

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

September 2003

"Observing Star and Planet Formation"

Dr Helen Walker (RAL)

The Night Sky this Month

By Bob Dryden

Mars - Mars continues to dominate the evening sky throughout September and early October. It is still very bright at -2.7 mag in early September, fading to -1.8 mag by mid October. You cannot fail to see it if you look south, low down, after dark. The planet continues to be greater than 20 arc seconds in size for most of this period so surface markings should still be visible (providing there isn't a global dust storm that is).

Uranus and Neptune - Now is the best time to be hunting for these two fainter planets. Both are visible in binoculars, and both are in the evening sky. Uranus is mag +5.7 in Aquarius while +7.8 mag Neptune is in Capricornus. In fact Uranus is not very far from Mars. [Ed. I saw it for the first time ever last Thursday – it shows a tiny greenish disk even through my tiny 2 $\frac{3}{4}$ " refractor. It's just up from Mars and right a bit.]

Most of the action after that is in the morning sky. Fortunately, the nights are getting longer, and so dawn is getting later, making it a bit easier to see the dark morning sky without having to get up too early. As the autumn equinox is on 23rd September (at 10hr 47 min UT to be exact) it even means the nights will be longer than the days soon.

Saturn - for those who have missed Saturn, the good news is it's back from behind the Sun. While you will still need to observe it in the morning sky just before sunrise for the best views (it will be highest then), it is rising earlier and earlier now. By the end of October it will rise before midnight. On 20th September, the Moon will be 3 degrees north of Saturn if you need a guide to find it.

Jupiter - On the other hand, Jupiter is very close to the Sun at the moment but is starting to rise just before it.

Mercury - This period is a very good one for viewing Mercury. It passes between Earth and Sun on 11th September and quickly climbs into the morning sky. It is

a very favourable apparition and the planet will be easily visible, fairly low in the east, for about the last two weeks of September and the first week or so of October. Greatest elongation west (ie: the furthest it gets from the Sun this time) is on 26th September and it will shine at a bright -0.5 mag. On the 24th September, Mercury, Jupiter, and the bright star Regulus will form a diagonal line (with Mercury closest to the horizon), and a thin crescent Moon will be next to Jupiter. Should be well worth getting out of bed for.

Comets and Meteors - There are no bright comets predicted to be on view this period, and there are no good meteor showers either.

Minor Planets - Two asteroids are beginning to make their presence known, but both are in the morning sky at the moment: Ceres is in Gemini at about mag. +8.6, and Pallas is in Cetus at mag. +8.8 in September, brightening to +8.3 by mid October. Both are visible in binoculars, and both will brighten as the year progresses.

Moon Phases:

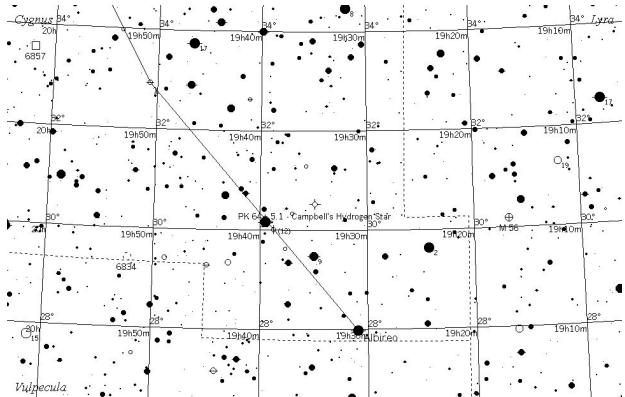
First Qtr: 3rd Sept.; Full: 10th Sept.; Last Qtr: 18th Sept.; New: 26th Sept.; 1st Qtr: 2nd Sept.; Full: 10th Sept.

This month's Deep Sky Object

By Paul Warren

I'll open the new season's DSO section with my experiences of two planetary nebulae in Cygnus.

The first planetary nebula is known as PK64+5.1, not too far from that most glorious of double stars Albireo. It is also sometimes known as Campbell's Hydrogen Star.



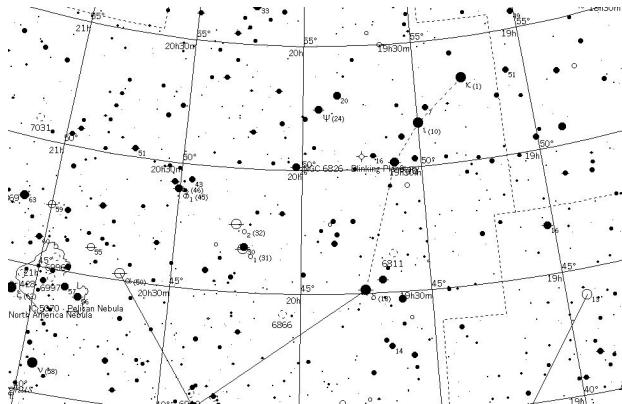
To date, I have not succeeded in observing this planetary. There are several reasons for this:

- ? At magnitude 11.3 it doesn't jump out at you.
- ? It is listed as being 8 arc seconds in size (very small).
- ? The Milky Way provides a very rich backdrop.

To find this planetary, high magnification is required and careful inspection of the field of view. Also, this planetary has an orange hue to it, so look out for an orange star and then increase the magnification to see the faint enveloping haze.

Despite not having found it yet, I did spend quite a long time just staring at the rich star field here. It's well worth the view and more than makes up for not having found my original quarry! I suppose that, in a way, this is the nearest we can get to resolving a galaxy. The star field just blends into a hazy background of unresolved stars, but just look at the sheer number of resolved stars – it's absolutely gob-smacking!

The second planetary is NGC 6826, more usually known as "The Blinking Planetary". This is a very bright planetary at magnitude 8.8 with a very bright central star (magnitude 10.6). The trick with this planetary is to stare at the central star, and after a while the nebula part of it fades. Then glance away from it and the nebula part of it reappears again, giving rise to a blinking affect.



North-west Iceland - Another Eclipse Report

By Andrew Ramsey

As you many of are aware, there was an annular eclipse visible from northern Scotland on 31st May this year. Paul Warren has already told you about his wonderful sunrise over the sea near Whitby in North Yorkshire. Together with another cycling friend, we decided, mad as we are to take our bikes to Iceland and to try to see the complete annular eclipse from there.

To be honest, the eclipse was really just an excuse to visit that wonderful country again. I first went in 1986 and wondered during my next visit in 2000 why it had taken me so long to return. I vowed to come back sooner next time.

So during the last week of May, we flew to Keflavik, took the bus, via a stopover in Reykjavik, to Skykkisholmur in the west of Iceland, where we caught the ferry across the wide Breidafjordur to the west fiords (that's the frilly bit in the top left if you don't know Iceland that well).

From there it was a three day cycle over 1700-foot passes on rough roads, dodging rain and wind, and climbing a road abandoned 7 years ago up to 1900' to avoid a 6km three-mouthed Y-shaped tunnel (single-track with passing places) – on a bike – no way! – to Isafjordur, a small fishing town in the far north-west.

From there we were to take a bus around over a 100 miles of fiord coastline to a place where we would get a clear north-easterly horizon – as the Sun was to be only 3 degrees above the horizon. In Isafjordur we were told that the first bus of the year didn't run until 1st June – the day after the eclipse! What were we to do – we were stranded there.

We headed further north-west to the little town of Bolungarvik, where, at 3 o'clock in the morning we climbed a 1800-foot mountain to see the eclipse. This was to ensure that the land across the wide fiord was low enough not to obscure the Sun.

South-west of us a large cloud bank covered most of the rest of Iceland. Only the very north-west tip we were on was clear.

The Sun passed into the vapour trail of aircraft which had passed over in the night, which was just the right thickness to allow us to view the eclipse by eye, without the need for filters. This meant, that like Paul, we could view the whole event in full colour.



Annularity from Bolungarvik – 4:13am : f8, 1000mm, 1/250th sec.

Annularity lasted just over three minutes, and as it finished, you could see the backwards-C-shaped Sun slowly opening up visibly. We deemed it a success – which after two failures of total eclipse chasing in the last two years was very welcome.

NASA's Space Place

Careful Planning and Quick Improvisation Succeed in Space Biz

By Tony Phillips

On December 18, 2001, ground controllers at JPL commanded NASA's Deep Space 1 (DS1) spacecraft to go to sleep. "It was a bittersweet moment," recalls Marc Rayman, the DS1 project manager. Everyone was exhausted, including Deep Space 1, which for three years had taken Rayman and his team on the ride of their lives.

DS1 blasted off atop a Delta rocket in 1998. Most spacecraft are built from tried-and-true technology—otherwise mission controllers won't let them off the ground. But Deep Space 1 was different. Its mission was to test 12 advanced technologies. Among them: an experimental ion engine, a solar array that focused sunlight for extra power, and an autopilot with artificial intelligence. "There was a good chance DS1 wouldn't work at all; there were so many untried systems," recalls Rayman.

Nevertheless, all 12 technologies worked; the mission was a big success. Indeed, DS1 worked so well that in 1999 NASA approved an extended mission, which Rayman and colleagues had dreamed up long before DS1 left Earth—a visit to a comet. "We were thrilled," says Rayman.

And that's when disaster struck. DS1's orientation system failed. The spacecraft couldn't navigate!

What do you do when a spacecraft breaks and it is 200 million miles away? "Improvise," says Rayman.

Ironically, the device that broke, the 'Star Tracker,' was old technology. The DS1 team decided to use one of the 12 experimental devices—a miniature camera called MICAS—as a substitute. With Comet Borrelly receding fast, they reprogrammed the spacecraft and taught it to use MICAS for navigation, finishing barely in time to catch the comet. "It was a very close shave."

In September 2001, DS1 swooped past the furiously evaporating nucleus of Comet Borrelly. "We thought the spacecraft might be pulverized," Rayman recalls, but once again DS1 defied the odds. It captured the best-ever view of a comet's heart and emerged intact.

By that time, DS1 had been operating three times longer than planned, and it had nearly exhausted its supply of thruster-gas used to keep solar arrays pointed toward the

Sun. Controllers had no choice but to deactivate the spacecraft, which remains in orbit between Earth and Mars.

Rayman has moved on to a new project—Dawn, an ion-propelled spacecraft that will visit two enormous asteroids, Ceres and Vesta, in 2010 and 2014. "Dawn is based on technologies that DS1 pioneered," he says.

Even asleep, DS1 continues to amaze.

Find out more about DS1 at <http://nmp.jpl.nasa.gov/ds1>. For kids, go to <http://spaceplace.nasa.gov/ds1dots.htm> to do an interactive dot-to-dot drawing of Deep Space 1.



This was the final image of the nucleus of comet Borrelly, taken just 160 seconds before Deep Space 1's closest approach to it.

This image shows the 8-km (5-mile) long nucleus from about 3417 kilometers (over 2,000 miles) away.

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

NATIONAL ASTRONOMY WEEK

To mark National Astronomy Week the Society held a stand in Abingdon Market Place on Saturday 30th August. The subject, of course, was Mars's close approach to Earth. The main purpose of the stand was to publicise the society and our Open Evening event on 3rd September in Sunningwell Village Hall.

The stand was very popular, especially the two telescopes (with safe solar filters fitted) we had set up to look at sunspots. At times people were queuing to look through the telescopes.

At the Open Evening in Sunningwell we filled the village hall and even had to turn people away, such was the interest. We showed a presentation produced by the Society For Popular

Astronomy all about Mars. Afterwards Bob explained why this approach was closer than normal oppositions. The last time Mars was nearly this close was in 1926, however, it has not been quite this close for almost 60,000 years.



Bob explains the formation of sunspots at the stall

After the lecture, right on cue, the sky cleared and Mars appeared above the trees behind the church. Telescopes were available in the hall's garden through which to view both Mars and the Moon. Although Mars's low altitude was causing it to wobble quite a bit, some surface features were visible as well as Mars's polar cap.



A queue forms to look at the Sun

NOTICES

FAS Convention is on 20th September at Institute of Astronomy, Cambridge. A day of talks and trade stands. Tickets are £7 on the door and £6 in advance. Further details at www.fedastro.org.uk

FURTHER DISCUSSION

The society's e-mailing list is used by members to comment on all things astronomical, as well as other related and not-so-related subjects. The list is also used to publicise "first-clear-night" observing evenings and for alerting members to hot observing news.

To subscribe: send an email to abiastro-subscribe@topica.com. You will then receive all e-mails sent to the list. To post e-mails on the list: send an email to abiastro@topica.com. To unsubscribe: send an email to abiastro-unsubscribe@topica.com

DATES FOR YOUR DIARY

15th Sept.: 8pm. Beginners' Meeting in the Perry Room.

22nd to 24th Sept. (FCN): 8pm. Observing Evening, Abbey Meadow, Abingdon. Another chance to view Mars.

6th Oct.: 8pm. Beginners' Meeting in the Perry Room.

13th Oct.: 8pm. Talk by Dr Mark Hurn (Institute of Astronomy, Cambridge) "The Story of Star Names"

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your help and contributions. Please send any news, observations, photos, etc. to:

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FINDER CHARTS

Mars, Uranus and Neptune next Saturday at 10pm (BST):

