

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

11th December 2006

Guy Hurst

(Editor, 'The Astronomer') –

'Guest Stars: Ancient and Modern'

On 30th November I was at a conference in Athens finally revealing the secrets of the Antikythera Mechanism, a remarkable geared device thought to have been made in about 200BC to predict the positions of the planets.

On Sunday and Monday mornings this week there was a close conjunction of Mercury, Mars and Jupiter. It was very near to the horizon, so was not so impressive. On 17th June 2BC, Jupiter and Venus were in conjunction too. At their closest, at 9.25pm, they appeared, as seen from east of Jerusalem, less than 30 arc seconds apart (see page 3), so close that they would have shone as one planet. This must have appeared as a brilliant 'star' in the west that night.

Had the three wise men who saw it had the Antikythera Mechanism to hand, they would have dialled in the date, seen that it was Venus and Jupiter and stayed at home.

Merry Christmas to you all!

THE NIGHT SKY THIS MONTH

by Bob Dryden

We are now approaching the winter solstice which occurs on 22nd December at 00.22 UT. This is the time when the Sun reaches its most southerly point, in Sagittarius, and the nights then begin to get shorter. Although we might not believe it here in the UK, the Earth is actually the closest it gets to the Sun on 3rd January when we are a mere 147 million kilometres apart. At the furthest, in July, Earth is an additional 5 million kilometres away.

Mercury: Mercury is getting very difficult to see now, very low in the morning sky. It is getting brighter though and by mid December it will be -0.7 mag so it is still worth trying to see the planet before it goes behind the Sun on 7th January. You will have to look low in the south-east as Mercury will be crossing Scorpius.

Venus: On view in the evening sky, Venus is still rather difficult to see despite it being a very bright -3.8 magnitude. It remains very low, crossing Sagittarius and Capricornus, so you will have to start looking straight after sunset. Very slowly, things will improve and by mid January Venus is about 10 degrees high at sunset. It will be very much easier to see by early spring.

Saturn: Saturn is slowly returning to the evening sky now and by mid January rises by about 21.00 UT. You need to let it rise high enough so it is above the horizon murk before trying to see anything in your telescope though. At magnitude +0.3 it is not too hard to see, and just a few degrees away is the bright star Regulus so you have two bright objects in the same area of sky. The rings have closed further now but are still easy to see in a small telescope.

Uranus and Neptune: Both these planets are on view in the early evening but Neptune will be increasingly difficult to find as the approaching twilight engulfs it after Christmas. Uranus is in Aquarius and is a little higher. It is close to the bright star Lambda Aquarius so is not that hard to find in binoculars.

Jupiter and Mars: This pair are only visible just before dawn and remain low so the telescopic views will not be very good yet.

Meteors:

There are two major showers and one minor shower worth mentioning this session.

The best shower will be the **Geminids**. Active from 7th to 14th December, these meteors are often bright and long. Additionally, this is the one major shower when it is possible to see quite a few of them before midnight. The night of maximum is the evening of the 13th / morning of 14th when, under perfect conditions, you could hope to see about 100 meteors an hour. In reality, you will probably see half that, but that is still a good number of meteors an hour. This year it is probably best to watch for Geminids before midnight anyway as the waning Moon rises at about 01.00 UT to spoil the view somewhat.

The other major shower to mention is the **Quadrantids** which are active from 1st to 6th January.

Maximum is 3rd, but that is also the night of Full Moon so you can forget about seeing any Quadrantid meteors this year.

If you get fed up with Christmas and fancy some time away from the family, why not step outside and look for a few Ursid meteors? The shower is not very active, only about 10 meteors an hour, but not very many people make any observations of it. Being active from 17th to 25th December doesn't help as that is right across the Christmas period, but maximum is on the 22nd, so a bit of meteor watching might be just the antidote for Christmas you need.

LAST MONTH'S TALK

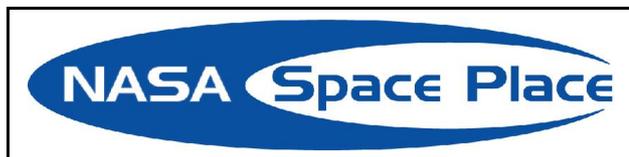
November's talk was the Stan Cocking Memorial lecture, given by Dr Allan Chapman. The subject of the talk was Sir Robert Ball (1840-1915), who sounds like a precursor to the popularisers of astronomy we have today – like Allan himself, and Sir Patrick, of course.

He was a brilliant scholar (first class maths at Dublin) then worked with Lord Rosse (of the 60" at Birr Castle fame) and became professor of astronomy at 33, but was best known for bringing the excitement of astronomy to the intelligent lay Victorians. His *The Story of the Heavens* (1885) was the first ever really popular astronomy book for the public.

Sir Robert spent his final 23 years as Lowndean Professor of Astronomy and Geometry, as successor to John Couch Adams, one of the people who calculated the orbit of Neptune. Allan's photograph of Sir Robert speaks volumes about the man – he looks a bit like a cross between Allan and Sir Patrick. He also spent a lot of time on the lecture circuit, and if he was half as good as Allan then we can understand why he made such an impression on the Victorian public.

MOON PHASES:

Full: 5th Nov.; Last Qtr: 12th Nov.; New: 20th Nov.; First Qtr: 28th Nov.; Full: 5th Dec.

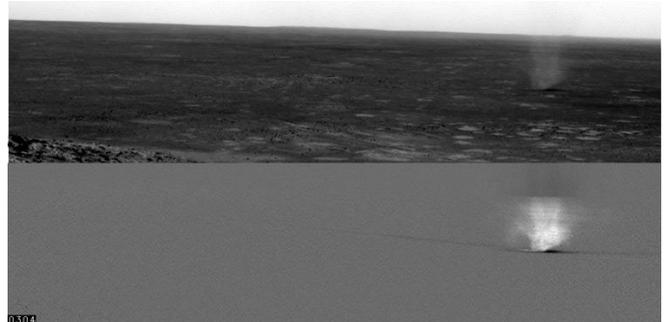


MARTIAN DEVILS

by Dr Tony Phillips

Admit it. Whenever you see a new picture of Mars beamed back by Spirit or Opportunity, you scan the rocks to check for things peeking out of the shadows. A pair of quivering green antennas, perhaps, or a little furry creature crouched on five legs...? Looking for Martians is such a guilty pleasure.

Well, you can imagine the thrill in 2004 when scientists were checking some of those pictures and they *did* see something leap out. It skittered across the rocky floor of Gusev Crater and quickly disappeared. But it wasn't a Martian; Spirit had photographed a dust devil!



The top half of this image is part of a series of images of a passing dust devil on Mars caught by Spirit. In the bottom half, the image has been filtered to remove everything that did not change from one image to the other. Notice the faint track left by the dust devil. Credit NASA/JPL/Mark T. Lemmon, Univ. of Arizona Lunar and Planetary Laboratory.

Dust devils are tornadoes of dust. On a planet like Mars which is literally covered with dust, and where it never rains, dust devils are an important form of weather. Some Martian dust devils grow almost as tall as Mt. Everest, and researchers suspect they're crackling with static electricity—a form of "Martian lightning."

NASA is keen to learn more. How strong are the winds? Do dust devils carry a charge? When does "devil season" begin—and end? Astronauts are going to want to know the answers before they set foot on the red planet.

The problem is, these dusty twisters can be devilishly difficult to catch. Most images of Martian dust devils have been taken by accident, while the rovers were looking for other things. This catch-as-catch-can approach limits what researchers can learn.

No more! The two rovers have just gotten a boost of artificial intelligence to help them recognize and photograph dust devils. It comes in the form of new software, uploaded in July and activated in September 2006.

"This software is based on techniques developed and tested as part of the NASA New Millennium Program's Space Technology 6 project. Testing was done in Earth orbit onboard the EO-1 (Earth Observing-1) satellite," says Steve Chien, supervisor of JPL's Artificial Intelligence Group. Scientists using EO-1 data were especially interested in dynamic events such as volcanoes erupting or sea ice breaking apart. So Chien and colleagues programmed the satellite to notice change. It worked beautifully: "We measured a 100-fold increase in science results for transient events."

Now that the techniques have been tested in Earth orbit, they are ready to help Spirit and Opportunity catch dust devils—or anything else that moves—on Mars.

“If we saw Martians, that would be great,” laughs Chien. Even scientists have their guilty pleasures.

Find out more about the Space Technology 6 “Autonomous Sciencecraft” technology experiment at nmp.nasa.gov/st6/TECHNOLOGY/sciencecraft_tech.html, and the use of the technology on the Mars Rovers at nmp.nasa.gov/TECHNOLOGY/infusion.html. Kids can visit spaceplace.nasa.gov/en/kids/nmp_action.shtml and do a New Millennium Program-like test at home to see if a familiar material would work well in space.

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

THE ANTIKYTHERA MECHANISM

by Andrew Ramsey

When you see the night sky from a really dark location, you get some idea of what impression the night-time heavens had on ancient civilisations. With no light pollution around, they got a fabulous view of the stars and planets. Imagine then some ancient Greek astronomer, over 2000 years ago, watching all this and thinking, “Hmm, it all revolves around in cycles of differing periods. D’you know, I think I could build a model of this.” And then he sat down, designed and built a complex system of gearing and dials with pointers to predict the positions of the Sun, the Moon and the five known planets of the time.

In October of last year, I was fortunate to be taking part in a new inspection of the Antikythera Mechanism, a corroded lump of bronze found on an ancient Greek shipwreck off the coast of Antikythera by sponge divers in 1900. As I trawled through gigabytes of X-ray CT data, I was the first person to read engraved text which had lain hidden for over 2000 years. The Mechanism, thought to have been made in the late second century BC, was revealed to be a complex astronomical calculating machine, capable of predicting the positions of the Sun and Moon in the sky, together with Mercury and Venus and maybe even the other three planets known at the time, Mars, Jupiter and Saturn. It predicted the positions so accurately that it could be used to predict future eclipses of the Sun and Moon. At a time when most people thought that all seven bodies revolved in perfect circles around the Earth, here was one person who knew differently and built all the complex gearing necessary to track the bodies accurately into a machine.

Just over a week ago I was at a conference in Athens to reveal the secrets of this machine. In a public evening session approximately 700 people packed into the conference hall, over 100 of them standing – for three

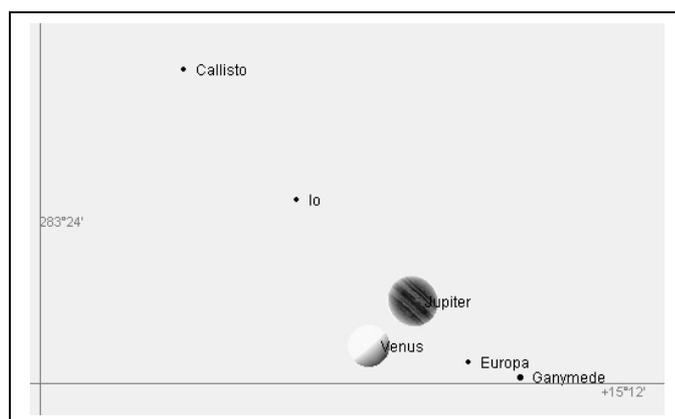
hours – to hear about the skills of their ancestors. Can you imagine that happening in Britain?

The inspection was a collaboration of three universities and took place in a basement room of the National Archaeological Museum in Athens, home of the Mechanism. Mike Edmunds from Cardiff University joined astronomers and archaeologists from the universities of Athens and Thessaloniki. Imaging specialists from Hewlett-Packard (USA) and X-Tek Systems (in Tring), for whom I work, provided equipment and staff during the two-and-a-half-week inspection last year.

Mike Edmunds and I shall be talking about our findings at our March meeting, so I won’t spoil it all here. Suffice to say that the Mechanism shows a remarkable degree of sophistication, not only in astronomical knowledge, but in mechanical design and craftsmanship, of which many people did not think that the ancient world was capable.

ANOTHER CONJUNCTION

Venus and Jupiter at 9.25pm on 17th June, 2BC, as seen through a 3” refractor from east of Jerusalem.



DATES FOR YOUR DIARY

18th – 20th Dec 8pm. Observing evening at Abbey Meadow.

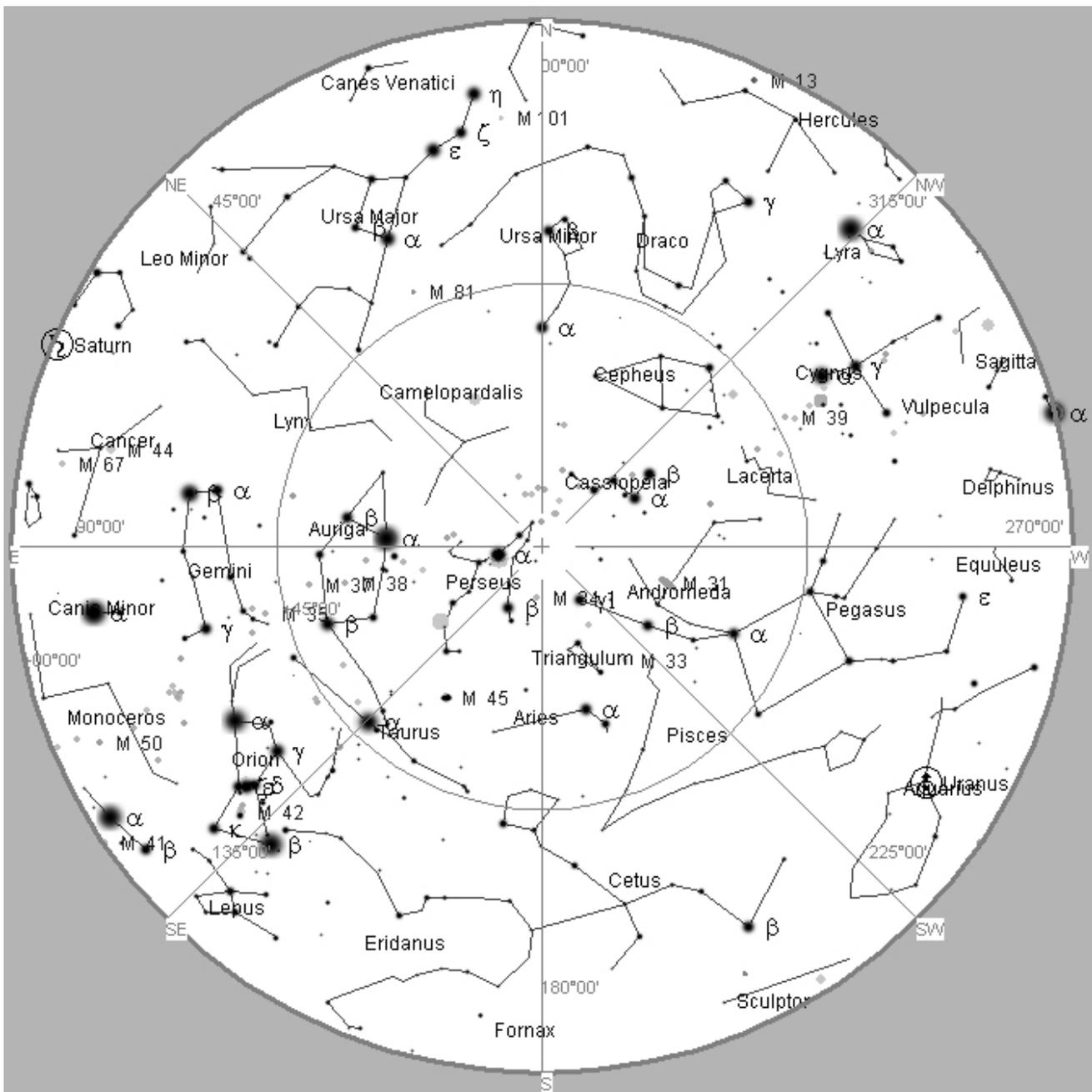
8th Jan. 8pm. Speaker Meeting: Stephen Lewis (Open University): “Weather, Climate and Climate Change on Mars”.

The editor of “SpaceWatch” is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:

Mail: A.T.Ramsey, 35 Cope Close, OXFORD, OX2 9AJ.

E-mail: AbAstro@ATRamsey.com Phone: 01865 245339

STAR CHART



The Night Sky at 9pm next Saturday (16th Dec.)

Orion is becoming more prominent now in the south-east rising high in the south later in the evening. If you wait a while longer in the evening you will see Saturn in the east. A small telescope will show its rings, which although not as wide apart as last year are still worth looking at. See if you can spot its largest satellite, Titan, which is in fact larger than Mercury.

Almost overhead is the nearest galaxy to our Milky Way, M31 in Andromeda. In a dark sky on good night you can see it with the naked eye. Binoculars or a small telescope will reveal it as a fuzzy blob. Long exposure photographs will pull out its spiral form. This galaxy is larger than ours – over 100,000 light-years across. Some say it is on a collision course with our galaxy, and travelling pretty quickly towards us, but don't worry it is over 2 million light-years away. Our Earth and Sun and pretty much all the stars we see in our night sky will all be long gone by the time that happens.