

Thanet Astronomy Group

Astronomy for Everyone in Plain English

NEWSLETTER

July 2015



Rosetta and Philae

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About the Cover Picture

Rosetta and Philae

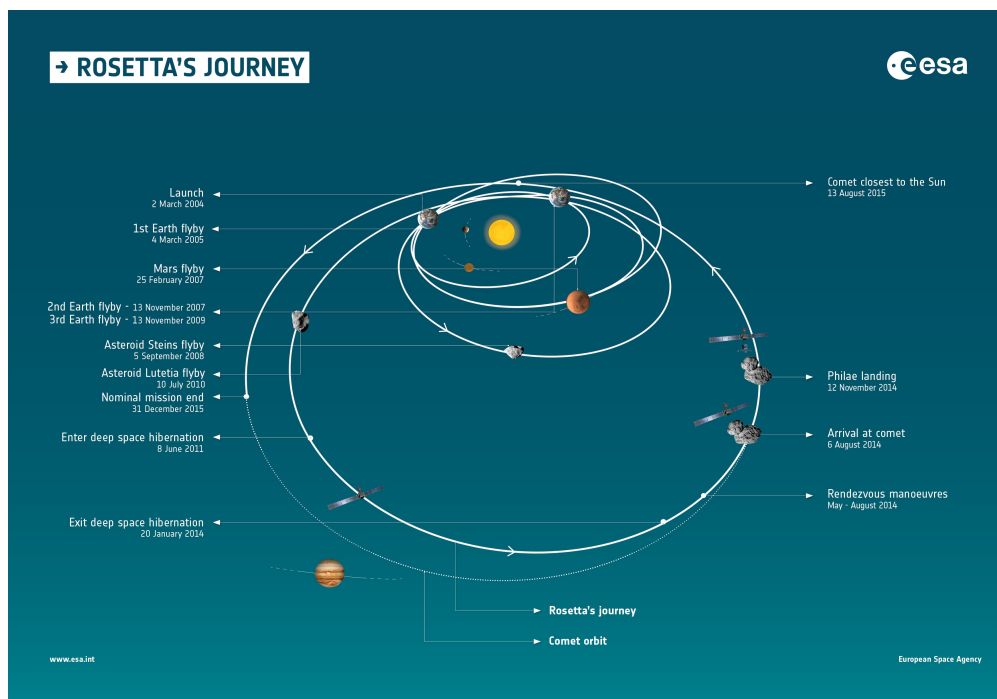


Copyright ESA, image by AOES Medialab

On 2nd March 2004 a space probe called Rosetta was launched by the European Space Agency (ESA), with a probe lander named Philae. Its destination, comet 67P/Churyumov-Gerasimenko (well done if you can pronounce that!).

It took a long time for Rosetta to reach the comet, as it had to chase down the comet which was in its own orbit around the Sun. Rosetta could not travel in a direct line to the comet, as it had no way to alter its course to match the orbit when it reached 67P, and would therefore fly straight past!

ESA had to put Rosetta in its own orbital path around the Sun, and then use gravity assist manoeuvres (or flybys, slingshots) to accelerate Rosetta through the inner Solar System. These manoeuvres used the gravity of a planet or other object to alter Rosetta's speed and path, in order to put it in an orbit which matched the orbit of 67P.



Copyright ESA

As you can see from the illustration above, after launch Rosetta was sent on an orbit around the Sun, with each flyby, the orbit and speed of Rosetta would change and send it towards the point needed for it to perform its next flyby and on and on and on.....

About the Cover Picture

Rosetta and Philae

Just over a year after Rosetta was launched it used Earth to perform its first flyby on 4th March 2005. The second flyby was with Mars on 25th February 2007, nearly 2 years later. Then there was another flyby of Earth on 13th November 2007.

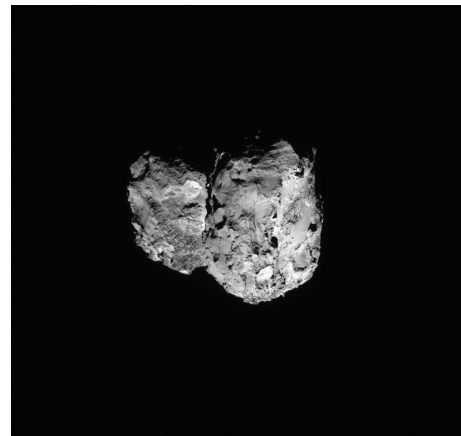
Nearly 2 years after the second flyby of Earth, Rosetta used asteroid 2867 Steins on 5th September 2008 to send it further on its way. A third and final flyby of Earth was on the 12th November 2009.

The final manoeuvre happened on 10th July 2010 when Rosetta used another asteroid – 21 Lutetia, which finally placed Rosetta in the correct orbit just behind 67P with just enough speed to catch up, and leaving enough fuel available to slow down and not fly past.

In May 2014, Rosetta began a series of 8 burns which slowed it down to match the speed of comet 67P.

Rosetta finally reached the comet on 6th August 2014, more than 10 years after its launch.

Rosetta has 11 instruments onboard (a list of which is on page 11) and spent a few months studying 67P and sending back data and photographs of the comets surface. ESA used this data to decide where to land Philae.



67P Copyright ESA/Rosetta/NAVCAM

On 12th November 2014, Philae was deployed to the comet, but it wasn't as straight forward a landing as was expected.

When Philae made first contact it actually bounced! It rebounded at 38cm per second and rose to an altitude of approximately 1km. If Philae had exceeded about 44cm per second, it would have actually escaped the gravity of the comet and this article probably would not have been written!!

During the first bounce, the lander started to rotate and also they think that Philae struck something on the surface which slowed the rotation but sent Philae tumbling. Philae then bounced for a second time at 3cm per second and finally came to a stop on the surface of 67P.

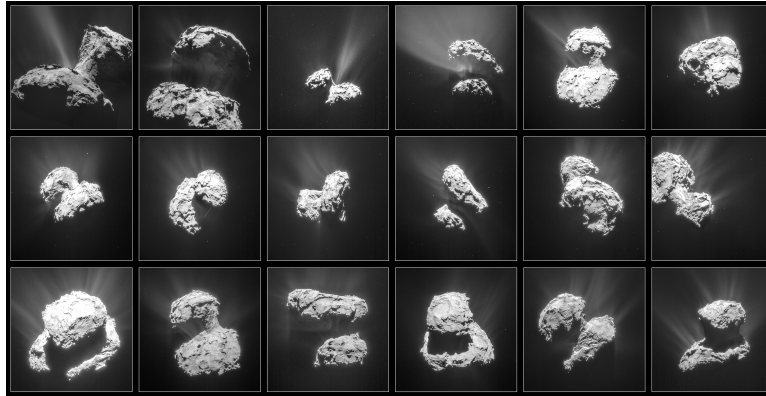
Philae has 10 instruments (a list of which is on page 12) and its primary battery was designed to power them for 60 hours, with a secondary rechargeable battery expected to be recharged using the solar panels which are attached to the outside of Philae.

Unfortunately, the place Philae finally landed was not in an optimal position for the solar panels to charge the battery, and on the morning of 14th November 2014 ESA estimated that there was enough battery power to only last the rest of the day. They used some of the remaining battery power to gather some scientific data and also to try to move the Philae into a more favourable position. Philae went to sleep and contact was ceased on 15th November 2014. But all may not be lost.....

About the Cover Picture

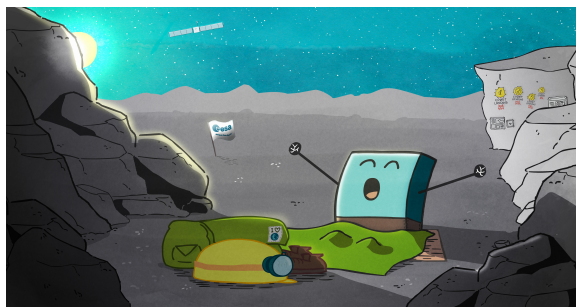
Rosetta and Philae

Rosetta continued to orbit the comet and send back data and some amazing photographs of it becoming more active. As comet 67P travels further into the inner solar system towards the Sun, it is starting to warm up and its icy surface can't remain stable. Part of it turns to gas and expands into space, forming a halo of dust and evaporated gas.



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On 13th June 2015, Rosetta received a transmission from Philae which meant that the lander had recharged its batteries enough in order to wake up! It sent historical data as well which indicated that Philae had woken before this date but had been unable to contact Rosetta on that date.



Copyright ESA

Now it's awake it will be able to continue to survey and watch the comet becoming more active as it approaches the Sun. They have already determined that Philae's first landing site has, under a layer of dust, a large amount of water ice. Also, at the final landing site an instrument was unable to hammer very far into the comet's surface. This area has been determined to have the consistency of solid ice.

The Rosetta mission was originally funded until the end of December 2015, but on 23rd June 2015 it was announced that it has been extended until the end of September 2016. This means that not only will they be able to see what happens to a comet as it nears the Sun (its closest approach will be on 13th August), but also how it changes as it moves away.

Tracy Howes

Thanet Astronomy Group Contact Details

Executive Committee

Chairman	Daniel Day	01843 228 904
Treasurer	George Ward	01843 292 640
Secretary	Gill Palmer	07543 942 245

Committee

Volunteers	George Cozens	07970 181 395
Members	Sheila Bull	07791 892 057
Newsletter	Janet McBride	01227 364 092
Newsletter	Tracy Howes	07917 710 638
Library	Janet McBride	01227 364 092
Web Site	Danny Day	01843 228 904
JAC & Gill	Gill Palmer	01843 848 064

Member's Meeting Dates and Times

Thanet Astronomy Group Member's Meetings Dates and Times

1st July 2015 at 8pm
5th August 2015 at 8pm
2nd September 2015 at 8pm
7th October 2015 at 7.30pm
4th November 2015 at 7.30pm
2nd December 2015 at 7:30pm
6th January 2016 at 7:30pm
3rd February 2016 at 7:30pm
2nd March 2016 at 7:30pm
6th April 2016 at 7:30pm
4th May 2016 at 7:30pm
1st June 2016 at 8pm

All Member's meetings will be held at the :-

West Bay Cafe,
Sea Road,
Westgate-on-Sea,
Kent.
CT8 8QA

Advertisement

WEST BAY CAFE

Sea Road - Westgate-on-Sea
CT8 8QA

Location :-

This Family Friendly Cafe is situated on the promenade just beside the sandy beach. Opposite the junction of Sea Road and Rowena Road. Westgate-on-Sea. CT8 8QA.

Access :-

via a flight of steps behind the cafe.

Disabled Access :-

via the main entrance to the bay and a slope at the cafe door.

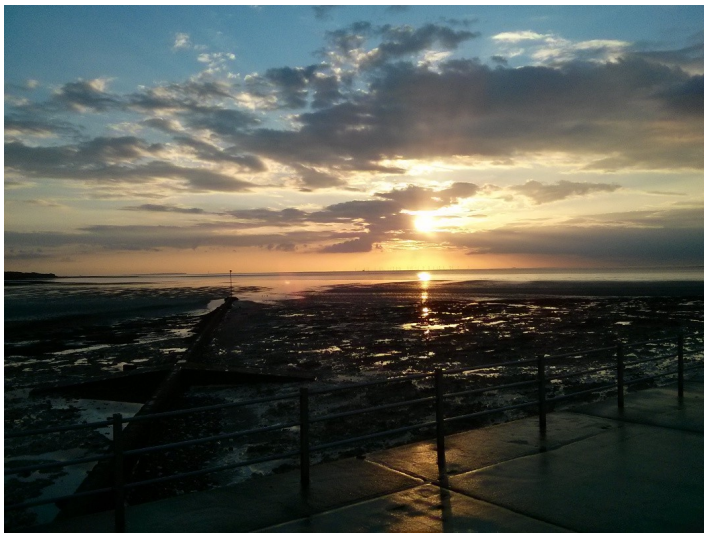
West Bay Cafe run by Alan and Kate and has a very friendly atmosphere.



Alan outside the new style West Bay Cafe

There is a wide variety of good food and drinks at very reasonable prices and there are always special offers.

There is seating both inside and outside for those extra hot days.



A Typical Sunset at the West Bay Cafe

The Sunsets at the West Bay Cafe are Spectacular.

**With a meal, some friends,
and a pint or two.**

What more could you ask for!

West Bay Cafe have hosted Thanet Astronomy Group since September 2013.

We would like to say a
HUGE THANK YOU to Alan and Kate
for all the help and support they have shown us over the last year.

Please use this Brilliant Seaside Cafe and Tell Your Friends.

What we did last month

June 2015

Wednesday 3rd Members Meeting

This meeting was the 1st anniversary of our members meetings. We had a quick review of what we had done over the last year and discussed the way forward. The main meeting was a presentation on the "History of Astronomy" covering all the main points of interest.

This was followed by the ever popular Stellarium tutorial session, looking at constellations and the magnitudes of their stars, its the many stars that are not bright enough to see in our light polluted sky, that stops most people being able to identify what constellation they are looking at.

Saturday 6th Public Outreach Meeting

It was sunny today, but with some annoying clouds. When we got a clear view of the sun, there were quite a lot of sunspots. We even managed to get some pictures of the sun through the telescopes.

We had lots of visitors - adults and children. The JAC & Gill group was very busy!

Tuesday 9th School

This was the final visit to Laleham Gap School. We had a quiz planed to see how much the children had learned. There were Apple, Jam, and Chocolate Doughnuts (one for each 5 correct answers). Needless to say the children all had loads to eat. You could say we came to a very sticky end :-)

Saturday 13th Public Outreach Meeting

It was very cloudy today, and it was a very quiet afternoon. We had the telescopes on the sea forts, wind farm, and the pier head at Herne Bay.

Saturday 20th Public Outreach Meeting

It was cloudy today, and although we did have a few visitors there wasn't a lot to see as it was misty out at sea.

Saturday 27th Public Outreach Meeting

It was a nice sunny day, and most of the telescopes were pointed at the Sun. There were a few sunspots around the edge which were very clear to see.

Saturday 27th Scout Camp

No sooner than we had got home from the afternoon meeting and had something to eat, it was time to make our way to Quex Park for the Annual Scouting and Guiding Big Night Out. We were going to provide an evening of astronomy for the children of Thanet (Some Seven Hundred and Fifty of them). We took several telescopes and helpers (Thanks to Gill, George W, Tracy, Dave, George Jr.)

The evening was a fantastic success we were not descended upon by hundreds of children as there was so much more going on. However all the children that came were able to have a close look at the Moon, a beautiful crescent Venus, Jupiter, and Saturn with its amazing rings and moon Titan.

With only 7 meetings this was a very quiet month at Thanet Astronomy Group.

Our thanks go out to all that helped to make all this possible !

Tracy Howes / Danny Day.

Junior Members Page

Congratulations to all the students from Laleham Gap Secondary School in Margate for finally completing the extended “Four Part” Stargazing Course, at their After School Astronomy Club...aptly named by the participating pupils as “Astronomy Space Raiders”!

The culmination of the 14 sessions, on Tuesday afternoons throughout the Spring and Summer Terms, ended with a Stargazing Quiz afternoon.

The pupils flew through the questions with flying colours...helped by the reward of doughnuts for each 5 correct answers!



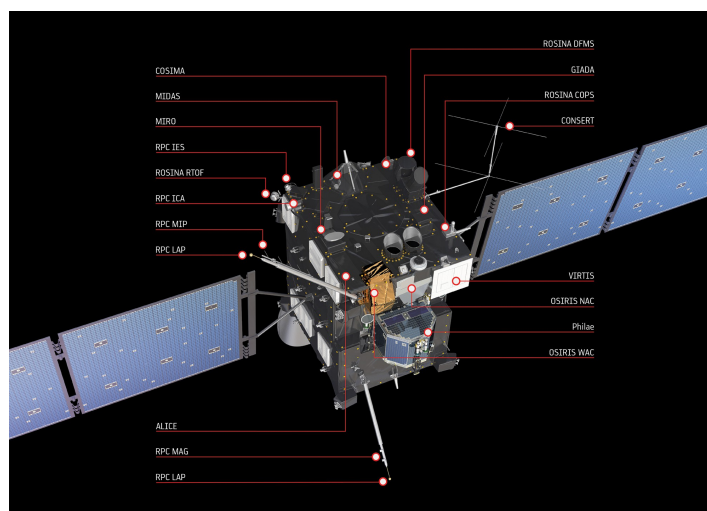
The Children With Their Certificates

However, their answers and counter answers to Danny's questions surpassed even their Teachers' expectations and proved that the next generation of Astronomers, Mathematicians, Scientists and Astro Physicists have many new theories to be proved or outdated theories to be disproved!

Many thanks go to Shaun O'Brien, their Science Co-Ordinator who arranged all the after school meetings and has liaised with us throughout. Sincere gratitude also goes to Laleham School for their kind donation to Thanet Astronomy Group funds.

Gill P.

Rosetta Instruments Instruments onboard Rosetta



Copyright ESA/ATG medialab

For those of you that want to know more about the instruments that are onboard Rosetta, here is a list of them:

ALICE: Ultraviolet Imaging Spectrometer – (characterising the composition of the comet nucleus and coma)

CONSERT: Comet Nucleus Sounding Experiment by Radio wave Transmission (studying the internal structure of the comet with lander Philae)

COSIMA: Cometary Secondary Ion Mass Analyser (studying the composition of the dust in the comet's coma)

GIADA: Grain Impact Analyser and Dust Accumulator (measuring the number, mass, momentum and velocity distribution of dust grains in the near-comet environment)

MIDAS: Micro-Imaging Dust Analysis System (studying the dust environment of the comet)

MIRO: Microwave Instrument for the Rosetta Orbiter (investigating the nature of the cometary nucleus, outgassing from the nucleus and development of the coma)

OSIRIS: Optical, Spectroscopic, and Infrared Remote Imaging System Camera (a dual camera imaging system consisting of a narrow angle (NAC) and wide angle camera (WAC) and operating in the visible, near infrared and near ultraviolet wavelength range)

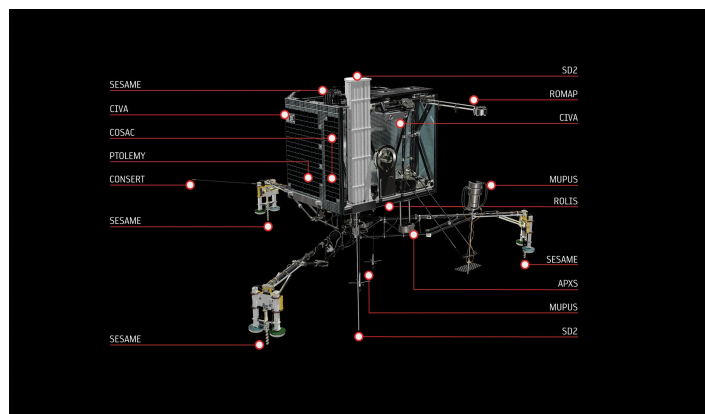
ROSINA: Rosetta Orbiter Spectrometer for Ion and Neutral Analysis (determining the composition of the comet's atmosphere and ionosphere, and measuring the temperature, velocity and density of the gas flow, comprising: DFMS (Double-focusing mass spectrometer), RTOF (Reflectron Time-Of-Flight mass spectrometer) and COPS (Comet Pressure Sensor))

RPC: Rosetta Plasma Consortium (studying the plasma environment of the comet, comprising: ICA (Ion Composition Analyser), IES (Ion and Electron Sensor), LAP (Langmuir Probe), MAG (Fluxgate Magnetometer), MIP (Mutual Impedance Probe), PIU (Plasma Interface Unit))

RSI: Radio Science Investigation (tracking the motion of the spacecraft to infer details of the comet environment and nucleus)

VIRTIS: Visible and Infrared Thermal Imaging Spectrometer (studying the nature of the comet nucleus and the gases in the coma)

Philae Instruments Instruments onboard Philae



Copyright ESA/ATG medialab

For those of you that want to know more about the instruments that are onboard Philae, here is a list of them:

APXS: Alpha Proton X-ray Spectrometer (studying the chemical composition of the landing site and its potential alteration during the comet's approach to the Sun)

CIVA: Comet Nucleus Infrared and Visible Analyser (six cameras to take panoramic pictures of the comet surface)

CONSERT: COmet Nucleus Sounding Experiment by Radiowave Transmission (studying the internal structure of the comet nucleus with Rosetta orbiter)

COSAC: The COmetary SAMpling and Composition experiment (detecting and identifying complex organic molecules)

PTOLEMY: Using MODULUS protocol (Methods Of Determining and Understanding Light elements from Unequivocal Stable isotope compositions) to understand the geochemistry of light elements, such as hydrogen, carbon, nitrogen and oxygen.

MUPUS: MUlti-PURpose Sensors for Surface and Sub-Surface Science (studying the properties of the comet surface and immediate sub-surface)

ROLIS: Rosetta Lander Imaging System (providing the first close-up images of the landing site)

ROMAP: Rosetta Lander Magnetometer and Plasma Monitor (studying the magnetic field and plasma environment of the comet)

SD2: Sampling, drilling and distribution subsystem (drilling up to 23 cm depth and delivering material to onboard instruments for analysis)

SESAME: Surface Electric Sounding and Acoustic Monitoring Experiment (probing the mechanical and electrical parameters of the comet)

Renaissance Glass

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Book review

Atlas Of The Constellations

Know Your Way Around The Night Sky

By Giles Sparrow

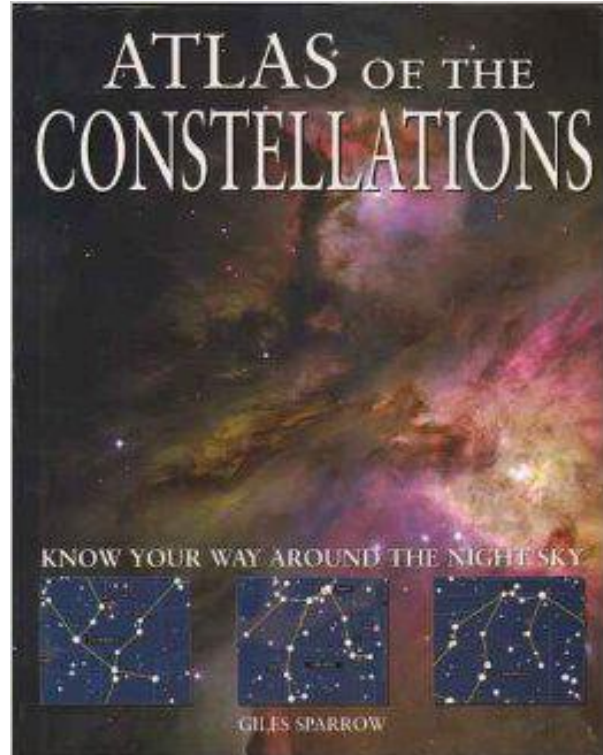
I decided that I needed to look at more astronomy books, and realised that the library might be a good place to start!

There were quite a few books in my local library and one of them was the Atlas of the Constellations by Giles Sparrow.

I thought that it might be a good book to look through as I do have trouble finding some of the constellations.

I found this book quite informative! Not only does it show you each constellation, but it gives you some information about it and also on what else is there, like galaxies and nebulae.

It also shows nearby constellations, so I'm hoping it will help me with star hopping.



If we take Cygnus, which can be seen in the night sky at the moment, the book tells you a few little facts:

1. Deneb (the star at the tail of the swan) is one of the brightest stars in the sky. It is about 2,600 light years from Earth and must be about 160,000 times as luminous as the Sun!!
2. Albireo (the star at the head) is much closer than Deneb, about 390 light years away and is a binary star. Looking through binoculars you can easily split the 2 stars and reveal a yellow and a blue star.

There is also information on the name and where you can see each constellation, and when it's most visible.

I must admit I haven't finished reading through the book but I have enjoyed what I have read. I will definitely have to finish it before it goes back to the library.

I will also have to keep an eye out for other books while I'm there!

Tracy Howes

What's in the sky this month

What to see Saturday 4th July at 10:30pm

Planets (Jupiter, Venus, Saturn)

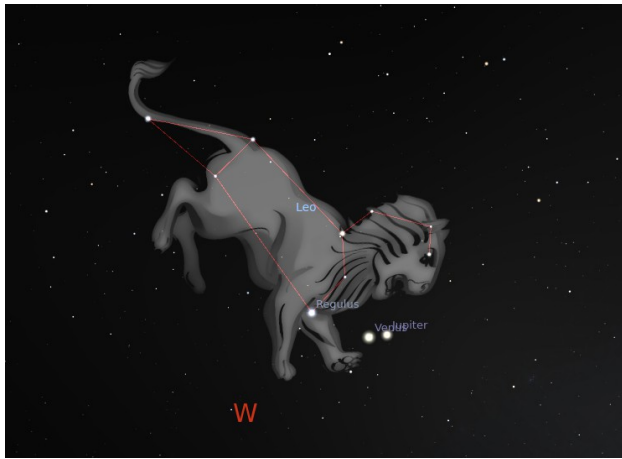
Moons (Io, Europa, Ganymede and Callisto)

Constellations (Leo the lion, Libra the scales)

Jupiter and Venus on collision course in the sky

As we hope you have been watching (there has been an article on the web site this month) during June both Jupiter and Venus have been on a collision course in the sky. They were of course not going to collide as they orbit the Sun on opposite sides of the Earth's orbit. Venus orbits the Sun at 108,200,000km and Jupiter at 778,500,000km, a gap of approximately 670,300,000km.

However when viewed from Earth during June, they appeared to be on a collision course. They reached their closest point on Tuesday 30th June, when there was less than 1° of difference!!!



Leo the Lion about to eat Jupiter and Venus



Close up of Jupiter (its moons) and Venus

At about 10:00pm look West at Azimuth 280° on your compass and just above the horizon at Altitude 8° and you will see Venus. Jupiter is very close at Azimuth 282° and Altitude 9°. If you recognise the constellation Leo (the Lion) then you will find the planets just about to be eaten by Leo.

Through binoculars if you can hold them very still or have a tripod you will be able to see the four Galilean moons of Jupiter. Callisto will be on its own on one side of Jupiter and in a line on the other side will be Europa, Io and Ganymede. These four moons will look like tiny little stars all in a row.

At about 10:00pm look South at Azimuth 181° on your compass and just above the horizon at Altitude 20° and you will see Saturn in the constellation Libra the scales.

If you have a small telescope and you see Saturn for the first time, I'm sure you'll find it a jaw dropping sight. Its rings are clearly visible and you may even see its moon Titan as a near by tiny bright star. You can refer back to stellarium to confirm its position.



Saturn in the constellation Libra

George Ward.

Member's Page

Photography within the Thanet Astronomy Group

When I first joined Thanet Astronomy Group, there were only a few members that were interested in taking photos of the objects that were seen either by star gazing or through a telescope.

As more members have joined the group so the interest and enthusiasm for this has grown.

We now have many members taking photos through various devices such as cameras and / or mobile phones.

This is because some mobile phones have a more powerful camera than their actual camera. It can be a strange sight seeing members lining up their mobile phones onto their telescope eyepieces to take photos of sun spots and we have had many members of the public asking what they are doing – which hooks their interest and engages them in discussion.



*Local Cormorant Mobile Phone
Telescope Helios D114 F100
Danny*



*Moon Camera
Telescope
Dave*

However, when it comes to taking photos of objects in the dark it is not just a matter of point and shoot, there are many other aspects to take into consideration such as delving a bit deeper into the use of some of the manual controls of your camera like shutter speed, aperture, and ISO control. This then becomes more confusing unless you are an experienced photographer.

This is where our Thanet Astronomy Group members come into their own, we have some very experienced photographers and a professional photographer, Steve Ward, who is going to come along to our Thanet Astronomy Group monthly meeting on Wednesday 01 July 2015 to talk about and answer any questions that members may have. Steve often joins us on Saturday afternoons too.

This will hopefully include advice about using cameras, what cameras to buy, equipment needed such as how to attach your camera to your telescope. As well as advice on how to take photos at night and during the day

If you look on the Thanet Astronomy Group website there are some super photos taken by our own George Ward and there are many web sites that have photos of galaxies etc.

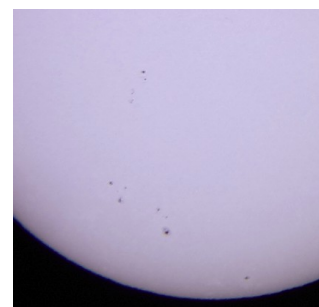
Some useful websites to look at images:

<https://www.spacetelescope.org/images/archive/top100/>

http://science.nationalgeographic.com/science/photos/stars-gallery/#/dying-star_935_600x450.jpg

<http://www.nikonusa.com/en/Learn-And-Explore/Article/h20zblit/photographing-the-night-sky.html>

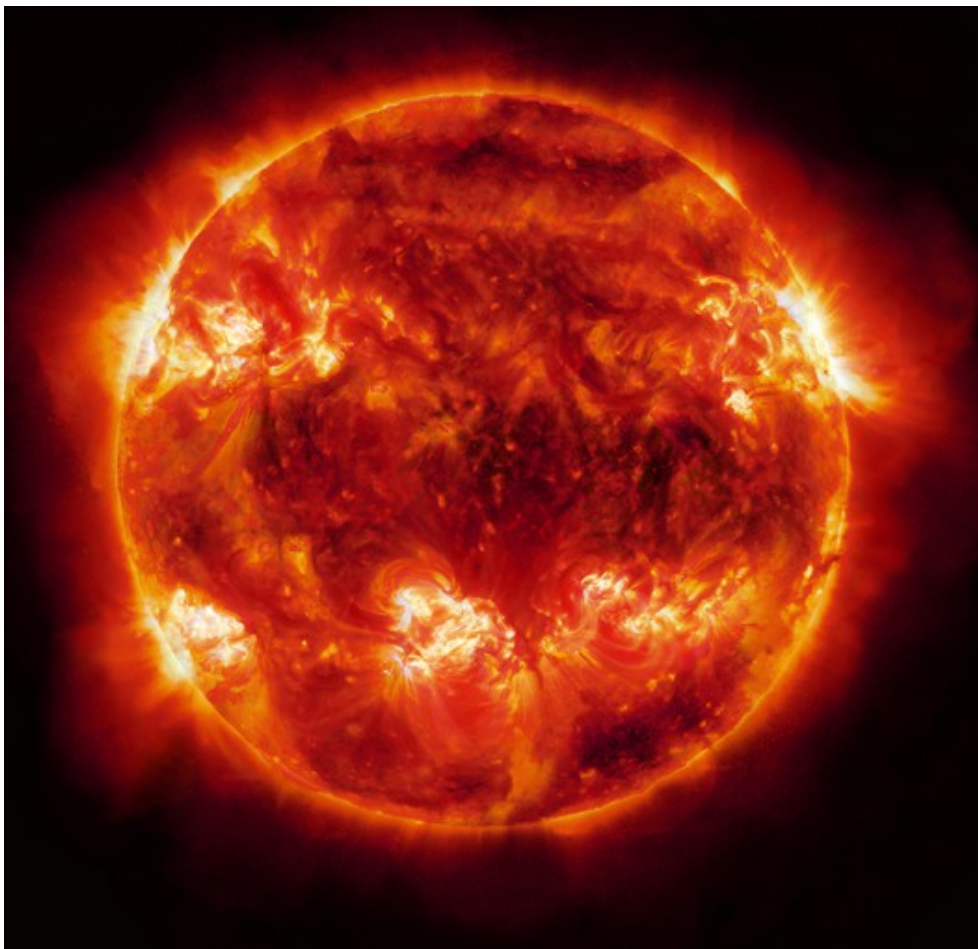
Sheila Bull



*Sun Spots Mobile Phone
Telescope Skywatcher 150PL
D=150 F=1200 Tracy*

Did You Know ?

The SUN Our Own Star



The Sun is not as small as it looks, as a percentage of everything in the Solar System, all the Planets, Minor Planets, Moons, Asteroid, Comets, Everything in the Kuiper Belt and the Oort Cloud, as well as all the gas and dust :- **The Sun is 99.86%**

That means that EVERYTHING else is only 0.14%. That's less than one and a half tenths of 1% !!!

Every second, 620 million tons of hydrogen are converted into 616 million tons of helium. That leaves about 4 million tons missing.

Three million tones are converted into energy (Heat, Light etc.) in accordance with Einstein's famous $E=MC^2$ equation.

The other one million tons are matter that is swept away into space, including the particles that cause the Aurora Borealis.

Danny

Fire and Ice

Some say the world will end in fire,
Some say in ice.

From what I've tasted of desire
I hold with those who favour fire.
But if it had to perish twice,
I think I know enough of hate
To say that for destruction ice
Is also great
And would suffice.

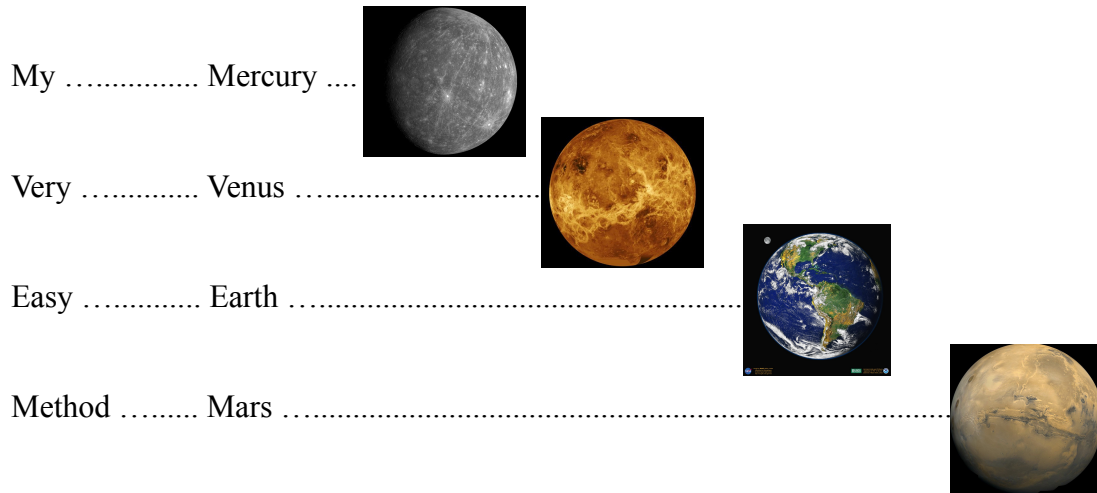
Poem By Robert Frost

Junior Astronomers Club (JAC & Gill)

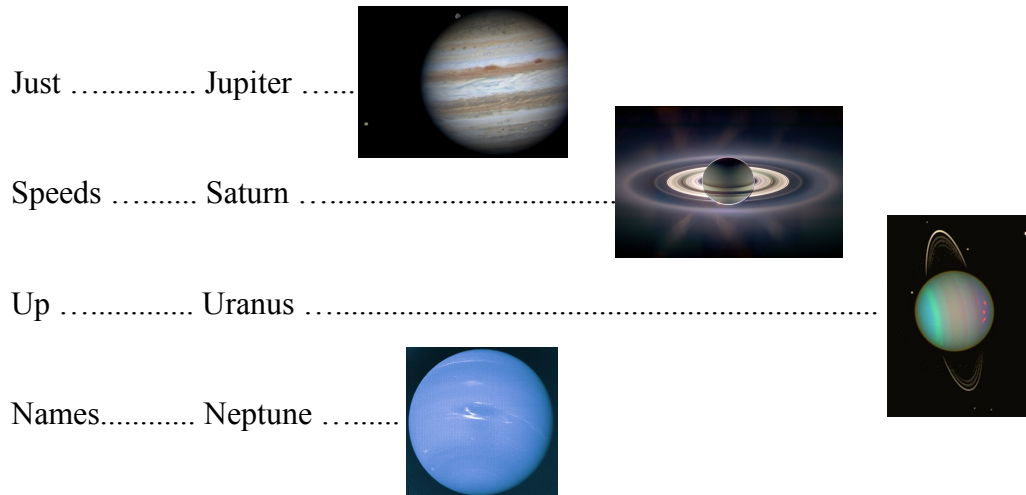
We had some surprise visitors at our JAC and Gill meeting on Saturday 6th June as over **150** Beavers trooped past us on the prom...with their Leaders in tow!!! They were all on a day trip to West Bay from West Malling District on their Annual Summer Beavers Trip.

Once fed and watered on the green at the top of the cliff, small groups of about 20 at a time came to see us to learn about the planets. After a quick lesson about the fascinating features of each planet, they joined in the rhyme which helps us to remember their order in the Solar System...

The Four Small Rocky Inner Planets



The Four Huge Outer Gas Giants



Before each group left to return to the rest of the pack up the stairs, they acted out the position of the planets around the Sun...with the help of Mia and Charlotte... two of our regular JAC and Gill members!

Luckily, the Leaders made sure no Beavers were hurt or lost in the staging of this re-enactment...so all were present and correct to return safely to West Malling! That has got to be the largest number of juniors we've ever had in one afternoon...definitely an eventful day for them...and us!

Gill Palmer.

Executive Committee Messages

Notice Board

This month we have been given the use of the Community Notice board in the council offices (The Gateway Building). The notice board is in the corner of the waiting area, to the right of the toilets. So it will be seen by many people.



Notice Board



Location in the Gateway

We will be changing the display around on a weekly basis, so if you have any ideas of what we need to tell people please let me know asap !

We hope you will go and have a look.

Scouting and Guiding Big Night Out

Last Saturday 27th June we were invited to attend the Thanet area Scouting and Guiding Big Night Out. This is the main event where all the Children from the whole of Thanet come together for one massive camp. This year they were based at Quex Park and took up a huge field. There were over 750 children !!! Not including the adults which brought the total even higher !

The plan was to take as many people and telescopes as possible and show the children what ever could be seen. We had a lot of stray cloud and loads of trees but all the children that came over got to see the following :-



Setting up at the Big Night Out

The Moon and a close up of a crater, a beautiful crescent Venus, Jupiter and its stripes, Saturn and its moon Titan.

A fantastic night was had by all,

Thanks to :- George W, Gill P, Tracy H, Dave and George Jr.

(-: Wishing you all Clear Skies :-)

Danny, George, Gill.

Adult Word Search

ALPHA CENTAURI
BARLOW
CORONA
HERCULES
PLANISPHERE
SATURN
UNIVERSE

ANDROMEDA
CEPHEUS
EYEPIECE
JUPITER
RETROGRADE
SOLAR SYSTEM
VEGA

ARCTURUS
CONSTELLATION
GALACTIC
PEGASUS
SATELLITE
TELESCOPE

D Y N S F U F J W X G P A L X J U F I A
T O O H A A F V I A G B D T M W I W E O
W A Q O Q F K E L S S S E V W A K I S H
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C D U W W O I A T E L E S C O P E Q N L
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L B H T P D N R A Y R H A T H Q X J G J
E L P H C O W L A T V W J Y P R R U L N
S G E A C F V O I D U K F U E L C Z A R
Z R C I T C A L A G E R W E Q U K O B Q
E D J U P I T E R H I S N P W R M A W L
W L I D Q X R W V S N Z Z P A N N B C T

Junior Word Search

CRATERS
HORIZON
ROCKET

CYGNUS
MARS
SHUTTLE

EARTH
MOON
STARS

F U V D J W M O K
B S T A R S T Z N
P H R C A X E S O
U U O E B H K U O
O T T R T A C N M
X T N S I A O G A
A L A H F Z R Y R
D E A R T H O C S
F J O K S Z K N X

We hope that you find the Adult and Junior word searches interesting and that they inspire you to look up any of the words you don't know *Absolutely Everything About* :-)

If you like these please let us know and we will continue to produce them.

We are thinking of adding a crossword as well in future newsletters. If you like this idea please let us know.

Comments Please : you all know the email address !

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