

## August 2011

### Events list

Sun 06 Aug: Solar Observing at Cygnus Observatory, 2-4pm  
 Sat 13 Aug: Full Moon; Perseid meteor shower peaks  
 Mon 29 Aug: New Moon  
 Sat 03 Sept: **Starbeque** at Derwent Reservoir -  
 The now traditional start to the new observing season.  
 Sun 18 Sept: **Lecture evening** – with Chairman Graham Darke  
 Fri 23/Sat 24 Sept: Deep sky observing opportunity  
 Tue 27 Sept: New Moon

Sat 01 Oct: SAS event at Killhope Mining Centre, Weardale  
 Tues 04 Oct: Age Action NE visit to Cygnus observatory  
 Sun 16 Oct: Lecture evening – Speaker: Simon Waim  
 Sat 22 Oct: Nightwatch at Kielder Castle  
 Wed 26 – Sun 31 Oct: Kielder Star Camp  
 Sun 20 Nov: Annual General Meeting

All Society events are free, are held in the Washington WWT facilities, and evening meetings start at 7:00pm unless otherwise noted. Please bring a torch and warm clothing to any night-time observing sessions. All observing sessions are dependent upon favourable weather and may be subject to cancellation.

**Editorial address:** Dave Newton, New Hartley Astrophysical Facility, 13 Alston Road, New Hartley, Whitley Bay, NE25 0ST  
 Tel: 0191 237 0355 / 07823 332 347

## Editorial

The school holidays have only just begun, but it feels as though the summer is almost over and we're heading rapidly for the new observing season. I'm sure that's not really the case but no doubt the warm days of Summer will seem to pass very quickly. The Society holds its last solar observing session in August and then the Starbeque opens the new observing season on the 3<sup>rd</sup> September. Fingers crossed some warm clear weather holds for these two events.

October looks like it's going to be a busy month for the SAS and Graham Darke outlines some of these events on page two. The Kielder Star Camp, which is the largest observing event in our regional calendar, closes out the month of October. As well as the usual Autumn sights, we have some comets heading through the skies in the next few months, including Comet Elenin (C/2010 X1) and Comet Garrard (C/2009 P1). Comets are some of the most unpredictable objects in the night sky and they may exceed all expectations – or they could fail dismally to reach their expected brightnesses. Whatever their brightness, they are always interesting to observe and a good exercise in star hopping and navigating with a star chart to track them down. As these two comets in particular come closer and brighter, I will aim to put more details and finder charts in future issues of the newsletter.

I'm pleased to welcome back Jack Newton to the pages of this newsletter, our SAS Southern hemisphere correspondent. Many of you know Jack and are aware that he now lives in Christchurch, New Zealand. While we have all seen the images of devastation from the earthquakes there earlier this year, the quakes have also had a particular effect on the city's astronomical heritage and facilities. Many thanks to Jack for his report. – Ed.

### In this issue:

- **The Darke Side**
- **NASA's SpacePlace**
- **Secretary's report**
- **New Zealand update**
- **News: Pluto's moons, Blue stragglers, weird supernovae and more "current" news**

[www.sunderlandastro.com](http://www.sunderlandastro.com)

Registered Charity #1071527

Graham Darke (Chairman) 0191 416 2625  
 Lynn Henderson (Secretary) 0191 426 1708  
 Dave Newton (Publications) 0191 237 0355

[chairman@sunderlandastro.com](mailto:chairman@sunderlandastro.com)  
[secretary@sunderlandastro.com](mailto:secretary@sunderlandastro.com)  
[double.cluster@tesco.net](http://double.cluster@tesco.net)



*There's more to astronomy than playing with Photoshop*

# THE DARKE SIDE

*Society Update* with Chairman  
Graham Darke

## Summer Roundup

We've held several successful events over the Summer, including solar observing at the WWT and at Cobalt Business Park. We also attended and exhibited at an astronomy exhibition at the Centre for Life on Friday 9<sup>th</sup> July. A handful of members also made it along to the Thomas Wright exhibition at Durham in June.



**Above:** Solar observing at Cobalt  
**Below:** SAS members making an exhibition of themselves at the Centre for Life



I hope that you are all having a pleasant Summer and have managed to make it along to some of the Society's events during the close season. As we head towards Autumn and the resumption of full activities again, we have a number of forthcoming events:

## Starbeque

First up is our traditional starbeque at Derwent reservoir on Saturday 3<sup>rd</sup> September. From 6.00pm join your fellow members for grub and observing. This event has become a firm favourite with friends and family too who are, of course, always welcome to come along. We're also extending an invitation to the other local societies to come and join us too. Millshield picnic site, Derwent from 6.00pm onwards, bring your barbeques, food and scopes.

## Killhope Public Event

On Saturday 1<sup>st</sup> October, the Society is hosting an event for the public at Killhope Mining Centre in Weardale. All members are invited to come along with their scopes and lend a hand. The site should be pretty dark so some good observing is promised. Further details to follow.

## Age Action North East Visit to Cygnus Observatory – Tuesday 4<sup>th</sup> October

We have a group of around 50 members of Age Action North East visiting on the above date. We could do with as many of our members and their scopes as possible along for this evening which starts at 6.30pm.

## Kielder Nightwatch – Saturday 22<sup>nd</sup> October

We have the next nightwatch event in conjunction with the Forestry Commission at Kielder Castle on the above date. These are usually popular events so put it in your diary now. (This is the weekend before the Starcamp)

## Kielder Star Camp

Wednesday 26<sup>th</sup> October sees the start of the Kielder Autumn Star Camp organised by our friends at the Kielder Observatory AS. Booking via the starcamp webpage at [www.richarddarn.demon.co.uk/starcamp](http://www.richarddarn.demon.co.uk/starcamp)

## Stay up to date

Keep up to date with all society developments on the website [www.sunderlandastro.com](http://www.sunderlandastro.com) and why not sign up for the news group.

*Graham*

## Milky Way Safari

By Dauna Coulter & Dr. Tony Phillips

Safari, anyone? Citizen scientists are invited to join a hunt through the galaxy. As a volunteer for Zooniverse's Milky Way Project, you'll track down exotic creatures like mysterious gas bubbles, twisted green knots of dust and gas, and the notorious "red fuzzies."

"The project began about four months ago," says astrophysicist Robert Simpson of Oxford University. "Already, more than 18,000 people are scouting the Milky Way for these quarry."

The volunteers have been scrutinizing infrared images of the Milky Way's inner regions gathered by NASA's Spitzer Space Telescope. Spitzer's high resolution in infrared helps it pierce the cloaking haze of interstellar gas and dust, revealing strange and beautiful structures invisible to conventional telescopes. The Milky Way Project is helping astronomers catalogue these intriguing features, map our galaxy, and plan future research.

"Participants use drawing tools to flag the objects," explains Simpson. "So far they've made over a million drawings and classified over 300,000 images."

Scientists are especially interested in bubble-like objects believed to represent areas of active star formation. "Every bubble signifies hundreds to thousands of young, hot stars. Our volunteers have circled almost 300,000 bubble candidates, and counting," he says.

Humans are better at this than computers. Computer searches turn up only the objects precisely defined in a program, missing the ones that don't fit a specified mold. A computer would, for example, overlook partial bubbles and those that are skewed into unusual shapes.

"People are more flexible. They tend to pick out patterns computers don't pick up and find things that just look interesting. They're less precise, but very complementary to computer searches, making it less likely we'll miss structures that deserve a closer look. And just the sheer numbers of eyes on the prize mean more comprehensive coverage."

Along the way the project scientists distill the volunteers' data to eliminate repetitive finds (such as different people spotting the same bubbles) and other distortions.

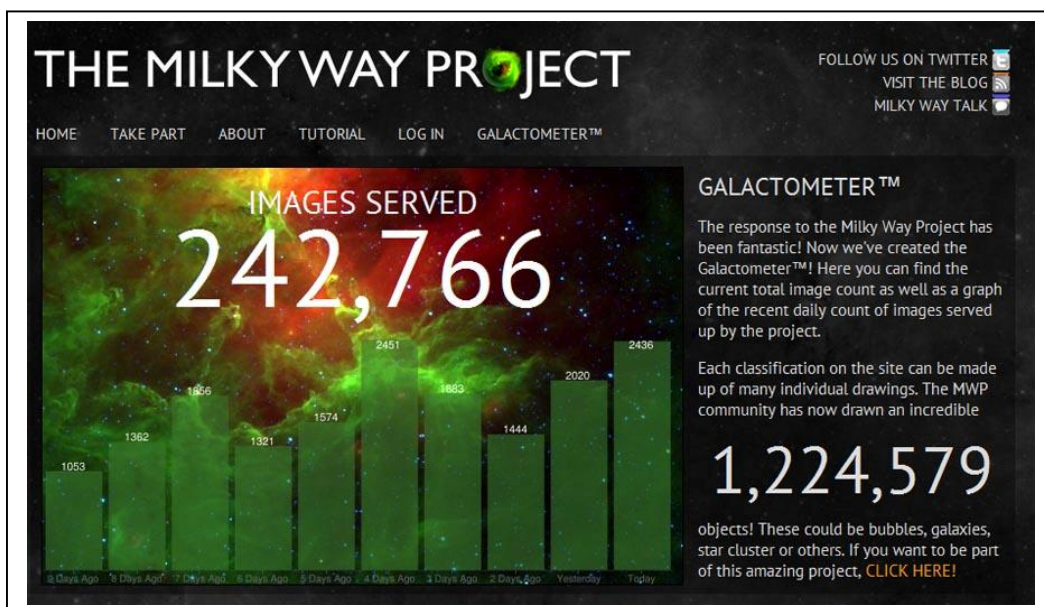
The project's main site (<http://www.milkywayproject.org>) includes links to a blog and a site called Milky Way Talk. Here "hunters" can

post comments, chat about images they've found, tag the ones they consider especially intriguing, vote for their favorite images (see the winners at <http://talk.milkywayproject.org/collections/CMWS00002u>), and more.

Zooniverse invites public participation in science missions both to garner interest in science and to help scientists achieve their goals. More than 400,000 volunteers are involved in their projects at the moment. If you want to help with the Milky Way Project, visit the site, take the tutorial, and ... happy hunting!

You can get a preview some of the bubbles at Spitzer's own web site, <http://www.spitzer.caltech.edu/>. Kids will enjoy looking for bubbles in space pictures while playing the Spitzer concentration game at <http://spaceplace.nasa.gov/spitzer-concentration/>.

*This article was provided courtesy of the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*



**Left:** Volunteers study infrared images of our galaxy from the Spitzer Space Telescope, identifying interesting features using the special tools of the Milky Way Project, part of the Citizen Science Alliance Zooniverse web site.

## SAS Yahoo Forum

The Society's Yahoo group provides a forum for members to exchange ideas, ask questions, and a place to post their pics:

<http://tech.groups.yahoo.com/group/SunderlandAstronomicalSociety/>

## Secretary's Report

### A summary of the Committee Meeting held on 10/04/2011.

**Attendees:** Kevin Baxter (KB), Graham Darke (GD), Lynn Henderson (LH), David Hughes (DH), Ken Kirvan (KK), Paul Meade (PM), Peter Stokel (PS), Michael Tweedy (MT)

**Apologies:** Tom Crann (TC)

### Items discussed - Completed Actions:

**KB** After discussions with Richard Darn it was decided that there is still a place to run the Kielder Castle Nightwatch events. Therefore these will continue to be part of the Society's calendar of events.

**LH** discussed with Richard Darn holding an "Astro-boot" type stall at the Kielder Autumn Star Camp. Although in principle it was agreed this was a good idea, the location and time suggested (on the campsite on the Saturday of the main event) wasn't considered suitable as it was felt this would take something away from the speakers and vendors at the castle.

### Visits and Events:

- **Joint Societies Event on 2<sup>nd</sup> April.** This was a very well attended success with members from all local societies in attendance. It was suggested that we should run this as an annual event.
- **Joint Event with WWT.** The first joint event with WWT was for St Nicholas Brownies and was another very successful event.
- WWT has asked if we will do more of these and it was agreed that we would do one per month between October and March, instead of organizing our own visits by local youth groups. If we receive any direct enquiries from Scouts, Guides, Brownies, Cubs etc. we would direct them to WWT and hold the event through them. **GD** to contact Joanne Newbury at WWT to confirm.
- **PM** did the talk for the recent visit of Dinnington Brownies and also gave a talk to 180 children from a primary school in North Shields.

Monday 22 August: Watergate Forest, Lobley Hill Bat Watch & Nightwatch joint event 7:30 – 10:30

22 October: Kielder Castle Night Watch (this will be the Saturday before StarCamp)

### Observatory Maintenance

- The PVA coating on the observatory hasn't taken and must be peeled off. We need to investigate alternative coatings. **PM** to investigate what coatings might be suitable.
- Jean and Natalie Lowes have volunteered to paint a mural or other suitable decoration to the inside of the dome one it has been prepared.
- The floor of the observatory needs some maintenance. It was agreed that rubber flooring should be purchased for the floor of the observatory. **PM** to organise the purchase of suitable flooring.

**Insurance:** **GD** has received a quote for insurance for the observatory and society equipment. The committee felt that the quote discussed was reasonable and it was agreed to go ahead with this.

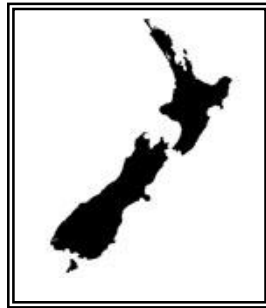
### Also discussed:

**GD** reminded the committee of his intention to stand down as chairman at the next AGM in November. He stressed that he would stay on the committee. He asked the other committee members to consider whether they would be interested in taking on this position.

**DH** has been approached by Ian Wardlaw to ask if we could host a page on our website for South Shields Astronomical Society (SSAS), giving details of their events. It was unanimously agreed to do this. **GD** to discuss ways of working more closely with SSAS rep Ian Wardlaw.

Next committee meeting: To be arranged.

# JACK NEWTON'S DOWN UNDER



flow through and we will one day have another public facility to house a new or restored refractor.



An update from the SAS's Southern Hemisphere correspondent is long overdue! As many of you will be aware I now live in Christchurch, New Zealand which has suffered many large earthquakes, the biggest two being a 7.1 in September 2010 followed by a more devastating 6.3 in February 2011.

There have been over 5,500 aftershocks, about half of which are felt and about 100 which have caused damage.

The city's public observatory, Townsend Observatory, in the centre of town has been destroyed completely as you can see from the photographs. It was badly damaged in September but was repairable, then in February the dome was completely destroyed along with much of the building and the Arts Centre/University building of which it was part. Sadly, the observatory was home to a pristine 6 inch Cooke Refractor built in 1864 with original tracking mechanism. The scope was used to observe the Venus transit in 1882 and the plan was to use it for the next transit in 2012.

Only the pier and some small components have survived and the telescope itself still lies amongst the rubble and ruins. This part of the city will likely be closed for a number of years and the telescope may not be recovered for some time, if ever.



On a positive note, the focus on recovery has been inspiring and has brought the city towards a real sense of togetherness, I am sure this will

I am looking forward to attending the Summer StarBQ at Derwent this August/September as it's been five years since I last attended and saw the great northern skies, and I look forward to seeing you all there. - *Jack Newton*.



## Fourth moon discovered around Pluto

The cosmos loves irony. Five years after Pluto was stripped of its planet status, astronomers have discovered yet another moon in orbit around it, bringing its entourage to four.

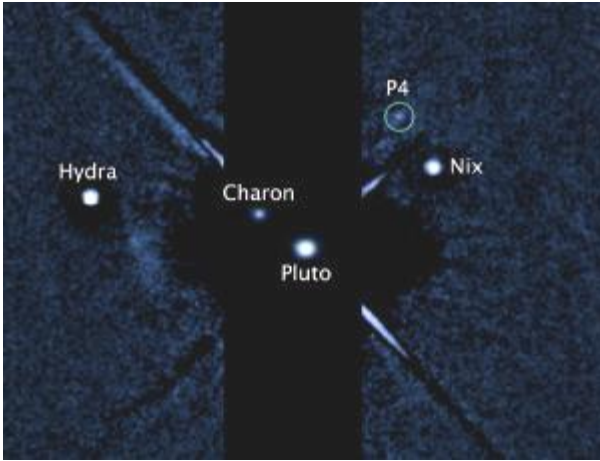
The tiny body may have been born in the same collision that gave birth to Pluto's other moons.

The Hubble Space Telescope spotted the new moon, which has been designated P4 for the time being. Astronomers estimate it is between 13 and 34 kilometres across. "I find it remarkable that Hubble's cameras enabled us to see such a tiny object so clearly from a distance of more than 3 billion miles [5 billion kilometres]," says Mark Showalter of the SETI Institute in Mountain View, California, who led the observing team.

Three other moons of Pluto were already known. Charon, discovered in 1978, is by far the largest at about 1000 kilometres across. Nix and Hydra, discovered in Hubble images in 2005, are tiny by comparison: both are estimated to be between 32 and 113 kilometres in diameter.

All four moons are thought to have formed at the

same time. "The discovery of this moon reinforces the idea that the Pluto system was formed during a massive collision 4.6 billion years ago," says discovery team member Hal Weaver of Johns Hopkins University's Applied Physics Laboratory in Laurel, Maryland.



"A big impact produced Charon, and the remaining three [moons] formed from the debris scattered further out," Showalter said.

Team member Alan Stern of the Southwest Research Institute in Boulder, Colorado, also heads the New Horizons mission that will fly by Pluto in 2015.

He is excited by the discovery but says it reinforces the need to keep scanning the Pluto region for more objects that could pose a hazard to New Horizons.

"We don't want our spacecraft running into any debris that's still hanging around from the massive collision that spawned the formation of Pluto's smaller satellites," he says.

### Universe's highest electric current found

A cosmic jet 2 billion light years away is carrying the highest electric current ever seen: 10 raised to the power of 18 amps, equivalent to a trillion bolts of lightning.

Philipp Kronberg of the University of Toronto in Canada and colleagues measured the alignment of radio waves around a galaxy called 3C303, which has a giant jet of matter shooting from its core. They saw a sudden change in the waves' alignment coinciding with the jet.

"This is an unambiguous signature of a current," says Kronberg. The team thinks magnetic fields from a colossal black hole at the galaxy's core are generating the current, which is powerful enough to light up the jet and drive it through interstellar gases out to a distance of about 150,000 light years.

### Oddball Stars in the Milky Way's Heart

Back in 2006, astronomers used the Hubble Space Telescope to watch vast numbers of stars in the Milky Way's central bulge to look for gravitational

lensing by extrasolar planets. The observations revealed 16 Jupiter-sized planetary candidates and also, as a byproduct, identified 42 oddly bright blue stars within the bulge. Astronomers think that many or most of these are "blue stragglers": old stars that, for reasons uncertain, burn as hot and bright as if they were part of a young stellar population. Bulge stars are supposed to be very old. Blue stragglers have intrigued astronomers since 1953, when Allan Sandage discovered them among the ancient stars of the globular cluster M3. Stars that form at the same time, such as in a cluster, should evolve together. But blue stragglers look rejuvenated — long after their equally massive peers have evolved into red giants or on to white-dwarfhood. In the standard explanation, a blue straggler has acquired a great deal of fresh mass from another star, perhaps by a collision and merger, and as a result is now fusing hydrogen at the fast pace of a younger star. The star merger could be the result of a direct collision or, perhaps more likely, the result of a close miss that results in a close binary that eventually spirals together. Only where stars are stars are much closer together than in our own vicinity is this ever likely to happen.



The galaxy's central bulge is indeed dense toward its centre, as are globular clusters. And in a population of old stars, such young-looking ones stand out. At a press briefing earlier this month at the American Astronomical Society's Boston meeting, Will Clarkson, the Indiana University investigator who led the study, said that only 3.4% of the galactic bulge's stars formed in the last five billion years.

While these reborn stars are commonly seen in globular clusters, this is the first time they've been spotted within the bulge itself. "Every new environment we can find these blue stragglers in is good," said Clarkson. He and other experts believe that these oddballs have much to reveal about the formation and evolution of stars generally.

But Clarkson noted that isolating them in the galactic bulge was tricky. Hubble peered at this distant region through a haze of foreground stars of all ages. The team had to filter these out to get a clean sample of bulge stars. They used the different speeds at which these two star

populations orbit the galactic centre to make this distinction.

"Stars that are closer [to us] seem to orbit faster," said Clarkson. He compared it to looking from Boston at cars driving in Los Angeles. "Cars in a city in Kansas will be in the way. But they will pass by faster against the background of Los Angeles, and you can use this speed to separate the two." In this way the team isolated 12,762 bulge stars. At least 18 to 37 of them are suspected to be blue stragglers. To confirm this, scientists will look for signs of lithium, carbon and oxygen depletion — chemical signatures of mass transfer. Clarkson said that a blue straggler's spin period could also indicate if it evolved from a merged binary pair. Clarkson's team, however, did not use their data to estimate the total number of blue stragglers in the entire galactic bulge. "What we saw is only a pencil beam," Clarkson said: a sample along one narrow line of sight. "We did not want to use this to make a prediction for a larger population of stars." So the bulge's exact makeup is still not known with complete precision.

### **Meet the league of extraordinary supernovae**

Some of the brightest and strangest objects to grace the skies in recent years are members of a new class of supernovae. Just how they are formed remains a mystery, but their brilliance should make it easier to observe their dim host galaxies.

Supernovae come in different varieties. Type Ia blasts, for example, show no hydrogen in their spectra, and occur when the ember of a dead sun sucks in too much material from a companion. Type II explosions, which do have hydrogen, form when the core of a massive star collapses.

Now Robert Quimby of the California Institute of Technology in Pasadena and his colleagues report on six supernovae that do not fit the mould of any known type. These misfits contain oxygen but no hydrogen, and outshine type Ia blasts by a factor of 10. They also stay hot for weeks or months — longer than other supernovae.

"The peak brightness and total amount of energy released is extraordinary," says Quimby. "Change the light bulbs in your house from 100 watt to 1000 watt. Live like that for a month and your electric bill — and tan — will show the difference."

The creation of the new class was prompted by the discovery of four unusual supernovae in 2009 and 2010. "We knew they were weird, but I had the feeling that I had seen this somewhere before," says Quimby. He looked back at the spectra of two objects that had previously stumped astronomers: a supernova that smashed brightness records after it was observed in 2005 and a bizarre object that brightened over a leisurely three months before fading in 2006. "I was utterly ecstatic when I saw the match," he says.

How do the rare blasts arise? One possibility is that they originate in a heavyweight star, weighing up to

130 suns. Such stars undergo violent pulsations late in life, expelling shells of material periodically, like smoke rings, for months or even decades before their cores explode. The hydrogen shell is the first to be sloughed off, so it would be the farthest away by the time the core exploded.

Debris from the explosion would initially slam into shells rich in other elements, such as oxygen, heating them up and causing them to glow. If the hydrogen shell had expanded outwards far enough, it might evade detection, says Stan Woosley, a supernova theorist at the University of California, Santa Cruz.

Another scenario begins with a normal, hydrogen-poor supernova. Instead of leaving behind a typical fast-spinning neutron star in a cloud of expanding debris, as such supernovae normally do, it gives birth to a highly magnetised neutron star called a magnetar. The star's intense magnetic field acts as a brake that slows its spin over a period of months. The energy this liberates heats up the surrounding supernova debris, making it shine. "The magnetar releases a huge amount of energy as it slows down," says Quimby.

Woosley favours the pulsing shell explanation but says both models can explain the objects' intensity and duration: "They're the brightest supernovae in the universe and they stay bright for months instead of weeks."

Both models rely on rare sources — either very massive stars or powerful magnetars, explaining why so few of the new class have been spotted so far. Quimby estimates that in our cosmic neighbourhood there may be 1000 to 10,000 normal supernovae for every superluminous one. "But we can see these to much larger distances," he says.

That could make them useful beacons for studying their surroundings. All of the bright new supernovae have been found in dim dwarf galaxies, which are usually hard to study. "When a superluminous supernova goes off in one, we can use it as a backlight to study the gas in the host galaxy," says Quimby. "That can tell us about how galaxies form and evolve."



**Above:** Supernova remnant N63A



Federation of Astronomical Societies

# Annual Convention and AGM



Institute of Astronomy, Madingley Road, Cambridge

**Saturday 15th October 2011**

## Speakers

Dr. Carolyn Crawford

'The Energetic Universe: X-Ray Astronomy'

Dr. Nick Hewitt

'Active Galactic Nuclei & Their Observation By Amateurs'

Nik Szymanek

'Photographing The Night Sky'

Prof. Albert Zijlstra

'Planetary Nebulae'

Lord Martin Rees

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Doors Open: 9am

Lectures Commence: 10am

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