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CAPELLA

CAMBRIDGE ASTRONOMICAL ASSOCIATION

Newsletter 186. Mar/Apr 2018
Registered Charity No. 800782



The most noteworthy Scientist to leave this earth this week. So sad to see Stephen depart. He will be very much missed as he touched everyone's lives and provided so much of his insight to the world of Astronomy.

Stephen William Hawking CH CBE FRS FRSA was an English theoretical physicist, cosmologist, author, and Director of Research at the Centre for Theoretical Cosmology within the University of Cambridge. Wikipedia

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Chairman's Comments

Greetings everyone, what a busy time this has been for the CAA with lectures, public observing, young astronomers and evenings talking to cubs, brownies and even a group from the Saffron Walden Women's Institute who came for a tour and were lucky enough to have a clear night so got to do some observing with the North Cumberland telescope.

The IoA open day approaches as I write this and we are gearing up to support that. The RSPB have asked us to help with an observing evening at Fen Drayton lakes (22nd of September which is a Saturday - if anyone can come and help that would be great- please talk to me!).

I'm also running a rooftop observing session from the roof-garden bar of the Varsity Restaurant in Cambridge in a few days time. Not perhaps the best location from a light pollution point of view but I've done it before and with a couple of six inch telescopes it has worked out OK.

We are also just about to go on our annual steam driving trip, this time to the North Norfolk Railway. Hopefully there will be some pictures and reports from that in the next edition.

Paul

Draft Accounts

Cambridge Astronomical Association			
Receipts & Payments for year as at 30/03/18			
Note	2016/17	2016/17	
1 Receipts	£	£	
2 Members subscriptions	2,090	1,898	
3 Events	6,473	6,901	
Donations	524	40	
Library	30	147	
Telescope Hire	115	105	
Visitors	32	44	
Miscellaneous	744	57	
TOTAL RECEIPTS	10,008	9,192	
1 Payments			
Speakers Expenses	426	210	
Refreshments	579	280	
4 Events	7,202	12,686	
Donations	584	339	
Library	30	0	
Capella, website and admin costs	1,017	455	
Astronomy Equipment	1,089	1,097	
TOTAL PAYMENTS	10,927	15,067	
Excess of receipts over payments	(919)	(5,875)	

Balance Sheet as at 09 March 2017			
	31.3.17	30.03.18	
Assets	£	£	
Cash in hand	217	234	
Current Account	7,967	2,547	
Deposit Account	4,630	4,631	
Total Assets	12,814	7,412	
Represented by			
Balance at start of year	13,733	13,287	
Excess of receipts over payments	-919	-5,875	
5 Balance at end of year	12,814	7,412	

Figures are subject to approval by CAA Committee

1 Receipts are shown in the accounts according to the date they were received. Payments are shown in the accounts according to the date they were paid.

2 Number of members (households):	31-03-17	30-03-18
Honorary members	2	2
Yearly members	152	115
Download (Standing Order)	419	444
Total Households	573	561

3/4 Events in 2017/18
 Astronomical Imaging Course Summer 2017
 Star Party Sept 2017
 Coach Trip To Royal Observatory Sept 2017
 Steam Trip Day April 2017

5 The difference between the EOY 2017 and SOY 2018 is made up of £503 unrepresented Debit minus a £30 Credit (£473) brought forward.

CAMBRIDGE ASTRONOMICAL ASSOCIATION

Treasurer: Mickey Pallett, 31 Lancelot Way, Fenstanton, Cambs. PE28 9LY.

Telephone: 01480 493045 Email: mickeypallett@gmail.com

Here are the draft accounts of Cambridge Astronomical Association as at 1 March 2017.

Things to note are as follows

Receipts from members is down. There are a number of standing orders which have lapsed during 2017/2018. Reminders will not be sent, and the members will be dropped from the association membership list. Also, we still have a months' worth standing orders to receive.

The costs and receipts of events are more than normal but that is due to there being a steam trip early in the financial year. This has been paid for but receipts will only start to arrive from March onward. The trip is well subscribed so this will not cause a deficit.

Membership is slightly down.

To summarise we had a loss of £5875. This down mainly due to a steam trip money still to credited.

A more accurate report will be published with the final accounts.

Mickey Pallett Treasurer Cambridge Astronomical Association

Speaker Meetings

Friday 16th March 2018

Speaker : Dr. Nick Bate

Einstein's Telescope

Start time : 20:00



Everything that we can ever see - all of the people and planets and stars and galaxies - makes up only a tiny fraction of the Universe. The rest is forever dark, emitting and absorbing no light at all. In this talk, Dr Nick Bate will explain how astronomers use gravitational lensing ("Einstein's telescope") to reveal these hidden parts of the Universe.

This lecture is the annual Michael Penston Lecture : Michael was based here at the Institute of Astronomy.

In 1990 Michael was due to give a talk to the CAA, but had to cancel because of illness. Sadly, he died soon afterwards. In March 1991 the CAA held a lecture in memory of Michael, and a collection was made for Cancer Research. By the following year a fund had been set up in his name, administered by the Royal Astronomical Society, to help up-and-coming astronomers establish themselves in their chosen profession. Each year, at the end of the lecture we have asked CAA members to make a donation to this fund.

Friday 20th April 2018

Speaker : Dr Davide Fiacconi

"Black Holes"

Start time AGM 19:30pm - Lecture 20:00pm

Our AGM will start at 7:30pm (doors open 7.00pm) before the speaker meeting gets going at 8pm.

Our AGMs are not lengthy affairs as we strive to keep the formalities to a minimum. Please let the chairman know of any issues you feel you want to discuss beforehand.

The agenda

1. Apologies for absence
2. Minutes of the previous AGM & Matters arising
3. Chairman's report
4. Treasurer's report
5. Election of Officers and Committee
6. AOB

Following the AGM at 8pm will be the speaker's talk.

Dr. Davide Fiacconi is a researcher at the Kavli Institute for cosmology in Cambridge.



These speaker meetings will be in the Hoyle building of the Institute of Astronomy, Madingley Road, Cambridge. Doors will open at 7.30 pm. and the talks will begin at 8:00 p.m. For security reasons, entry will not be possible after 8:10 pm. As usual, the library will be open before and after the lecture and refreshments will be available after the lecture. These meeting are free to members. Non-members are charged £1

Cambridge Science Festival

Some of the Science Lectures and Events on.

14th March	5:30pm – 8pm	Whipple Museum of History & Science	Astronomy and Empire : Late opening
14th March	6:00pm – 7:00pm	Whipple Museum of History & Science	Matter of fact or Matter of faith?
14th March	6:00pm – 7:00pm	Whipple Museum of History & Science	Science & Empire panel discussion
17th March	10:30am – 4:00pm	McDonald Institute for Archaeological research	Science and Archaeology
18th March	10:30am – 11:30am	Babbage Lecture Theatre	Top 10 way to die in space
19th March	6:00pm – 7:00pm	Cambridge Academy of Science and Technology	The Future of Organ Transplantation
19th March	7:30pm – 8:30pm	Mill Lane Lecture Rooms	How to spot dodgy data in the news
20th March	7:30pm – 9:00pm	Jesus College Frankopan Hall	Creating the coolest objects in the Universe
20th March	5:30pm – 6:30pm	St John's College Fisher Building	Cambridge Gravity Lecture: Sir Paul Nurse
21st March	1:00pm – 2:00pm	Whipple Museum of History & Science	Astronomy and Empire talk
21st March	6:00pm – 7:00pm	Mill Lane Lecture Rooms	This does not make sense : 6 words that rocked molecular science
23rd March	5:00pm – 6:00pm	Dept of Chemistry, Bristol Myers Squibb Lecture Theatre	How to make a dwarf Mammoth
24th March	Afternoon	Institute Of Astronomy	Open day
24th March	3:00pm – 4:00pm	Dept of Materials, Science & Metallurgy Goldsmiths lecture (Theatre 1)	Connecting planetary Magnetic Records to Atomic Structures
24th March	1:00pm – 1:45pm	Cavendish Laboratory	How science really works
24th March	2:00pm – 3:00pm	Anglia Ruskin University (Recital Hall)	Sounds of Space
24th March	10:00pm – 1:00pm	University Library Milstein Room	Tales of discovery: stories inspired by Cambridge research
24th March	11:00am – 3:00pm	British Antarctic Survey	Antarctica uncovered
24th March	1:00pm – 4:00pm	Dept of Materials, Science & Metallurgy Goldsmiths lecture (Theatre 2)	Engineering Atoms
24th March	1:00pm – 5:00pm	Institute of Marketing	What would you use that for?
24th March	10:30am – 12:30pm	The Fitzwilliam Museum	Making sense (am session)
24th March	1:30pm – 3:30pm	The Fitzwilliam Museum	Making sense (pm session)
25th March	11:00am – 3:00pm	Cambridge Academy of Science and Technology	Inspiring the next generation of scientists
25th March	10:00am – 4:00pm	Cambridge Science Centre	Sunday Science

These are all free events and all comers are welcome but you have to get there in time as the event timing maybe crucial. To see the full list in detail ; visit the website at <https://www.sciencefestival.cam.ac.uk/events?page=1> and click on the event you want to look at in detail.

Members Contributions

Being in the shadow.

Pictures and story by Mariusz Krukar

I would like to share my feelings from the last total solar eclipse, that took place in the United States of America. I was a participant of the Great Expedition of the Polish Society of Amateur Astronomers, that lasted 18 days. During this time we visited many of the national parks like the Great Canyon, Yellowstone and The Arches. The main goal of this expedition was undeniable to see the total solar eclipse on 21st August 2017. We were observing this beautiful natural phenomenon in the Wyoming state alongside the state road no 26 between Riverton and Shoshoni.

Our last day before the eclipse was in Rock Springs, around 175km from the path of totality. We set off at 1:00 am and reached our observation place at 4:20 am. The time was quite strange, but we wanted to be as early as possible to avoid the increasing traffic. Some of our colleagues tested their astrophotography skills and carried out a short observation of the rising Orion group. We prepared our equipment, though we weren't sure about the weather we would have during the eclipse; the most recent forecast was from the day before the eclipse, and that said we could relax because everything was going to be alright. However, even a few wisps of clouds during the eclipse can interrupt observations, and some of our group were a little bit worried, especially when the Sun rose, and a few patches of high altitude clouds were visible.

As the Sun rose higher, the traffic grew rapidly and the parkway occupied by our cars since 4:20 am was soon full. Moreover, people started to stop their cars on the roadside. A part of our team then decided to drive further north and east towards Casper to leave the irritating clouds behind. They were watched the Eclipse near Powder River village, where totality occurred approximately two minutes later than from our first position.

Most of the people from the Polish Society of Amateur Astronomers were interested in watching totality itself, to see the beautiful prominences and coronal brushes. A dozen or so our members had seen at least one total solar eclipse before. For a few, it was their fifth totality. Our team leader Marek Substyk and few other members decided to make a photographic documentation of a whole eclipse period using the Eclipse Orchestrator software. Other people simply wanted to see this beautiful celestial event.

My observations were concentrated on a few things: measurement of the dimming light, the changes in sky brightness, movements of the lunar shadow, documentation of the solar corona outside totality, observations of the shadow band and making a photo sequence of the entire eclipse period. I had an original plan because it was not focused on the Sun only. To be honest, my observations of the eclipsed Sun was a minor part of all the observations.

For my observations, I used two smartphones, one for measuring light levels using the EclipseDroid application, and the other to make a 4K movie recording of the lunar shadow. I also had two DSLR cameras: an Olympus A510 and a Nikon D5300. The first one was used to capture the darkening sky using a wide-angle lens to and the second was used to make a photo sequence of the eclipse through a long focus lens, a Nikkor AF-S 55-300mm VR. To achieve my observation goals, I also used photo and video materials from other members of the expedition, who were observing at the same place.

The eclipse at our position began at 10:23 am and finished at 1:04 pm (UTC-7). The weather was excellent for the entire time. Clouds slightly interrupted only the initial partial phase before second contact. The sky around the eclipsed sun at 11:20 am (19 minutes before totality) was completely clear.

Totality passed very quickly. It was only 2 minutes and 23 seconds of being inside the lunar shadow. During this time I could see a beautiful solar corona and darkness around me. There was one star, Regulus, close to the eclipsed Sun. Looking towards the Sun with the naked eye, I could see only Regulus and Venus. Unfortunately, I couldn't see the pinkish prominences unless I started watching it through my Nikkor long lens, that I used as a telescope.

I was not watching on the Sun all the time because I was attending to my observations. The smartphones were recording movies and measuring the light levels, so I was not concerned about them. I had to control my both DSLR cameras because my tripods were broken just before the eclipse. It was my the biggest piece of bad luck. Fortunately, I could take decent photos of the eclipse and also look around quickly.

Looking to the mountains opposite, unlike to all people around me, I could see a very intriguing thing. The Moon's shadow was leaving from the remote Owl Creek Mountains range situated about 30km from my position. It was amazing to see half the mountain range in the sunlight and another half still in the shadow of the Moon. I captured the sight it as quickly as possible. After maybe 30 seconds, totality was over. The lunar shadow left quickly towards the south-east. Just after the third contact, I could see a mind-boggling grey shadow cone, that was getting brighter and brighter and finally disappeared. The daylight was back, and people started to spread out leaving their observation sites.

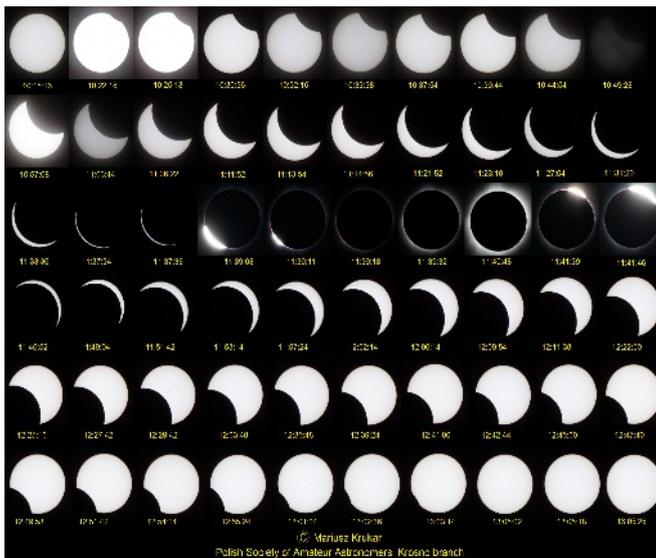
Members Contributions

Continued from previous page.

During the totality, only one car passed along the state road No25 near to us. The first person left the roadside just after third contact. Our observations lasted up to the last contact. Some of our participants still had the Eclipse Orchestrator software running, and they had to carry on. I also wanted to complete my sequence of observations. Everyone was awestruck after this celestial event, especially me and others, like me for whom this totality was a first life experience. Afterwards, we proceeded on our journey towards Cody, located just behind the Owl Creek Mountains range, although we struggled through terrible traffic, that was the typical total solar eclipse aftermath. Presumably, Wyoming, that has around 500 thousand inhabitants was visited by nearly 2 million eclipse-watchers.

My head after the eclipse was really heavy. I had a terrible headache, and I was sleepy. All my emotions felt depressed, but I was feeling simply awesome. I deeply hope that it was not the last totality in my life.

To finish, I would like to share my records and explain it a little about them below:

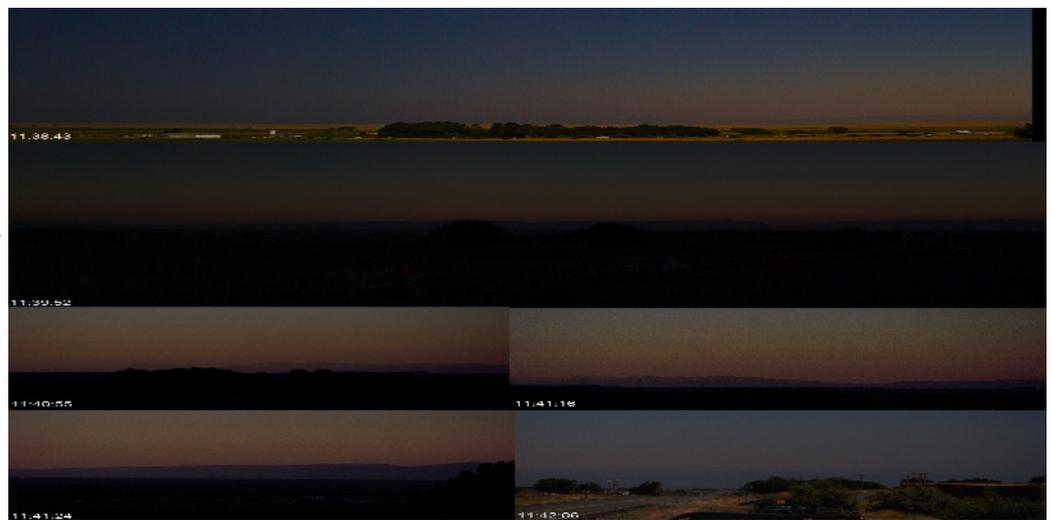


1. First, the whole solar eclipse photo sequence (on the left). I used the same camera settings (1/4000s, ISO 100, f5.6) for the partial part of the eclipse, so some of the pictures are bright. During the first part of the eclipse, some thin clouds were visible and veiled the Sun from time to time, requiring me to change the camera settings. For the totality, I changed the settings to 1/640s, ISO 100 and f5.6 for the majority of photos.

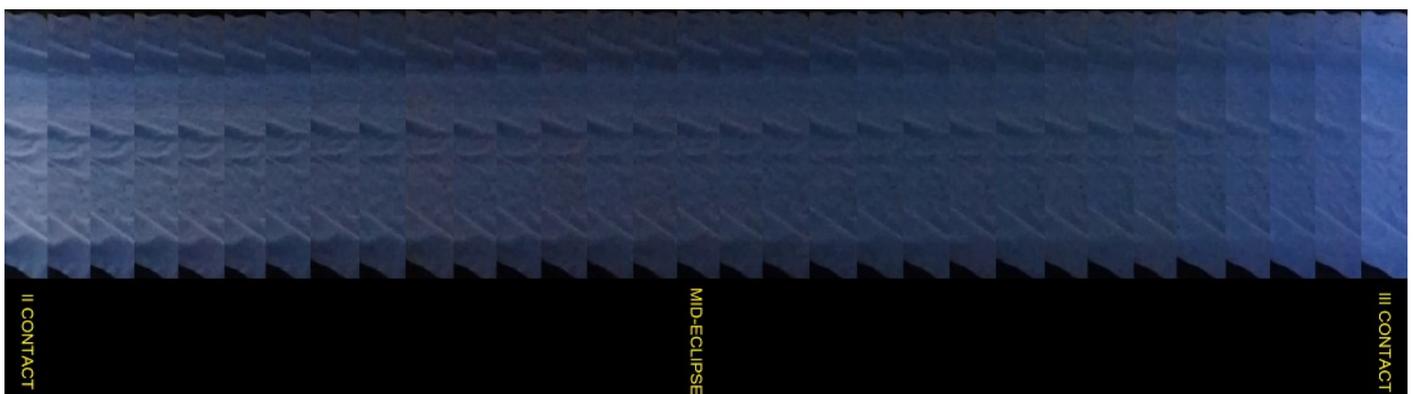
2. The solar corona outside the totality has been captured by the Nikkor 55-300mm long lens with the light-fall feature (vignetting), that helped reduce the direct sunlight into the camera and keeping the corona outline visible up to 5 minutes before and after totality!

3. The changes in light level have been drawn in the charts below. These measurements were carried out in two opposite directions: north-west from where the shadow came (shadow-in) and south-east, where the shadow receded (shadow-out). The graphs look slightly different due to the Sun's movement across the sky during the time of the eclipse.

4. The lunar shadow was the best visible from around one minute before totality to ten seconds after third contact. The most intriguing sight was as it made it way alongside the Owl Creek Mountain range that extends north of Shoshoni village.



5. The shadow bands were not visible, at least during the time of making the movie. However, the plain-coloured sheet displayed the light dispersing in the totality window. I could ascertain, that the darkest moment happened just after the mid-eclipse.



Members Contributions

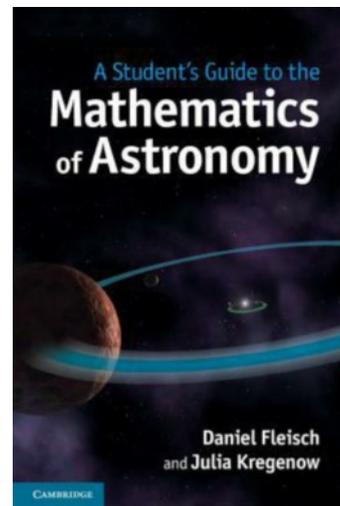
"A Student's Guide to the Mathematics of Astronomy" By Kevin Black

Published by Cambridge University Press, and primarily aimed at students, this book will appeal to those who want a definitive mathematical understanding of astronomical phenomena.

The book starts with mathematical fundamentals such as units, ratios and rates before moving on to the law of gravity. Here, for example, it is shown why the Moon's gravity is approximately 1/6 that of the Earth. Subsequent chapters cover: light, parallax, stars, black holes and cosmology. If you've ever wanted to work out the age of the universe for yourself, this is the book for you.

It's designed to dip into for a particular topic, rather than read end-to-end. I browsed through a few sections during a cold afternoon recently, and I thought the content, whilst appearing challenging, was not beyond A level maths, even if, as in my case, that was 40 years ago.

Further suggestions for relevant books are most welcome.



Useful Web Sites

<http://www.fourmilab.ch/earthview/pacalc.html> - Moon Perigee and Apogee Calculator.

Members please contribute other sites that would be of interest to the members.

CAA/CYA News

Public Observing Sessions.

These have now restarted. For further information, including if you'd like to volunteer to help please contact Paul or Brian.

Display table

At our speaker meetings we're putting out a table for members to display their photographs, bring along laptops to present their work or even show objects of interest.

Capella editor's notes.

I would ask that any information you wish to include in Capella must be in a standard text or word format document. Any embedded pictures you have used in your story should be also sent as separate JPG's and smaller than 10mb. You can contact me by email on any content or publication issue at jazzyrjw@gmail.com

Loan Telescopes.

Our four existing loan telescopes are easy to use and easy to transport, and usually with no long waiting periods so why not give it a try. **See news above on two additions.** Visit our website (www.caa-cya.org) and click to book an instrument, or alternatively please ring Mickey Pallett on 01480 493045.

CYA Meetings

7-11 Year Group

Saturday 31st March 2018 at 10:00am

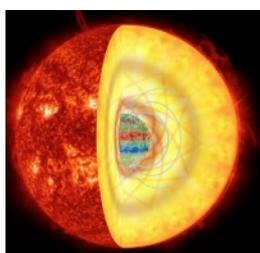
“Ancient Greek Astronomy”

Despite not having the use of telescopes, the ancient Greeks managed to figure out a great many things. They were the first to have the Sun at the centre of the Solar System with all the planets going around it, an idea that would not be generally accepted for nearly 2000 years. Even things we take for granted, like Venus being both the morning and evening star, were worked out by these clever folk worked out by careful observation.



Saturday 28th April 2018 at 10am

“Live Fast - Die Young”



Giant stars gallop through their nuclear fuel, and only live a tiny fraction of the lives of smaller stars like the Sun. Most of the stars you see in the night sky are distant giant stars, rather than closer dwarf stars. We will be looking at red giants like Betelgeuse in Orion, as well as monster stars of other colours, and of course, finding out just how big a star really can get! Once a giant star has exhausted its supply of hydrogen in its core and comes to end of its life, what is its fate? Useful clue; it is usually spectacular!

11+ group meetings

Monday 5th March 2018 at 7:15pm

"Beyond the Solar System!"

At present, there are just five spacecraft that have left the Solar System, and three continue to send data of the conditions that are beyond the Neptune/Pluto boundary.



Monday 2nd April 2018 at 7:15pm

"Meteors and Meteor Craters"



The April Lyrid meteor shower will peak on the 22nd/23rd April and it is considered the best meteor shower from a long period comet. Some sporadic or shower meteors do not burn up completely and reach the ground as meteorites. Some are big enough to cause a crater.

Meetings for the 11+ Group will be held in the Hoyle Building at the Institute of Astronomy, Madingley Road from 7.15pm to 8.45pm. Free to CYA members; for non-members there is a £1.00 fee.

Chairman : Paul Fellows
Vice Chairman : Brian Lister
Treasurer & Membership Secretary : Mickey Pallett
Secretary : Michael Jenkins
Events Secretary : Margaret Sanderson

Capella Editor and DTP Setter : Richard White jazzyrjw@gmail.com
 Members should send stories for inclusion where possible by email to Richard or send them to Brian Lister Tel: 01223 420954 (evenings) or email btlister@btinternet.com
 Please make sure that article text contributions are sent as standard Word files and images as .jpg's wherever possible.

President : Jim Hysom
Vice President : Carolin Crawford
Committee : Dave Allen, Kevin Black, Paul Drake, Barry Warman, Richard White and Brenda Field.
Cambridge Young Astronomers : (both groups): Brian Lister Tel: (evenings) 01223 420954 or email btlister@btinternet.com
Telescopes for hire to members : Mickey Pallett Tel: 01480 493045 or book on line.
Loan Telescope maintenance : Dave Allen, email day.vid@hotmail.co.uk
Library : Kevin Black Tel: 01223 473121
Webmaster : Paul Fellows: email paul.fellows@ntlworld.com

Website: www.caa-cya.org