TRANSIT

The December 2009 Newsletter of

Cleveland & Darlington Astronomical Society

NEXT MEETING

11 December 2009, *7.15 pm for a 7.30 pm start*

Wynyard Woodland Park Planetarium

Eta Carinae

Dr Julian Pittard (Leeds University)

Contents

Editorial

Rod Cuff

A recurring theme at the moment is the legacy of the Apollo project, with articles from Neil Haggath and Michael Roe this month and next (respectively): both keen, knowledgeable and forthright students of the missions and their aftermath. Taking the history theme a little further back, I'm delighted that Barry has offered a full list of the astronomical anniversaries that will come our way in 2010. You may know that the *Journal of the* BAA each January publishes a paper from Barry containing the anniversaries for the coming year; we're privileged this year (and I hope in future years too) to see a slightly reduced version of it a month earlier.

And of course we have our continuing series. Rob gives his twelfth successive set of 'Skylights' and Keith's excellent webcam imaging tutorial reaches its climax with his final article, on the remarkable Registax software. Alex's journey on the North Pole Expedition doesn't run smoothly this month …

Unfortunately, the climactic part of Dave Weldrake's story of what the Lupus project found has had to be held over until January. Dave has recently changed not only his job but his career, and the time he'd allocated to completing his story was swallowed up by a short-notice meeting with the Australian minister for climate change – a wee bit more important even than *Transit*, I felt.

Many thanks again to all contributors to this issue. The copy deadline for the next issue is a little earlier because of Christmas: **Tuesday 22 December**. I hope you all have a great Christmas, much-desired astronomical presents, and several months of clear skies as a bonus. Watch out for those luminous pigs overhead, though.

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OBSERVATION REPORTS AND PLANNING

Skylights – December 2009

Rob Peeling

The Moon

2 Dec	9 Dec	16 Dec	24 Dec	31 Dec
Full Moon	Last Quarter	New Moon	First Quarter	Full Moon

There are two full moons in December. The second one, on New Year's Eve, is also a partial lunar eclipse. The darkest part of the Earth's shadow, the umbra, passes over only a small fraction of the lunar disk, so I'm afraid this isn't going to be a very spectacular event.

Planets

This year December is not offering the best opportunities for scrutinising the planets.

Jupiter is starting to set early in the evening, not long after 21:00 by 15 December. **Neptune** is similarly starting to set early because it is currently close to Jupiter. Both will still be easy to find very early in the evening once it gets dark. **Uranus** is likewise pushing on to the west but will be observable until a little bit later in the evening.

Mars will be rising at around 21:00 at the start of December. It will start to be properly observable by midnight. Dave Blenkinsop has already been able to spot the north polar cap and some dark markings with his 6" 'scope. This may not be one of the closest oppositions for Mars, but clearly with good conditions some great views may be on the way.

Saturn is only on show if you want to stay up way past midnight.

Meteors

The **Geminid** meteor shower reaches maximum on 13–14 December. There will be a public observing night on 14 December from 20:00 at the Planetarium. As with the Leonids, the moon will be cooperating by staying out of the way. Will the weather cooperate too, having been the party-pooper for the Perseids and the Leonids this year?

Deep sky

Last month I mentioned Dr Mike Inglis's programme for finding the **faintest possible naked-eye objects** (see http://web.me.com/mdiastro/faintestobject/Welcome.html). I've been having a go, and have found a less well-known object for you to try out. **NGC 752** is an open cluster in Andromeda. Look for the two stars marking the shortest side of Triangulum (β and γ Tri). Using these stars as pointers, move about twice their separation distance up towards Andromeda and scan with averted vision. I glimpsed it from the Planetarium on 20 November, and from the moors it's quite clear. This cluster is one of Sir Patrick Moore's **Caldwell objects** (#28) and is an excellent low-power telescope target as well. It is unusual because the stars are quite old for a cluster – about one billion years.

M78: APOD 2005 November 4, Stephan Messner

Of course, Orion is back in December. When you've finished enjoying the spectacle of **M42**, try to find the nebula **M78** for a change (*see previous page*). It lies north of Orion's belt. While not as breathtaking as M42, it is still an interesting object. This is a reflection nebula rather than an emission nebula because the embedded stars are cooler than those of the **Trapezium**. I usually see a fuzzy area with two stars embedded in it.

An expedition to the North Pole

A CaDAS project to celebrate the International Year of Astronomy 2009
by collecting observations, sketches, images and *any* kind of information about any object with a J2000 declination ≥70 degrees.

Send your reports, lists, or whatever to Rod, Alex or Rob (contact info for all three is at www.cadas-astro.org.uk/contacts.html) or, if you prefer, bring them along to a CaDAS meeting.

REPORT 1: 20 /10 – 25/11 *Alex Menarry, 25 Nov 2009*

What a terrible month for observing! A single, solitary, viewing evening with the telescope and binoculars in the whole period! My log book is full of entries like "half clear, Jupiter visible, Northern area cloudy". Or "wind and rain, no chance". On the one possible night, Friday 12 November, the seeing wasn't great. Naked-eye visibility in my back garden no better than 3.

16:50 hours, set up the C8, did a 3-star alignment and had a play. **Brocchi's Cluster**, aka Al Sufi's Cluster, the Coathanger or Collinder 399, very clear in binoculars. **M13** found OK but very difficult to focus on. **M81** and **M82** were obscured behind the house at first but appeared by 19:00. However, unable to find them, even with the help of the GoToStar. Suspect the atmospherics were obscuring it. Old favourites very bright – **U Cep**, **RZ Cas**, **Algol**.

By 19:26 the sky was so bad that there was nothing visible under the Great Square of Pegasus, so the binocular attempt to find Uranus had to be abandoned. All in all, a night of hard work for little result. Thinking of taking up tiddlywinks instead of astronomy. Oh well, back to reading those wonderful books *Megalithic Lunar Observatories* and *Megalithic Sites in Britain* by Alexander Thom and *Sun, Moon and Standing Stones* by John Edwin Wood. Theoretical astronomy at its very best, sorting out the mysteries of the movements of the Moon and discovering how Neolithic astronomers had understood it all 3750 years ago. Planning a trip to Argyll and Kintyre to see the classical sites – Kintraw, Templewood and all the circles and standing stones from Oban to Campbelltown.

And one last thing – did you see the announcement of the setting-up of a dark-site astronomy park in Galloway? Another trip to put on the list.

[Commiserations, Alex! For those who missed the announcement, the Galloway Astronomy Centre's website is at www.gallowayastro.com – Ed.]

REPORT 2 *Rob Peeling, 18 Oct 2009*

[*This is Part 2 – November's* Transit *contained Part 1 – of a comprehensive report by Rob on 'North Pole' observations from the past couple of years, including asides on the discovering astronomers of the past. January's issue will complete the set by giving descriptions of various* **asterisms** *that Rob has found out about and/or seen in 'our area of sky'.*]

NGC 3172 – Galaxy.

- 24 August 2009, from Eaglescliffe with 12" f/5 Newtonian. Polarissma Borealis possibly glimpsed with averted vision. Seemed to be a slight nebulosity near to a star in the right place. Reference to the DSS image attached to the relevant entry in the NGC/IC Project database suggests this might be correct.

IC 3568 – Theoretician's or Lemon Slice Nebula in Camelopardalis**.**

- 23:50 UT 30 September 2009, from Eaglescliffe with 12" f/5 Newtonian. It is really quite faint. Looks stellar in 32mm when the right field is found and clearly the right object with 15mm, but needs the Barlow as well to really see as a nebulous object. Adding the CLS filter enhances it slightly. Small and quite dim object. Used *Uranometria* to locate this.
- 20:10 UT 11 October 2007, from Eaglescliffe with 12" f/5 Newtonian. Near-stellar or even stellar with 32 and 15mm lenses. Used the UHC filter to confirm as definite nebulosity with a definite extension around a bright core when using 15mm with 2× Barlow and UHC filter. Core is NOT the central star.

Collinder (Cr) 464 – Open cluster to the east of γ Camelopardalis.

- 20:58 UT 17 September 2007, from Eaglescliffe with 12" f/5 Newtonian and 8×40 binoculars. Only a large but sparse area of mostly bright stars easily seen in the finder. The narrow field of view of the 12" scope is unsatisfactory for this object. A distinctive pattern of three stars marks it and is easily picked out with 8×40 binoculars.

NGC 2985 – Faint **galaxy** close to 27 Ursae Majoris.

- 20:45 UT 11 October 2007, from Eaglescliffe with 12" f/5 Newtonian. Glimpsed with 32mm and confirmed with 15mm lens. Not much to see apart from core with a faint nebulosity around it.

NGC 3147 – **Galaxy** in Draco.

- 20:10 UT 11 October 2007, from Eaglescliffe with 12" f/5 Newtonian. Close but to the east of 27 UMa, and north of a 6th-magnitude star. With the 32mm lens it is only suspected. With 15mm it is confirmed but still difficult to see. The CLS filter helps to show a definite core, and with averted version an extended object running north–south.

HO 200 – **Double star** in Cepheus.

- 17 September 2009, from Eaglescliffe with 12" f/5 Newtonian. Somewhat north-west of NGC 188 there is a matched double marked in the *Cambridge Double Star Atlas* (& *Sky Atlas 2000*) but not named. It splits into an evenly matched pair with the 10mm lens and Barlow. The stars were dancing around with the poor seeing but definitely double. Close enough to be an uncertain split with the 15mm and Barlow. From *Uranometria*, this star is shown as variable and double. The variable designation is V377 Cephei, and

SIMBAD gives an ADS designation 16759 AB. The variable is a δ Scuti type. With some effort found the Washington Double Star designation using Vizier. It is HO 200. Separation 1.7", magnitudes, 6.65 and 10.61. V377 Cephei is the primary. Discoverer's code HO refers to **George Washington Hough** (1836–1909), an American astronomer born in Montgomery, New York, who discovered 627 double stars.

HJ 1986 – **Double star and group**.

- 17 September 2009, from Eaglescliffe with 12" f/5 Newtonian. Closer to and slightly south of NGC 188 there are two stars marked in the *Cambridge Double Star Atlas*. The one to the east is marked as a double, the one to the west is not. In the finder the western star appears double. With 32mm lens it becomes a little group. The southernmost of the original pair is single but the northern one of the pair becomes a slightly yellowish pair with a fainter star to the south at a similar separation to the yellowish pair. The star to the east (shown as a double) is a wide, optical pair with the 32mm. Switching to the 15mm lens shows that the brighter of the pair (southern) has a faint companion somewhat to the east. *Uranometria* shows it differently; the eastern pair are plotted as two separate stars. The western pair are also shown separately with the northern one shown as a double. *Sky Atlas 2000* shows these stars differently again; the eastern is double and the western is as shown in *Uranometria*. WDS has no entries in the vicinity of the eastern stars.
- Using Vizier to interrogate WDS, the western system is identified as HJ 1986. AB are 30" apart, mags 7.96 and 8.5 with spectral type F8. C is mag 10.9, 55.6" away and almost due south of A. The discoverer was **John Herschel**.

Σ1362 – **Double star** in Ursa Major.

- 11 October 2009, from Eaglescliffe with 12" f/5 Newtonian. Near 27 UMa. A close blue pair, matched in brightness, easily split with 15mm lens. Measured and catalogued by **Friedrich Georg Wilhelm von Struve** (1793–1864). He was a pioneer in the observation of double stars and one of the first to measure stellar parallax in 1830.
- Struve was born in Altona, Schleswig-Holstein. He had 18 children and was the founder of a family of astronomers that spanned four generations. To avoid conscription into the German army, he fled to Estonia and studied at Dorpat (now Tartu). He became professor there in 1813, and director of the Dorpat Observatory 1817. In 1839 he supervised the construction of Pulkovo Observatory near St Petersburg, and became its director. He was succeeded in 1862 by his son **Otto Wilhelm Struve**.
- Struve published a catalogue of about 800 double stars in 1822, and instigated an extensive observational programme. The number of such stars known had increased to more than 3000 by 1827. In addition, Struve described more than 500 multiple stars in a paper of 1843.

OΣ258 – **Double star** in Camelopardalis.

- 4 October 2009, from Eaglescliffe with 12" f/5 Newtonian. Slightly further to the south from 32 Cam. Pretty sure I found the right star but I can't separate it with the Microguide + 2× Barlow. With 6.3mm lens, I still can't split it. Sometimes there is a hint of splitting through the seeing. There is a thin layer of light cloud and the moon is full. Failure to separate this star may be down to the conditions. Limiting magnitude seems to be close

to mag 9 through the telescope at the moment (by comparing star field to *Uranometria*). Note: B is mag 10.6, so no wonder it wasn't seen!
- OΣ258 was measured and catalogued by Otto Wilhelm Struve.

SHJ 136 – **Double star** in Camelopardalis. *[See article and letter in November's* Transit*.]*

- 28 August 2009, from Wynyard Planetarium with 12" f/5 Newtonian . A nice, wide blue/yellow Albireo-type double near to 32 Camelopardalis and IC 3568.
- 4 October 2009, from Eaglescliffe with 150mm f/5 Newtonian . Finally found SHJ136 after frustrating search. A is yellow and B is blue. Using Microguide and 2× Barlow the separation is 89.1". WDS separation = 70.8".
- 11 October 2009, from Eaglescliffe with 150mm f/5 Newtonian. Clear sky after a patch of heavy cloud. SHJ 136 can be split with 8×50 finder. SHJ 136 B is difficult to see with the finder but it can be done, and the colour contrast between A & B is also apparent.
- SHJ136 = WDS designation 12110+8143. First catalogued in South, J. & Herschel, J. *Phil. Trans. R. Soc.* 1824.

Σ1694 – **Double star** in Camelopardalis. Also known as 32 Cam.

- 4 October 2009, from Eaglescliffe with 150mm f/5 Newtonian. Easily found from Polaris. Two well-matched stars; measured separation with Celestron Microguide eyepiece and 2× Barlow as 27.4". Both components are blue-white. WDS: Separation = 21.4". 32 Cam is clearly separated with 25mm lens.
- 11 October 2009, from Eaglescliffe. Split with 15×70 monocular. 8×50 finder can't quite split it.

ASTROPHOTOGRAPHY

A beginner's guide to imaging solar system objects

Keith Johnson

Part 4: Registax for beginners

Some revision

In last month's edition we noted that, although poor seeing will affect the final outcome of an imaging session, there are rare occasions when good seeing is evident and that when it does occur the observer should make full use of these precious occasions, whether visually or by imaging.

One such occasion occurred on 14 April 2007 when, after I'd set up my telescope, it became obvious to me while I was looking at Saturn with the eyepiece that the seeing conditions were amazing. So I quickly replaced the eyepiece with my ToUCam Pro camera and 2.5× Powermate with infrared blocking filter attached.

That evening, I captured my best images of Saturn so far. This was possible only because five very important factors were in place, something that we covered earlier in this tutorial:

1. I was using a good **web camera**.
2. I took time to get the best **focus** possible.
3. My telescope was well **collimated**.
4. The **camera settings** were set appropriately.
5. The **seeing** was superb.

Processing our captured video: Registax

So, after we've captured our AVI, what do we do with it?

We could simply marvel at our work by playing it back on Windows Media Player – or we could do something much more exciting and interesting by creating a very detailed image from it.

An AVI is simply a movie file made up of many individual frames. Using dedicated software it is possible to select a good-quality reference frame and then automatically compare all other frames within the AVI to the reference frame. Those that fall below the quality of the reference frame would be discarded, and the remaining frames aligned and stacked to create one single frame that has a much better signal-to-noise ratio. Applying various levels of sharpening ('wavelet filters') can then bring out the hidden detail of the object.

I have just explained a layman's approach on how to use **Registax**, which incidentally is the (free!) aligning and stacking software program most favoured by planetary and lunar imagers.

Registax is available at www.astronomie.be/registax/html/download_v4.html (the sample session below uses the latest release, version 5).

After you've installed Registax, double-click on its desktop icon and then browse for the folder containing your AVI by clicking on the "Select" menu item at the top left of the screen. After you've found your AVI file, click on "Open" (Fig. 1).

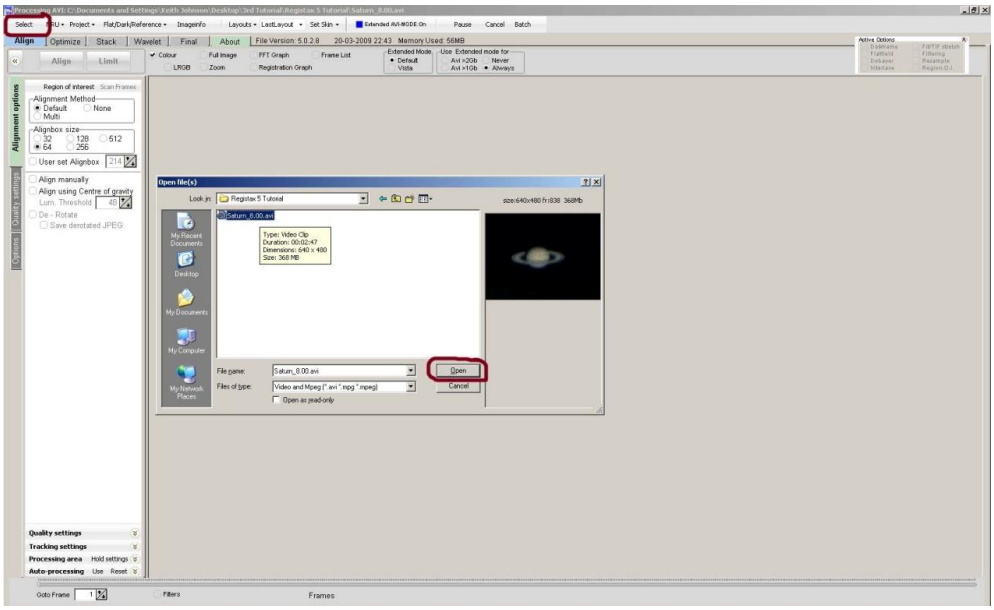


Figure 1. Identifying your AVI file to Registax

The first frame of your AVI file is shown on the screen. Click on the “Frame List” tick-box to display the complete list of frames, and click on “Frame 1”. You can then use the up and down keys of the keyboard to scroll through the frames one at a time while looking carefully at the image of each. You’re looking for an image that stands out as showing more detail and having a better-defined shape than other frames. In this demonstration I’ve chosen frame 14.

Aligning and selecting

The next step is to choose an alignment-box size that will cover the image of your object. Here I’ve chosen an “Alignbox size” of 256, with “Alignment Method” set to Default, “Quality settings” to “Compress” and “Lowest quality” to 95%. Left-click the mouse on the centre of the planet and a rectangular box will appear on the image (Fig. 2).Now click on the blue ”Align” tab.

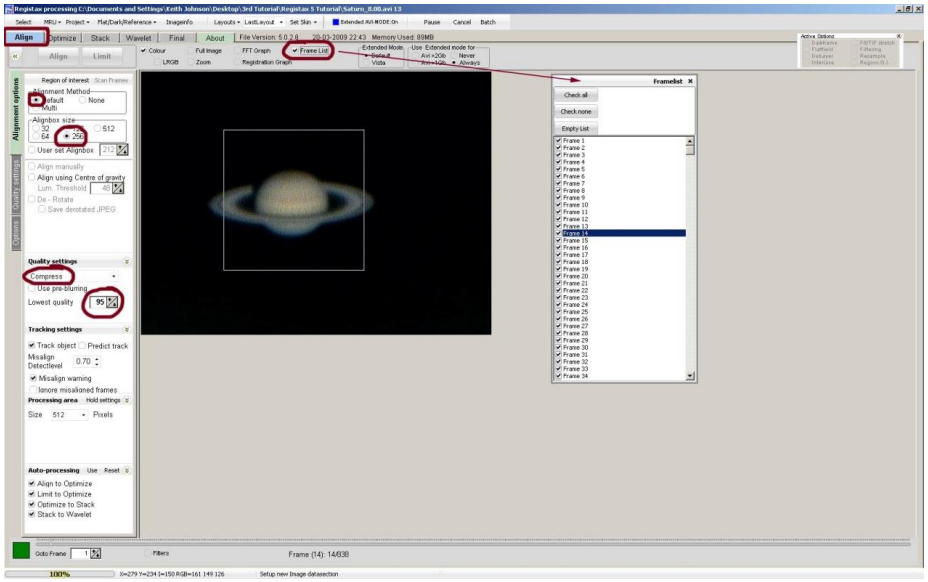


Figure 2. Preparing to align the frames of your AVI

Near the top left of the screen, a large “Align” button, underlined in green, will appear. Click that to make the software carry out the alignment procedure while estimating the quality of the images. Any images falling below the lowest acceptable quality (in our case set at 95%) as compared with the reference frame will be rejected.

After Registax has aligned the frames, the frame list will be indicating them in descending order of quality. The slider at the bottom of the screen (*see ‘B’ in Fig. 3*) shows where the final frame of the sequence is.

At this point, if you wish, you can remove a number of frames from the poorer-quality end of the slider scale by left-clicking and dragging the slider to the left. In any event, once you’re happy with your selection, click on the large “Limit” button (Fig. 3).

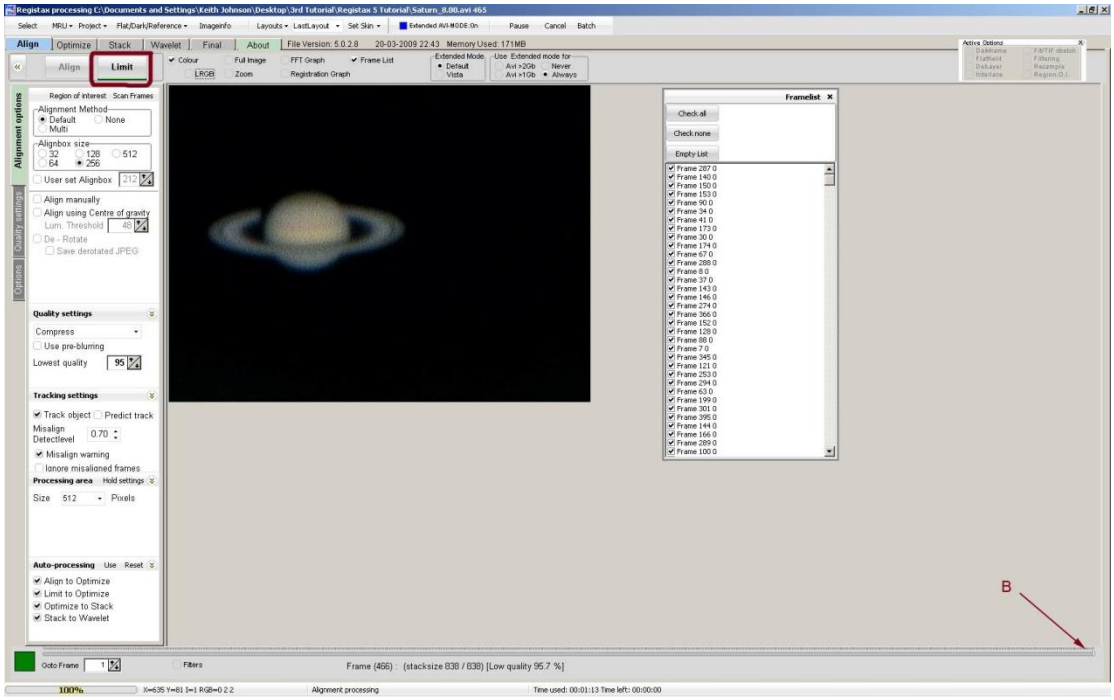


Figure 3. Limiting the frames to be processed further

Optimizing

The “Optimize” page now appears.

Two suggested values are displayed in the “Optimizer Settings” section:

- “Optimize until 1% improvement” means that the optimiser will run repeatedly until no image improves in quality by more than 1% in successive runs.
- The “Search area” is the size of the region around each pixel that the optimizer will examine in order to try to get an improvement; in our case it is 2 pixels (square).

Now click on the “Optimize” button just below the line of tabs – it will light up in yellow as your mouse hovers over it. Two frames are displayed; the left-hand image is your reference frame and the right-hand image runs rapidly through all of the frames being optimised (Fig. 4).

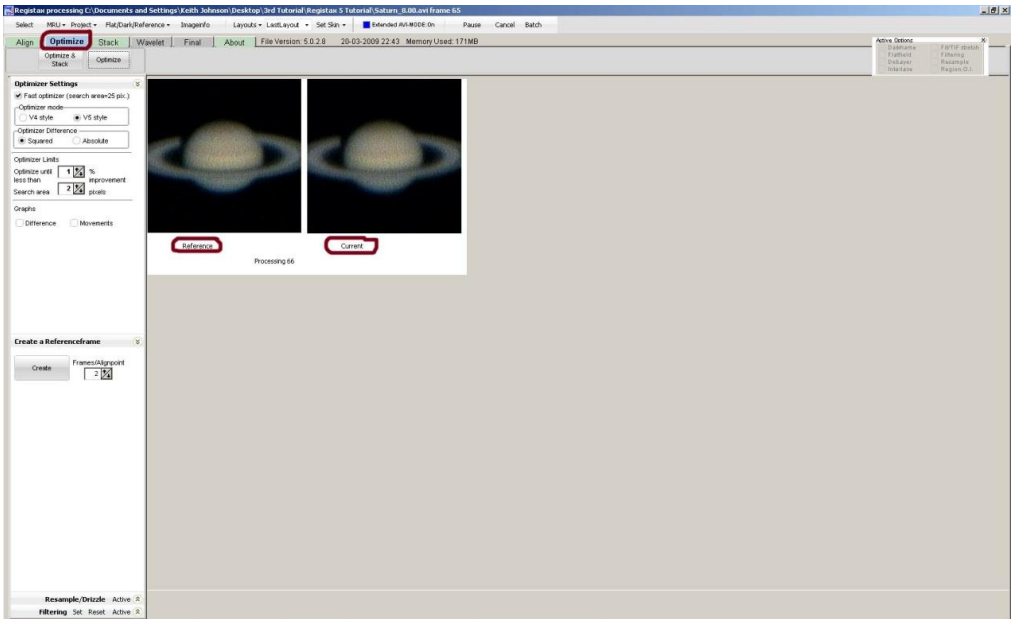


Figure 4. Frames being optimised

Stacking

After optimizing has completed, click on the “Stack” tab. You can now further refine the set of frames to be used for your final stack. Left-clicking in the “Show Stackgraph” box under “Stacking options” generates a pop-up panel showing a representation of the quality of the frames, with the best frames to the far left and the poorest frames to the far right. You can move the bottom slider to the left if you want to reject frames of a relatively poor quality. Similarly, moving the left-hand slider up or down will cut off any individual frames having a difference level that sits above the line shown (Fig. 5).

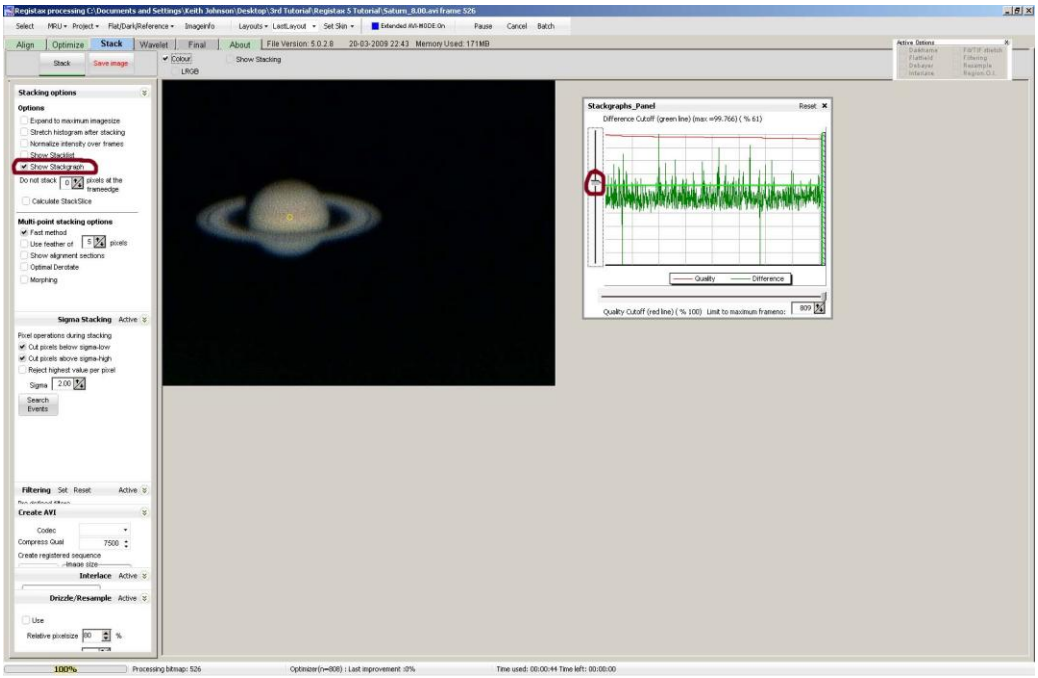


Figure 5. Final selection of frames for stacking

Once you're happy with your selection, click on the green-underlined "Stack" button to start stacking your frames. When that process is complete, click on the "Wavelet" tab to start working on adjusting the resulting image to show it off to best advantage.

Using wavelets to improve your image

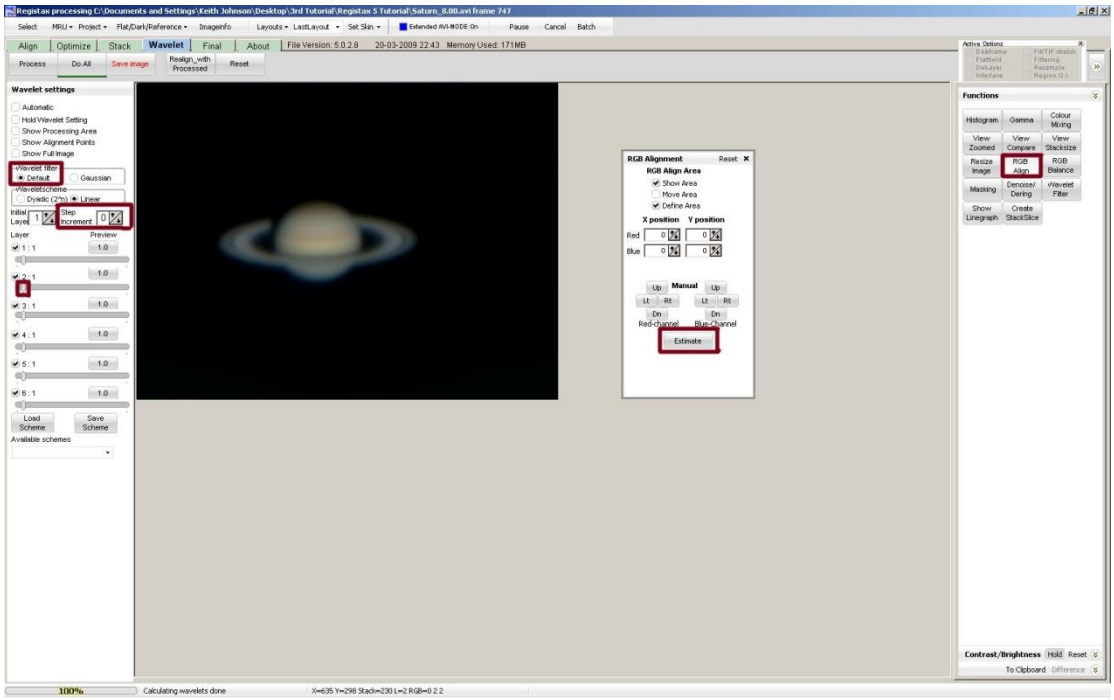


Figure 6. The Wavelets page

Registax's "Wavelets" page (Fig. 6) gives you access to a range of image-manipulation functions that other graphics programs usually call filtering, unsharp masking, colour balancing, brightness/contrast adjustment and so on.

RGB Align

Each individual AVI frame is made up of red, green and blue (RGB) channels. When many hundreds or thousands of frames are stacked, these channels get slightly shifted in relation to each other because of the difference in the wavelengths of the light they register. This shift is larger if the object being imaged is low down on the horizon, when light of different wavelengths is more dispersed because of the greater thickness of atmosphere it travels through.

To re-align the channels, click the "RGB Align" button to display the RGB alignment box. Then simply clicking on its "Estimate" button causes the channels to be scanned and re-aligned.

Wavelet settings

On the left-hand side of the Registax screen there are half a dozen sliders that can be adjusted to sharpen or blur your image. Much of the image-enhancement power of Registax is realised by experimenting with one or more of these sliders until the desired amount of detail is coaxed from the stacked image. The upper sliders enhance smaller details than the lower ones do, but I urge you to play around with them to see what seems to you to work best – though don't over-sharpen the image by pushing the sliders too far.

Gamma Adjustment

Close the RGB alignment box and click on the “Gamma” button. In the resulting pop-up “Gamma Panel” box, right-click on the displayed straight line somewhere close to where the arrows point to in Fig. 7, and then use the “left-click and drag” method to gently move the line either upwards or downwards, which will alter the amounts that certain colours are enhanced or made fainter. This is something you have to experiment with to try to achieve an image that does not over-expose or under-expose the object or make the colour balance look strange. You may also want to experiment with altering the “Contrast” and “Brightness” sliders.

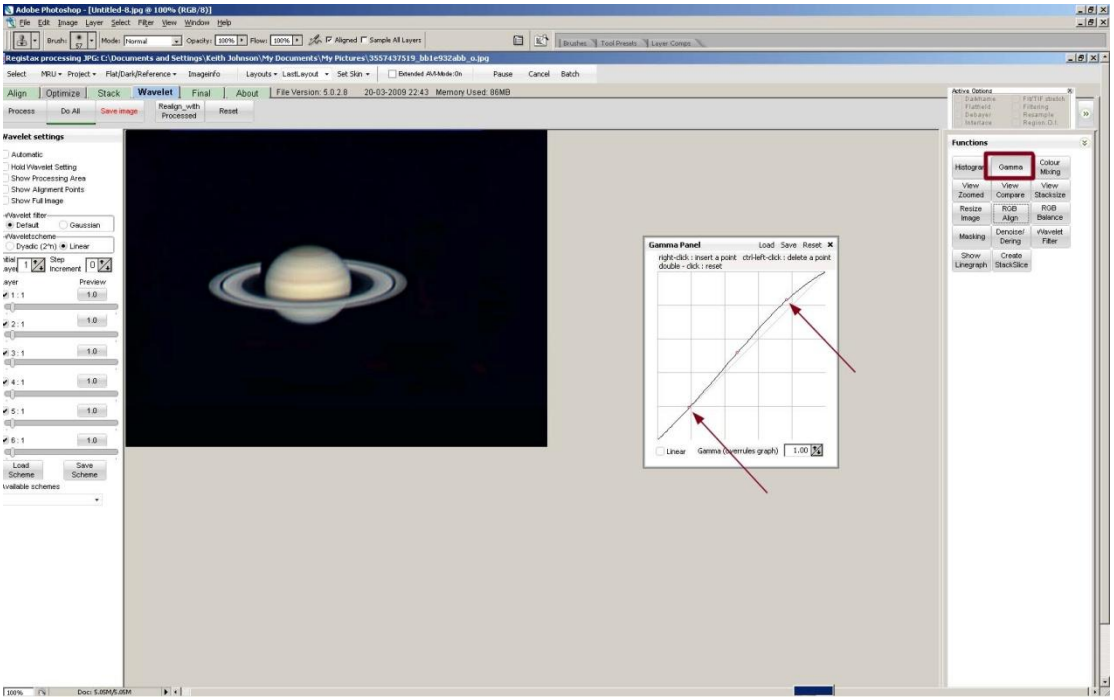


Figure 7. Adjusting the gamma value

And finally

At the beginning of this tutorial series, you may recall my saying that the saturation setting should be kept low when setting up the camera for image capture. Now you have the opportunity to adjust hue, saturation and lightness, by clicking on the “Final” tab, which gives you a last chance to make various finishing touches to the image.

As well as making the tweaks just mentioned, you can flip the image vertically or horizontally, or rotate it (Fig. 8) using the left-click and drag method (“A”) or in incremental steps (“B”).

Then save your final image (“C”). The result of our sample session here is displayed as Fig. 9.

I hope this four-part tutorial has helped and encouraged you to become involved in imaging. Who knows – the Society could have its very own imaging competition in the near future!

****** *Good luck!* ******

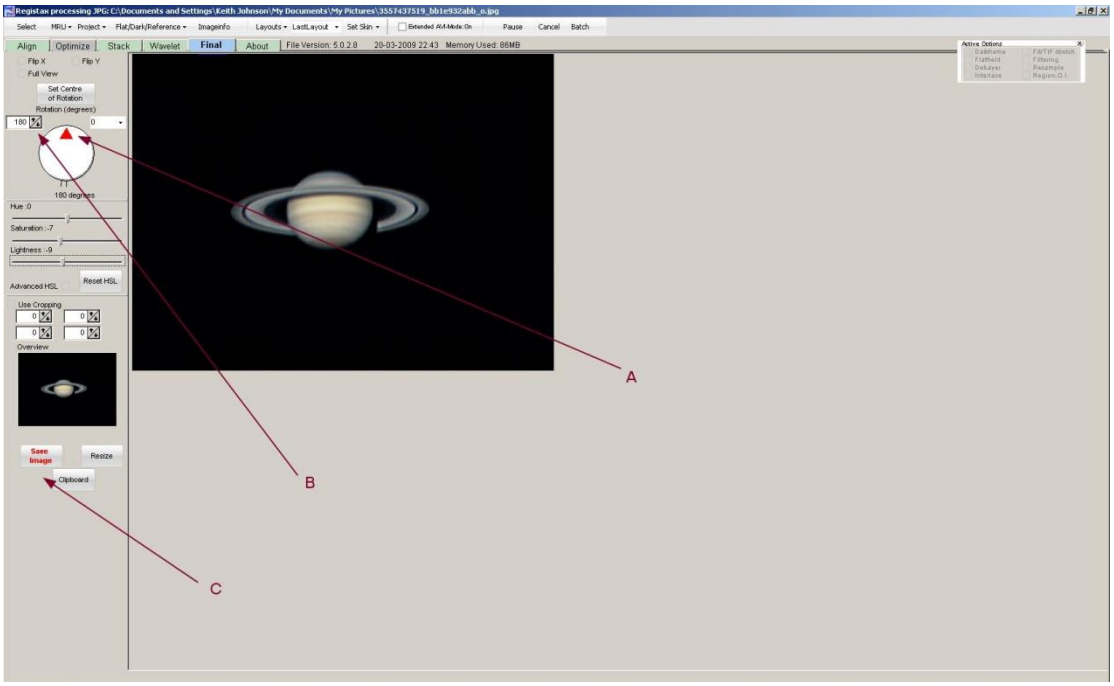


Figure 8. The final touches

Figure 9. The result!

"Mankind's pinnacle": The lost legacy

Neil Haggath

This year we celebrated the fortieth anniversary of one of the greatest of all human achievements – the first landing of men on the Moon. A friend of mine recently described Project Apollo as "Mankind's pinnacle". I wholeheartedly agree with that sentiment, and with its inference – that while Apollo was the ultimate triumph of human ingenuity, we have gone steadily downhill ever since!

In the immediate aftermath of Apollo, we dared to imagine a manned mission to Mars within our lifetime, and Arthur C. Clarke's vision of a permanent lunar base by the year 2001 didn't seem particularly far-fetched. But compare that with the reality; while we have achieved great things with our robotic probes – such as Viking, Voyager, Galileo, Cassini and the Mars rovers – humans have never travelled beyond low Earth orbit since 1972.

So *where did we go wrong*? For one thing, Apollo was the supreme example of what scientists and engineers can do, *when they are allowed to get on with it*! Contrast that with today, when everything is run by multiple levels of management and bean counters. In 1961, when President Kennedy laid down his challenge to the nation to go the Moon, Apollo was nothing more than a design study on paper; from that point, once the funding was allocated, it took eight and a half years to build the hardware and get Armstrong and Aldrin to Tranquility Base.

In today's world, a new fighter aircraft has been under development for a similar length of time, and has got as far as having two prototypes actually flying…

But the main theme of this article is something equally dismaying – the tragic and baffling fact that "Mankind's pinnacle" is now all but forgotten!

Time to admit my age here; I'm not *quite* as old as the Space Age, but I am (just) old enough to remember Apollo 11. I was seven years old at the time, and already fascinated by space. The earliest mission, which I remember knowing about as it happened, was Apollo 8; by the last few landings, I was following the missions avidly. In any astronomical society, or gathering of amateur astronomers, you will probably find a disproportionate number of people of around my age; we are the generation who grew up with the Space Age, and for many of us, the fascination and enthusiasm will stay with us for life. I, for one, consider myself privileged to have lived through it.

In recent years, I've had the immense honour and privilege of meeting three of the Apollo astronauts – Charlie Duke and Alan Bean, who landed on the Moon on Apollo 16 and 12 respectively, and Fred Haise, one of the heroes of Apollo 13. I rank those occasions among the Great Moments of my life; the photos of myself with these men, together with their signed crew photos, take pride of place on my living-room wall. Another comparable moment was visiting the museum of the Energia Rocket and Space Corporation near Moscow, and seeing and touching the actual capsule in which Yuri Gagarin flew.

Charlie Duke

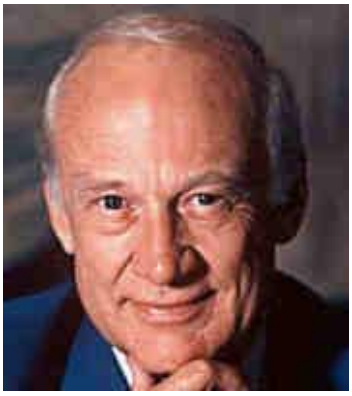
Alan Bean

Fred Haise

But at the same time, I've been amazed, and greatly saddened, by the realisation that all of this is completely lost on younger generations. Apart from a very small minority who share our interest, younger people today know virtually nothing about Man's supreme achievement. And even worse, most of them seem to *care* even less.

(Yes, I realise that talking about "the younger generation" is going to make me sound like an "old git" – but what follows is something which needs to be said.)

When the excellent film *Apollo 13* was released in 1995, I thought that one of the best things about it was that it somehow managed to maintain the tension throughout, despite the fact that everyone already knew the ending. But I soon realised, to my dismay, that a substantial proportion of younger people who saw the film *didn't* know the ending – they knew nothing of the story, and actually didn't know whether or not the astronauts made it home alive! (I guess it didn't occur to them that if they hadn't, no one would ever have made the film.) One friend, only five years younger than me, watched it as an in-flight movie, just because it was showing – and later told me that she had had no idea how the story ended. A couple of younger work colleagues, in their early twenties at the time, talked about it as an episode of which they were just vaguely aware, as something from dim and distant history, before they were born.



Even more disturbing was something that happened just a couple of years ago. As well as meeting the aforementioned astronauts, I went to a talk by Buzz Aldrin (*left*) – though I didn't get to meet him. When I told my work colleagues about this, one friend – a pretty intelligent guy, in his early thirties – responded with, "Who's he?" He had honestly – and I kid you not – *never heard of him*!!! He even joked, "Is he Buzz Lightyear's brother?", and I had to tell him that he was the man from whom "Buzz Lightyear" got his name. He *did*, thankfully, know who Neil Armstrong was – but when I told him that Aldrin was the second man on the Moon, he said, "First is everything; who cares who was second?" He didn't even seem to realise that they had landed in pairs.

When I told my friends about seeing Gagarin's capsule, the same person had also never heard of Gagarin!

Of course, those who don't have any interest in the subject are not likely to know the names of any other astronauts or cosmonauts – but I would have thought that *everyone* should know the

names of Armstrong and Aldrin, which are inextricably linked in history, and that of Gagarin (*right*). My friend responded by saying, "I have no interest in any of that!" – but surely, that's akin to someone saying they have no interest in politics, so they have never heard of Winston Churchill, or that they have no interest in boxing, so they have never heard of Muhammad Ali! *Isn't it*???

That last paragraph contains the crucial phrase – "inextricably linked *in history*". And there's the rub. If you mention "history" to youngsters today, you could almost expect them to say, "What's that?" "History is a thing of the past" may sound like a corny joke, but in this context, I'm sad to say that it's far from funny.

It seems to me that all of this is just one small aspect of a far greater malaise, which pervades the whole of society today – certainly in the UK and the USA, and, as far as I can tell, in many other countries as well. I could write a lengthy essay on the "dumbing down" of our education system, and consequently of our entire culture, but this isn't the place. Here, I'll concentrate on this particular aspect; for most of today's younger generation, the very *concept* of history, as a subject of interest or knowledge, is apparently completely alien. There seems to be a prevailing attitude that "if it didn't happen in my lifetime, who cares?" (Indeed, the same person who hadn't heard of Aldrin or Gagarin recently asked me, "Who cares about astronauts? What was the point of going to the Moon?" I replied that I couldn't expect him to understand the motive behind Apollo, as it was all to do with the politics of a world he never knew.)

A case in point: a contestant on a TV quiz show was asked a question on an aspect of twentieth-century history. He had no idea; when told the answer, he actually said, "Well, how was I supposed to know that? It was before I was born!"

Another thing that happened on TV a few years ago pretty well says it all. There was a series called "Great Britons"; at the end of it, a viewers' poll was conducted, to decide who was "the greatest British person of all time". A substantial proportion of people were apparently unable to differentiate between the concepts of "the greatest of all time" and "the greatest within my own lifetime and personal memory"; they actually voted for… *Princess Diana* – instead of the likes of Winston Churchill, Horatio Nelson and Sir Isaac Newton!

Please excuse me for a moment while I go and bang my head against the nearest brick wall…

Now, I don't pretend to entirely know the cause of this malaise, but I can guess at a few factors. Firstly, we all know that the education system is being steadily and deliberately "dumbed down"; this has been well documented in the more reputable press. When the Government tells us, almost every year, that "a record number of 16-year-olds have achieved Grade A GCSEs", etc., all it actually means is that the standards are constantly being lowered.

Secondly, we have the internet. Despite its obvious *potential* as an educational medium, we all know that the useful educational material on the internet is far outweighed by the terabytes of senseless drivel. Undoubtedly, the rise in popularity of assorted lunatic "conspiracy theories" is driven by the ridiculous mentality of "It must be right, because I read it on the internet!" Similarly, there is a tendency for youngsters to regard the net as the fount of all knowledge, and pay no attention to whatever it is they are still being taught at school.

Finally, we have the all-pervading influence of what I call the "moron media", which constantly propagates today's idiotic "celebrity culture". It appears that most of today's youngsters are

obsessed, almost to the exclusion of all else, with the hero-worship of sports or film stars, and with following the totally pointless antics of a multitude of so-called celebrities – most of whom have done precisely nothing to merit that description. (One "newspaper" actually has a column within its gossip pages, headed "Do keep up!".)

This brings us back again to the film *Apollo 13*. A little while after its release, some of my work colleagues were talking about the film, when a young lady aged 19 interjected, "Oh, I want to see that – Tom Hanks is in it!" She neither knew nor cared what the film was *about* – just that Tom Hanks was in it! (I suspect that Mr Hanks himself wouldn't be too pleased about that, as he's a very keen supporter of the space programme. Making the film, and later directing the TV series *From the Earth to the Moon*, were labours of love for him.)

The very *meaning* of the word "celebrity" has changed beyond recognition. There was a time when it meant a person who had become famous, by virtue of having done something notable or especially worthwhile. Today, the term is applied to every footballer who has played a couple of games for a Premiership club, every singer who has had a single song in the charts, every bit-part actor who has appeared in half- a-dozen episodes of *EastEnders*… and not to mention all those so-called "reality TV stars", who become famous for no other reason than through making an exhibition of themselves for a few weeks, or for displaying their spectacular levels of ignorance and stupidity! And how exactly does some female nonentity qualify as a celebrity, just because she happens to be the girlfriend of a footballer?

Of course, when I tell younger people that I've had the honour of meeting some *real* celebrities, in the old-fashioned meaning – well, you can't get much more notable than a man who walked on the Moon! – they don't have a clue who they are.

Combining all these factors, we now have an entire generation of kids who believe that there is nothing more to life than *Big Brother*, playing mindless computer games, and wearing the "right" brand of trainers. And now it even seems to have gone a stage further; inspired – if that's the right word – by certain "celebrity" couples and and some of those aforementioned "reality TV" idiots, we now have a culture in which it's actually considered fashionable, or cool, to be utterly thick!

You will have realised, I hope, that I've used my specific example – lack of knowledge about Apollo – simply to illustrate the overall trend of younger people having little or no interest in science, history or *anything* remotely intellectual. What can we do about it? Frankly, I've no idea.

Thankfully, however, I've been over-generalising. All is not *entirely* lost; there are still *some* youngsters who haven't become part of the "Generation of the braindead"! Each of the astronauts' talks has been attended by around 400–500 people; each time, a significant proportion of the audience has consisted of younger people who were not born at the time of Apollo, and who clearly don't subscribe to the attitude of "It was before I was born, so who cares?". My friend who coined the phrase "Mankind's pinnacle" was born the year after the Moon landings ended, but he shares my enthusiasm for space travel, and shows an impressive degree of knowledge of Apollo.

When I gave my talk "One small step: A celebration of Apollo" to CaDAS during the anniversary year, one very interested listener was Andy Fleming's teenage son David. David, of course, shares his dad's interest in astronomy and space; before the talk, he knew a bit about Apollo, mainly learned from his dad. But Andy later told me that my talk had been a real

eye-opener for David; he had never quite realised what an incredible achievement it was, or appreciated the immense courage of the astronauts. Now he most certainly does. In fact, it was an exchange of e-mails with Andy after the talk that inspired the theme of this essay.

So if space travel, astronomy and science in general can still inspire awe and wonder in just a few youngsters, perhaps there's still hope after all.

I would like to thank my good friend Andy Taylor for allowing me to use his phrase in the title of this article.

Centenaries for 2010

Barry Hetherington

110 In January a comet appeared to the south-west of Eridanus

310 Ch'en Cho made a map of 1283 stars and 254 constellations.

510 In March a display of the Aurora Borealis was seen from China.

810 On 20 June a total eclipse of the moon was seen from France.

On 30 November an eclipse of the sun was seen from France.

1010 Al-Jorjânî died, wrote a compendium of the *Almagest*.

1110 An eclipse of the moon was seen on 5 May.

A comet appeared in June around Cassiopeia and Draco, observed from Asia and Europe.

1210 A synod held in Paris decreed that 'the books of Aristotle on natural philosophy must not be read either publicly nor in private'.

1310 Isaac Argyrus born, wrote a treatise on the astrolabe.

1410 An astronomical clock by Mikulas of Kadan installed in the Town Hall of Prague.

1610 William Crabtree born; studied astronomy; observed the transit of Venus on 24 November 1639.

Georg Markgraf born; a Saxon astronomer; built an observatory in Brazil where he observed with a quadrant, sextant, and a telescope.

Matteo Ricci died; a Jesuit missionary; Court Astronomer at Peking; described an 11-sphere universe.

Three satellites of Jupiter observed by Galileo on 7 January; the fourth on 13 January

Telescopes made in London in February.

Sidereus Nuncius by Galileo published in March, the first scientific treatise based on observations made through the telescope.

The phases of Venus observed by Galileo in May.

The strange aspect of Saturn observed by Galileo in July.

Sunspots observed by Galileo in July.

Thomas Harriott commenced a series of observations of the satellites of Jupiter on 17 October.

The phases of Mars discovered by Galileo in December.

Thomas Harriott began observing sunspots on 8 December.

M42, the Great Nebula in Orion, discovered by Nicholas-Claude Fabri de Peiresc.

Narratio de observatis a se quatuor Jovis Satellibus erronibus by Johannes Kepler, containing the results of his observations of Jupiter's satellites.

William Lower suggested that some comets move in very eccentric ellipses.

1710 Jacob Cocleo died; a French Jesuit priest; discovered a comet in 1695.

George Costard born; an English clergyman; wrote *History of Astronomy*, 1767.

Stephen Charles Triboudet Demainbray born; Superintendent of the Royal Observatory, Kew; arranged for king George III to view the 1769 transit of Venus.

Peter Elvius born in Upsala; a scientific Swedish traveller; founded the Stockholm Observatory.

James Ferguson born; wrote and designed the *Astronomical Rotula*, a scheme for showing the motions and places of the sun and moon in the ecliptic.

George Gargrave born; wrote on the transits of Venus of 1761 and 1769.

Gottfried Kirch died; a German astronomer and mathematician; appointed astronomer royal in Berlin; observed variable stars; discovered a large comet in 1680.

Ole Römer died; a Danish astronomer; the first to measure the speed of light based on his observations of Jupiter's satellites

Henry Sheeres died; military engineer; wrote *Essay on Certainty and Causes of the Earth's Motion*, 1698.

James Short born; optician and telescope maker; observed the transit of Mercury of 1753 and the transit of Venus of 1761.

A transit of Mercury on 6 November of which there are no recorded observations.

Joseph Nicolas Delisle set up an observatory in the dome of the Palais de Luxembourg.

John Keill appointed Savilian professor of astronomy at Oxford.

1810 Antoine Thompson D'Abbadie born; a French geographer and geodesist; observed solar eclipses; in 1882 he was sent to Haiti to observe the transit of Venus.

William Bayly died; assistant at the Royal Observatory; sent by the Royal Society to observe the transit of Venus from North Cape in 1769.

Thomas Hornsby died; the first Radcliffe Observer; observed the transits of Venus in 1761 and 1769.

John Dillwyn Llewellyn born; an amateur astronomer; built an observatory on his estate at Pen-lle'r-gaer, near Swansea.

Daniel Melander died; a Swedish mathematician and astronomer; studied planetary atmospheres, and the motions in the solar system and the lunar orbit.

Marcin Odlianicki-Poczobut died; director of the Vilnius Observatory; made observations of the positions of asteroids, planets and comets, and lunar and solar eclipses.

George Sabler born; director of the Vilnius Observatory; undertook astrophysical methods of research.

Simon Sinas born; a Greek entrepreneur and patron of astronomers; made donations to the Athens Observatory.

A comet discovered by Jean Louis Pons on 22 August, visible six weeks.

R Aquarii discovered variable by Karl Ludwig Harding.

Königsberg Observatory founded; Friedrich Wilhelm Bessel appointed Director; the observatory was completed in 1813.

A 1653lb meteorite fell at Santa Rosa, New Grenada.

1910 Subrahmanyan Chandrasekhar born; an astrophysicist who worked at the University of Chicago; studied the structure and evolution of stars; studied white dwarfs and the theory of Black Holes.

Auguste Charlois died; worked at the Nice Observatory; discovered 99 asteroids.

Val Axel Firsoff born; studied the solar system.

Hisao Fukushima born; a Japanese dentist and amateur astronomer; studied the history of astronomy.

Johann Gottfried Galle died; a German astronomer; Director of the Breslau Observatory; discovered the planet Neptune in 1846.

Henry Lee Giclas born; staff member of the Lowell Observatory; worked on asteroid positions and stellar proper motions.

John Ellard Gore died; an Irish astronomer; made stellar observations; wrote *The Visible Universe*.

Louis George Henyey born; an American astrophysicist; studied reflection nebulae; a pioneer in the calculation of stellar interiors and stellar evolution.

William Huggins died; an English astronomer; a pioneer in astronomical spectroscopy.

Luigi Giuseppe Jacchia born; worked at the Harvard College Observatory and the Smithsonian Astrophysical Observatory; studied meteors and the motions of artificial satellites.

Petr Grigor'evich Kulikovskij born; a stellar astronomer and an authority on the history of astronomy.

Harold Lane born; an American astronomer; taught astronomy; studied flare and other variable stars.

Walter Pennell born; an English astronomer; made a photographic survey of the whole celestial sphere.

Lukas Plaut born; a German-born Dutch astronomer; worked at the Leiden Observatory; worked at the Kapteyn Laboratory in Groningen; studied RR Lyrae variables.

Wilhelm Prinz died; a German selenologist; undertook comparative studies of the lunar and terrestrial surfaces.

Guntram Schrutka von Rechtenstamm born; an Austrian astronomer and astronomical computer; the first astronomer to derive the shape of an asteroid, (433) Eros.

Nikolaus B. Richter born; first Director of the Tautenburg Observatory; studied meteorites, interplanetary matter and compact galaxies.

Giovanni Virginio Schiaparelli died; discovered the connection between comets and meteor streams; observed and drew Mars; discovered the "canali" on Mars.

Max Schürer born; Director of the Astronomical Institute of Berne University; studied the orbits of the asteroids, stellar dynamics, and satellite geodesy.

M. Ya. Shmakova born; an astronomical computer; worked at the Institute for Theoretical Astronomy, Leningrad.

Richard Hugh Stoy born; an English astronomer; studied planetary nebulae at the Lick observatory; undertook photographic photometry at the Cape of Good Hope observatory.

Thorvald Nicolai Thiele died; a Danish astronomer; Director of the Copenhagen Observatory; worked on celestial mechanics; studied double stars and their orbits.

Ivan Leslie Thomsen born; a New Zealand astronomer; Director of the Carter Observatory, Wellington.

Carlos Guillermo Torres born; worked at the Córdoba Observatory; observed asteroids and comets.

Hans Vehrenberg born; an amateur astronomer and publisher of star atlases.

Carl Alvar Wirtanen born; an American astronomer; contributed to the work of the Lick Observatory for 33 years; discovered several comets and asteroids.

Nova OY Aræ appeared, magnitude 6.0.

Nova V999 Sagitarii appeared, magnitude 7.5.

Nova DI Lacertæ appeared, magnitude 4.3.

A fall of meteorites on January 22 at Vigarano, Italy.

A white spot observed on Saturn by Phillips.

Frank Dyson appointed ninth Astronomer Royal at the Greenwich Observatory.

Norton's Star Atlas first published by Arthur Philip Norton.

A 77-inch map of the moon published by Walter Goodacre.

Answers to November's quiz

Last month I quoted some definitions from the glossary of a standard reference book [it was Norton's Star Atlas, 2000.0 *edition] and asked what terms were being defined.*

Q1. Any star on the main sequence of the Hertzsprung–Russell diagram.

A1. Dwarf star. The Sun is a dwarf star, but many such stars are actually larger than the Sun. The term is also applied to white dwarfs*, which are not on the main sequence.*

Q2. The centre of mass, or balance point, of a pair of bodies such as a double star or a moon and planet, around which the bodies orbit.

A2. Barycentre.

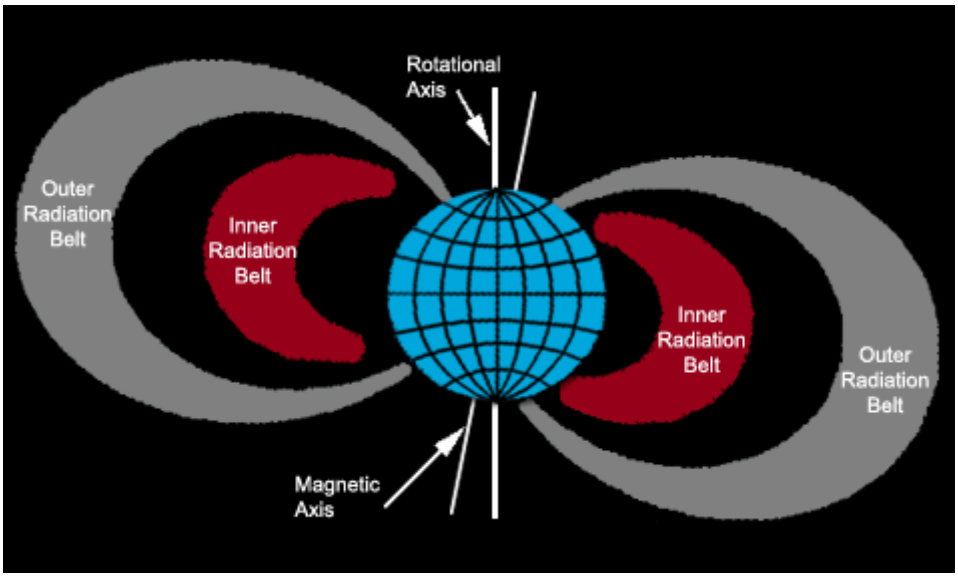
Q3. The dividing line between the illuminated and dark portions of a planet or satellite, particularly the Moon.

A3. Terminator.

Q4. The occasion on which a star or planet first appears in the dawn sky, after having been too close to the Sun to be visible.

A4. Heliacal rising.

Q5. Two doughnut-shaped zones of atomic particles around the Earth.



A5. Van Allen belts. They consist of electrons and protons trapped inside the Earth's magnetosphere. [Image: NASA]

Q6. In astronomy, either a difference between two values or a correction.

A6. Equation – as for instance in the equation of time *(difference between mean and apparent solar time) or a* personal equation *(correction for personal error when measuring or timing something).*

Q7. The period of 19 calendar years (6939.6 days) after which the Moon's phases recur on the

same day of the year.

A7. Metonic cycle. There are 235 lunations in a Metonic cycle.

Q8. The splitting of spectral lines into two or more parts by a magnetic field.

A8. Zeeman effect.

Q9. The dimming of starlight by dust in space or by the Earth's atmosphere.

A9. Extinction. Extinction is greater for blue light than it is for red, causing a reddening of starlight. Atmospheric extinction is least at the zenith, where it amounts to a few tenths of a magnitude under clear skies, and increases towards the horizon.

Q10. A band of young, brilliant stars at an angle of between 15° and 20° to the plane of our Galaxy, stretching around the sky from Perseus, Taurus and Orion, via Carina, to Centaurus and Scorpio. [It] is believed to be a spur on the local spiral arm of our Galaxy.

A10. Gould's Belt.

Quiz questions for December

Here are some sentences or phrases ripped from an edition of the BAA Journal *from earlier this year. What are they talking about, or what are the words that should replace the question marks?*

Q1. "Cycle 24 has been reluctant to show its hand."

Q2. "He is now the leading discoverer of supernovae worldwide (including all individuals, whether professional or amateur, who have personally searched for those objects but excluding those discovered by automatic surveys)."

Q3. "It was discovered by Anthony Wesley, on a freezing winter's night at his home in the mountains of New South Wales."

Q4. "Having been laid down over numerous returns of 1P/Halley, the *?* stream is quite spread out."

Q5. "*?* (1835–1910) was the leading observer of Mars of the late nineteenth century."

Q6. "Prof. Tom Ray … spoke on 'Hubble's successor: the *? ? ?* Telescope'."

Q7. "The session saw the celebration of the 400th anniversary of the invention of the *?*."

Q8. "*?* came to fame when it was the first [star] to have a planet detected around it in 1995."

Q9. "The prolonged period of solar inactivity has resulted in an almost complete absence of the *?* from British skies …"

Q10. "During this session Bob Marriot stood down as Double Star Adviser and was replaced by *? ? ?*."

Answers in next month's issue

There are a lot more astronomical quiz questions in this month's issue of

Sky at Night Magazine*, in addition to a prize-competition crossword.*