



# TRANSIT

The Newsletter of



11th March, 2005. Julian Day 2453441



Name this galaxy: Messier and NGC number as well as constellation.

**Editorial**

**February meeting.** Rod Hine, of Bradford University and Bradford A.S, had travelling problems but did manage to arrive to give his lecture. “Children of the Sun” developed the thesis that the evolution of life on this planet has been crucially dependent on the detailed properties of the radiation we receive from the Sun. It was a rare treat to be given some enlightening demonstrations, as well as the more usual Powerpoint presentation.

**250<sup>th</sup> Meeting Celebrations.** The February, 2005 meeting marked the 250<sup>th</sup> meeting of the Society. John McCue brought a cake, which was shared and enjoyed by those who were at the meeting.

**March meeting.** On Friday, the 11<sup>th</sup> of March, Neil Haggath will talk to us about spaceflight history, with the title “It’ll be Alright on the Flight”.

**January’s Back Page Puzzle.** You may not remember that far back but the Moon crater pictured was Plato. The mountains to the east were not the Apennines as I said but, as several people pointed out, the Alps. My brain said “Alps” but the fingers typed something completely different. Sorry about that.

**Subscriptions.** They were due in January and some were collected at the last meeting. They can still be paid at the March meeting, if required. Would members who wish to pay by post please send their £6 subscription to Ian Miles at 11, Heathfield Park, Middleton St. George, DL2 1LN, making cheques out to Cleveland and Darlington Astronomical Society?

**New Baby.** Those who know Dr. Carole Haswell, Open University lecturer, researcher and one of our professional Honorary Life Members, will be pleased to learn that her baby was due to be born on February 28<sup>th</sup>. She will be on maternity leave until October but no doubt any congratulatory messages sent to her email address will be passed on.

**Scarborough Star Party.** An advance notice of this event was given by Neil Haggath. It will be held at the usual dark sky site, which also has camping facilities. The dates are Friday, Saturday and Sunday the 5<sup>th</sup> to 8<sup>th</sup> August. Anyone interested please contact Neil. He will have details and application forms at a future meeting.

**February’s Puzzle Pictures.** On the front page was the lovely, face-on, spiral galaxy M101, NGC5457, in Ursa Major. Its extra claim to fame is that it is duplicated in Messier’s Tables. On the back page, the crater Plato (featured in January) is at the top right of the Mare Imbrium. I think the mare are relatively uncratered for both the reasons suggested - the lava flows were late in the history of the Moon and did cover up existing craters. After the lava flow episodes, the major bombardments had ceased, so leaving the mare relatively uncratered. Mike Gregory wrote me an interesting letter on the subject, part of which is printed later in this issue.

**This Month’s Galaxy.** There were three different pictures of this on the websites. It is always a surprise to find that, even in visible light, the pictures are so different when presented by different Observatories. The lower one is by David Malin at the AAO. (I have erased the M number, which was originally in the title!)

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## NASA Details Earthquake Effects on the Earth

NASA press release from Ray Worthy

NASA scientists, using data from the Indonesian earthquake, calculated it affected Earth's rotation, decreased the length of day, slightly changed the planet's shape and shifted the North Pole by several centimeters. The earthquake that created the huge tsunami also changed the Earth's rotation. Dr. Benjamin Fong Chao, of NASA's Goddard Space Flight Center, and Dr. Richard Gross of NASA's Jet Propulsion Laboratory said all earthquakes have some affect on Earth's rotation. It's just they are usually barely noticeable. "Any worldly event that involves the movement of mass affects the Earth's rotation, from seasonal weather down to driving a car," Chao said.

Chao and Gross have been routinely calculating earthquakes' effects in changing the Earth's rotation in both length-of-day as well as changes in Earth's gravitational field. They also study changes in polar motion that is shifting the North Pole. The "mean North pole" was shifted by about 2.5 centimeters (1 inch) in the direction of 145 degrees East Latitude. This shift east is continuing a long-term seismic trend identified in previous studies. They also found the earthquake decreased the length of day by 2.68 microseconds. Physically, this is like a spinning skater drawing their arms closer to the body, resulting in a faster spin. The quake also affected the Earth's shape. They found Earth's oblateness (flattening on the top and bulging at the equator) decreased by a small amount. It decreased about one part in 10 billion, continuing the trend of earthquakes making Earth less oblate.

To make a comparison about the mass that was shifted as a result of the earthquake, and how it affected the Earth, Chao compares it to the great Three-Gorge reservoir of China. If filled, the gorge would hold 40 cubic kilometers (10 trillion gallons) of water. That shift of mass would increase the length of day by only 0.06 microseconds and make the Earth only very slightly more round in the middle and flat on the top. It would shift the pole position by about two centimeters (0.8 inch).

The researchers concluded the Sumatra earthquake caused a length of day (LOD) change too small to detect, but it can be calculated. It also caused an oblateness change barely detectable, and a pole shift large enough to be possibly identified. They hope to detect the LOD signal and pole shift when Earth rotation data from ground based and space-borne position sensors are reviewed. The researchers used data from the Harvard University Centroid Moment Tensor database that catalogs large earthquakes. The data is calculated in a set of formulas, and the results are reported and updated on a NASA Web site.

The massive earthquake off the west coast of Indonesia on December 26, 2004, registered a magnitude of nine on the new "moment" scale (modified Richter scale) that indicates the size of earthquakes. It was the fourth largest earthquake in one hundred years and largest since the 1964 Prince William Sound, Alaska earthquake. The devastating mega thrust earthquake occurred as a result of the India and Burma plates coming together. It was caused by the release of stresses that developed as the India plate slid beneath the overriding Burma plate. The fault dislocation, or earthquake, consisted of a downward sliding of one plate relative to the overlying plate. The net effect was a slightly more compact Earth. The India plate began its descent into the mantle at the Sunda trench that lies west of the earthquake's epicenter.

For information and images on the Web, visit:

[http://www.nasa.gov/vision/earth/lookingatearth/indonesia\\_quake.html](http://www.nasa.gov/vision/earth/lookingatearth/indonesia_quake.html)

For the details on the Sumatra, Indonesia Earthquake, visit the USGS Internet site:

[http://neic.usgs.gov/neis/bulletin/neic\\_slav\\_ts.html](http://neic.usgs.gov/neis/bulletin/neic_slav_ts.html)



### A New Use for Planetaria

Hayden Planetarium, in New York, has been the site for astrophysicists to bring their theoretical predictions to visible life. Reading a report by Bruce Schechter in the November 2002 New Scientist, the place is described as “a glass cube as wide as the wings of a Boeing 737, holding a pure-white sphere and supported inside a framework of gleaming metal trusses”. The Planetarium can display the results of astrophysical research and show how a globular cluster of stars forms and interacts. The masses of data and abstract figures poured out by modern computers and hi-tech instruments are not usually presented as the human eye and brain would see them. Now, simulations over millions of years can be projected as a virtual sky in a few minutes at the touch of a mouse.

Piet Hut, an astrophysicist at the Institute of Advanced Study in Princeton (the place where Einstein spent many years) has studied globular clusters for most of his career. These are ancient balls of stars that are called the fossils of the early Universe. Our own galaxy contains about 150 globular clusters, many of which we can see through a small telescope or a pair of binoculars. They are very difficult to study because there is so much happening in them as they evolve. Collisions between stars are common and this is the latest explanation for the formation of “blue stragglers”. These quite young stars were seen by the Hubble Telescope in an old globular cluster and it was a puzzle that old and young could be so closely connected.

Understanding globular clusters will be a large step towards explaining the early processes of galaxy formation and star birth from gas clouds. So, the idea is to project on to the planetarium dome the results of very complex and sophisticated calculations on the two million stars in a typical cluster. The GRAPE-26 supercomputer at Tokyo University can handle about 130,000 stars, computing the detailed paths as the cluster evolves.

The idea is to use the projecting computer of Hayden Planetarium to show what a developing cluster would look like. Theoretical physicists will no longer have to imagine what the equations tell them. Now they will be able watch as stars form, collide, whirl around one another and form binary pairs. The astrophysicists say they get space sickness watching the results but they all think it is worthwhile.



## The CaDAS Interview – John Borrett

*John lives in Ampleforth and yet still manages to remain a member of the Society and travel to a large proportion of the monthly meetings. He is one of the group of very experienced observers in the Society and has an impressive array of telescopes and imaging equipment. As he recounts in the Interview, his observing has been interrupted by a house move but hopes to set up a new observatory in what must be a very good observing area. He has been a member for quite a long time and an interview was long overdue. We had arranged to meet at his home in Ampleforth but the snowy spell intervened and I chickened out of travelling over the high ground between there and Darlington. Hence the interview was conducted at long range.*

*Where were you born and brought up?*

I was born in Middlesbrough, but lived in Marton for 18 years, prior to going to University. I have one sister. She and I were the first of our family to go to university. She to Cambridge, me to Newcastle. My mother and father are still living in Marton.

*Have you moved around the country a lot?*

No, I have found living in the North very satisfactory. I could not see myself living in the southeast, EVER!

*Tell me about your family.*

My father was born in West Hartlepool; my mother is from Middlesbrough. The family name comes from East Anglia, where our family records go back several hundred years plus.

*When did you first get interested in Astronomy?*

I cannot think of a time when I have not thought about astronomy. However, not until my children were reaching that age, when I could talk to them about this, did I buy my first proper telescope, perhaps 16 years ago. I currently have a custom built German equatorial mount, carrying a 12" F3.5 Newtonian, and a 5" F8.5 and 4" F5 refractor. This is fully driven and interfaced with a computer.

*Where is most of your observing done? Do you still have time to do a lot of observing?*

Sadly, latterly, very little observing has been done. Since moving to Ampleforth, our project of renovating the two cottages has taken the greatest part of my free time and energy. I do most certainly intend to rebuild an observatory, to rehouse the systems mount. Once in the blood, it never goes! Most of the data I have was collected when I was living in Nunthorpe.

*You are skilled in the use of advanced ccd cameras. How did you begin this interest?*

Deep sky has always fascinated me the most, which inevitably lead to astrophotography. Sky pollution (light and other), forced me to go to Hypered 2415 to record and see the fainter delights of the universe. Anyone who has practised the black art of hypering/guiding/developing and printing a decent image, will understand what patience really

means! When CCD's became available (I use Santa Barbara), their potential was immediately apparent and so much easier than with emulsion.

*What is your favourite type of astronomy?*

As a consequence of using CCD's, I found myself concentrating on emission and reflection nebulae, dark nebulae, star clusters, and galaxies. In fact, in the end, it became a challenge to see how deep I could go. Guiding tolerance and atmospheric conditions soon showed where the ceiling was.

*What do you enjoy most about the society?*

Meeting like-minded people and learning so much from them.

*Did you enjoy your education?*

I went to St Mary's College grammar, then to Newcastle for 5 years. I really started enjoying science only when entering 6<sup>th</sup> form.

*You are in medicine. How did you come to choose that career?*

I chose dentistry, I suppose by chance. I had three choices, Sandhurst, architecture or Medicine/Dentistry. After close inspection of the first two, and rejecting them, this left me with M/D. Medicine, even then, was too claustrophobic, controlled by big bureaucracy, so dentistry was chosen (with a big helping of ignorance on my part). Experience has convinced me that I backed the right horse.

*Do you consider yourself as mathematically and computer literate?*

No. Only sufficiently so for my needs.

*Do quantum theory and super massive black holes excite you?*

Yes

*In astronomy, you are a life-long learner – comment.*

Anyone who tells you they are experts, or know everything,... has learnt nothing. Life is one big journey. You never stop learning. The older I get, the less I feel I know, dentistry included!

*Do you like travelling?*

Yes, although I haven't taken specifically astronomy holidays. The best place I've been to is Florence.

*What is the essence of astronomy for you?*

Fun.

*Tell me about the memorable characters you have met in the astronomical world.*

I have to say that I have met very few high powered astronomers. I once had a long chat with David Malin some years ago. I found him helpful and interesting. I probably was quite envious, he has a bigger telescope than me and better skies!

*Have you any heroes?*

St.Thomas Moore.

*Have you “done” all the Messier objects?*

No. This type of astronomy just does not appeal to me.

*Do you have time for any other interests and hobbies?*

Yes. Opera and music generally, gardening, house renovation(!), military ( Napoleonic) history, architecture.

*Do you like music? Do you play a musical instrument?*

I am not a dancer. See above! I used to play the clarinet and classical guitar, but have let this slip.

*Are you interested in the theatre and films?*

Theatre and opera mainly. I haven't seen Harry Potter, but have seen Ring trilogy,...v. good. As for a favourite type of film, mmmm,..I suppose the anti hero, Clint Eastwood, would be a good example.

*What are you reading? Any recommended books which we should all read?*

Astronomically, none - at the moment. One book I found most useful, both as an astrophotographer and more generally for understanding the different types of telescopes, is TELESCOPE OPTICS, EVALUATION & DESIGN. By Harrie Rutten and Martin Van Venrooij. Pub. Willmann-Bell.

*What is your most satisfying astronomical achievement to date?*

I haven't achieved one yet. I'm still waiting!

*Do we do enough as individuals, or as a Society, to combat light pollution?*

As individuals, I hope so. As a society, one needs to tread carefully, with the public. They already consider our breed slightly suspect. We should never make them feel it is our self-interest only driving this essential bandwagon.

*Where does your motivation and enthusiasm come from?*

Curiosity. This I think, is the mainspring for all my hobbies. In fact, without it learning would cease.

*Who has influenced you the most?*

Difficult one. I really don't know. Outside the family and faith, it is difficult to pinpoint one person.

*If you were World dictator, what measure would you introduce?*

Abolish dictatorship!

*In a short sentence, what is your definition of a civilised society?*

The Ten Commandments. Look no further.

*What is your idea of a perfect night at the telescope?*

A late summers evening, dark clear skies, eyeballing Cygnus, with a glass of good single malt. Not too much malt though, there are enough double stars up there already!

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*At the Member's Night in January, Eric Kendall handed round an article he had written to provoke some discussion. Not everyone was able to have a copy and I thought it would be of interest to all members, not only those able to attend the meeting. It is reproduced below.*

### The Speed of Light, Is it Constant?

From Eric Kendall

The story of Ole Roemer and Cassini's work using Jupiter and its four major moons that led to a direct measurement of the speed of light is well known. More recently, in 1849 and 1850, Fizeau and Foucault used mechanical cogged wheels and mirrors to obtain a more accurate figure and Michelson in 1931 developed Foucault's apparatus to obtain a figure of 299,774 kps.

The speed of a wave is equal to its wavelength multiplied by its frequency and these 2 properties can be determined very accurately by techniques I don't understand. By 1980 the speed was fixed at 299,792,458 metres per second. With a metre defined as 1/299,792,458th of the distance light travels in a second, light speed is constant but the metre's value can change.

This constant speed is only true in a vacuum and is generally accepted as a fact of nature and regarded as never varying and the limiting speed of all things. However in other mediums light speed does change. It slows down a little in glass but in the fifth state of matter known as a Bose Einstein condensate medium it can be slowed down to a speed of 1 metre per second. This was shown by Lene Vestergaard in 2000 - her medium was cold sodium atoms and she used two lasers to convert the opaque sodium into a transparent medium. The first laser creates a path that the second laser can crawl through.

Other work, by Professor Nimtz in Cologne and Professor Chiao at Berkeley, had shown that light in a wave guide apparatus travelled faster than the speed of light and more than four times faster through a photonic lattice. We also have evidence that a strong gravitational field can bend the path of light rays. This was first proposed by Einstein and confirmed in 1919 by Eddington, Crommelin and others during the total eclipse. If a gravitational field can cause the equivalent of refraction, might it not also affect the speed of light?

This could explain one of the mysteries of the Big Bang, where distant galaxies appear to have been in contact but have travelled further apart than space-time permits, if light cannot exceed 300,000 kps. The usual explanation is that there was an expansion phase of space shortly after the big bang. Alternatively light could have travelled at a greater speed after acceleration due to the high gravitational forces of the early universe. Modern theory requires dark matter and dark energy to explain observed phenomena. Perhaps light is affected by these strange particles and forces and is not a constant





## The Power of the Press

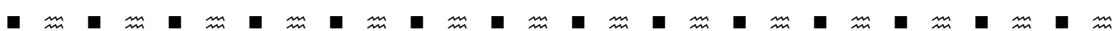
From Neil Haggath

There have been reports in the papers recently, about a woman in Lowestoft who was supposedly hit by a "walnut-sized" meteorite. Of course, it remains to be seen whether it actually *is* a meteorite.....

The following is an extract from the write up in the Daily Telegraph - a supposedly "respectable" paper! It was obviously written by some pillock who knows bugger all about astronomy, doesn't know the difference between a meteor and a meteorite, and couldn't be bothered to check his facts!

"The rock fell last week when the annual Perseid meteorite shower from the asteroid belt between Jupiter and Mars was at its peak."

AAAAAAAAAAAAAAAAAAAAAGH!!



## Armchair astronomy in good company

From Bob Mullen

Being housebound over the last week with the recent snowstorms reminded me of an astronomical entertainment I discovered a few years ago to fill in the time when observing conditions were bad.

I refer to a regular Internet talk program hosted by the American comet hunter David Levy, his wife Wendee and invited guests. The site contains a large archive of previous programmes covering lots of astronomical subjects. If you can overcome the rather slow ponderous delivery of our colonial cousins compared with the Gatling gun delivery of Patrick, these hour-long programmes can be very entertaining as well as educational.

<http://www.letstalkstars.com/cgi-bin/archive.pl>



## The Moon Picture

From Mike Gregory

The mare pictured on the back page of last month's edition is Mare Imbrium (which is yet another word that Bill Gates' Microsoft spell checker does not recognise). I have recently read that, until we have a permanent base on the Moon, we will never really know the full truth of how the Moon was formed and about its history. Judging by the fact that there are single mountains and small mountain chains protruding from the mare, can we assume that there were larger craters beneath the present surface? Perhaps when these craters were formed magma was allowed to leak from below and form the basis partially of what we see today. Larger scale photos of Imbrium and other mare suggest faulting (I think), but the Moon's surface has been battered for millions of years by a micro-meteoritic 'rain' consisting of particles no larger than one millimetre. This 'rain' was possibly the final residue from the heavier cratering of millions of years ago.

Anyway, I must confess that I pinched this information from a cheap CD-ROM called EXPERT Astronomer. If it is all rubbish, we can blame that!

Yours astronomically,  
Mike Gregory



### Transit Tailpiece

#### Quote/Unquote

Some people see a partial eclipse and wonder why others talk so much about a total eclipse. Seeing a partial eclipse and saying that you have seen an eclipse is like standing outside the opera house and saying you have seen the opera. In both cases you have missed the main event.

*Jay M. Pasachoff.*

I look up. Incredible! It is the eye of God. A perfectly black disc, ringed with bright, spiky streamers that stretch out in all directions.

*Jack B. Zirken.*

There was at the same time something in its singular and wonderful appearance that was appalling; and I can readily imagine that uncivilised nations may occasionally have become alarmed and terrified at such an object.

I did not expect from any of the accounts of preceding eclipses that I had read, to witness so magnificent an exhibition as that which took place.

*Francis Baily (he of the beads), 1842.*

The Sun . . .

In dim eclipse disastrous twilight sheds  
On half the nations and with fear of change  
Perplexes monarchs.

*John Milton, 1667.*

“And it will come about in that day” declares the Lord God, “that I shall make the Sun go down at noon and make the Earth dark in broad daylight”.

*Amos 8:9*

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**Telescope for Sale** Celestron 8 inch Schmidt-Cassegrain on a wooden tripod and German equatorial mount. Various extras such as dew shield, moon and LPR filters and a half pillar to raise the telescope to a comfortable viewing height. Should suit anyone wanting a reasonably cheap, second-hand, hardly-used telescope.

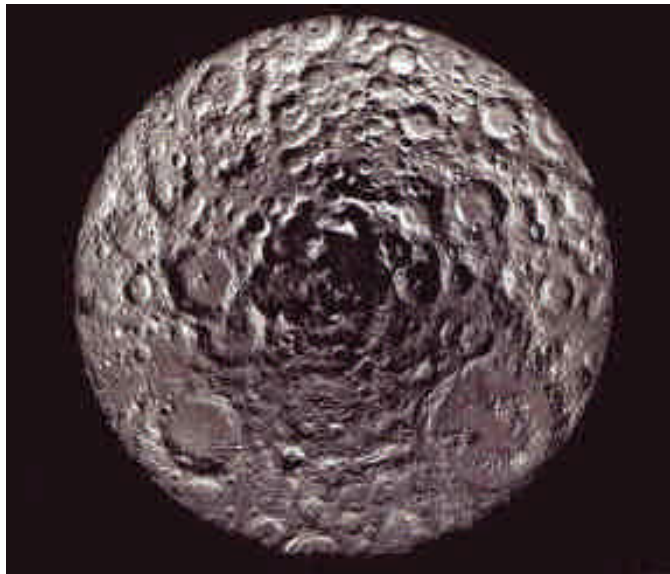
Please contact Brian Cooper on 0191 371 9106.

## The Back Page Pictures



Interviewed this month – John Borrett

And this month's Moon image. Can't remember where I got this one from.



This is an attempt to fool the experts. A clue is offered for the rest of us – if you think you have seen this in your telescope, you haven't. A further clue is that it is not the far side, or the dark side as some people call it.