

Society News

Trevor Tuckwell

1933 - 2015



It is with great sadness that I report the recent death of Trevor Tuckwell aged 82.

Until last year, Trevor was an active VAS member and a very popular, regular visitor to the observatory.

Trevor died peacefully on 28 May 2015.

Our sincere condolences to his wife Sheila and his daughter Catherine.

Phone number error

Sorry, last month's newsletter contained the wrong phone number for me and NZ - just one digit but it makes a lot of difference! No wonder the phone has been so quiet.

The correct one is 01983 296128.

Brian Curd
Editor New Zenith.

VAS Website: wightastronomy.org

Submissions or letters to New Zenith are always welcome and should be sent to:

The Editor New Zenith
75 Hefford Road
East Cowes

Isle of Wight PO32 6QU

Tel: **01983 296128** or email: editor@wightastronomy.org

Material for the next issue by the 6th of the month please.

VAS Registered Office

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The Vectis Astronomical Society and the Editor of the New Zenith accept no responsibility for advice, information or opinion expressed by contributors.

Registered Charity No 1046091

Observatory Diary

Monday, 19.30hrs	Members Only by arrangement Telescope and night sky training. Contact Barry Bates 01983 872979
Thursday, 19.30hrs	Members and Public. Informal meeting and observing

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2015

Date	Subject	Speaker
26 Jun	Herschel Space Observatory and ALMA explore deep into space	Dr Mikako Matsuura
24 Jul	Light - Astronomical Applications of Spectroscopy	James Fradgley
28 Aug	Astro Photography and AGM	Simon Plumley
25 Sep	Photographing the Aurora	Elizabeth Cunningham
23 Oct	EUCLID and the Expanding Universe	Tom Kitching
27 Nov	TBA	James Fradgley

Please check wightastronomy.org/meetings/ for the latest information

Telescope Training

Any member who would like training on the observatory Meade LX200 should contact **Barry Bates on 872979**

Observatory Visits Booked

None

It would be appreciated if members could avoid using the observatory at these times.

Astronomers aren't anti-light

We just want:

***The right light
In the right place
At the right time***

**VAS Contacts
2014/15**

President	Barry Bates president@wightastronomy.org
Chairman	Bryn Davis chairman@wightastronomy.org
Secretary	Vacancy secretary@wightastronomy.org
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Membership Secretary	Norman Osborn members@wightastronomy.org
NZ Distribution	Brian Bond distribution@wightastronomy.org
Others	Mark Williams & Nigel Lee

Important





Members using the observatory outside normal Thursday meetings **MUST** enter a line or two in the Observatory Log Book.

On several recent occasions, lights, heaters and the Meade LX200 have been left on!

When you leave the observatory please ensure it is secure and all lights, heaters and telescopes are **TURNED OFF.**

July 2015 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
July 16th	July 24th	July 2nd	July 8th

Planets

Mercury

Mercury is on the far side of the Sun this month and will be making a rather poor apparition in the evening sky early in August.

Venus

On June 30th Venus and Jupiter come into close conjunction being separated by 23 arc seconds, less than the diameter of the full moon. After this time they both separate with Jupiter heading towards the northwest and Venus to the southwest. After a few days Venus starts to make a dive towards the Sun and by the end of the month is at the horizon only 30 minutes after sunset.

There is photo opportunity as the Moon passes close by on the 18th.

Mars

Mars is in conjunction on the other side of the Sun from the Earth and can not be seen, it will appear again in the morning sky in the autumn.

Jupiter

After its conjunction with Venus at the start of the month, Jupiter remains close by and a little above, setting shortly after Venus. Both planets will be leaving the evening sky in early August.

Saturn

As soon as the sky is dark enough Saturn can be found low in the south amongst the stars of Libra. To its lower left is the bright red giant star Antares.

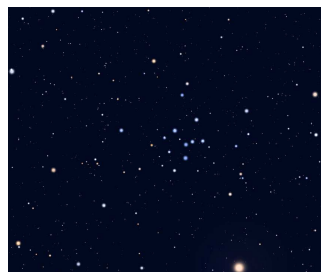
Uranus

Uranus is to be found about halfway between Epsilon and Mu Piscium, At this time of year the sky is relatively bright all night making both outer planets more difficult to observe.

Neptune

In the early hours of the morning, Neptune can be found a little over 2 degrees west of the third magnitude star Lambda Aquarii.

Deep Sky



IC4665 Open Cluster
RA 17h 47m Dec 5° 42'
mag 4.2

This is a large cluster slightly more than a degree in diameter. It is best viewed in a rich field telescope or large binoculars. The brighter members form right angled triangular patterns around the cluster's centre.



NGC6633 Open Cluster
RA 18h 28m Dec 6° 34'
mag 4.5

Although it is clearly visible in binoculars it is best viewed through a rich field telescope where the brighter members of this cluster form a rather wavy looking wedge of stars. If viewed before the sky darkens too much restricting the number of visible stars the scene is reminiscent of a miniature Leo, the backward question mark is a little indistinct, but the back and haunches are easily distinguishable.



IC4756 Open Cluster
RA 18h 39m Dec 5° 27'
mag 4.5

Located a short distance to the southeast of NGC6633 this cluster is also an easy binocular target, but again is best views through a small low magnification telescope. There are a number of long chains of stars throughout the cluster the brighter ones form a rough five pronged Catherine wheel shape covering most of the cluster. The brighter foreground stars form a slight distraction when observing this cluster.

Peter Burgess

Advertising in NZ

If you would like to advertise in New Zenith, you can have a space like this for £50 per year

Only four slots are available

Artwork can be created or you can supply it.

Don't forget that member's who take the electronic version see a full colour version

Contact the Editor for information

Details on the Front Page

August AGM

Please consider joining the VAS Committee

We **urgently** need volunteers as:

1. *Secretary*
2. *Programme Organiser*
3. *Dark Skies representative*

and I'm pretty sure some other Committee Members could do with a break!

VAS needs the full support of its members to carry on, so please consider helping, even if it's just for a year.

There is a nomination form on the other side of this page so please get involved.

Totland Stargazing

We are organising a Stargazing evening for 45 Phd students from Southampton University at the Youth Hostel in Totland on Monday 21st Sept

A draft itinerary is:

7.00pm BBQ and set up scopes.

8.30pm Brian to do a start up talk and intro to the sky

9.00pm Start observing

We need lots of members with scopes, so please let me know if you are willing and able to help

Elaine Spear
elainespear1@gmail.com



**Island Planetarium
@Fort Victoria**

The Island's Telescope Professionals

Serious Stuff

TAL 200mm Newtonian Reflector OTA
180mm Maksutov Cassegrain OTA
EQ 5 mount and drives

Various Used ETX 's

Also starter scopes and accessories

Discounts and deals for VAS members

Call Paul England – VAS Member
on 761555 - leave a message if I am not there
Or - enquiry@islandastronomy.co.uk

VAS Officers and Committee Nominations 2015/16

For those wishing to stand for election at the AGM of the Society to be held on Friday 28th August 2015 at 7.00pm.

Name and Address of Nominee:

Standing for

- Chairman
- Treasurer.....
- Secretary
- Observatory Director.....
- Membership Secretary.....
- Programme Organiser.....
- Committee

Proposed by:

Seconded by:

Signature of Nominee:.....

Notes

- The Committee meets once each month usually on a Thursday evening before the usual club night.
- No person can be elected to more than one position.
- Only adult fully paid-up members may stand for election (or propose or second).
- All completed nomination forms to be received by the Secretary at least 7 days before the AGM.
- The Committee consists of not less than six members.

Guildford campus gets new spacecraft control centre



A satellite map at the Guildford control room shows the positions of the SSSL spacecraft

A new hub designed to control satellites and collect their data has opened at a Surrey research park ahead of the launch of four new spacecraft.

The spacecraft operation centre (SOC) opened by Surrey Satellite Technology (SSTL) replaces the old mission control at the company's Guildford campus.

SSTL has built and launched 43 satellites since 1981, and is currently controlling and monitoring 14. Four more, to be run from the Guildford HQ, will be launched this summer.

The company, which designs, manufactures and operates satellites and ground systems, is currently assembling more than 20 spacecraft. It operates satellites of its own, and for organisations including the Canadian government, BAE Systems and the UK Space Agency.



The new operation centre will also control four new satellites being launched later this summer

“The facilities are really are out of this world and I have no doubt they will be the nerve centre for many successful missions,” said Surrey County Council deputy leader Peter Martin, who attended the official opening of the SOC on Thursday.

The new SOC communicates with the satellites via ground stations in Guildford and Bordon, Hampshire, and another in the Arctic Circle which will come into use in June.

James Northam, head of ground systems and mission services, said: “They are mostly Earth observation satellites taking images of the Earth which can be used for everything from mapping purposes to disaster relief.”

“When there is a natural disaster we will be able to produce flood relief maps for aid agencies.”

“Some of the data allows maps to be produced to show how crops are growing, so farmers can determine how much fertiliser to put on sections of their fields.”

Satellites usually make six passes over the Guildford ground station in 24 hours.

This article was highlighted by Nigel Lee and originally appeared on the [BBC News website](http://www.bbc.com/news/technology)

Pluto Probe Spies Weird ‘Dark Pole’ on Big Moon Charon

June 23, 2015 - NASA's New Horizons spacecraft has spotted a strange dark patch at the pole of Pluto's big moon Charon, further whetting researchers' appetites ahead of the probe's epic flyby of the dwarf planet system next month.

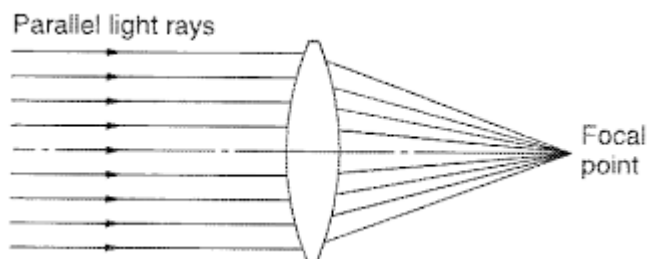
New Horizons has also detected a rich diversity of terrain types in Pluto's “close approach hemisphere” — the side of the planet New Horizons will zoom past at a distance of just 7,800 miles (12,500 kilometers) on July 14. The newly resolved features, which New Horizons captured in images taken from May 29 through June 19, are visible in a Pluto-Charon video NASA released today.

“This system is just amazing. The science team is just ecstatic with what we see on Pluto's close approach hemisphere: Every terrain type we see on the planet — including both the brightest and darkest surface areas — are represented there. It's a wonderland!” New Horizons principal investigator Alan Stern, of the Southwest Research Institute in Boulder, Colorado, said in a statement. “And about Charon — wow — I don't think anyone expected Charon to reveal a mystery like dark terrains at its pole. Who ordered that?”

Read more at: <http://www.space.com>

Aberrations

In an ideal optical system, all rays of light from a point source would converge at the same point, to form a clear image.



The influences which cause different rays to converge to different points are called aberrations.

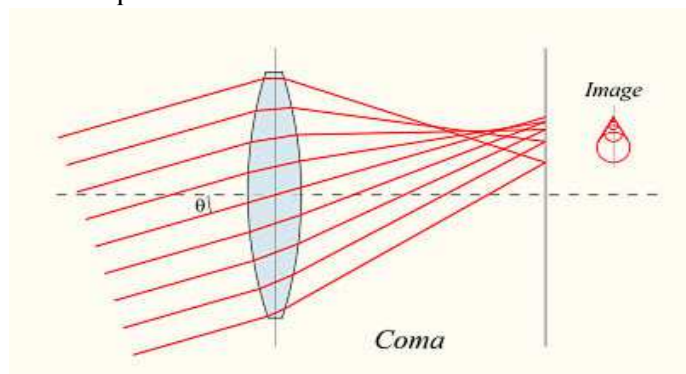
Aberrations are errors in an image that occur due to imperfections in the optical system. In other words, aberrations result when the optical system misdirects some of the object's rays. Optical components can create errors in an image even if they are made of the best materials with no defects.

For simplicity, consider aberrations divided into two groups, *chromatic aberrations* (present when using more than one wavelength of light) and *monochromatic aberrations* (present with a single wavelength of light). Chromatic aberration was discussed last month.

Monochromatic aberrations can be grouped into several categories: *spherical*, *coma*, *astigmatism*, *field curvature*, and *distortion*. Let's discuss these one at a time.

Coma

Coma is a complex aberration that affects light rays from a point source that pass through a lens at an angle. With coma, the rays don't refocus to a point but flare out from the point.

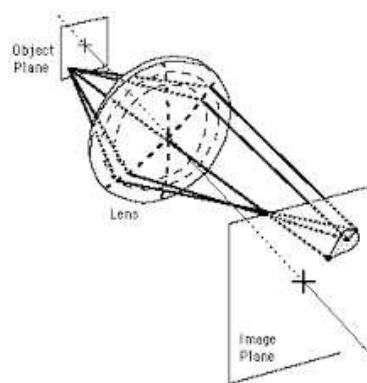


This causes points of light to become an elongated flare. Usually the flare is further away from the centre (*positive coma*) but in some cases it can be toward the centre (*negative coma*). The further from the centre of the

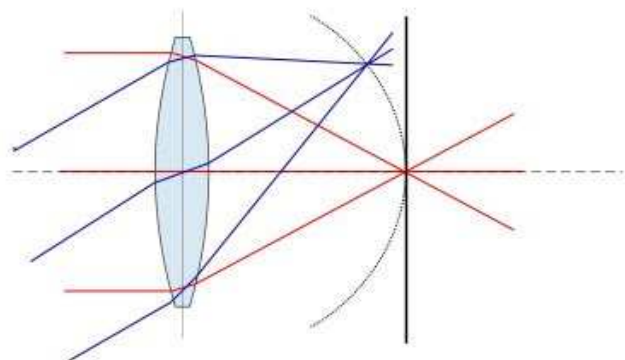
image, the more noticeable the effect. Thus a lens with considerable coma may produce a sharp image in the centre of the field, but become increasingly blurred toward the edges. Light rays passing straight through the centre of the lens are not affected.



Coma in telescopes can cause stars to look distorted by giving them a comet like tail, hence the name. The "comet" shape may have its "tail" toward or away from the centre of the view, depending upon whether the aberration has a negative or positive value respectively.



Coma is a property of a telescope with a parabolic concave circular mirror. When the incoming rays strike the mirror at an angle, individual rays are not reflected to the same point. When looking at a point that is not perfectly aligned with the optical axis, or parabola, some of the incoming light from that point will strike the mirror at an angle.



Collimating a telescope to ensure the image is viewed in the centre of the mirror, will greatly improve the quality of the image.

The degree of coma aberration is greater for lenses with wider apertures, and can be corrected (in part) by reducing aperture size.

Systems with two curved (*hyperbolic*) mirrors, such as in the **Ritchey-Chretien** telescope, coma can more or less be eliminated. This allows for a larger useful field of view.

Newtonian telescopes have a parabolic primary mirror and need a corrector lens to eliminate coma. This only works if the scope is collimated properly so the optical axis passes through the centre of the lens and for telescopes below $f/6$.

Catadioptric systems such as **Maksutov-Cassegrain**, **Schmidt-Cassegrain** add a frontal lens or corrector plate. However, the frontal lens tends to limit designs to smaller apertures. A catadioptric system for a telescope is one that uses mirrors and lenses combined.



ACF (*Advanced Coma-Free*) is a modified version of the Schmidt-Cassegrain that replaces the traditional spherical secondary mirror with a hyperbolic one. Here the full aperture corrector is slightly altered in shape and combined with a spherical primary mirror.



Designing lenses with no aberration is almost impossible. Correcting one type of aberration may worsen another. No lens is perfect, so each should be used in a way that minimizes its weaknesses and plays to its strengths.

Elaine Spear

Next Month: Astigmatism

Archaeoastronomy



The sun rising over Stonehenge at the Summer Solstice.



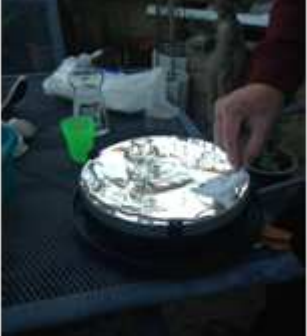




Archaeoastronomy (*also spelled archeoastronomy*) is the study of how people in the past “have understood the phenomena in the sky, how they used these phenomena and what role the sky played in their cultures.” Clive Ruggles argues it is misleading to consider archaeoastronomy to be the study of ancient astronomy, as modern astronomy is a scientific discipline, while archaeoastronomy considers symbolically rich cultural interpretations of phenomena in the sky by other cultures. It is often twinned with ethnoastronomy, the anthropological study of skywatching in contemporary societies. Archaeoastronomy is also closely associated with historical astronomy, the use of historical records of heavenly events to answer astronomical problems and the history of astronomy, which uses written records to evaluate past astronomical practice.

Archaeoastronomy uses a variety of methods to uncover evidence of past practices including archaeology, anthropology, astronomy, statistics and probability, and history. Because these methods are diverse and use data from such different sources, integrating them into a coherent argument has been a long-term difficulty for archaeoastronomers. Archaeoastronomy fills complementary niches in landscape archaeology and cognitive archaeology. Material evidence and its connection to the sky can reveal how a wider landscape can be integrated into beliefs about the cycles of nature, such as Mayan astronomy and its relationship with agriculture. Other examples which have brought together ideas of cognition and landscape include studies of the cosmic order embedded in the roads of settlements.

Archaeoastronomy can be applied to all cultures and all time periods. The meanings of the sky vary from culture to culture; nevertheless there are scientific methods which can be applied across cultures when examining ancient beliefs. It is perhaps the need to balance the social and scientific aspects of archaeoastronomy which led Clive Ruggles to describe it as: “...[A] field with academic work of high quality at one end but uncontrolled speculation bordering on lunacy at the other.”

Read ***much*** more at: [Wikipedia](#)

Cleaning a Dobsonian Mirror

		
<p>Remove mirror cell located at the bottom of the scope. The screws are tiny so keep them safe.</p>	<p>Mirror removed to reveal dust and dog hairs! It's heavy, so take care.</p>	<p>Wet the whole mirror gently with clean tap water. See notes below</p>
		
<p>Add a little washing up liquid, preferably non-bio or "organic". Mix gently then leave it while you have some dinner! (thanks Elaine)</p>	<p>Wipe the mirror from the centre to the edge with hospital standard wood free cotton wool. Be careful not to apply any pressure.</p>	<p>Thoroughly rinse with clean tap water to remove all of the detergent (for a really filthy mirror, repeat the previous 3 steps).</p>
		
<p>Rinse with de-ionised/distilled water to avoid residue</p>	<p>Use a hair-dyer to blow water droplets off the mirror</p>	<p>Leave to air dry and see your super new shiny mirror</p>
	<p style="text-align: center;">You undertake this process at your own risk!</p> <p style="text-align: center;">A mirror only needs cleaning if it is really dirty, the odd mark or spider poo is fine and will hardly affect the performance.</p> <p style="text-align: center;">Before using tap water, allow it to stand for an hour or so to ensure that particulates settle out.</p> <p style="text-align: center;">Marking the original position of the mirror cell before removing it and replacing it in the same orientation will ensure minimal collimation problems.</p> <p style="text-align: center;">Martyn Weaver, Elaine Spear and Brian Curd</p>	
<p>Replace mirror cell, align, collimate and get observing. Simples!</p>		

Veteran NASA Spacecraft Nears 60,000th Lap Around Mars, No Pit Stops

NASA's Mars Odyssey spacecraft will reach a major milestone June 23, when it completes its 60,000th orbit since arriving at the Red Planet in 2001.

Named after the bestselling novel "2001: A Space Odyssey" by Arthur C. Clarke, Odyssey began orbiting Mars almost 14 years ago, on Oct. 23, 2001. On Dec. 15, 2010, it became the longest-operating spacecraft ever sent to Mars, and continues to hold that record today.

Odyssey, which discovered widespread water ice just beneath the surface of the Red Planet, is still going strong today, serving as a key communications relay for NASA's Mars rovers and making continued contributions to planetary science.

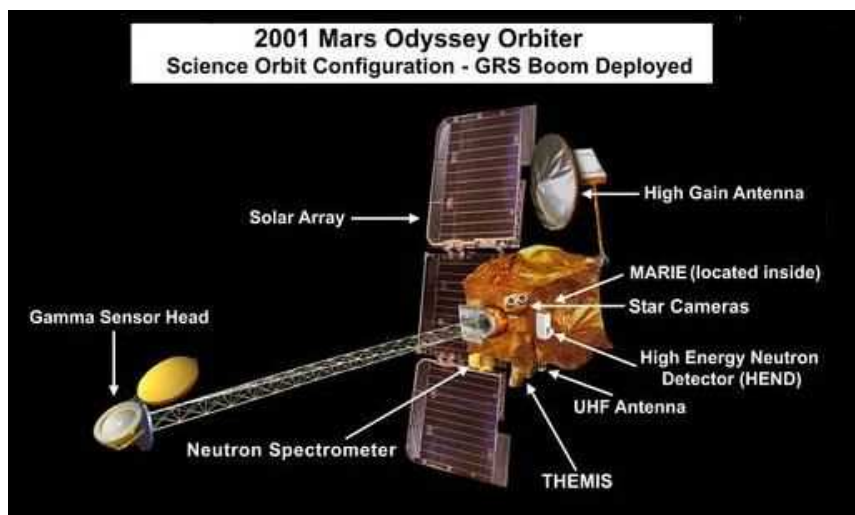
"This orbital milestone is an opportunity to celebrate Odyssey's many achievements," said Jim Green, NASA's director of Planetary Science. "Odyssey will continue to help lay a foundation for the first humans to Mars in the 2030s through NASA's Journey to Mars initiative."

Odyssey's orbital milestone translates into about 888 million miles (1.43 billion kilometers) traversed by the spacecraft. In addition to the 286 million miles (460 million kilometers) covered on its trip from Earth to Mars, the spacecraft is a high-mileage vehicle like no other, but remains in fine condition.

"The spacecraft is in good health, with all subsystems functional and with enough propellant for about 10 more years," said David Lehman, project manager for the Mars Odyssey at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California.

Odyssey's major discoveries began in the early months of its two-year primary mission, with gamma-ray and neutron measurements that indicated plentiful water ice just beneath the surface at high latitudes on Mars. The spacecraft's unexpectedly long service has enabled achievements such as completion of the highest-resolution global map of Mars and observation of seasonal and year-to-year changes, such as freezing and thawing of carbon dioxide.

Through its many accomplishments, the spacecraft also has aided NASA's preparations for human missions to Mars by monitoring radiation in the environment around the planet via the Mars Radiation Environment Experiment, developed at NASA's Johnson Space Center in Houston.



Odyssey currently is completing an adjustment to an orbit that will position it to pass over Martian terrain lit by early-morning sunlight rather than afternoon light. In its current orbit, the spacecraft always flies near each pole and along what is called the terminator. The terminator is a moving "line" that encircles Mars and passes through any point on the planet's surface at sunrise and again at sunset, separating the portion of Mars lit by the sun from the portion experiencing darkness, dividing day and night. The position of this line varies by time of day and time of year.

"Upcoming observations will focus on what is happening in the Martian atmosphere in the morning, such as clouds, hazes and fogs, and on frosts on the surface that burn off by later in the day," said Jeffrey Plaut, Odyssey project scientist at JPL.

The planned drift to a morning-daylight orbit began in 2012, was accelerated in 2014, and will be completed with a manoeuvre in November to lock in the orbit timing so that each pass over the equator occurs at the same time of day.

"We have performed many orbit manoeuvres over the long life of this mission, and we will use that experience conducting the one to halt the drift," said Steve Sanders, Odyssey spacecraft engineer at Lockheed Martin Space Systems in Denver.

To date, Odyssey's Thermal Emission Imaging System (THEMIS) has yielded 208,240 images in visible-light wavelengths and 188,760 in thermal infrared wavelengths. THEMIS images are the basis for detailed global maps and identification of some surface materials, such as chloride salt deposits and silica-rich terrain. The infrared imaging also indicates how quickly regions of the surface cool at night or warm in sunlight, telling researchers how dusty or rocky the ground is.

Read more at: <http://mars.nasa.gov/odyssey/>

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

Quanta Magazine

I stumbled on this new website the other day, it describes itself thus "*Quanta Magazine's mission is to enhance public understanding of research developments in mathematics and the physical and life sciences. Quanta articles do not necessarily represent the views of the Simons Foundation.*"

It is worth a look: <https://www.quantamagazine.org/>



Why looking at the light makes us sneeze

In 1991, a University of Manchester pathologist named Emyr Benbow wrote a letter to the editor of the British Journal of Ophthalmology. "Even trivial symptoms are more easily tolerated if you can put a name to them," he wrote, "even if that produces only an illusory understanding of their significance". The name he was referring to was "photic sneezing". Benbow suffered from a curious phenomenon where moving from darkness into very bright light, caused him to reflexively sneeze. He found it of some comfort that "it occurs in normal people".

The first formal investigation of the reflex was probably made in the early 1950s by a French researcher named Sedan. He discovered that some patients sneezed when he shined his ophthalmoscope, used to examine the retina, into their eyes. His continuing inquiry into six such photic sneezers established that they would also sneeze when exposed to bright sunlight, flash photography, and in one case, an ultraviolet light. In describing the phenomenon, he noted that the sneeze only occurs just as the patient becomes exposed to light; they don't continue to sneeze even if continually awash in the bright glow of the Sun (or an ophthalmoscope).

Read more at: www.bbc.com

Observatory

When visiting the VAS observatory, for your own safety, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

Articles Needed

New Zenith needs letters, articles, reviews or pictures related to all aspects of astronomy.

Contributions to the Editor please at the email or postal address on the front page.

*"I'm reading a book
about gravity.
I just can't put it down."
Anon*

*"It is strange that only
extraordinary men make
the discoveries, which
later appear so easy and
simple."
Georg C. Lichtenberg*

*"There is no law except
the law that there is
no law."
John Archibald Wheeler*

*"Never memorize
something that you can
look up."
Albert Einstein*