OASI News

The newsletter of the Orwell Astronomical Society

IC443 The Jellyfish Nebula

Credit: Andy Gibbs

Trustees: Mr Roy Adams Mr Neil Morley Mr David Payne

Honorary President: Dr Allan Chapman D.Phil MA FRAS

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Society Notices

Dear Members,

We have moved to using a Zoom Pro account. If you would like to join in, email Paul Whiting, treasurer@oasi.org.uk

In the coming months, we will be guided by advice from the Government and Public Health England, as to when we can resume some of our activities. These are likely to be very limited at first, the Committee will decide what could be done, with the health and safety of everybody being the highest priority.

I would like to wish everybody clear skies, stay safe and I hope to see you soon.

Andy Gibbs, Chairman

Society Contact details

Email queries: info@oasi.org.uk

Facebook: Orwell Astronomical

Twitter: @OASIpswich

YouTube: https://www.youtube.com/channel/UCHgxe3QAeRVWf7vkjKkCl2Q

Members-only message board

https://groups.io/g/OASI

Observatory (meeting nights only)
07960 083714

Please send material for the OASI web site and newsletter e.g. observations, notices of events, general interest articles, to news@oasi.org.uk

The CLOSING date is the 15th day of the month

Access into the School Grounds and Observatory Tower

The Observatory is closed.

Articles for OASI News

News, pictures and articles for this newsletter are always welcome. Details above.

Please submit your articles in any of the following formats:–

Text:	txt, rtf, rtfd, doc, docx, odt, Pages, pdf
Spreadsheets:	xls, xlsx, OpenOffice/LibreOffice, Numbers
Images: tiff, png, jpg	Please send tables as separate files in one of the above formats.

If you don't feel up to writing a major article, perhaps you might write a short note for OASI News along the lines of "This month I have mostly been observing/constructing/mending/reading/etc."?

Newsletter archive www.oasi.org.uk/NL/NL_form.shtml

Authors, please note that your articles will be publicly available worldwide!

Reproducing articles from OASI News

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Committee 2021

Chairman	Andy Gibbs	Set overall agenda for OASI, Chair committee meetings, Press and publicity,
Secretary	Roy Gooding	Outreach meetings (jointly with Chairman), observatory decoration.
Treasurer	Paul Whiting FRAS	Finance, Supervision of applications for grants. Visits by outside groups, Observatory tours, Public appreciation of astronomy, Outreach activities.
Committee	James Appleton	Committee meeting minutes, Web site
	Martin Cook	Membership, Tomline refractor maintenance & user testing
	Matt Leeks	Safety & security
	Peter Richards	Lecture meetings, Email distribution lists
	John Wainwright	Equipment curator
	Mike Whybray	Astronomy Workshops, Child protection officer, Orwell Park School Astronomy Club.
	Andy Wilshere	Librarian
	Avtar Nagra	OASI @ Newbourne
Assistants	Martin Richmond-Hardy	Newsletter, OASI @ Newbourne

Committee Meeting

This will be held via Zoom at 8pm on Friday 21 May. Please Contact Paul Whiting for Zoom connection details.

OASI and BAA Events

Please note that the listed events may change depending on the progress of the pandemic. For the latest event details, please see www.oasi.org.uk/Events/Events.php

There's a Google Calendar on the OASI web site with the latest dates (and corrections!). If you want to easily add OASI Events to your own computer/phone/tablet calendar application click this button on the website Events page (bottom right of the calendar) or use this address to access this calendar from other calendar applications.

https://calendar.google.com/calendar/ical/1jhs9db71ncki4sojo7092vfvc%40group.calendar.google.com/public/basic.ics

For other astronomy news and astro pictures try our

Twitter feed https://twitter.com/OASIpswich

Facebook page https://www.facebook.com/pages/Orwell-Astronomical/158256464287623

Date, Time & Location	Contact	Event
Weekly, every Wednesday, from 20:00	Martin Cook, Roy Gooding	OBSERVATORY CLOSED Meet via Zoom.
Saturday, 10 April	https://britastro.org/winchester2021	BAA Winchester Webinar
Sunday 11 April BBC4		The Sky At Night: Meteors, all-sky cameras
Monday 12 April login 19:30 talk 20:00	Paul Whiting treasurer@oasi.org.uk	OASI@Newbourne Zoom "Exploring the Dark Universe with XENON" a talk by Prof Marc Schumann (recorded)
Wednesday 14 April 19:00	https://britastro.org/node/25422	BAA Webinar: "The Great Debate," by Dr Nick Hewitt
17 April 12:00 – 16:30	http://fedastro.org.uk/fas/convention/	FAS Conventiom Register https://www.eventbrite.co.uk/e/fas-april-online-convention-tickets-144762551689
Thursday 22 April login 19:45 talk 20:00	Paul Whiting treasurer@oasi.org.uk	Live online talk "The Appley Bridge meteorite – the space rock that hit Lancashire" a talk by Russell Parry
Monday 26 April login 19:30 talk 20:00	Paul Whiting treasurer@oasi.org.uk	OASI@Newbourne Zoom "The Weirdest Stars in the Universe" a talk by Dr Emily Levesque (recorded)
Saturday 10 July from 13:00 Newbourne Village Hall	Peter Richards lectures@oasi.org.uk	OASI Summer Picnic and Barbecue

Meetings via Zoom

Paul Whiting has set up an OASI account on Zoom Pro which allows us to accommodate more participants.. To join, please first contact Paul, treasurer@oasi.org.uk – OASI members only. Be sure to install the latest version of Zoom – there's no need to set up an account. Go to https://zoom.us/join and enter the meeting ID or personal link name. You will have received a link from the meeting organiser.

We meet on Wednesday evenings from 20:00 and on Newbourne evenings (see below) from 19:30.

OASI @ Newbourne (still Zooming)

Martin Richmond-Hardy newbourne@oasi.org.uk

We normally meet at Newbourne Village Hall, Mill Lane, IP12 4NP on the 2nd and 4th Mondays (with a few exceptions). BUT In view of the COVID-19 situation **all meetings at Newbourne are suspended.** If OASI members would like to meet up via Zoom on those evenings, please first contact Paul Whiting with your email address to receive an invitation. Members only, please. Subsequent meetings will be assessed in line with the current Government Guidelines in place at the time. Thank you for your understanding.

April 12 (T)	April 26 (S, T)	May 10	May 24 (S)
June 14	June 28 (S)	July OASI BBQ	

We open up for all meetings at 7:30pm. Star Guide (S) at 7:45pm followed by any Talks (T), Workshops (W) and the occasional Quiz (Q).

Stargazer's Guide

On the last meeting each month, at 19:45, Bill Barton FRAS will give a short presentation of what can be viewed in the following 4 weeks plus a reminder of OASI events. During the COVID-19 isolation period these will be available on our website.

Astronomy Workshops/Informal talks

Meetings will depend on COVID-19 situation. Talks will be via Zoom during lock-down.

Contact Mike Whybray Monday meetings start at 7:30pm. Workshops / Talks start at 8pm

If you are a new OASI member, or haven't been to one of these informal workshops before, they are a mixture of events of different characters including beginners talks, interactive workshops, films, etc., suitable for all. They are also a chance to chat with other members over a cup of tea and a biscuit, in a venue rather warmer than the observatory dome on a winter's night!

- Monday April 12th - OASI@Newbourne Zoom
  "Exploring the Dark Universe with XENON" a talk by Prof Marc Schumann (recorded)
- Monday April 26th - OASI@Newbourne Zoom
  "The Weirdest Stars in the Universe" a talk by Dr Emily Levesque (recorded)

All meetings are via Zoom. The OASI@Newbourne events are via the usual meeting ID. Contact Paul Whiting if you can't find the details.

Do you have a subject you could workshop/talk? You could do a short one, or share the effort with a partner. Drop Mike Whybray a line! workshops@oasi.org.uk

Lectures – via Zoom

Contact: Peter Richards lectures@oasi.org.uk

We are arranging an exciting and interesting set of online lectures by guest speakers for this year

The start time for all talks will be 8pm and, as usual, the talks will usually be held on a Friday evening.

- Thursday April 22nd – live online talk
  "The Appley Bridge meteorite - the space rock that hit Lancashire" a talk by Russell Parry

All meetings are currently via Zoom. Contact Paul Whiting if you can't find the details.

Other local astronomy society meetings

Athaneum Astro Society

www.3a.org.uk/index.htm

Meetings suspended during the Covid-19 situation.

We normally meet fortnightly on Thursdays, from 7.30pm, at our dark-sky site in the Walled Garden at Nowton Park, just outside Bury St Edmunds. If you're planning on joining us for the first time, please contact us in advance, just to make sure the meeting is going ahead. We recommend that you wear warm clothing (even summer nights can be chilly, especially when the skies are clear!) and bring a flask, or insulated mug, for a warm drink. We have tea and coffee-making facilities on-site. Events are listed here http://www.3a.org.uk/events.htm

LYRA Lowestoft & Yarmouth Regional Astronomers

www.lyra-astro.co.uk

Due to current Corona Virus outbreak all LYRA meetings are cancelled until further notice.

DASH Astro

Darsham And Surrounding Hamlets http://dash-astro.co.uk

Meetings are normally held at New Darsham Village Hall and all DASH Astro observing sessions will take place at Westleton Common. ASOG observing sessions and locations may be arranged at the time of observation. Unless stated all group meetings will take place from 7:30 pm. on Sundays.

Meetings will be assessed in line with the current Government Guidelines in place at the time.

BAA news & webinars

For full details of all meetings or cancellations, please go to https://britastro.org/meetings/2021.

2021

Saturday, 10 April	BAA Winchester Webinar
Wednesday, 14 April 14 - 19:00	"The Great Debate", by Dr Nick Hewitt.
Saturday, 24 April – 11:00	1-day webinar Cosmology, Galaxies & Exo-planets.
Wednesday, 27 October	BAA Annual General Meeting and BAA Meeting,
Saturday, 04 December	BAA Christmas Meeting

BAA Tutorials

David Basey: Venus as a Planet

https://britastro.org/node/25692

This short tutorial discusses the planet Venus as a body in its own right rather than as a target for observation.

Latest Online Presentations from GoSpaceWatch

Wednesday 7th April at 7:30 BST

James Blake (PhD Student at the University of Warwick): "The Sticky Issue of Space Debris"

Since the launch of Sputnik 1 in 1957, thousands of satellites have followed suit. The Space Age has opened up a wealth of opportunities, but sadly a great deal of mess has accrued in our wake. Fragments of space debris routinely pose a threat to active satellites and, if left untamed, may soon render certain orbital regions unusable for future generations to come. In this talk, I will look to paint a relatively current picture of the debris environment and explore the challenges and merits of potential solutions to the problem that have been proposed in recent years. I will also present some of the ongoing efforts at the University of Warwick to detect, track and characterise artificial objects in space. Tickets: https://spacedeb.eventbrite.co.uk

Wednesday 21st April at 7:30 BST

Dr Leigh Fletcher (University of Leicester): "The Jovian Explorers: From Juno to JUICE"

NASA's Juno spacecraft has been orbiting the gas giant since 2016, providing exquisite views of the atmosphere of the giant planet, and discovering how atmospheric circulation in the hidden layers deep below the clouds can influence the dramatic visual changes we see through our telescopes. Whilst Juno's reconnaissance continues in the coming years, Europe is readying its first ambitious mission to Jupiter: the Jupiter Icy Moons Explorer (JUICE), which will explore the planet and its icy satellites in the early 2030s. Launching in 2022, this solar-powered spacecraft is destined to become humankind's first orbiter of an icy moon, Ganymede. This talk will reveal Juno's latest discoveries, and set the scene for JUICE. Tickets: https://junojuice.eventbrite.co.uk

For further information The GoSpaceWatch speaker programme is here

Or email michael (at) gospacewatch.co.uk

Royal Society lecture on Fast Radio Bursts

April 27 18:30 – 19:30

This year's Royal Society Bakerian Lecture is being given by Professor Victoria Kaspi CC FRS on 27 April at 6.30pm BST, and is entitled 'Fast Radio Bursts'. In this lecture, Professor Kaspi will discuss the Fast Radio Burst field and recent results from the Canadian Hydrogen Intensity Mapping Experiment (CHIME).

As this lecture may be of interest to your members, I am contacting you to see if there are any opportunities to promote the lecture with you. The lecture will be held online and the video will be available after the lecture has taken place. More information about the lecture is available on our website (https://royalsociety.org/science-events-and-lectures/2021/04/bakerian-lecture/), where it is possible to register to receive the joining instructions.

The SARA Spring Conference

SARA (The Society of Amateur Radio Astronomers) is holding an on-line conference on Saturday April 3rd.

Attendees at the conference must be SARA members; if you are not yet a member, this will cost an additional $20.

NB this conference is run at Pacific Daylight Saving Time. Times given below are UTC. Add 1 hour for BST!

Registration: https://www.radio-astronomy.org/node/367

Programme

Time [UTC]	Activity/Title	Presenter
16:00 – 16:15	Introductions, etc.	Dennis Farr, David Westman
16:15 – 17:00	Keynote Speech	Miguel Morales
17:00 – 17:45	Converting a G5500 AZ/EL Rotor to an RA/DEC Tracking System	Richard Russel
17:45 – 18:00	Break	
18:00 – 19:00	Pulsar Observations at the Astropeiler Stockert Observatory	Wolfgang Hermann
19:00 – 20:00	Meal Break	
20:00 – 20:45	High-Frequency Active Auroral Research Program: HAARP – 2020	Whitham Reeve
20:45 – 21:30	Implementation, modification, improvements and uses for SARA's Scope in a box	Pablo Lewin
21:30 – 21:45	Break	
21:45 – 22:30	Innovations in merging optical astronomy with radio astronomy	Thomas Ashcraft
22:30 – 23:15	Mendoza SuperSID	David Westman
23:30	Closing Remarks	David Westman

From the interweb

Try it at home

https://greenbankobservatory.org/try-it-at-home/

Try these activities out at home! Activities that are easy for all are shown, and those that are a little more challenging or may need adult supervision are in orange. All activity pages are in PDF format and you will need a printer for some of these activities.

Lab-grown black hole analog behaves just like Stephen Hawking said it would

https://www.livescience.com/black-hole-analog-confirms-hawking.html

Is the nearest star cluster to the Sun being destroyed?

https://www.esa.int/Science_Exploration/Space_Science/Gaia/Is_the_nearest_star_cluster_to_the_Sun_being_destroyed

Astrophotography: a beginner's guide

https://www.skyatnightmagazine.com/astrophotography/a-beginners-guide-to-astrophotography/

The Night Sky in April 2021

Martin RH

All event times (BST) are for the location of Orwell Park Observatory 52.0096°N, 1.2305°E.

Sun, Moon and planets

Sources: http://heavens-above.com/PlanetSummary.aspx

http://heavens-above.com/moon.aspx

Times BST

Object	Date	Rise	Set	Mag.	Notes
Sun	1	06:30	19:29		
	30	05:27	20:19		
Moon	1	31/3 23:28	08:23		Last Q: 04 April 11:03 New: 12 April 03:31 Apogee: 14 April 18:46 First Q: 20 April 07:59 Full: 27 April 2021 04:32 Perigee 27 April 2021 16:23
	30	29/4 23:55	07:31		
Mercury	1	06:22	17:41	-0.4	Superior conjunction: 19 April Perihelion: 27 April
	30	05:51	21:34	-1.2	
Venus	1	06:45	19:27	-3.8	
	30	05:55	21:02	-3.8	
Mars	1	08:55	01:36	1.3	
	30	08:13	01:04	1.5	
Jupiter	1	05:15	14:40	-1.9	
	30	03:32	13:14	-2.1	
Saturn	1	04:49	13:32	0.8	
	30	02:59	11:47	0.7	
Uranus	1	07:27	21:54	5.9	Superior conjunction: 30 April
	30	05:36	20:09	5.9	
Neptune	1	06:08	17:20	8	
	30	04:16	15:31	7.9	

Occultations during April 2021

If you would like to know more about lunar occultations, please see:–

https://iota-es.de/moon/grazing_descrx101.html and

http://www.lunar-occultations.com/iota/bstar/bstar.htm

Observers are encouraged to download and install the Occult software program [Windows only] to generate predictions for their own particular site coordinates.

Meteor showers during April 2021

Source: BAA Handbook 2021 p26-27 and https://in-the-sky.org//newsindex.php?feed=meteors

Shower	Normal limits	Maximum	Max RA/ Dec.º	ZHR at Max	Notes
April Lyrids	April 14–30	April 22	18:07 272º	15	Normally rather moderate activity, but fine displays in 1803, 1922, 1982. Favourable
η-Aquarids	Apr 19 – May 28	May 6	22:32 338º	40	Fine southern shower, poorly seen from UK. Fast meteors, many with persistent trains. Good in 2013

For radio observation, use reflections from Graves radar on 143.050MHz or the Brams transmitter in Belgium on 49.97MHz.

Visible ISS passes ≥15º max altitude

Source: http://heavens-above.com/PassSummary.aspx?satid=25544

Times arGMT. Predictions are approximate (31 Mar) due to craft adjustments. Check the day before.

Date	Bright –ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
1 Apr	-1.7	21:16:44	10°	W	21:19:09	18°	SW	21:20:15	16°	S
02 Apr	-2	20:29:03	10°	W	20:31:54	25°	SSW	20:34:44	10°	SSE
04 Apr	-1.1	20:31:52	10°	WSW	20:33:28	13°	SW	20:35:03	10°	SSW
28 Apr	-1.7	04:46:38	10°	SSW	21:49:09	19°	SE	04:51:39	10°	E

Starlink passes

https://heavens-above.com/AllPassesFromLaunch.aspx

For a dynamic 3-D display, see https://heavens-above.com/StarLink.aspx

Comets with magnitude brighter than magnitude 10

Source: https://heavens-above.com/Comets.aspx and BAA Handbook p95.

Comet	Brightness	Date of last reported observation	Angular separation from Sun	Altitude	Azimuth	Constellation
C/2020 R4 ATLAS	9.8	2021-Mar-30	72°	-3.6°	272° (W)	Aquila

Astronomy on the radio

Bill Barton's Radio Broadcast

ICRFM (Ipswich Community Radio) 105.7 MHz at about 08:25 in the morning of the first Wednesday of each month. I aim to cover what there is to see in the sky and then a little bit on something topical. ICRFM is also available to listen to over the Internet and there is a listen again option on their website. http://www.icrfm.com

David Murton's Radio Broadcast

On 1st Tuesday of the month, 2.40pm on the Lesley Dolphin show on BBC Radio Suffolk – now digital (channel 10c) and FM 103.9 (Ipswich), 104.6 (west Suffolk), 95.5 (Lowestoft), 95.9 (Aldeburgh) and the internet. https://www.bbc.co.uk/radiosuffolk

IC443 The Jellyfish Nebula

Andy Gibbs

As we approach Galaxy season, there are not many narrowband objects available to image. However, by late March, IC443 in Gemini, is above 20 degrees in elevation until around 00.00 UT.

This image was taken on 23-03-21. 7x 420 second exposures in H*a,* SII and OIII, plus darks and flats.

Equipment used: Atik One 6.0 camera, Explore Scientific ED80 CF refractor, HEQ5 mount with Rowan belt mod, Altair Astro 60mm guide scope, QHY 5 II L guide camera, Sesto Senso focuser, controlled by a Primalucelab Eagle 3.

Software used: Sequence Generator Pro, Atik Dawn and Affinity Photo.

IC443 The Jellyfish Nebula

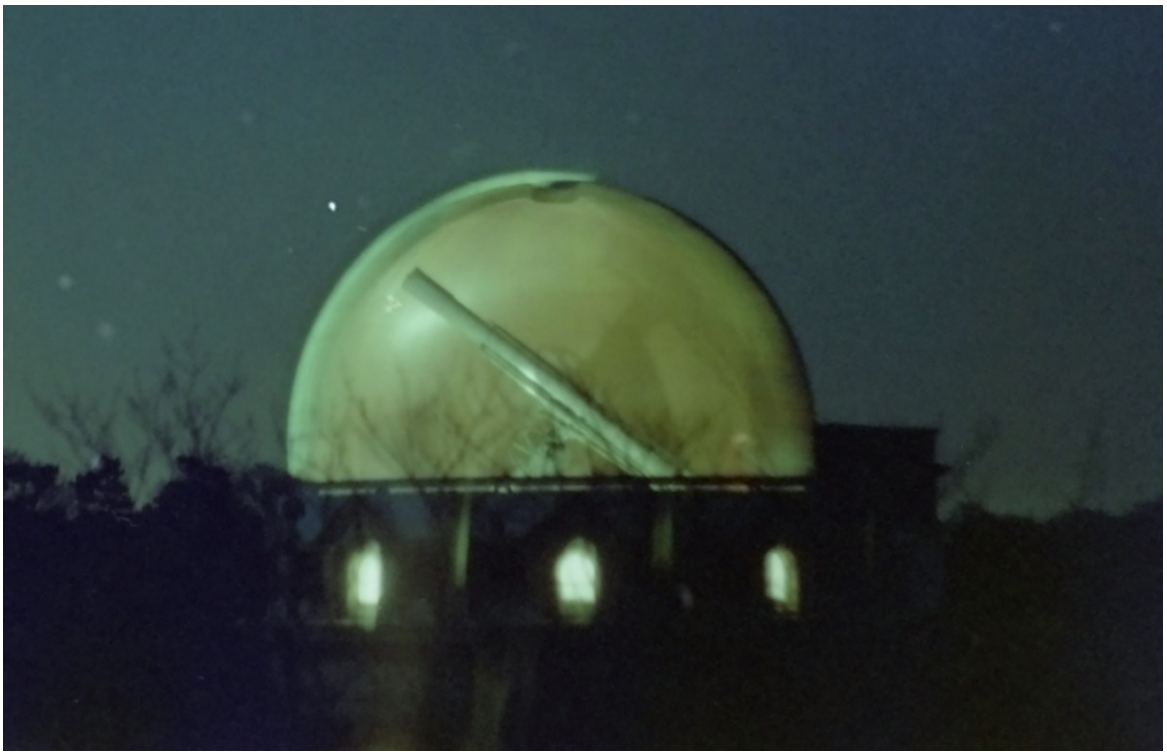
From the archives

Alan Smith

As most of you will know, the Orwell Park Observatory was built by Colonel George Tomline in 1874. Given his considerable fortune, Tomline was able to employ the services of Wilfred Airy, second son of the Astronomer Royal ,George Biddle Airy, and architect John Macvicar Anderson, later president the Royal Institution of British Architects.

Responsible for the specification of scientific instruments in the observatory, Airy specified that the telescope be mounted 16 m above ground, giving a clear horizon over surrounding roofs and minimising the loss of observing opportunities caused by mist rising above the nearby River Orwell.

This gave Macvicar Anderson scope to design the observatory tower on five floors, incorporating many features not normally associated with an observatory, including the use of a transparent, glass dome, along similar lines to the 'Crystal Palace' that had been constructed for the Great Exhibition of 1854. This would allow Tomline and his resident astronomer (Isaac Plummer) to observe all year round in some comfort.



At the top of the observatory, the dome was constructed from a cast iron ring rotating on thirteen removable wheel sets inset into the circular wall of the equatorial room, with a framework of wrought iron ribs fitted with curved glass panels. This glass dome, served very well for the next 60 years, but eventually became 'tired' and in need of some restoration. It was proposed by Basil Brown (the discoverer of the Sutton Hoo ship burial and published astronomer) that the dome might be dismantled and used to cover the burial ship as protection from the elements. As is now well known, the outbreak of the second world war meant that this proved impossible and dome remained in place at the top of the observatory, serving as a lookout and fire watching post by the Seventh Armoured Division (the *Desert Rats)*, until the end of the war.

By this time, the dome was in a sorry state but postwar finances did not permit any work to be carried out.

However, when OASI was formed in the late 1960's, the telescope was brought back into use and the dome, with its support ring and wheels, was stabilised.

The attached picture was taken in the autumn of 1983 from the top of the clock tower situated about 50m to the south of the observatory, and clearly shows the support ring, and the telescope on its cast iron mount. As can be seen, the tops of the Leylandii trees planted between the tower and the observatory are just starting to obscure the view along the bottom of the dome.

In the original image, Ursa Major can just be seen above the dome.

Further deterioration of the dome continued until the fateful night of 15-16th Oct 1987, when hurricane force winds swept across East Anglia (the notorious Michael Fish forecast). These proved too much for the centenarian structure and the glass panels finally fragmented, happily with no casualties.

The now familiar copper clad, mahogany lined dome was constructed using the original support ring and fine ribs.

For all you doubting Thomas's, the original image was taken using a soviet era Zenit 'B' camera fitted with its original 58mm Helios lens on a single frame of KodaColorII 100 C-41 film and is still in my possession. No computer wizardry or Photoshop gimmicks have been used, and the image is believed to be the only colour photograph of the glass dome in existence.

Flippin' Owl – M97 The Owl Nebula

John Hughes

Towards the end of 2020 I acquired a 8" Ritchey-Chretien telescope and after a brief time under the stars it became apparent it needed collimating. By all accounts RC's are notoriously difficult to collimate and so I learned the hard way by putting in long hours in a cold garage over the winter evenings. My task wasn't helped by the poor run of bad weather we have had, however, having finally had some clear spells I have managed to get closer to my goal.

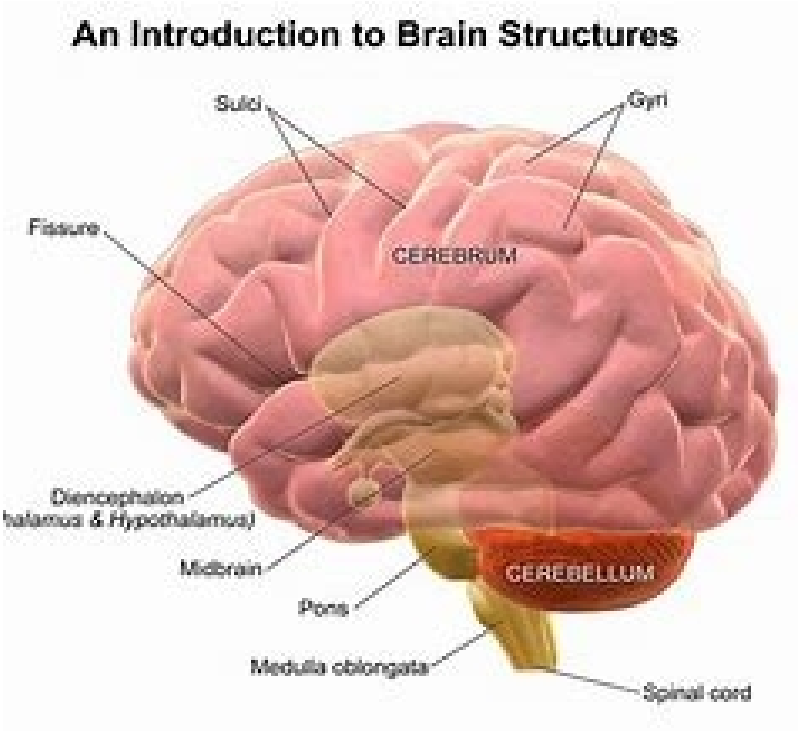
So with a clear spell earlier this week I put the RC8 through its paces. Balancing the scope is a challenging as it is back heavy, cable management was required as I nearly had my laptop crash on to the patio during a meridian flip. Luckily I was around to stop the mount and untangle the cables. There have been many more challenges just to get the RC8 in a position to take this picture of M97, my smallest object to date.

The human brain and the effects of microgravity and space missions.

A basic insight

Article from the library

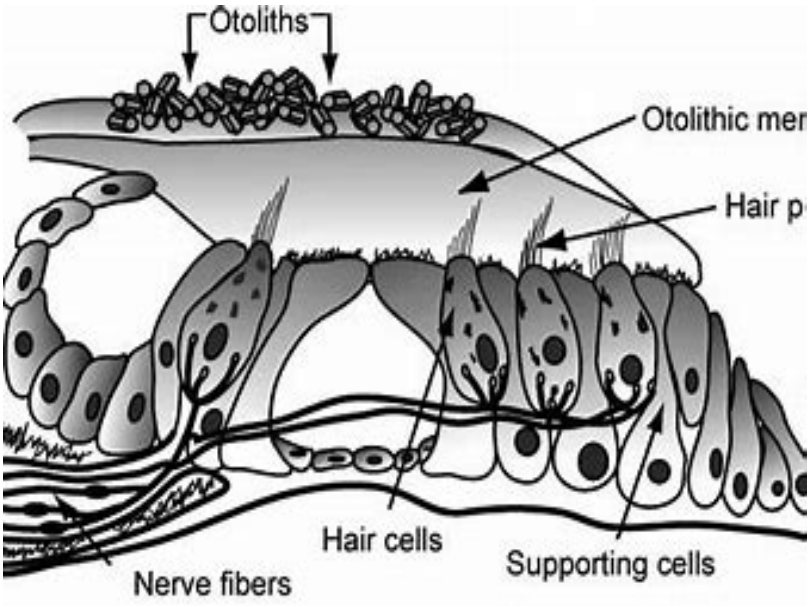
Humans have been pushing the barriers of spaceflight for the last fifty years. During that period of time it has become apparent that flying through space can have detrimental effects on the human body especially our main control system, the brain. Today, the length of any spaceflight could be as much as one year increasing the time span from the earlier times and enhancing the chances of human body deterioration greatly. Some examples of this are visual impairment, bone density reduction, muscle wasting and neurovestibular distress. What happens when the brain spends vast periods in microgravity? Recently research papers have agreed that specific areas of brain tissue and the ventricular system increase in size, especially when tested after having been aboard the ISS on extended assignments. This culminates in the impairment of both cognitive and behavioural functions. In the brain, the areas that control these functions are cerebrum, cerebellum and brainstem for the cognitive functions and the limbic system for behaviour. The latter is concerned with emotion, memory and aggression as well as stimulating the reward and punishment centres and some features of movement.



Picture credit : Wikipaedia.org

So, the question to ask, is what is being affected and how?

During spaceflight and because of microgravity electro-cortical function may be reduced due to gravity changes impinging upon the linear acceleration sensors called otoliths. These calcium carbonate structures sit within the inner ear in a viscous fluid.



Picture credit: Nasa.gov

When these tiny structures move, they strike hair cells, which in turn pass this signal down sensory nerve fibres to the brain, where they are decoded as motion. Our human body has two sets of vestibular systems, one on each side of the head, and therefore upon stimulation, the vestibular cortex of the brain will compare both. If a discrepancy is noted, body and spatial awareness and understanding may become disjointed. Retention of balance may become a problem. Returning space crew are seen to present with forms of ataxia. This loss of fine control and coordination may be considered as a possible structural and operational malfunction of the cerebellum. MRI findings in one case showed a reduced capacity of part of the cortical area, which demonstrates the basis of gravitational and vestibular distress. Post flight tests confirmed a reduction in cerebellar-motor connections.

Results from research papers on data from ISS astronauts show some interesting results. Overall, the total volume of the brain from pre-flight to post-flight changes little. However, there is a meaningful escalation in total ventricular volume at the post-flight stage. This is the cerebrospinal fluid, which acts as a cushion safeguarding the brain within the skull, as well as helping in controlling cerebral blood flow. The % Δ of ventricular volume was allied with flight duration for all astronauts, accounting for ages at commencement of flight. It was of note that the longer the duration of flight, the greater the local changes in brain structure occurred. These changes affected neurons and glial cells at the brain vertex, involving motor regions. The enlargement of the vestibular system also displaced some brain tissue at the ventricular boundaries. When tested the astronauts showed different performance at the post-flight investigations when compared to the pre-flight checks, demonstrating changes in motor function. Mental processing speeds and learning ability also showed a decrease in functional precision. Several suffered from spaceflight associated neuro-ocular syndrome.

From these observations, it can be seen that long duration space flights can cause many quite catastrophic conditions. Alterations in the brain anatomy and chemistry whilst in microgravity can have profound behavioural effects as well as disparity to both global and local brain formation.

The problems of setting up programs to fully access astronauts throughout their flights are logistic, economic and pragmatic, but in order for interplanetary and space excursionist missions to continue, answers to the question of space flights in microgravity and effects on the human body are essential.

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