ECLIPSE

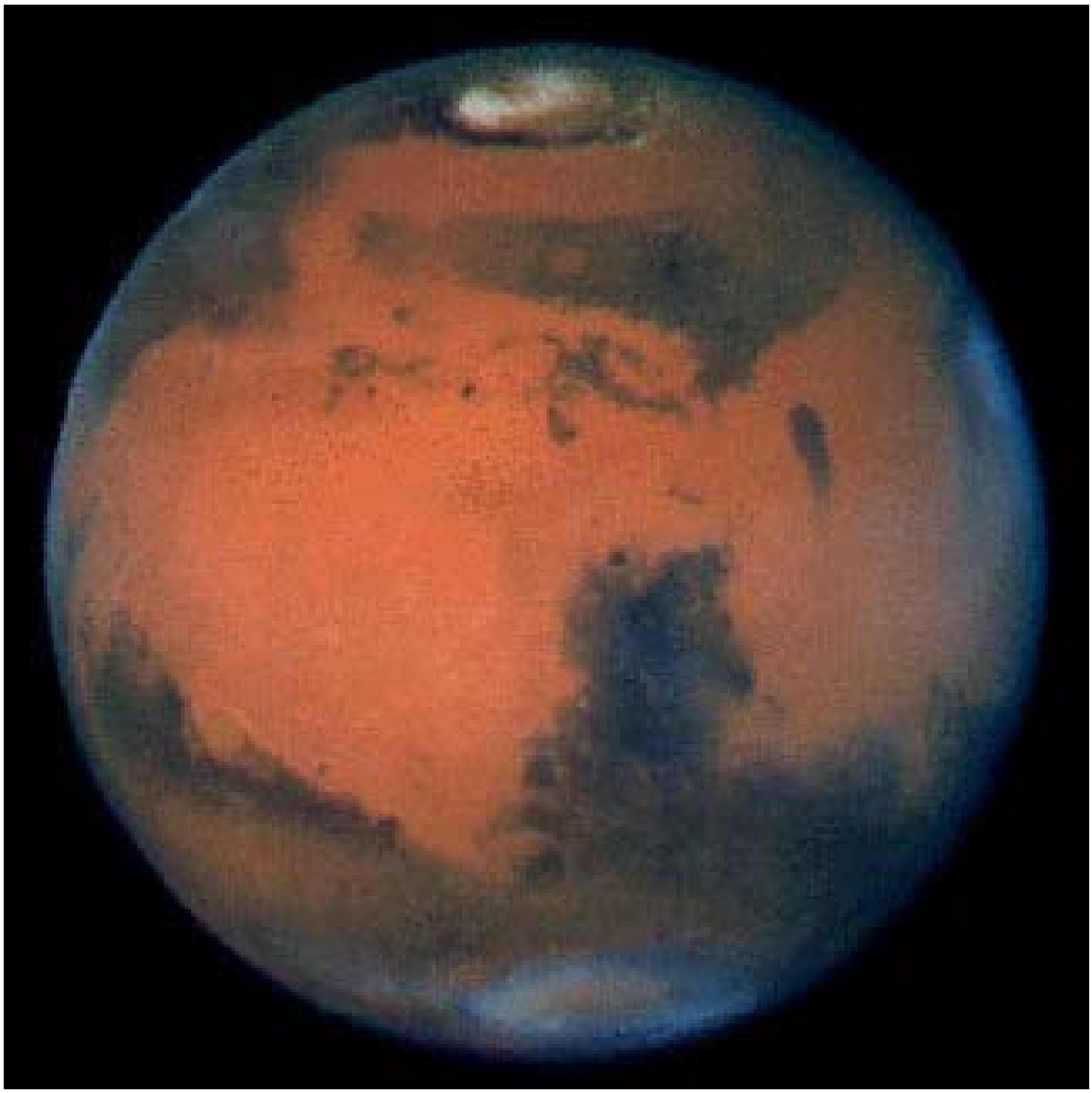
SEKAS Astronomical Society

£2.00 Vol. 34 No 2 October 2005

Care & Maintenance of Telescopes – Part 1

Building a Laser Collimator

"Cosmic Butterflies"



The Official Journal Of The South East Kent Astronomical Society Since 1972

SEKAS Committee Members and contacts 2004-5

President:	Paul Andrew	Alcyone, Reach Road, St. Margarets-At-Cliffe, Dover, CT15 6AE	(01304) 852692 president@sekas.co.uk
Chairman:	Alan Buckman	67 Thornbridge Road, Deal, CT14 9DZ	(01304) 367711. chairman@sekas.co.uk
Secretary	Tony Bennett	5, Ryders Avenue Westgate-on-Sea CT8 8LN	(01843) 831079 secretary@sekas.co.uk
Program	John Kemp	55 South Street, Whitstable, CT5 3EA	(01227) 265503 program@sekas.co.uk
Minutes Sec:	John Evans	24 Bland Drive, Hawkinge Folkestone, CT18 7PX	(01303) 891494 minutessec@sekas.co.uk
Treasurer & Membership Sec:	Alan Snook	8 Mill Lane, Nonington, CT15 4HR	(01304) 841694 treasurer@sekas.co.uk
Eclipse Editor:	Mike Kinns	Westhouse, Mill Lane Eastry, CT13 OJX	(01304) 611400 editor@sekas.co.uk
Publisher:	Mark Salisbury	The Old Post Office, The Street, Staple, CT3 1LN	(01304) 813857 publisher@sekas.co.uk
Editor of CSO:	Paul Andrew	Alcyone, Reach Road, St. Margarets-At-Cliffe, Dover, CT15 6AE	(01304) 852692 csoeditor@sekas.co.uk
Meetings Officer:	David Stedman	12 Seabourne Way Dymchurch, TN29 OBX	(01303) 875394 meetingsofficer@sekas.co.uk
Instrument Advisor:	Alan Buckman	67 Thornbridge Road, Deal, CT14 9DZ	(01304) 367711 instrumentadvisor@sekas.co.uk
Publicity Officer:	John Carruthers	48 Mill Green Eastry, CT130LE	(01304) 614566 publicityofficer@sekas.co.uk
Co-opted:	Peter Ashby	35 Craddock Road, Canterbury, CT1 1YP	(01227) 781171 peter.ashby@edfenergy.com
	Michael Baron	1, Eastry Old School, Church St., Eastry, CT13 0HH	(01304) 614032 mikebaron@freeuk.com
	Lee Phillips	Dawe House, 2 Mill Lane, Herne, Herne Bay, CT6 ED	(01227) 372169 star.trails@virgin.net
	Tom Norton	16, Helvellyn Ave., Ramsgate, CT11 0RS	(01843) 588387
	Paul Thomsett	4 Listways Cottages Aylesham. CT3 3HR	(01304 849091 paulthomsett@AOL.com

SEKAS Web address : http://www.sekas.co.uk

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Front Cover

This Hubble picture of Mars is centred on the Syrtis Major region. Although views from the ground will not be this good, Mars reaches closest approach on the 29th October when it will be just 43 Million miles from Earth. Mars will reach Opposition on the 7th November. Mars will remain about 20" through November, smaller than two years ago but much higher in the sky offering excellent observing opportunities.

Editorial
by M. Kinns

In this edition of Eclipse there is a good variety of articles as usual, but articles from new contributors will be especially welcome. Details of how to send articles, letters and images etc. are given below and at the back of this magazine.

Public Observing sessions at Walmer and Blean have now restarted. Lets hope we will have some clear Friday nights over the coming months, so we can enjoy the night sky and attract new members to the society. The "Sky this Period" gives details of Solar system observations until February 2006.

I have am now using Binomate binoculars with my 10" Meade LX200. These are very good for relaxed viewing of bright objects such as M13 and M57. I've also restarted CCD imaging so I hope to publish more images on CSO this year.

CSO is now well used by society members who receive current information about meetings and the latest members' CCD images. Please let the CSO editor, Paul Andrew, have your e:mail address if you would like to receive current information in this way.

The recent lecture by Simon Singh "The Big Bang -The Universe in 60 minutes" at UKC was very well attended, with a predominately youthful audience. His demonstration of light emission by passing an electric current through a pickled gherkin was spectacular- Don't try this at home! The next lecture to look forward to is on November 19th when Konrad Malin-Smith will talk about "White Dwarfs" at Bridge. Details of other forthcoming meetings are in this edition of Eclipse

Thanks are due to Mark Salisbury for the high presentation quality of Eclipse and to Alan Snook for printing and distributing the magazine. This edition can also be viewed in the members section of the SEKAS website.

The next edition of Eclipse will be published in the new year, so the final date for contributions will be the end of January 2006. Both Colour (colour editions only) and B/W images can be included in Eclipse provided they are produced in electronic format.

CARE AND MAINTENANCE OF TELESCOPES
PART 1 – MECHANICAL ISSUES
Alan Buckman B.Sc. FRAS

In order to keep the scope tracking at optimum performance it is necessary to inspect and adjust mechanical alignments periodically. GOTO scopes have the additional requirements of acquiring objects, so the pointing accuracy needs to be repeatable and any mechanical mis-alignments need to be fixed in order to be calibrated out or reduced. Problems can manifest in several ways:

- A motor can begin to stall above a certain speed (check torque requirements - gears and balance).
- An increasing amount of backlash can be present making autoguiding difficult or impossible.
- A motor can suddenly start making unusual sounds.

MOTORS

Nothing much can go wrong with motors! The sounds they make can indicate electrical or mechanical problems. A stepper motor can 'rustle' at slow speeds. This is a normal for a chopper mode current source drive electronics. A loud buzzing sound at high speed actually means the motor has stalled. A stepper motor is not harmed by such behaviour but the vibration and sound can be very loud. This only indicates that the load is too heavy and could be caused by an out of balance telescope, or the gear reductions requiring more torque than when it was set up. A buzzing sound from a stepper motor at low speed can indicate that one phase is missing. There is generally a loss of power and the motor may go in unpredictable directions. Check the wiring - plugs and connectors are the usual problems. Occasionally the drivebox may have blown up. These faults can usually be repaired.

DC Motors - with two wire connection - can burn out if they stall and they are not driven by a current limited circuit. Most Meade, Celestron and modern Vixen scopes have these types of motors fitted because they offer large torque and can rotate at a high rate of knots. The designers problem is getting a steady slow running speed, and so they all have encoder wheels to provide about 5 pulses per second of feedback when going at sidereal rate. All the scopes I have examined involving small DC motors also have fairly flimsy mechanics and gearboxes and can suffer from an uneven torque requirement over one revolution. This makes the motor very uneven in its speed and the servo control loop can make the instantaneous speed between zero and twice sidereal rate. The average is right but not good for smooth following. The rotation can be observed by drawing a line across the end of a shaft that rotates, then you can see how smoothly it rotates,

A general check on motor operation is to swap over the electronic drive cables to the two motors. The fault transfers if it is in the drivebox or stays where it is if it is the motor. Certain mounts do not have this flexibility - all the cables are internal and not possible to swap them over.

GEARS

When the motor is removed you can rotate the shaft by hand. This is an extremely sensitive test for torque variations in the rest of the gear train. If there are tight spots these need investigating. All unevenness will result in wobbles in following stars.

Worm and wheel sets are the normal gears in most telescope mounts. Things to watch out for are the closeness of the fit of the worm to the wheel (backlash) and the worm shaft able to shift along its length (endfloat which causes backlash). If you grab the telescope and rock it backwards and forwards then you may be able to see or feel any movement in the wormwheel or worm axle. These need to be fixed. In normal use the forces on these components are considerable.

A common problem with endfloat is a lack of thrust bearings or washers at the ends of the slow motion shaft. If there is a roller bearing secured in place with a grub screw then in normal use the roller bearing will get pushed outwards, the forces are that much. The only solution is to add an end plate onto the worm bracket (both ends) with washers to bear down onto the roller bearing. An example is required - if the endfloat is 10 thou (0.25mm) and the wheel is 6 inch diameter then the endfloat movement corresponds to 11.5 arc minutes in the sky. The plates are arranged so their mounting screws control the endfloat and so it is adjusted until the rotational force just increases. Feel with the fingers to get the right condition.

The fit of the worm against the wheel is also critical. There should be fine adjustments to gradually bring it in closer. Again the best position for it is when the rotational force on the slow motion axle increases. After the adjustment has been made a locking mechanism should be used. This can be by the provision of grub screws locking the adjusting parts together.

Lubrication - A common problem with grease lubrication is that it can pick up dust or grit, or in extreme cases metal swarf. I have seen all of these, even on freshly manufactured mounts. The effect is to cause sudden binding or grinding down of worm teeth. The only cure is a dismantle and thorough de-grease. Worm and wheel sets do need lubrication otherwise the torque required to overcome the friction can be considerable and enough to stall the motor at low

speeds. A Teflon spray can be used for open gears or a Lithium based grease for enclosed worm wheels.

Gearboxes used on telescopes tend to be run at their maximum torque limits and so they exhibit abnormal wear in their internal bearings quite quickly. Cogs can also loose teeth, so jamming up the gearbox completely. The Russian TAL telescopes have a metal geared gearbox but the shaft bearings are all nylon and after a time these get very sloppy resulting in increased backlash out of the gearbox. I have repaired such items.

MOUNTING BRACKETS

Motors, worms and gears need to be held in precise positions even when they are driving the telescope round. The forces on the telescope wheel can be about 200 Newton-metre (Nm). Motors can generate between 0.5 and 2 Newton-metre. 2Nm is the rotational force achieved when a weight of 20kg is hanging off a string wrapped round a 2cm diameter horizontal shaft.

With these forces involved it is apparent that brackets need to be made of substantial material otherwise they will flex. Items which are also bolted together can move, all upsetting backlash adjustments. If your mount suffers from these effects then the metal work needs to be strengthened and bracket parts need to be locked together by the use of grub screws.

Finally the mechanical arrangement should be tested. An ideal device to do this is the AWR SEEKER which plugs into the autoguide socket of nearly all drive systems. This plots the motion of a star with a given fixed angular movement in all four directions. The variations from a true matrix of points can be analysed to determine periodic errors and backlash components in both axes.
Viewing on the stars is the ultimate test. If it performs well, then it is well. To keep it at its peak of performance needs at least an annual maintenance regime. There are several members within the society that have the required knowledge and many more that can work metal precisely so there is no excuse. All sundry components, screws and metal can be provided by myself.

Observe the Total Solar Eclipse in 2006 from Turkey

The hotel that I originally wanted was fully booked, but t the one described below is 15km to the west of Side, on the centre line of the eclipse. We fly from Gatwick at 07-45hrs on the 26 March 2006 and we are at the hotel for 14 nights. It costs £1090 all inclusive for two of us.

Description of Hotel

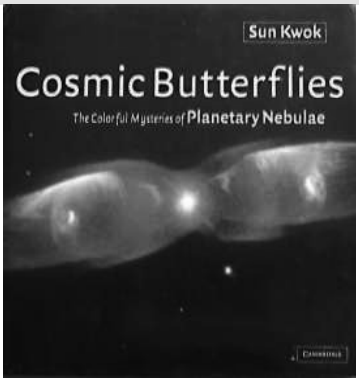
The hotel is on page 268 of Cooks Winter book,
and it is the Sunrise Resort: It's 4 star, and it is on the beach. Book
early otherwise you won't get in. The country and people are good, and one
last thing, you have to pay for is £10 for a visa, when you get to Turkey. You can
book for 7 nights, and pay a deposit, through Cooks.

Description of the Eclipse Location

I think that I had better tell all, so that the Mrs Bosses can let hubby's go,
Side you pronounce as "Ceedem". It means pomegranate, and the place is full of history. Cleopatra and Mark Anthony had a BIG affair there. . Cleo's Pool is one of the attractions. It also has the largest amphitheatre in Asia Minor.
and this is for the Bosses, on Thursday's there is a big market in Manhavgat
and clothes are good and best of all CHEAP, and to top it off, the people are very friendly, and bus trips out to visit places are very cheap, like £5 for a day out, even bus trips from one town to another are cheap, like 40 new pence from Side to Manhavgat. If you go and the clouds make it a washout, you will still have a good holiday, but the forecast is 95% clear.

Hope to see you there
all the best
Jim Reed

"Cosmic Butterflies"
Review by
Mike Kinns



Author	Sun Kwok
Publisher	Cambridge University Press
ISBN	0521731359
Hardcover	179 pp/Price £25

This book on Planetary Nebulae was first published in 2001 and I purchased it at AstroFest in 2004, because of my interest in Planetary Nebulae. A detailed review is displayed on the Astronomical Society of Southern Africa website:
www.saao.ac.za/assa/html/kwok.html
However, I was so impressed with the quality of the book, I wanted to include my own impressions.

The author, Dr. Sun Kwok is Professor of Astronomy at Calgary, Canada and author of over 200 scientific papers. He is an expert on Planetary Nebulae and has been carrying out research into these objects for 30years.

In this well structured and beautifully illustrated book Kwok describes how understanding of the nature of Planetary Nebulae has advanced during the last century. The images displayed in the book were mainly obtained with the Hubble Space telescope Wide Field (WFPC2).

At the beginning of the 20th century planetary nebulae were believed to be newly formed young stars, but 20 years later it was realised that they had more in common with old stars.
By the 1960s significant advances in nuclear physics resulted in important developments in theories of stellar evolution. Planetary nebulae were now believed to be old objects which evolved from red giant stars. However, according to theory (Chandrasekhar Limit) stars with a mass <1.4 solar masses would end up as white dwarfs, while more mass massive stars would end their lives in Supernovae explosions. In fact the latter are very rare so there was a conflict between theory and observation.

In 1970 it was realised that asymptotic giant stars (AGBs)-see a detailed Hertzprung-Russell diagram-were the real precursors of planetary nebulae and a new model was developed for the formation of the latter objects. The AGB star, formed from a red giant, eventually became a white dwarf.

It was now necessary to determine how a planetary nebula was formed from the circumstellar envelope of an AGB star. In 1960, infrared (IR) observations showed that the atmosphere of an AGB star contained much more dust than a red giant, and that this dust was still present in a planetary nebula. In 1971 further IR observations showed that carbon dioxide was synthesised in the atmospheres of AGBs, which was later ejected. These observations implied there must be a large scale mass loss in the AGB phase and it could be explained why 95% stars of <8 solar masses would end their lives as white dwarfs, rather than neutron stars or black holes.

In 1978 the author and co-workers formulated an interacting winds theory, which would explain the formation of a dense planetary nebula shell and the experimental evidence for this was obtained the same year by UV measurements. X-ray emissions were also predicted to occur, and these were detected using the Roentgen Satellite (ROSAT) and the Chandra space observatory in 2000.

The variety of shapes adopted by planetary nebulae fascinate observers and theoreticians alike, but it is now believed they have a common structure with a central taurus and two lobes forming a butterfly shape, outside of which is a fainter extended halo. Planetary nebulae look different because of their orientation relative to us.

Kwok discusses the issues surrounding the above model, and the search for very young nebulae known as proto-planetary nebulae. In 1986 the author and colleagues discovered the first nebula of this type using the Infrared Astronomy Satellite (IRAS), followed quickly by others. These data suggested the asymmetry in planetary nebulae develops very early and this was confirmed by high resolution data obtained with the HST.

In the final chapters, the use of planetary nebulae as standard candles in determining the size and mass of the universe is discussed, and how heavy elements are formed in old AGB stars, which are also molecular factories where carbon and nitrogen based molecules are formed in their atmospheres. The later stage planetary nebulae end their existence by spreading new atoms, molecules and dust through our galaxy, and the implications for life on earth are discussed. We are all made of star dust!

There are still many issues about the structure of planetary nebulae which need to be resolved. In the April 2005 edition of "Astronomy Now" the latest discoveries about planetary nebulae are discussed. Many planetary nebulae are now believed to be associated with double stars- the gravitational interaction with an unseen companion could make the dying star spin faster and explain the detailed nebula structure. Very strong magnetic fields have also been detected around the central stars of a sample of 4 planetary nebulae, which could also help to explain their structure.

During the next few years the detailed mechanism of formation of planetary nebulae should become clearer, and we will understand what eventually happens to our own Sun.

"Finding My Way"
John Carruthers

It's tantalising using a Dobsonian isn't it? You see images of exotic objects, but can you find them?- No. Hunt as you may, night after night, the object you desperately want to see evades you.

However, the problem is solved. No longer must we hunt blindly or star hop to our chosen destination- Setting Circles are the answer. Until recently it was necessary to have a PC running a planetarium programme which could give a real time readout of the Altitude and Azimuth co-ordinates, now there are several compact astronomy programmes for the Palm and Psion handheld computers which conveniently do the job. These mini computers can be found second-hand very cheaply. I use the Palm 3x as a compromise between the cheaper, older, versions and the newer more versatile but more expensive marks.

Setting circles marked out in at least 1 degree (or better still ½ degree) graduations can be printed out using the "Setcirc" freeware programme. Once you have calibrated your printer the results are both smart and accurate. I found a scale of 5mm per degree quite large enough to be easily visible from the eyepiece. The Azimuth scale is marked out from 0 to 360 degrees, clockwise from North and is fitted to a circular base on which the Dobsonian rocker box turns. A fixed pointer on the rocker points to the graduations on a movable tape scale which I can rotate to set up the initial alignment. When constructing the base circle, whatever design you choose, it is essential that the scale is concentric with the azimuthal axis. Any errors here will return to haunt you.

The Altitude scale runs from 0 to 90 degrees. I have experimented with a freely swinging pointer, in the manner of an inclinometer, which hangs vertically whatever the orientation of the telescope, and a semi fixed scale quadrant. Again the scale is movable to facilitate initial calibration. I may yet try a clear plastic curved tube containing a ball bearing as an indicator.

Once the hardware has been fabricated operation is simplicity itself. The telescope is set up on a level piece of ground and aligned on a known object. The setting circles are matched to the Alt/Az co-ordinates read off from the Palm. To minimise errors it helps if you re-align on widely separated objects, averaging any differences. Now by offsetting, any object you seek can be put into the field of view. I first tried this in daylight, after pointing at the moon the circles were set to the moon's co-ordinates. Then I looked up Venus and slewed the 'scope to Venus's co-ordinates, presto, it was not just in the finder field but almost central in the field of a 25mm eyepiece, (approximately 1 degree diameter). That night I tried several other objects, sometimes re-setting the scales and slewing between 2 close objects gave more accurate alignment. Like shooting fish in a barrel.

There are many programmes available for the Palm devices; I use 'Astro-Info' (freeware), 'Planetarium for Palm' (shareware), 'Planets' (commercial) on a regular basis. There are many other astronomy related programmes though, 'Messier' is for dedicated Messier catalogue observing and has its own observing log utility. 'Satmoon' does what it says on the tin, it plots the position of Saturn's major moons. 'Jupmoon' does – guess what? It also plots the Great Red Spot (GRS) when it's visible. There are also Lunar and Martian low resolution atlases that show the major features.

Fitting these modifications have made the old Dob a joy to use, obscure comets can be found in seconds rather than hours and long hunted M's are now within my grasp. The age of full computer directed PUSHTO capability is with us!

Building a Laser Collimator
By Peter Ashby

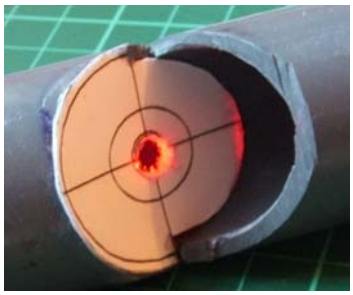
I decided that I needed a laser collimator to collimate my 'scopes and looking around the internet I decided that most of them were made from those cheap laser pointers that you could get on market stalls for just a few pounds each. Since I already had a couple of these, I thought I would see what I could do.

Knowing that one end of a vacuum cleaner hose is exactly the same size as an eyepiece, I started off by finding an old section of vacuum cleaner tube. As it turned out the one I found had a very slight taper to it, so when pushed into the focuser, it naturally wedges itself in place quite firmly, with no excess movement to take up.

Next step, How to mount the laser.? Well considering the designs I had seen on the internet, some had one end fixed, and the other with 3 adjustment screws. To my mind though, if the laser coming out of the pointer was just slightly off line, this would lead to miscollimation in the longer term. Thus I decided to use the 3 screw adjustment at each end, giving me more of a task aligning the collimator initially, but being worth it for better accuracy at the end of the day.

So with 3 screws spaced at 120° to each other at each end of the pointer, I needed another screw to operate the on-off button. Careful measuring and a bigger screw pay dividends here, as the bigger screw allows for more positional error in the placement of the pointer inside the tube. Here I must mention that the vacuum cleaner tube I found was a plastic one, so where I would have needed to drill and tap holes in a metal tube, drilling slightly smaller holes in the plastic, and using the screws to cut their own thread worked well here. A drill and tap would be required in a more substantial material.

For the collimator to be easy to use, a target was required – for the reflected laser beam to hit and let you know when you were collimated correctly. Some I saw used a translucent target just past a hole in the side wall of the tube, others a target at the far end of the tube, my decision was to cut a 90° wedge out of the tube at 45° to the tube, much like the target of a Cheshire collimator, this being easy to see from the back of the scope whilst adjusting the collimating screws. To aid the collimation I printed a target of ellipses, drawn such that when viewed from the side of the tube, they would form circles. This was printed on card and the centre ellipse cut out to allow the passage of the lasers beam. (approx 3mm on the small axis). this was fixed into the collimator at the 45° angle.



The collimator was now finished, One job was left – collimating the collimator, basically aligning the laser pointer such that the beam coming out of the device was parallel and true to the sides of the collimator. One way of achieving this would be to place the collimator in the focuser and rotating it, watching the resultant path of the beam on the mirror. It would need to be adjusted until the spot remained stationary whilst the collimator was turned.

To get it more accurate a greater distance would be advantageous, so I needed a stand for the collimator that would enable me to support it whilst turning it, all the time minding out for the protruding screws. thus I made a frame up with 2 V grooves to support the collimator. To get the best distance I used the full length of my kitchen-about 6m (20'). The laser was set in the V-blocks and slowly rotated; a piece of paper at the other end had the marks where the laser was hitting marked with a felt pen. The 6 screws were then adjusted until the dot stayed stationary when the laser was rotated.

The laser collimator was now ready for action. I have to say that when I put the collimator into my scope which I had collimated as best I could by eye using the methods described in the owners manual for my 'scope, I was really surprised. The centre spot was well over 1½" (30mm) off the centre spot of the mirror. A quick tweak of the secondary brought this back to the right place, then some minor tweaking on the primary's collimation screws, and the laser dot was bouncing back down the hole it had originated from.

Another method I have heard of but not yet tried, involves using a Barlow to evenly spread the lasers beam. The centre spot on the primary then reflects back the diffused beam with the shadow of the centre spot. You then line up this shadow on your target, nicely centred. This does not rely on the laser being so accurately collimated, as the beam is diffused slightly, and wherever the beam goes, the shadows return will be correct.

Kemp's Chronicle Part 33
"Saturn and Selsey, Mars and Mirrors"

Still keen to exploit my newly recoated mirror, I found myself observing at some unusual times, like late afternoon on May 3rd. A glance at a planetarium program will quickly show that, of course, the Sun was up, but low in the sky in the West, as was Venus. Jupiter was reasonably placed, approaching culmination. Nothing else of note … EXCEPT … Saturn. Now experienced astronomers frequently observe the inner planets Mercury and Venus in daytime of necessity. Venus is easy, but Mercury less so – but one has to have a go, because it's always so close to the Sun, and, at our latitude, cannot be high in a dark sky (observers in the tropics are better off here). Jupiter is quite easy in daytime too, but few bother as, being a superior planet, there is less need or incentive to do so. Saturn was high in the sky in the South: it was a clear blue sky, with exceptionally good planetary seeing for daytime and, remembering how I had recently failed to take such an opportunity to exploit a superb view of Mercury in twilight, I thought I'd have a go.

Saturn is about as difficult as Mercury in daytime, but for different reasons: its angular diameter, with the rings, it is much bigger, but the surface brightness is low, about a tenth that of Mercury and a quarter that of the Moon. So it was quite a challenge! But I did find it quite easily, with my GOTO Skysensor telescope computer, and the image was still. So, I got my webcam out, and set up with eyepiece projection at about f/40 (10m focal length). The big problem was viewing the low contrast image on the laptop screen in bright sunlight – I had to drape a towel over my head and the screen. But once I'd solved the sunlight problem, it wasn't much more difficult than doing it at night. I got one very nice video clip, which was actually easier to process than a night time shot, as I could, and did, accept the image as presented, without adjusting the contrast or sky background. This meant that such detail as was present in the image was compressed into a low tonal range, but there were two advantages to this. Firstly, it was exactly as the eye saw it – something true of relatively few astronomical images – and secondly, it was unequivocally and visibly a daytime image. There are very few published daytime images of Saturn, and I wanted to make the most of it. I sent it to Kaddy Lee-Preston at BBC SE weather, and she used it on TV, but no mention of it as a daytime shot! However, it was the BAA Picture of the Week on their website, and was included in the Sky at Night Magazine cover CD-ROM.

I received a an email from the producer of The Sky at Night inviting me to visit Patrick Moore for his Perseid Meteor Watch from his garden on the night of Thursday Aug 11th. This was on the strength of a picture of the Perseid I took at Walmer last year, which had been BAA Picture of the Week last year, and had come to the notice of John Mason.

The timing was awkward – I was committed to being in Bath that day, so I packed up all my kit into the car a few days earlier for my trip to Bath, and called off at Selsey on the way back, arriving as requested for 7pm.
There were 14 of us – amateur astronomers plus BBC staff – we all had a chat and were provided with a superb buffet supper at about 9pm. Patrick's large garden is divided into about four sections, the two main ones being an orchard, and the patch where his main observatory stands. I was surprised how occluded it was round the horizon – much more than I had recalled from a previous visit with SEKAS about ten years ago – I had planned to do some Mars imaging when dawn intruded into the meteor watch, but managed to set up in a position where I could not start this quite as early as I had planned.

There was more light pollution than I had expected, but overall it was undoubtedly a bit better than Whitstable. The weather was so-so. Some scudding high and mid-level cloud, and mostly a bit hazy. The others had a variety of kit with them – one of them, Andrew Elliot – was an expert at videoing meteors and got some very good results. He had arranged to be imaging the same patch of sky as a colleague in the midlands, and we heard afterwards they had over thirty meteors that they had both recorded and planned to triangulate. It'll make a nice publication! Their work is, as of now, planned for inclusion in The Sky at Night in very early January, in a broadcast prior to the Quadrantid shower.

We all gave interviews before we started, explaining what we hoped to achieve. I explained I was using old-fashioned film, and hoped to get enough tracks to confirm the position of the radiant. I didn't give a bad interview, but it wasn't a particularly good or memorable one either, and I have no idea if it will be used. I suspect not, if only because the Perseids themselves will be stale news by January. As Patrick Moore is always saying at the end of his program: "We'll, we shall see!"

I darted around the sky, following the clear patches, but mostly photographing Ursa Minor. I had my 10" reflector set up and re-polar aligned, and was using it as the tracking platform for my photography. Personally, I don't like recording meteors with star trails, and it makes determining the radiant impossi-

ble unless one has precise timings for start and end of the exposure, and of any the meteors recorded, for each picture.
However, I got two meteor traces only: a rare alpha-Cygnid, and only onePerseid. So no radiant determination anyway!

Meanwhile, the others were busy doing their thing, and the proceedings were being interspersed with more interviews, mostly with Patrick Moore and John Mason, who were sitting in adjacent deck chairs, John with his BAA clipboard and recording sheets, and Patrick nowadays taking a more leisurely approach, as he thoroughly deserves to do. The BBC was filming them with a hired night vision lens. I think it astonishing that their inventory doesn't run to such a thing!

About 2.15am I switched to Mars. I had set up a long trailing mains cable from the observatory so as to power my ancient laptop – which has a duff battery that's not worth replacing – and replaced the camera with my Philips ToUcam Pro webcam, using eyepiece projection at the usual 10metre focal length. I had just got the planet on the chip and focussed when (no prizes for guessing what comes next) – it clouded up. We hung around for an hour or so longer, and then after a cup of tea retired to bed.

My film was over-exposed. I'd under-estimated the extent of the light pollution on this unfamiliar site, and had to scan the negatives and do a lot of work on them to get presentable pictures. I had got a star field at lower exposure for just such an eventuality, and had to cut and paste the trails onto this. I had to assess the boundary of the pasted image literally pixel-by-pixel, both for artistic reasons but even more so to retain scientific integrity of the trace.

Following the Perseids, it has been Mars that has been the main thrust of my observing. I've been watching as it has been growing in brightness and angular size, and rising (somewhat) earlier. I've been imaging with my webcam, and getting results which have varied from poor to fairly good. At least I've sorted out the colour balance: many of my videos from the last apparition have had almost nothing in the blue channel. And my later ones have been getting better.

I've also made a final final (?) upgrade to my 'Callisto' observatory, which is now three years old. (For new members, CaLLISTO stands fro Cantilevered Lifting Lid Inclined Sundial Telescope Observatory. It's a long story which I've STILL to write up properly.) I have made a bracket on the telescope tripod for my laptop computer, a far more convenient layout in use than my previous one. However, the screen is not visible from all the positions I adopt for observing (which depend on the direction the scope is pointing), but I noticed that the slope on my sundial-cum-lid was such that it translates into precisely into what was needed for mirrors, attached to the inside of the lid, near vertical in use, to allow me to view the screen from a position at the telescope. It doesn't matter that the image is reversed, because I only need to be able to do this for finding and focussing, not reading text or figures. So, when you read (hopefully in 'Sky & Telescope', who have shown interest in my bizarre design) that "… I tilted the sundial-roof to the North to allow rain to drain off, and also to provide the correct slope on the inner surface to attach mirrors to view the laptop screen from the telescope..." you may have a wry smile on your face!

As well as upgrading my observatory, I have been upgrading my Skysensor GOTO telescope control (SS2K) - see **http://groups.yahoo.com/group/ss2k/message/6308** for full details and diagrams, or talk to me.

In fact it's more than an upgrade: it was salvage of a piece of kit that had become almost unusable! The SS2K - good though it is - has a reputation for 'quirkiness'. There is, in my experience and opinion, a fundamental and unnecessary design fault in the cabling and plugs. The resulting flexures lead to intermittent failure of the contacts, loss of signal and spurious signals from both the handset, and the encoders. My SS2K was getting steadily worse and had recently become totally unusable and had been written off as 'end of life'.

The main plug carries a heavy cable and in my opinion is inadequately-supported for the job. I made a wood and aluminium support for it, attached primarily by a bolt from the INSIDE of the box (I took the case off to fix it). This almost but not entirely removed the problems. I found that adding pressure to the cable from below would restore full performance, and made a second support, like a small aluminium shoe- horn, which did the
trick. I don't believe there were actually any broken contacts ('dry joints') or I don't think my repair would be
working so well. The problems appear to be all due to many years wear on the prongs and sockets. Then also for good measure, I splayed the prongs very slightly in the motor plugs to enforce improved contact. This last procedure didn't work very well on the main plug that goes from the cable to the handset, but I used little bits of thin copper wire, salvaged from some old mains flex, to wedge the pins into the sockets and improve the electrical contacts. For good measure, I noticed that the four push buttons, which occasionally jammed, did so simply because the holes in the box were 1 mm too near the top of the box, and - while I had the case off to insert the bolt to fix the first support - I filed the holes slightly to enlarge them. The whole setup now worked as well as new, and I finalised it by embedding the cable and its support in epoxy-putty.

Last but not least, I am pleased to announce that after I announced that I was no longer willing to dismantle my observatory contents and lug my very

heavy kit each month, SEKAS has purchased an Orion (USA) Skyquest Intelliscope 10" dobsonian for use at the Blean Public Stargazing sessions. This is optically a very fine instrument, and has just the right balance of features – it could almost have been designed with what the Americans call "Sidewalk Astronomers" in mind. It is quite large aperture. It breaks down into five components for transport – two big ones, the mount and the tube – plus two large knobs, and the computer handset. The secondary mirror is quite small, being optimised for visual use. The setup contains what are called digital setting circles. They are rather unfashionable now, have been superseded by GOTO drives. But they AREN'T just an inferior option to a GOTO drive – but just the right alternative for a transportable scope that isn't going to be used for photography.

The two axes on the mount contain a series of magnets in a ring on each of the two axes of the movable parts, and an electronic sensor facing these magnets on the non-moving parts. These latter transmit pulses to the handset, which thus records angular movement in both axes from an initial position. The scope has first to be set up: the mount has to be accurately levelled, and then the tube has to be pointed accurately vertically. A spirit level is essential for this operation. A setscrew is then adjusted to provide a stop for the tube in this position. At this point we have a setup that ensures that whenever the telescope tube is pressed against this stop, it is accurately at right angles to the mount. In actual usage, from this point on, the scope can be dumped anywhere. It doesn't have to be pointing North, or be level. If it's not level, it's equivalent to it being at another location on the Earth's surface, that's all, if you think about it! You put the tube against the stop, and turn the handset on. (By the way, the handset computer is powered by a little 9v smoke-alarm battery. No hefty power supply is needed for an undriven Dobsonian!) Then you do a two-object alignment. From this the computer works out the orientation of the mount, and knows where you are pointing the tube by counting the pulses from the encoders. You choose an object from the menu – which, like all such, has far more objects than you can see from our light-polluted skies, or would want to attempt to show a member of the public – but, importantly, the planets are there. Maybe not really needed, but what about Uranus and Neptune? Digital setting circles are a great help with these two. The handset then displays two arrows telling you the direction in which to move the telescope: these arrows are replaced by numbers when you are close to the object, and you then continue to move the scope till both numbers read zero, and you are then pointing at the object!

I look forward to the imminent Public Stargazing sessions with this new piece of kit, and to reporting some interesting and exciting observations in my next 'Chronicle'. Watch this space!

Draft Program for May 2005 - August 2006

Meetings start 7.30pm unless otherwise stated. **OBSERVING EVENTS** are weather-permitting. Children are especially welcome but MUST be accompanied by a responsible adult. Canterbury sessions are run by John Kemp (01227 265503); the Walmer Castle sessions are run by Alan Buckman (01304 367711) [N.B. the former Dymchurch sessions are discontinued due to lack of support] **BRING TELESCOPES TO THESE: THEY DOUBLE AS SOCIETY OBSERVING EVENTS** *** ***ALL our speakers are distinguished and are worthy of and should be honoured with a good-sized audience - PLEASE PUT THE DATES IN YOUR DIARY NOW!!!***

It is suggested that there is an informal "Bring & Buy" at all our meetings at Bridge Village Hall

2005

November 4th Fri	Public Stargazing - CANTERBURY Blean Church Car Park 7.30-10pm
November 19th Fri	Konrad Malin-Smith (Croydon AS) - **"White Dwarfs"** – *A return visit by the popular and entertaining lecture/demonstrator, educator & broadcaster.* Bridge Village Hall - 7.30pm
November 25th Fri	Public Stargazing - WALMER CASTLE Beach Car Park 7.30-10pm
December 2nd Fri	Public Stargazing - CANTERBURY Blean Church Car Park 7.30-10pm
December 17th Sat	**CHRISTMAS PARTY Bring & Share** + Talk "Taking the Measure of Things" (John Kemp) *(A-M bring savouries, N-Z bring cake/ sweets, please!)* - Bridge Village Hall - 7.30pm

December 30th t Fri	Public Stargazing - WALMER CASTLE Beach Car Park 7.30-10pm
	2006
January 6th Fri	Public Stargazing - CANTERBURY Blean Church Car Park 7.30-10pm
January 21st Sat	**BAA "Beginning in Astronomy"** One-day meeting hosted by SEKAS, UKC Darwin College. Cost will be about £10 Helpers (solar and evening observing, & stewarding from SEKAS will be needed)
January 27th Fri	Public Stargazing - WALMER CASTLE Beach Car Park 7.30-10pm
February 3rd Fri	Public Stargazing - CANTERBURY Blean Church Car Park 7.30-10pm
February 18th Sat	**ANNUAL COMPETITIONS EVENING** – A fun evening: ANYTHING astronomical eligible – drawings, photos, home-made equipment, articles, observations and research. Enter yourself or make a nomination to the committee! Bridge Village Hall - 7.30pm
February 24th Fri	Public Stargazing - WALMER CASTLE Beach Car Park 7.30-10pm
March 3rd Fri	Public Stargazing - CANTERBURY Blean Church Car Park 7.30-10pm
?March 11th Sat	POSSIBLE DATE FOR ANNUAL DINNER – TBA
March 18th Fri	Greg Smye-Rumsby (Orpington AS). **"The Craig Telescope – the World's largest refracting telescope"** *Greg has a reputation as an outstanding speaker, and will be talking of his historical research and detective work on what was the World's largest refractor in late Victorian England.* Bridge Village Hall - 7.30pm
March 24th Fri	Public Stargazing - WALMER CASTLE Beach Car Park 7.30-1 0pm
April 15th Sat	"**Total Solar Eclipse of 29th March 2005"** – Report from SEKAS attendees - Bridge Village Hall - 7.30pm
May 20th Sat	ANNUAL GENERAL MEETING - Bridge Village Hall - 7.30pm
?August 12th Sat	**Perseid Meteor Watch** - Blean Church Car Park - from 10pm – *till dawn if clear! Bring a thermos and butties! Location and precise date (11th or 13th ?) to be confirmed*

THREE events yet to be confirmed or arranged:
SECOND "STAR LECTURE" jointly with UKC; ANNUAL DINNER; 2006 PERSEID WATCH

THE SKY THIS PERIOD

by Paul Andrew

The MOON

Month/ Phase	New	First Quarter	Full	Last Quarter
November	2nd	9th	16th	23rd
December	1st, 31st	8th	15th	23rd
January	29th	6th	14th	22nd
February	28th	5th	13th	21st

MERCURY:
During December this elusive planet can be found close to the south-east horizon just before sunrise between the 7th and 17th. Mercury once again becomes visible, this time in the evening sky, towards the end of February.

VENUS:
Venus remains an evening object, low down in the west, with greatest elongation from the Sun on 3rd November.

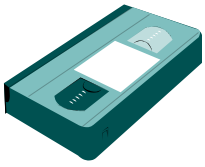
MARS:
After a well placed opposition on the 7th November Mars remains observable for a number of weeks, but a decline in the apparent size of the planet (due to an ever increasing distance from the Earth) will make observations (both visual and photographic) progressively more difficult.

JUPITER:
Jupiter reappears in the morning sky and by the New Year once again becomes favourably placed for observations of its cloud features and four brightest satellites.

SATURN:
As Saturn approaches opposition on the 28th January this beautiful planet is well placed for both telescopic observations and photography throughout this period. The ring system is still well presented to us, and so we should make the most of this opportunity.

URANUS & NEPTUNE:
Both of these outer planets are unfavourable for observation during this forthcoming period.

METEORS:
The main shower of this period is the Geminids which takes place around the 12th December, sadly peaking only a few days before Full Moon. As a result the Moon will drown out all but the brightest of meteors.



VHS video to DVD transfer

Kiss goodbye to rewinding tapes, never quite able to find the bit you want. Forget about tangled tapes jammed in the video player. Enjoy the benefits of instant access and save space. Get your tapes transferred to **DVD**. Cost is £10 for a full DVD (typically up to 4 hours). Ask for a price for shorter recordings or bulk orders. Contact Robert Snook at RobWSnook@aol.com or via his Dad, Alan, contact details on the committee page.

*** Still available – audio cassette transfer to CD, £5 per CD. ***

Classifieds

Notice|: Readers are advised that SEKAS cannot be held responsible for the accuracy of any descriptive statements or for the quality of goods advertised.

8 inch Meade SCT with Magellan 1 digital setting circles. Steve Portman 01304-381784	**Meade ETX 70AT** with three eyepieces, Autostar, tripod and hard carry case. £220 ono. Charles Finn 01233 335397	**TAL-1 4.5** inch reflector with all accessories. £100.00 ono Mrs Lundgren 01303-872129

Discounts from Local Traders

(Arranged by John Kemp)

Bryan Cowley , NEW ADDRESS: Canterbury Camera Centre next to small Safeways in Canterbury. 2 hours free parking and Safeway's customers can have their parking tickets validated by Cowleys. The co-managers of the new premises are Brian Cowley and Shaun Vincent . Tel. 01227 763905

Countryside Optics, NEW ADDRESS: 9, Gloucester Rd., Whitstable Tel. 01227 266337, bias towards naturalists' and sports optics, but some astronomical stuff, including Meade.

Hall's Battery Services, 256 Sturry Rd., Canterbury, Tel. 01227 763551.
Excellent range of sealed rechargeable batteries and chargers.

New Members

SEKAS would like to welcome the following new members.

Helen Kemp	The Robins, 10 Silver Hill, Tenterden, TN30 6NE
Phillip Young	3 Willow Way, Chestfield, Whitstable, CT5 3JJ
Neil Hinton	10a Cliffe Gardens, Minster-on-Sea, Isle of Sheppey ME12 3QY
Gordon Sykes	Grove House, Prospect Road, Hythe, CT21 5NR
Adam Wright	61 Nursery Lane, Whitfield, Dover, CT16 3ES
Alan Pack	7 The Foreland, Canterbury, CT1 3NT
Ashley & Tony Fuggle	2 St Luke's Walk, Hawkinge, Folkestone, CT18 7EF

How to submit articles to Eclipse

Please send articles, news, photos, observations and letters to Mike Kinns at the address on the inside front cover.

Note that material submitted may be held back to a later issue. Any submissions received after the deadline will normally be held back to the next issue. Return of any materials cannot be guaranteed, so please do not submit master copies. Every effort will be made to return computer disks or replace, articles submitted on disk should be in plain ASCII or DOS format.