

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

5th April 2004

Nick Hewitt

(BAA Director Deep Sky)

“Cosmic Recycling – An Amateur’s Perspective”

THE NIGHT SKY THIS MONTH

By Bob Dryden

Don't forget that we are now on British Summer Time (BST) and all astronomical times are given in Universal Time (UT). So you must ADD one hour from UT to give you BST. So if an event is billed as 18:48 UT then it will be at 7:48pm BST.

Last month all the action surrounded the planets. This month it's the Moon and a pair of comets that will be the centre of attention.

Planets: The two old favourites, **Saturn** and **Jupiter**, are still there of course, shining brightly in the evening sky. Saturn is starting to approach the evening twilight zone now so make the most of this fantastic apparition. Jupiter is over towards the east as it goes dark, so you have much longer to view it. The other major planet on view is **Venus** and it's entering its more interesting phase now. The planet is actually approaching Earth so it appears to grow in size while at the same time it takes on a very pleasing crescent shape. You have the next three weeks or so in which to grab your binoculars and have a look. Yes, binoculars will show you the crescent shape quite easily, especially later in the month.

Moon: There is a total eclipse of the Moon on the night of the 4th May. The umbral part of the eclipse (which is probably the only bit you will notice) starts at 18.48 UT and it ends at 22.12 UT. Totality starts at 19.52 UT and ends at 21.08 UT, with mid-eclipse being 20.30 UT. There is a problem though, perhaps you can see what it is if I tell you the Moon rises at about 19.25 UT? The first minutes of the partial phase will be missed as the Moon will still be below the horizon. Even after it rises, you are going to need a very clear south eastern horizon to see much as it will take some time for the Moon to gain height. The Moon will only be about 15° above the horizon when it all ends. Even so, it promises to be a grand sight. Photography could be good as the Moon will be near to the horizon which means you might be able to get some foreground objects in the frame.

Anyway, do try and see at least some of the eclipse. There is another one in October but that one is in the early hours of the morning. This one is at a much more sociable hour.

Comets: The other potential highlight of this session is a pair of comets. I say potential because comets are a bit unpredictable and don't always behave as we hope. If these two do perform as expected then they should be well worth a try.

The harder of the two to try for is **C/2002 T7 (LINEAR)**. It could be a naked eye comet at 1st or 2nd magnitude by the middle of May so why is it harder to see? Because it will be in the morning sky so you will have to get up very early to see it. The comet will be in Pisces, not far from the square of Pegasus. T7 (LINEAR) has been on view for a few weeks now in the evening sky so is not a new object to us.

The other comet, **C/2001 Q4 (NEAT)** will be new to us, but not to southern hemisphere observers. They have been watching it brighten for a long time but now it will be visible to us more northern watchers. It will shoot up into the evening sky during the first week of May. On May 5th it will be in southern Canis Major (near Sirius) at -27° declination and by the 15th it will have reached +18° in Cancer. Hopefully it will be at least second magnitude, but it might possibly reach first magnitude. It is several years since we had a really bright comet (Hale-Bopp in 1997) so you really should try to see this one. How its tail will develop and how bright it will be we will just have to wait and see, but in all likelihood it WILL have a decent tail. Although Q4 (NEAT) will be at its brightest in early May, it will still about 5th magnitude by the end of June, and by mid-August, 7th magnitude in the bowl of the Plough (and visible all night), so there's plenty of comet watching ahead.

MOON PHASES:

Full: 5th Apr.; Last Qtr: 12th Apr.; New: 19th Apr.;
First Qtr: 27th Apr.; Full: 4th May (total eclipse).



Sciencecraft

By Patrick L Barry and Tony Phillips

Probes that can distinguish between "interesting" things and "boring" things are vital for deep space exploration, say JPL scientists.

Along with his colleagues in NASA's Space Technology 6 Project (ST6), JPL's Steven Chien is working to develop an artificial intelligence technology that does just that. They call it the Autonomous Sciencecraft Experiment, and it's one of many next-generation satellite technologies emerging from NASA's New Millennium Program.

As humanity expands its exploration of the outer solar system—or even neighboring solar systems!—the probes we send suffer from two unavoidable handicaps. First, commands radioed by mission scientists on Earth take a long time to reach the probe: six hours for the planned New Horizons mission to Pluto, for example.

Second, the great distance also means that data beamed back by the probe trickles to Earth at a lower bandwidth—often much less than an old 28.8 kbps modem. Waiting for hundreds or thousands of multi-megabyte scientific images to download could take weeks. And often many of those images will be "boring," that is, they won't contain anything new or important for scientists to puzzle over. That's certainly not the most efficient way of using a multi-million dollar probe.

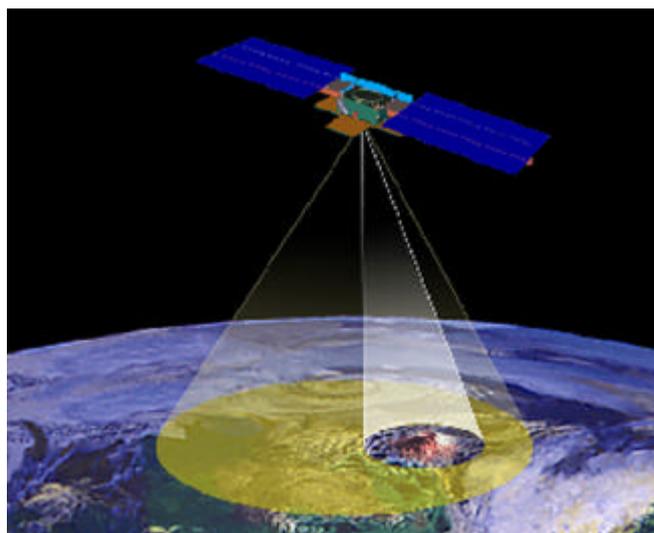
Even worse, what if one of those images showed something extremely "interesting"—a rare event like a volcanic eruption or an unexpected feature like glaciers of methane ice? By the time scientists see the images, hours or days would have passed, and it may be too late to tell the probe to take a closer look.

But how can a probe's computer brain possibly decide what's "interesting" to scientists and what's not?

"What you really want is a probe that can identify changes or unique features and focus on those things on its own, rather than just taking images indiscriminately," says Arthur Chmielewski, one of Chien's colleagues at JPL.

Indeed, that's what Chien's software does. It looks for things that change. A mission to Jupiter's icy moon Europa, for instance, might zero in on newly-formed cracks in the ice. Using artificial intelligence to set priorities, the probe could capture a complete movie of growing fractures rather than a single haphazard snapshot.

Until scientists can actually travel to deep space and explore distant worlds in person, they'll need spacecraft "out there" that can do some of the thinking for them. Sciencecraft is leading the way.



The Autonomous Sciencecraft technology that will be tested as part of NASA's Space Technology 6 mission will use artificial intelligence to select and transmit only the scientifically significant images.

Learn more about Sciencecraft at nmp.nasa.gov/st6. Kids can make a "Star Finder" for this month and learn about another of the ST6 technologies at spaceplace.nasa.gov/st6starfinder/st6starfinder.htm.

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

MORE NEWS FROM MARS

At a gathering of over 1200 scientists in Houston, Texas the week before last, Mars was the main topic of discussion. This was the annual Lunar and Planetary Science Convention, and was the first opportunity for researchers from all the Mars rover and orbiter missions to get together and share their findings.

The main question on everyone's mind was – was there life once on Mars. This is tied up with the question of whether there once was water on Mars. There is abundant evidence that water once flowed on Mars, but was there enough to support life?

Steven Squyres, the lead scientist for the two NASA rovers, "Spirit" and "Opportunity" presented evidence that the landing site of "Opportunity", the Meridiani Planum, was once very wet indeed.

Presence of the mineral haematite in the form of very small perfectly round spherules seems to suggest that water was present in abundance when these were formed. These spherules are identical in appearance and composition to those found in the red sandstones of Utah, which formed when very salty mineral-rich and highly acidic waters flowed through the soil.

High concentrations of sulphur and bromine suggest the presence of evaporates – rocks which form when a salty ocean evaporates away. The finding of the mineral jarosite on Mars also suggests an acidic environment.

An acidic environment may seem too harsh for life, but there is evidence on Earth that certain bacteria thrive here. In Spain, previously unknown bacteria were found living in a highly acidic environment below ground, without sunlight or oxygen.

So will we find fossils of ancient Martian lifeforms? No one admitted that we might, but Squyres did suggest that the environment has great potential for preserving evidence of any past life.

In fact controversial evidence has already been found by the two rovers which some scientists are suggesting could be fossils. Unfortunately the equipment isn't really good enough to prove the nature of the strange forms found.

However, both rovers have evidence for large quantities of liquid water having been present. There is also photographic evidence to suggest that many of the canyons seen in Mars's northern hemisphere end at the same altitude at the edge of a vast flat-bottomed basin. Could most of the northern hemisphere have been under water, rather like Earth's Pacific Ocean?

There will be more evidence shortly. Later this month, the Mars Express orbiter will switch on its ground-penetrating radar instrument. This will reveal any ice or water hidden underground. And there could soon be evidence from the rovers of sedimentary rock formations of the type only found in liquid water.

Watch this space!

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.

The list host has recently changed. Please make sure you are now on the new list hosted by SmartGroups, not the old list hosted by Topica, which is now defunct.

To view the messages on the web go to:

<http://www.smartgroups.com/groups/abastro> .

To subscribe to the list either go to this web page and click on "Join the Group" or send an email to abastro-subscribe@smartgroups.com . You will then receive all e-mails sent to the list. To post e-mails on the list: send an email to abastro@smartgroups.com . To unsubscribe: send an email to abastro-unsubscribe@smartgroups.com

Don't forget the AAS web site: www.abingdonastro.org.uk

NOTICES

NOTICE OF ANNUAL GENERAL MEETING

The Annual General Meeting for 2003/04 will take place on **Monday 10 May 2004** at All Saints' Methodist Church Hall, Dorchester Crescent, Abingdon at approximately **8 p.m.**, followed by a presentation on the transit of Venus.

Agenda

Apologies for absence; Minutes of the previous Abingdon AS AGM (held 12/5/03); Matters arising; Presentation of Committee's report; Presentation of Treasurer's report and Adoption of accounts; Setting of membership fees for 2004/05; Election of officers: i) Chairman ii) Secretary iii) Treasurer iv) Publicity Officer; Election of other committee members (between one and six in number); Any other business.

Chris Holt, Secretary, Abingdon Astronomical Society

NOMINATIONS FOR ELECTIONS TO COMMITTEE

Nominations are sought for the posts of Chairman, Secretary, Treasurer, Publicity Officer and between 1 and 6 other committee members.

Under the Constitution of the Society, the "candidates for election shall be proposed and seconded by ordinary members of the Society and the nomination, including the candidate's signature, submitted in writing to the Chairman at least four weeks prior to the Annual General Meeting"(para. 10.3.3). Ordinary members are all those who are not honorary members or affiliated members.

The Constitution goes on to say that, "in the event of there being no candidate for the election of an officer of the Society, or fewer than ten candidates for the election to the Committee, the Chairman may accept nominations given at the meeting" (para. 10.3.4).

Chris Holt, Secretary, Abingdon AS

N.B. A detailed knowledge of astronomy is not required to be a committee member, just enthusiasm.

DATES FOR YOUR DIARY

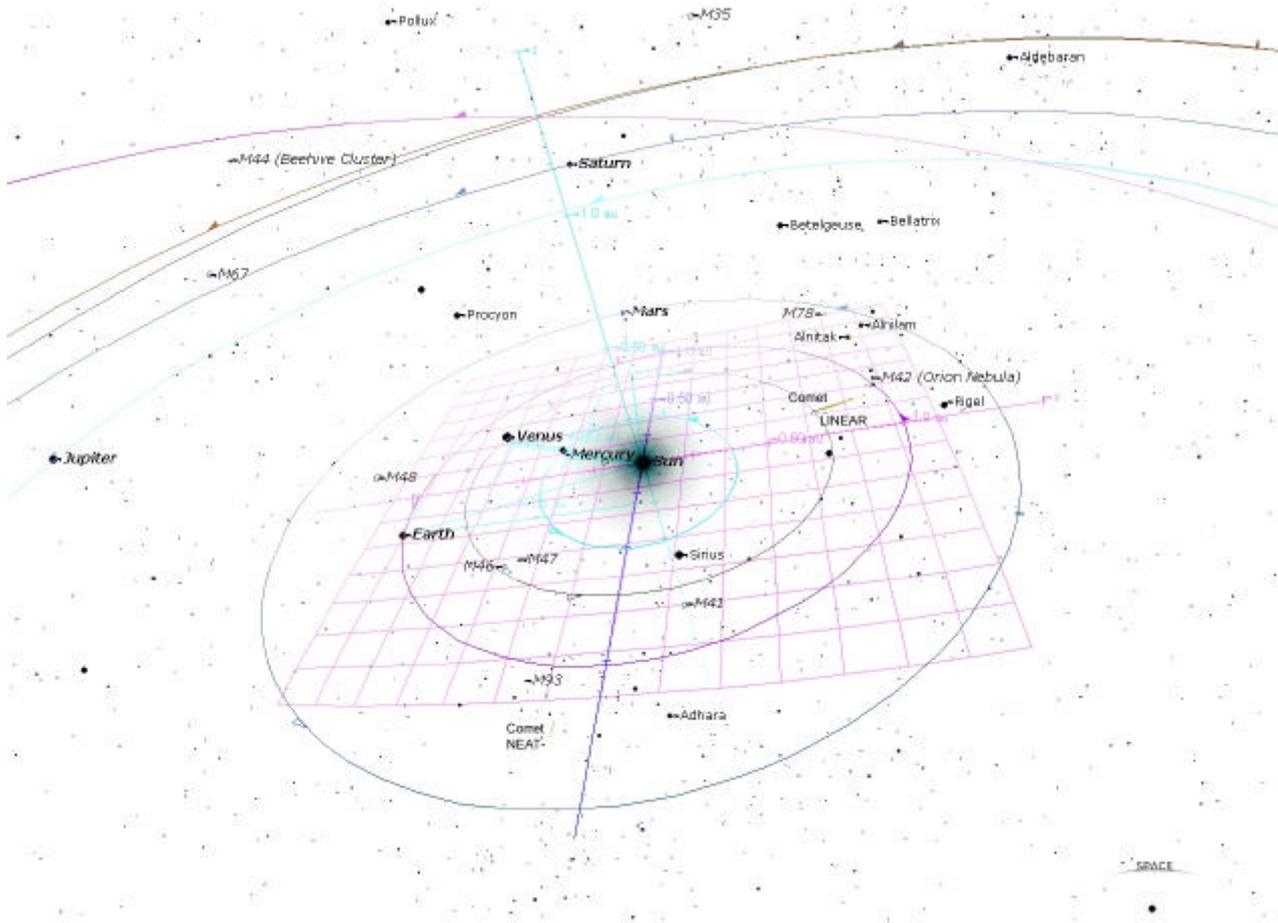
19th to 21st Apr. (FCN): 8pm. Observing Evening, Ridgeway above Britwell Salome. Phone Bob on 01491 201620 to confirm night and for directions.

26th Apr.: 8pm. Beginners' Meeting in the Perry Room.

10th May, 2004: 8pm. AGM, followed by a presentation from the SPA on the Venus transit.

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

STAR CHART



A *slightly* different perspective this month to show you what's going on with the planets at the moment. The last two weeks gave you the opportunity to see all five naked-eye visible planets at the same time. Mercury is now heading back towards the Sun. Venus is starting to come between us and the Sun, but is still way out. By the time these two come back again Jupiter will have moved on. The five won't be visible together again for another 30 years!

Looking from Earth, Mercury is closest to the Sun, then Venus and Mars – although they are fairly close in the sky you can see that they are well apart in space. Then comes Saturn, with Jupiter being in almost the opposite direction to the Sun.