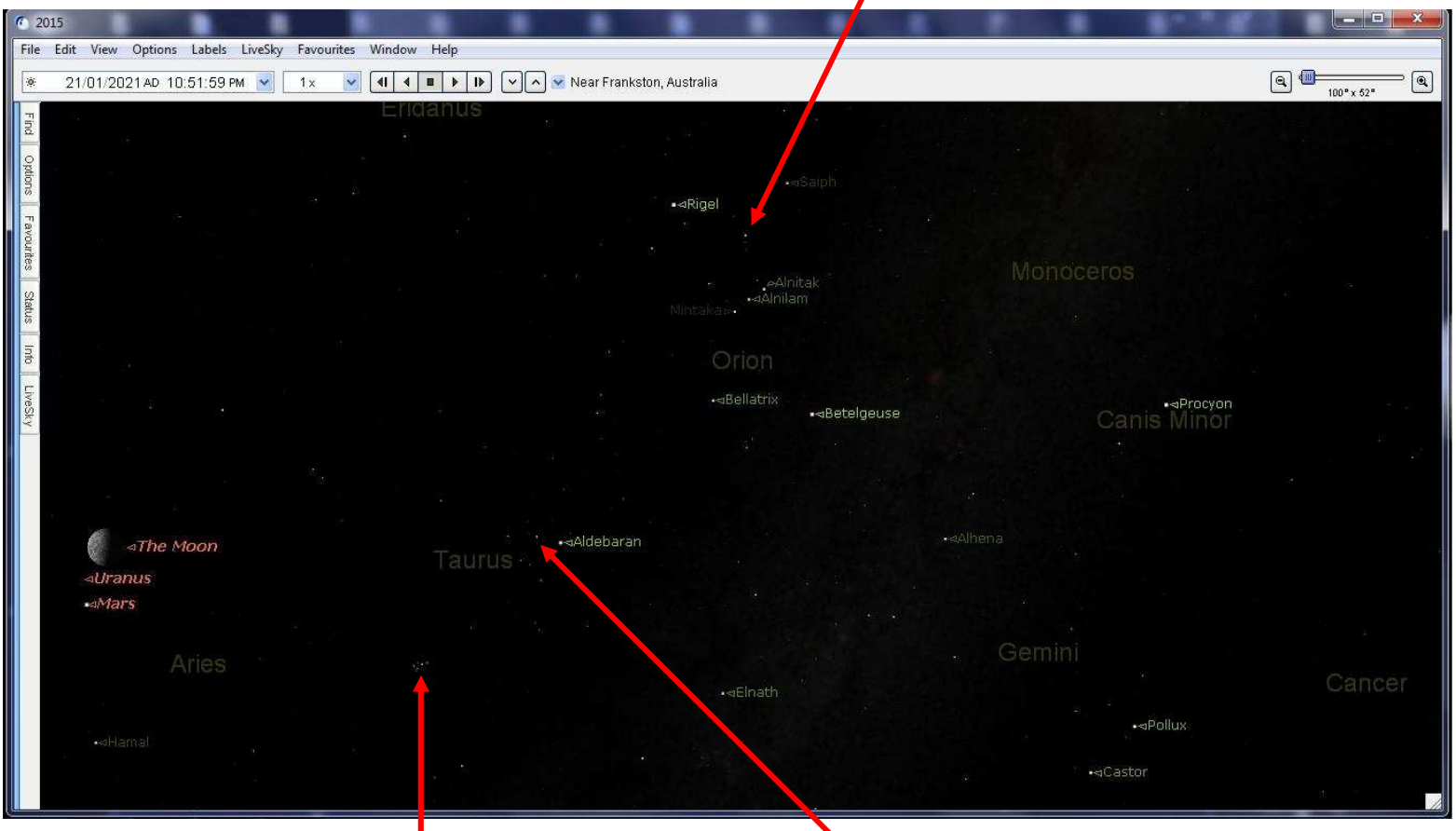
Mornington Peninsula Astronomical Society

On the evening of 21st of January in the north-west Uranus will be between Mars and the Moon. Uranus is 6th magnitude and is easy to see in a 50mm finder scope or 50mm binoculars. Through a telescope at 100 times magnification Uranus will look like a small blue dot. You will be able to distinguish that it's not a star and looks more like a disc. Uranus doesn't show any surface features.

While you have your binoculars out, look at the bright yellow star Aldebaran and just to the left you will see a bright cluster of stars in the shape of a tilted house, simular to what a child would draw.

Move down to the right you like find a bright tight cluster of star named Pleiades or Seven Sisters. See how many stars you can count with the naked eye. Most people don't see more than 7.

Looking north in the handle of the pot you will find the M45 Orion Nebula which can also be seen in binoculars.



ASTRO NEWS

By Nerida Langcake

Mornington Peninsula Astronomical Society

Europe's Solar Orbiter is headed for a flyby of Venus

Solar Orbiter spacecraft will tackle an important milestone as its operators and scientists on Earth mark the holiday season. Solar Orbiter, a joint project of the European Space Agency (ESA) and NASA, launched in February on a mission to capture the best-ever images of our sun, including its elusive poles. But getting close to the star at the heart of our solar system is a difficult endeavour, so the spacecraft needs to slalom around a few planets to set its course properly. The first of those flybys, which visits Venus, will occur on December 27.

An artist's depiction of the Solar Orbiter spacecraft skimming past Venus.

Solar Orbiter's closest approach this month will bring the spacecraft about 7,500 kilometres above Venus' atmosphere; later similar passages will bring the spacecraft much closer, as it manoeuvres closer to the sun.

In addition to dragging the spacecraft in toward the sun, the flybys are also coordinated to pull Solar Orbiter at a tilt out of the ecliptic plane, which holds the sun and the planets. It is this tilt that will let the spacecraft peer at the sun's poorly studied poles.

During the flyby, the spacecraft must continue pointing toward the sun, so the telescopes on Solar Orbiter will not be able to snap images of Venus. However, a subset of the instruments that analyse the immediate environment of the spacecraft will be at work.

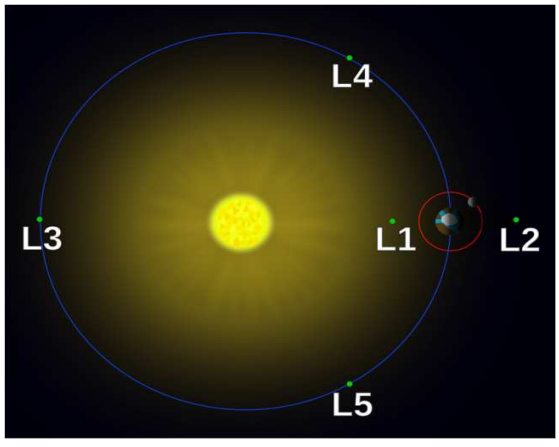
China's Chang'e 5 moon craft begins extended mission

News being reported today (December 22, 2020) that China's Chang'e 5 mission - which successfully retuned rocks from the moon to Earth last week - is now heading for a gravitationally stable point in space, the sun-Earth Lagrange point known as L1. The chief engineer of the mission's third stage reported that more than 200 kg of propellant remain: ample fuel to keep the orbiter mobile.

The capsule touched down on snow-covered grassland. Image via BBC News.

This extended mission follows the craft's successful return of moon rocks to Earth last week, the first new moon samples in 44 years (since the Soviet Union's Luna 24 mission in 1976). The craft launched from Earth on November 23, 2020, landed on the moon on December 1 and returned about 1.731 kilograms of lunar material on December 16.

It is being reported that the spacecraft is now heading to a sun-Earth Lagrange point to carry out observations of the local environment, the sun, and perform operational tests.



Lagrangian points in the Earth-sun system. These points are more gravitationally stable than other points in space. In this illustration, our Earth and moon are inside the red circle. Chang'e 5 is headed toward L1.

The landing site of the Chang'e 5 mission - the Mons Rumker area - was in the vast lunar volcanic plain known as Oceanus Procellarum (Ocean of Storms). Parts of this region on the moon have been explored by other moon missions, including NASA's Apollo 12 in 1969. Rocks in the Mons Rumker region are thought to have formed just 1.2 billion years ago. In contrast, the moon rocks brought home by the Apollo astronauts - between 1969 and 1972 - are much older.

Chang'e 5 is not the only ongoing sample-return mission. Japan's Hayabusa2 mission returned a lander from space to Australia on December 6, 2020; it was carrying pieces of the asteroid Ryugu collected over two years ago. More recently, NASA's OSIRIS-REx probe took a sample of the asteroid Bennu; that material is expected to be returned to Earth in September 2023.

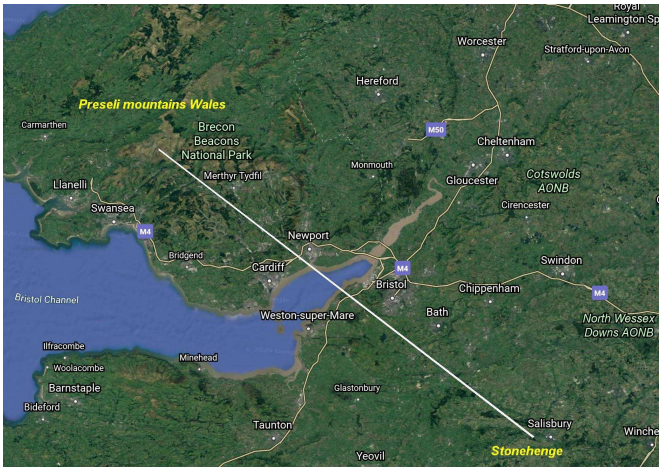
China became the first country to send an unmanned rover to the far side of the moon last year. Last July, China launched its first unmanned mission to Mars - Tianwen-1 - expected to arrive in February 2021. If Tianwen-1 is successful, Beijing hopes eventually to send a manned mission to Mars. There are also plans to bring up a permanent space station by 2022, as well as sending astronauts back to the moon by the 2030s.

STONEHENGE – Meeting place, church, cemetery, astronomical observatory or all of these things? *By Greg Walton*

After reading many books and watching many documentaries on Stonehenge. I saw too many conflicting views. Rather than trying to sort the good from the bad, I will concentrate on the basics.

Before Stonehenge most of southern England was covered in trees with small communities clearing small areas of forest to make way for crops. As the communities got larger, more and more of the forest was cleared and the wood used for building, tools and heating. Once the forest was cleared to the horizon only then was it possible to start building an astronomical calendar. It may have taken many generations to slowly work things out, moving rocks and sticks around till it worked. There are many stone circles across Europe; it's possible that as people travelled around they took the basic technology with them. It's also possible that different communities strived to build a better and more accurate stone circle than their neighbours. As to say we are more advanced and you'd better not mess with us. Stonehenge is not a sundial as it doesn't face south and when it was built there was little need to divide the day into segments.

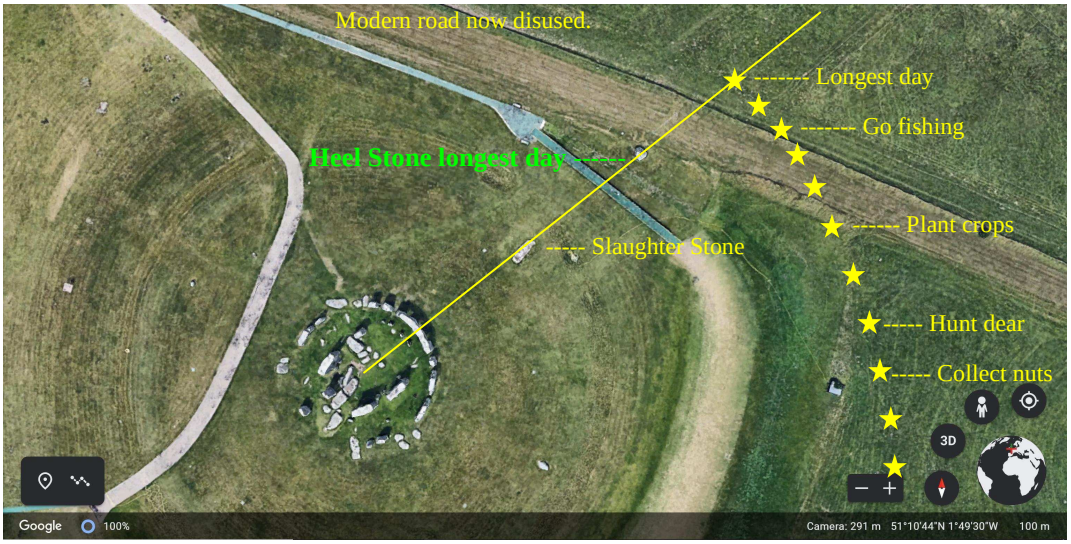
When Stonehenge was built on the Salisbury plain around 5,300 years ago, just before the bronze age, humans may have lacked modern day technology but were just as intelligent and probably more in tune with their surroundings, mostly because their lives depended upon it. Also the human brain was the same size as it is today. The night sky would have been very dark and the stars very bright covering you like a blanket and pushing down upon you from above. You wouldn't have missed the planets climbing over the eastern horizon, warning you that something was about to happen. Also, you would have seen the same stars rising at the same time each year, marking a point in time when you need to start preparing for winter or the best time to hunt for a particular animal.



Stonehenge was a work in progress constantly changing and being upgraded over a 5,000-year period. It would have started as a few sticks hammered into the ground and over many years the position of the sticks would have been refined. The 10 large centre stones weigh upwards of 45 tons and were brought to the site from 25 kilometres away. The 80 smaller blue stones weighing 3.5 tons each were brought from Wales, travelling almost 300 kilometres across land and sea, most likely across water on large canoes each carved from a single tree. One canoe would not have been sufficient so it's thought at lest 2 canoes could have been lashed together. Geologists have found sites in the Preseli mountains in Wales where stone with the same composition as the stone at Stonehenge and the evidence where they have been split from the hillside using stone wedges. Stonehenge geologists have unearthed hundreds of human remains, some genetically matched to the Walsh people also giving support to the origin of the stone. It's been calculated that 300 people could have built Stonehenge in 2 years but most likely it would have been longer. Such a coordinated effort over such a large area shows us that 5,000 years ago some people had control over communities, just like today.

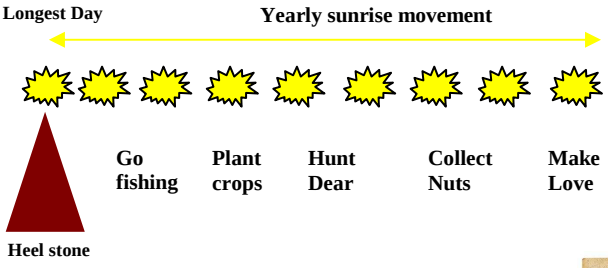
Interestingly the outer ring of stones is a fairly accurate circle and the top layer of the outer ring is perfectly level even though the ground is not, so the builders of Stonehenge understood how to make a levelling tool most likely using a stone hanging from a rope, today known as a Plumb bob. Using a plumb bob the builders would have been able to set up an accurate centre pole which all measurements could be taken from. More recently Stonehenge has been mapped and measured in every possible way and ground penetrating radar has found post holes all around the site. Some of the post holes on the site have been dated to around 10,000 years old; that's not long after the last ice age.

Throughout the year the sun rises at a different point on the horizon each day and only on the summer solstice (longest day) does the rising sun align with a Heel stone placed outside the circles in the middle of a ancient track way which extends many kilometres away from Stonehenge in a straight line towards the point where the sun rises on the horizon. The large stones in a horse shoe shape are orientated with the opening facing the summer solstice. Stonehenge doesn't face north. Many have tried to work out if Stonehenge is an astronomical calendar which can predict events like a lunar eclipse, but there's no conclusive evident. We must remember the calendar we use today did not exist then. The people who built Stonehenge would have worked on a calendar that marked the seasons not the days, or more likely each stone meant something: a time to fish, time to hunt dear, a time to plant crops, a time to collect nuts and a time to make love.



Google Earth link - Stonehenge in 3D - https://earth.google.com/web/search/Stonehenge,+Salisbury,+England,+UK/@51.17889796,-1.82598244,100.79519574a,229.29089139d,35y,359.13009091h,0t,0r/data=CigiJgokCbS3k0UBBEPAEeH3WNpYCEPAGe3jpYwRJWJAIap2HdfZI2JA

The Heel stone marks the position of the sun in summer on the longest day, the furthest point the sun can travel to the north. If you were an ancient astronomer this would have told you that the sun came to the same place each year and no further. This would have provided evidence that there was some rule the world had to adhere to. The movement of the sun was regular and never changing.



Right - Sketch of Stonehenge made in the 1700's.

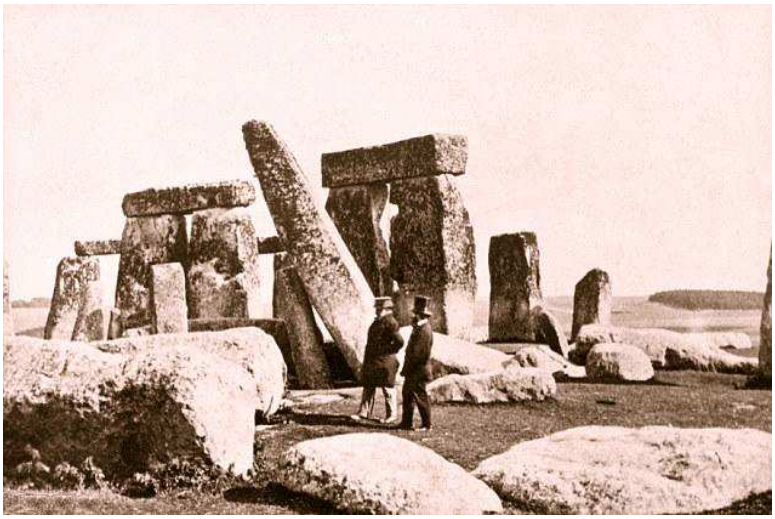
The Druids claimed to have been the builders of Stonehenge but this is not true. Although the Celtic Druids claim to have worshiped at Stonehenge for 2,000 years and a modern version of the Druids congregate at Stonehenge on the summer solstice each year except 2020 due to covid-19.

A lot of the clues to the purpose of the circles have been lost, as 2000 years ago religious leaders sent people out to many stone circle to destroy them as they posed a threat to the churches' religious views. Most of the smaller stones would have been repurposed.

Right - For hundreds of years Stonehenge has been treated as a curiosity with a mystical past. Many parties and events were held at Stonehenge over the centuries, including the policeman's yearly picnic.

Above - During the First World War an airfield was constructed next to Stonehenge and it's said that airmen practiced dropping dummy bombs on Stonehenge. Note: Large stone is straight in this picture.

Right - In 1915 Salisbury resident and barrister Cecil Chubb bought the then-neglected ruin of Stonehenge, for the sum of £6,600, only to gift it to the nation three years later.

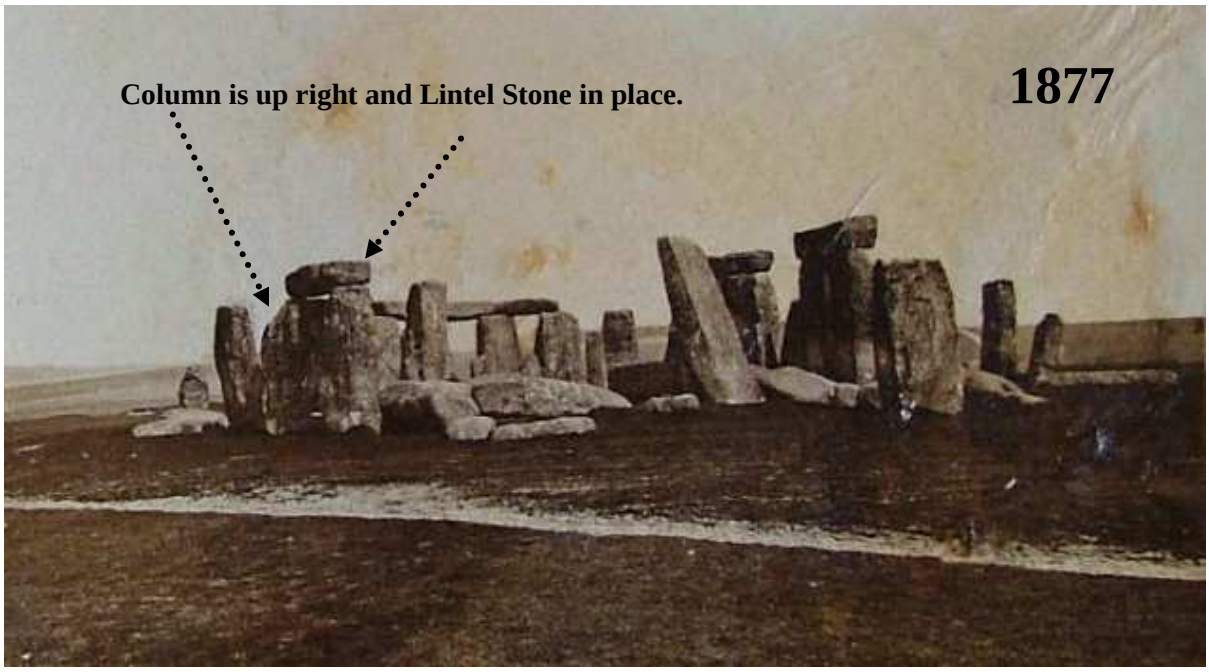


Below - During the Second World Wars an American army base was constructed next to Stonehenge.

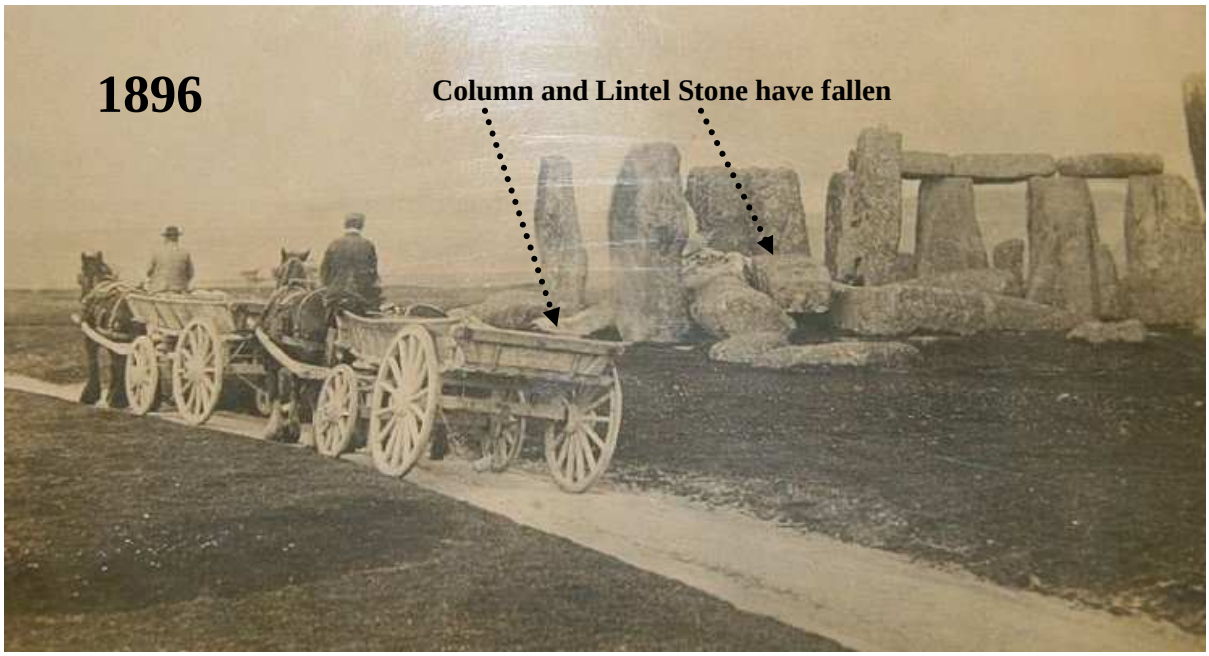
How many changes can you see?

Many may think Stonehenge has always been the way it looks today, but Stonehenge has changed its appearance many times, with each generation having a go at reassembling Stonehenge.

This photo taken in 1877 shows a lintel stone in place and the column in the upright position.

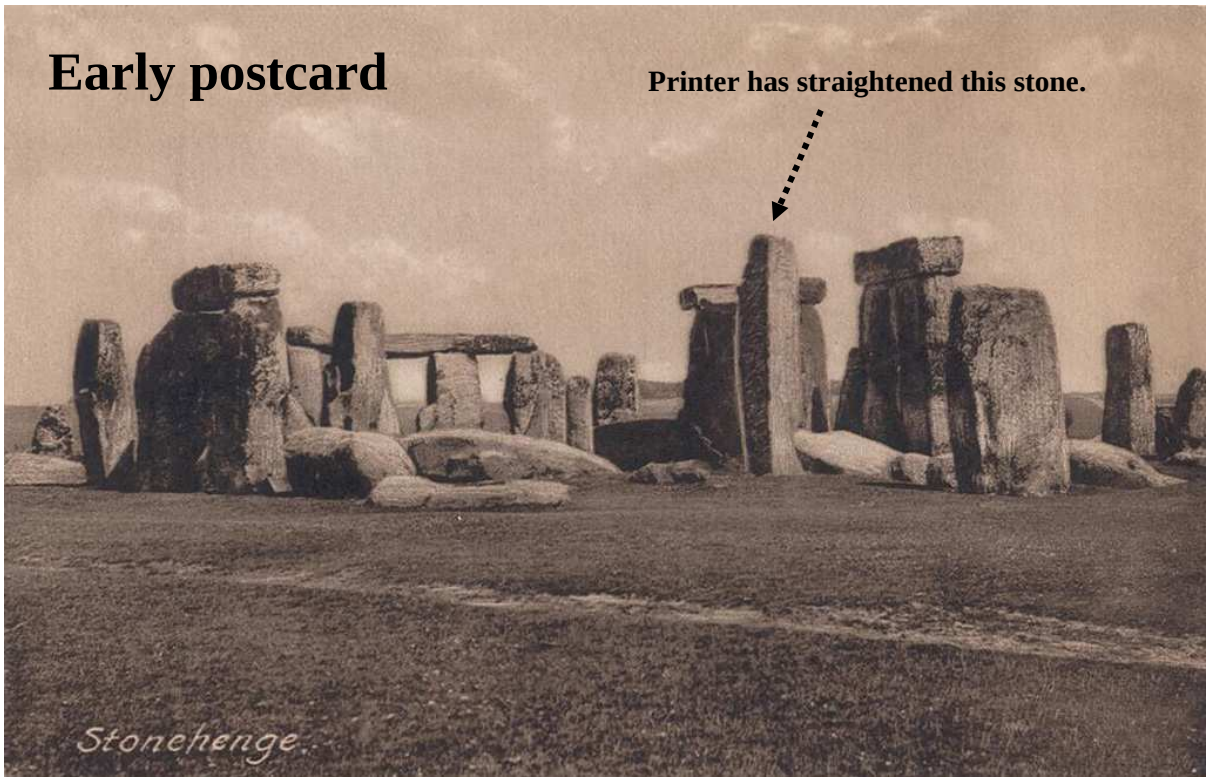


This photograph taken in 1896 shows that a lintel and column have fallen, said to have been blown over in a storm.



This postcard was first printed in 1910 from an earlier sketch done in the 1800s.

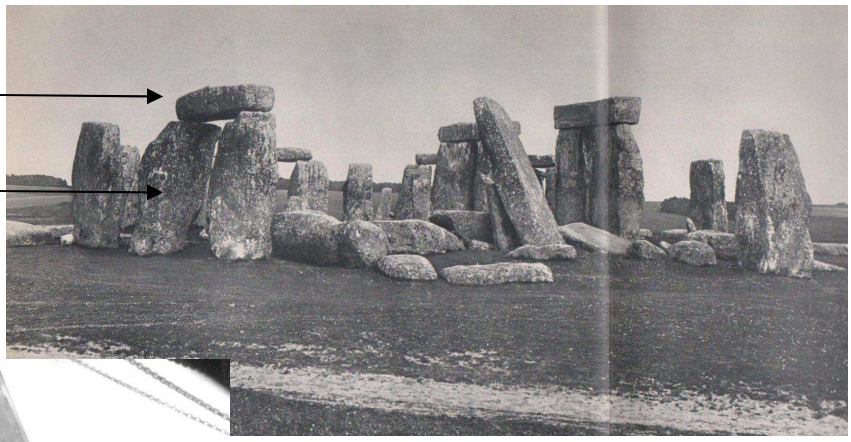
For some reason the printer straightened the leaning stone.

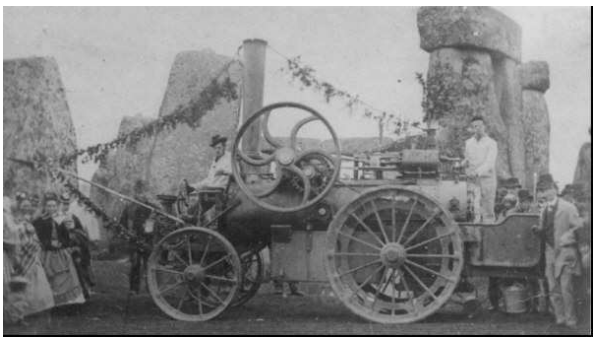


Right - This photo is thought to have been taken in the early 1890's, before the large lintel fell.

The stone underneath was leaning badly and would not have taken much to make it fall.

Below a selection of photos taken of the restoration work done in 1919 and again in the 1960s.





Below - Recent photos of Stonehenge take from near the Heel stone.

View from the Heel stone

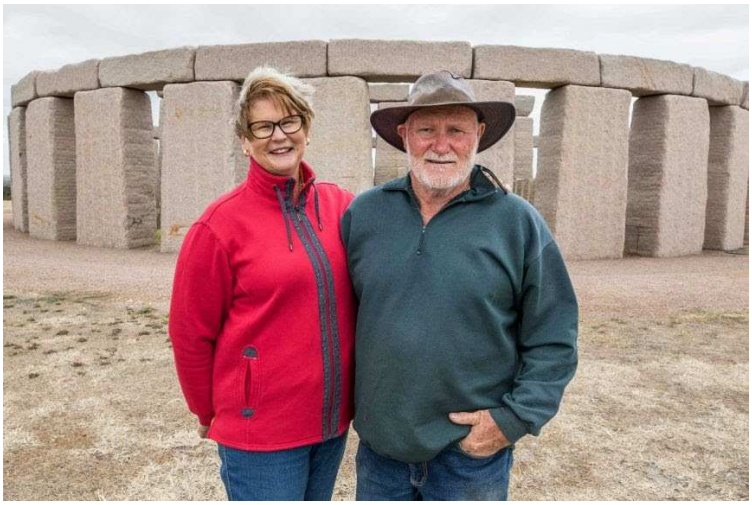
Concrete repairs done in the 1959

Right - President Obama admiring Stonehenge, I wonder if he noticed the concrete repair work that had been done in 1959. This large hole in the base of one of the large stones was where visitors sometime sheltered.

Today in 2020 the battle to save Stonehenge still goes on, as a major highway upgrade is to commence with a tunnel going under the Stonehenge site, but could be an opportunity to find more relics.

Each year Stonehenge receives one million visitors and hundreds of weddings are performed. Also it has inspired many to build their own Stonehenge.

More reading - History of Stonehenge - http://blog.english-heritage.org.uk/30-things-you-might-not-know-about-stonehenge/



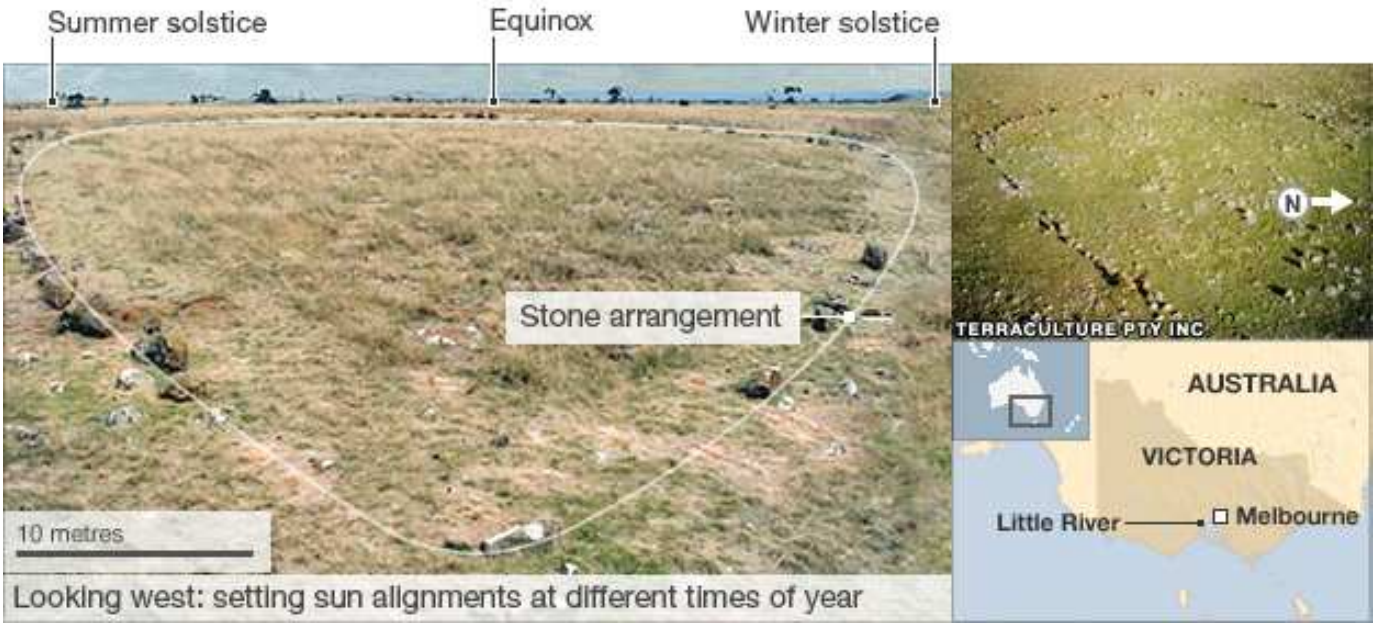
Above - Stonehenge at Esperance Western Australia GPS 33.47S - 122.02E made from 137 stones of pink granite quarried from less than 1 km from the site. The full size replica weighs 2500 tons and cost 5 million dollars to build. It's also up for sale, see links below.
In 5000 years people with be asking the same questions about the western Australian Stonehenge as we ask about Stonehenge today.
It would be a bit of a job if we could move it to the Briars.

http://esperancestonehenge.com.au/
https://www.atlasobscura.com/articles/victorian-stonehenge-picnic-photos
https://www.abc.net.au/news/2020-01-29/owners-of-esperance-stonehenge-race-to-sell-as-they-retire/11904190

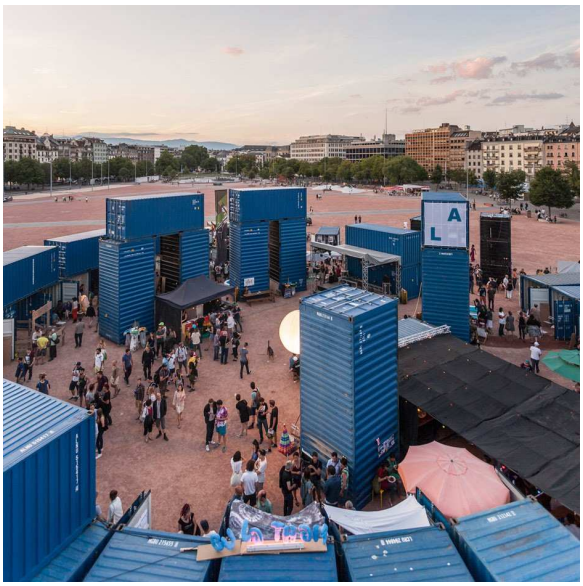
The circle of stone found at Little River, Victoria is said to be much older than Stonehenge. See links below

Victoria stone circle - https://www.bbc.com/news/magazine-15098959

https://www.abc.net.au/news/2016-10-12/aboriginal-astronomy-provides-clues-to-ancient-life/7925024



Shipping container henge Sweden - https://www.dezeen.com/2015/11/03/bureau-a-steelhenge-stonehenge-shipping-containers-big-biennial-geneva/



Below - American Stonehenge copy - http://www.wanowandthen.com/Stonehenge.html

Above right - Carhenge - https://random-times.com/2019/04/07/carhenge-the-american-stonehenge-made-of-vintage-cars/

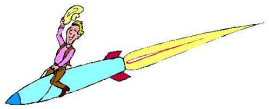
https://www.npr.org/sections/thetwo-way/2017/08/10/541583064/as-eclipse-madness-sweeps-u-s-a-stonehenge-made-of-cars-prepares

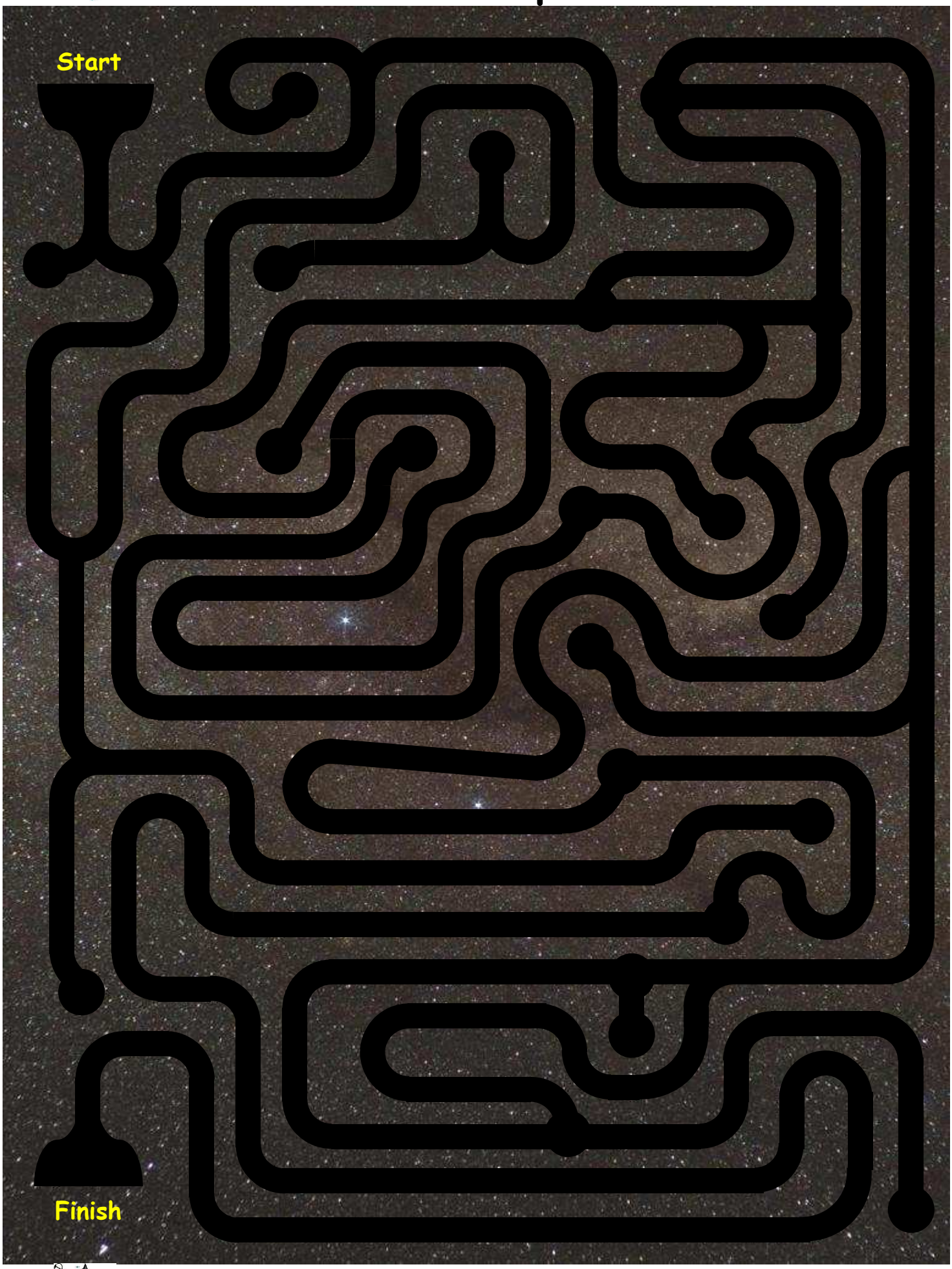
Excellent Carhenge solar eclipse - https://youtu.be/l7SJ4-oThpA **The man who made carhenge -** https://youtu.be/oIE9qC-j1vY

15 Henges around America - https://www.atlasobscura.com/lists/american-henges

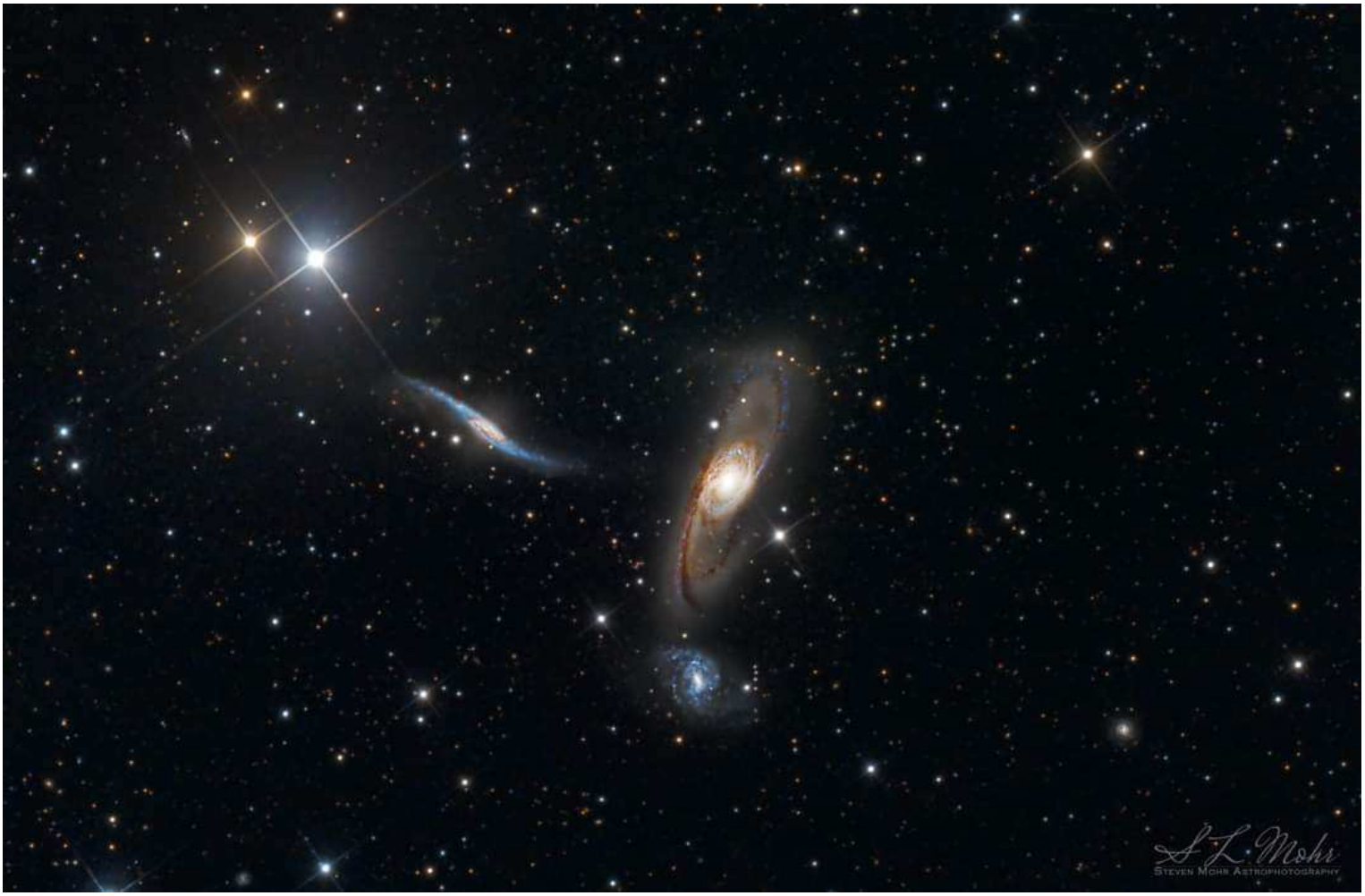
All images found by Google

Worm holes in space maze.





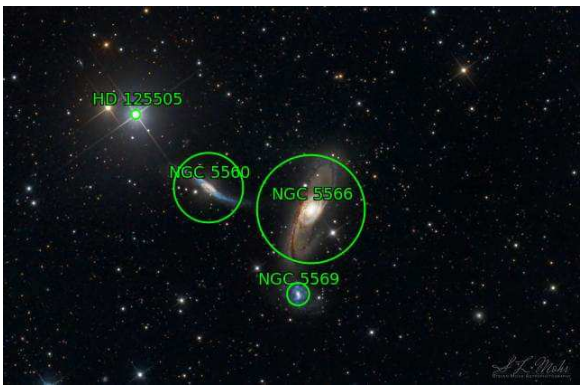
MEMBERS GALLERY



NGC5566, NGC5560 & NGC5569 | Interacting Galaxy Group | LHaRGB *By Steve Mohr*

This scene features a trio of interacting galaxies found in the constellation of Virgo, being some 70-90 million light years away from Earth. The largest galaxy in the group is NGC 5566, which is a barred spiral galaxy stretching nearly 150,000 light years in diameter. Having widely sweeping spiral arms, with dark dusty lanes, these arms are speckled with new star forming regions throughout. The elongated galaxy to the left of NGC 5566 is the heavily distorted NGC5560. You can just see faint dusty interconnections between NGC 5560 and NGC 5566, providing us some clues that these are in fact interacting. The lower blueish galaxy NGC5569 does not appear to be disturbed, and maybe placed slightly in the foreground. In the darkness of the surrounding space, the speckled background indicates a sea of background objects, all being in the significant distance.

This image represents only 34% of the camera's full frame, composed of luminance, red, green, blue, and hydrogen alpha filtered colour channels. Thanks for having a look.



Hi res link:
https://live.staticflickr.com/65535/50577593972_849ecd82d2_o.jpg

Information about the image:
Center (RA, Dec): (215.064, 3.940)
Center (RA, hms): 14h 20m 15.436s
Center (Dec, dms): +03° 56' 24.737"
Size: 28.7 x 18.8 arcmin. Radius: 0.286 deg.
Pixel scale: 0.733 arcsec/pixel. Orientation: Up is 126 degrees E of N

Instrument: Planewave CDK 12.5 | Focal Ratio: F8
Camera: STXL-11000 + AOX | Mount: AP900GTO
Camera Sensitivity: Lum & Ha: BIN 1x1, RGB: BIN 2x2
Exposure Details: Total: 22.75 hours | Lum: 47 x 900 sec [11.75hr], Ha: 15 x 1200 sec [5.0hr], RGB 16 x 450sec each [6.0hrs]
Viewing Location: Central Victoria, Australia. Observatory: ScopeDome 3m. Date: June-July 2020
Software Enhancements: CCDStack2, CCDBand-Aid, PS, Pixinsight

NGC5367 and CG12 | Reflection Nebula & Cometary Globule| LRGB *By Steve Mohr*

The dominant dusty section of this image forms part of the larger Cometary Globule known as CG12, with the lower right corner, blue reflection nebula being NGC5367. These objects are located in the constellation of Centaurus, being approximately 2,000 light years distant from Earth.

This image is made up of nearly 5 hours of sub exposures made up of Luminance, Red, Green, and Blue filters. This total exposure time is under what this object really needs for it to be resolved well. Processing was quite difficult, and I presume there may be a fine foreground dust layer lightly obscuring this entire field of view. The image has been made quite noisy from the 3-4 flattening sequences applied to try and make the surrounding space nice and clear of this fine foreground dust.

CG12 is definitely an interesting object, with photographing dust in space always being a crazy thing to think we can do. Thanks for having a look. Hi res link: https://live.staticflickr.com/65535/50549342061_fc7771dfed_o.jpg

Information about the image:
Center (RA, Dec): (209.585, -40.124) Center (RA, hms): 13h 58m 20.456s Center (Dec, dms): -40° 07' 28.019"
Size: 41 x 30 arcmin Radius: 0.424 deg Pixel scale: 0.732 arcsec/pixel Orientation: Up is 279 degrees E of N

Instrument: Planewave CDK 12.5 | Focal Ratio: F8
Camera: STXL-11000 + AOX | Mount: AP900GTO Camera Sensitivity: Lum & Ha: BIN 1x1, RGB: BIN 2x2
Exposure Details: Total: 4.75hours | Lum: 10x 900 sec [2.5hr], RGB 450sec x 6 each [2.25hrs]
Viewing Location: Central Victoria, Australia. Observatory: ScopeDome 3m. Date: March - June 2020
Software Enhancements: CCDStack2, CCDBand-Aid, PS, Pixinsight

Barnard 312 | Dark Nebula in the constellation of Scutum | LHaRGB *By Steve Mohr*

Looking into our Milky Way galaxy, amongst a sea of stars, lies the dark nebula known as Barnard 312. Occupying the centre of this image, Barnard 312 is located in the constellation of Scutum, and lies about 2.5 degrees east of the more famous M16: Eagle Nebula and M17: the Swan or Omega Nebula. Sections of this dark nebula is so dense, it totally blocks out the light of background stars.

Hi res link:
https://live.staticflickr.com/65535/50521757716_3381fa5833_o.jpg

Information about the image:

Center (RA, Dec): (277.506, -15.272)
Center (RA, hms): 18h 30m 01.508s
Center (Dec, dms): -15° 16' 19.237"
Size: 48.6 x 32.2 arcmin
Radius: 0.485 deg
Pixel scale: 0.732 arcsec/pixel
Orientation: Up is 198 degrees E of N

Instrument: Planewave CDK 12.5 | Focal Ratio: F8
Camera: STXL-11000 + AOX | Mount: AP900GTO
Camera Sensitivity: Lum & Ha: BIN 1x1, RGB: BIN 2x2
Exposure Details: Total: 10.9 hours | Lum: 24 x 900 sec [6.0hr], Ha: 8 x 1200sec [2.67hr], RGB 450sec x 6 each [2.25hrs]
Viewing Location: Central Victoria, Australia.
Observatory: ScopeDome 3m
Date: July 2020
Software Enhancements: CCDStack2, CCDBand-Aid, PS, Pixinsight

NGC6744 | PAVO Galaxy | LHaRGB *By Steve Mohr*

NGC 6744 (also known as Caldwell 101) is an intermediate spiral galaxy about 30 million light-years away in the constellation Pavo. It is considered as a Milky Way mimic in our immediate vicinity, displaying flocculent (fluffy) arms and an elongated core. It also has at least one distorted companion galaxy (NGC 6744A) superficially similar to one of the Magellanic Clouds. It was discovered from Parramatta in Australia by Scottish astronomer James Dunlop on 30 June 1826.
[Courtesy of the Wikipedia]

Interestingly, this galaxy is a real big comparison to our own galaxy, being nearly twice as big at about 175,000 light-years across [our Milky Way Galaxy being some 100,000 light-years across].

Colour combination was completed in Pixinsight, calibrated with the PhotometricColorCalibration tool, and I used the script tool EmmissionLineIntegration that assists you to combine Ha into your RGB colour base. Later I used the PI script StarReduction to reduce the larger field stars – and this worked quite well. I still prefer to use PS to put everything together as I know this really well. Oh, I also use the Photoshop tool StarSpikes Pro 4 to add a few glitz stars to add some sparkle.

Hi res link: https://live.staticflickr.com/65535/50442301153_616fb08d1d_o.jpg

Information about the image:

Center (RA, Dec): (287.633, -63.831), Center (RA, hms): 19h 10m 31.920s, Center (Dec, dms): -63° 49' 51.815"
Size: 35.2 x 27 arcmin, Radius: 0.370 deg, Pixel scale: 0.732 arcsec/pixel, Orientation: Up is 201 degrees E of N
Instrument: Planewave CDK 12.5 | Focal Ratio: F8, Camera: STXL-11000 + AOX | Mount: AP900GTO
Camera Sensitivity: Lum & Ha: BIN 1x1, RGB: BIN 2x2, Exposure Details: Total: 47.25hours | Lum: 89 x 900 sec [22.25hr], Ha: 48 x 1200sec [16.0hr], RGB 450sec x 24 each [9.0hrs], Viewing Location: Central Victoria, Australia, Observatory: ScopeDome 3m, Date: June-Sept 2020, Software Enhancements: CCDStack2, CCDBand-Aid, PS, Pixinsight

Some great images from a few Smartphone groups that I'm in have been published in a new book by NASA scientist, Sten Odenwald, and I'm lucky enough to have 3 of mine included (Sombrero Galaxy M104, Tarantula Nebula NGC 2070, and a Lunar Eclipse sequence). A great book for all smartphone astrophotographers! If you're interested, you can download it from here https://spacemath.gsfc.nasa.gov/

Nerida Langcake

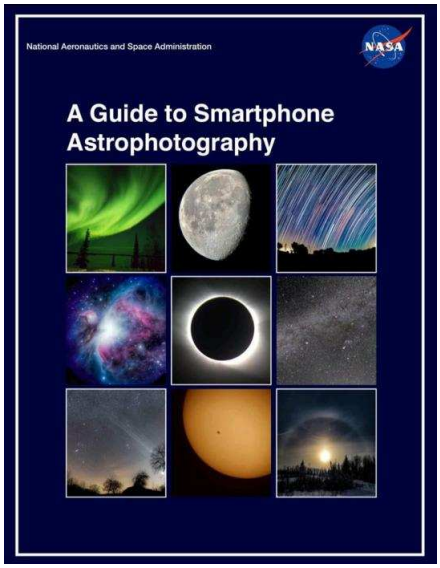
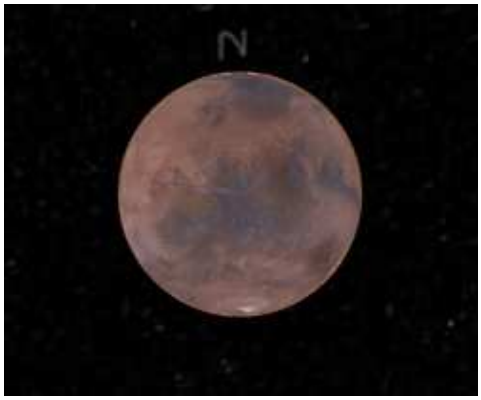


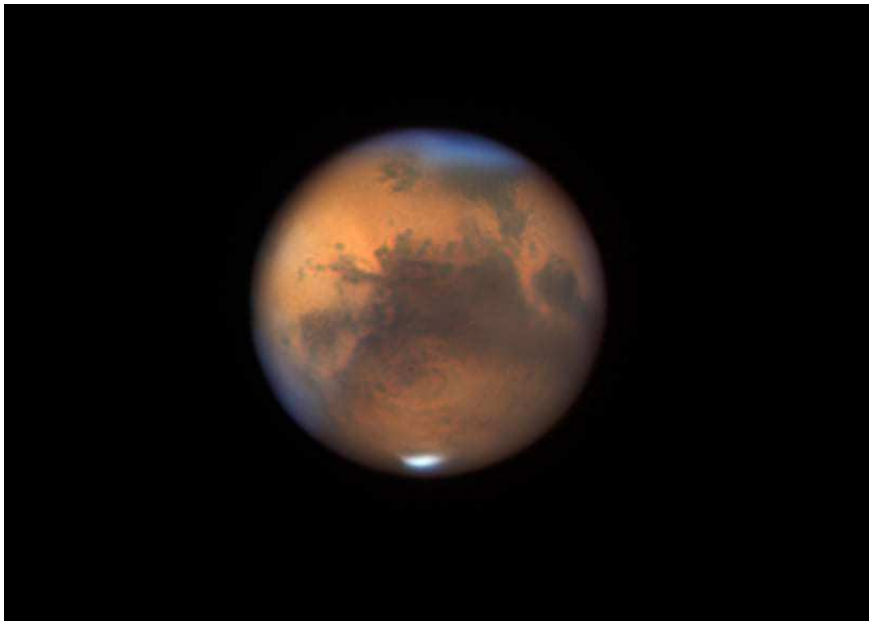
Figure 119. Lunar eclipse sequence on January 31, 2018 taken through a 6-inch *SkyWatcher* reflector with a 25mm eyepiece. The **Samsung Galaxy S8** was set at ¼-sec and ISO 1250 for the darker eclipse shots, and 1/536-sec and ISO 40 for the brighter shots. (Credit Nerida Langcake)

Squinty comrades, I've been pushing the limits of my vision observing Mars. When trying to identify the darker blobs the yearbook map has limits in being a flat projection. You can calculate the current centre longitude and lat. but the map still left me confused (polar position angle is a little more difficult to interpret). Features also distort as they wrap around a globe. I had a search for maps in a globe format and hey presto:- https://trek.nasa.gov/mars/# does the job. You can rotate the globe on your screen to get calculated orientation, zoom out, then squint, and see exactly the pattern of blurry features that were frustrating you moments before. Here is a zoomed out example which corresponds to last night. N marks North. Polar caps are not visible. Disk centre is Long 45, Lat -22. So before the disk gets too small, give it a go. *Phil Holt*



Left - Mars 17 Nov 20, I didn't have very good seeing, and only quickly processed this, but I though I'd mention that a new dust storm can be seen close to the Central Meridian. The dust has a light orange colour against the darker marina. Taken with C11 and Zwo290MM

By Dominic Lucarelli



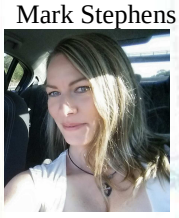
Right - Hi team, Another Mars - from the same night as my last post but about half an hour after my last one; only got to the data yesterday. Spent a while processing this one - think I've got the balance between surface detail, colour and cloud done better this time. 20th October 2020

Cheers Russell Smith

SOCIETY INFORMATION


Peter Skilton


Mark Stephens


Nerida Langcake


Jamie Pole


Anders Hamilton


Trevor Hand


Simon Hamm


Peter Lowe


Dave Rolfe


Greg Walton

OFFICE BEARERS OF THE MORNINGTON PENINSULA ASTRONOMICAL SOCIETY

President: Peter Skilton
Vice President: Mark Stephens
Committee: Anders Hamilton, Trevor Hand, Guido Tack, Simon Hamm, Dave Rolfe Peter Lowe & Ian Sullivan

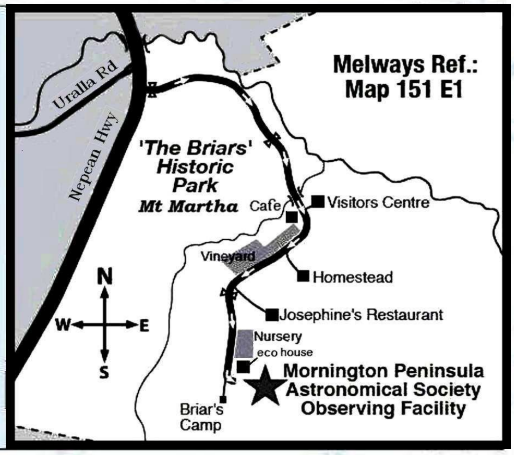
Secretary: Nerida Langcake
Treasurer: Jamie Pole
Web master: Guido Tack
Scorpius editor: Greg Walton
Librarian: Fred Crump

SOCIETY MEETINGS

Meeting Venue: MPAS Astronomy Centre
The Briars, Nepean Hwy, Mt Martha
(Melways ref. 151/E1)
Society meetings: Don Leggett Astronomy Centre
8pm on the third Wednesday of the month
(*except December*)
(See map at right & Below)

For addition details:
Internet: www.mpas.asn.au
email: welcome@mpas.asn.au

Phone: 0419 253 252
Mail: PO Box 596, Frankston 3199, Victoria, Australia



LIBRARY


Guido Tack


Fred Crump

The Society also has books & videos for loan from its library, made available on most public & members nights at The Briars site. Contact Fred Crump

E-SCORPIUS NEWSGROUP

M.P.A.S. main line of communication is the online newsgroup called E-Scorpius. Here you will be kept up to date with the latest M.P.A.S. news & events information as well as being able to join in discussions & ask questions with other members. To join, email welcome@mpas.asn.au say that you want to join E-Scorpius & you will be added to the E-Scorpius list.

facebook
MPAS members - https://www.facebook.com/groups/MPAS1/
MPAS - https://www.facebook.com/mpas0/

VIEWING NIGHTS - MEMBERS ONLY

Viewing Night - Members only any night, at The Briars, Nepean Hwy, Mt Martha, starting at dusk. Members visiting The Briars for the first time must contact Greg Walton on 0415172503 if they need help getting to The Briars site. Upon arrival at the site, remember to sign the attendance book in the observatory building.

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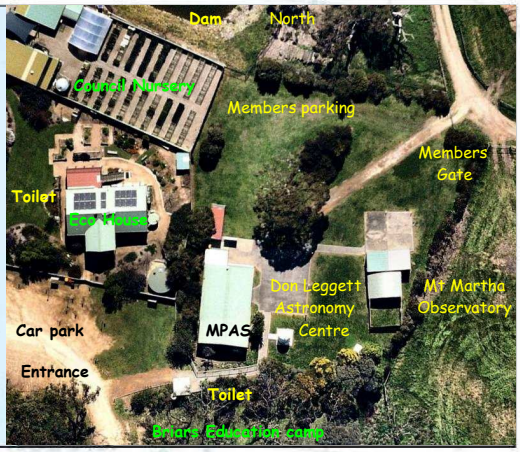

Members please write a story about your astronomy experiences and add some pictures.
Send them to the editor: Greg Walton gwmpas@gmail.com
MPAS newsletters online - https://drive.google.com/folderview?id=0ByvkxzZGI9g_SUNmZVhkZTFGWTA

SCORPIUS **The journal of the Mornington Peninsula Astronomical Society**