



# The PRETORIA CENTRE

of the

## Astronomical Society of Southern Africa

[www.pretoria-astronomy.co.za](http://www.pretoria-astronomy.co.za)

## JULY 2004 NEWSLETTER

The next meeting of the Pretoria Centre will take place at Christian Brothers College, Pretoria Road, Silverton, Pretoria.

Date and time	Wednesday 28 July at 19h15
Chairperson	Michael Poll
AGM	(It will be short and sweet )
What's Up	by Tony Viljoen

+++++++ LEG BREAK - Library open ++++++

### Main Topic “South African Weather and Atmospheric Phenomena” by Dries van Zyl

The meeting will be followed by tea/coffee and biscuits as usual.

The next social & practical evening will be held on Friday 23 July at the Centre Observatory, which is also situated at CBC. Arrive anytime from 18h30 onwards.

### INSIDE THIS NEWSLETTER

LAST MONTH'S MEETING.....	2
LAST MONTH'S OBSERVING EVENING.....	2
ASSA SYMPOSIUM .....	2
NOTICE OF AGM.....	3
WATER ON MARS PART 1.....	4
EXPANDING UNIVERSE .....	6
ASTROPHOTOGRAPHY .....	8
PRETORIA CENTRE COMMITTEE .....	8

## LAST MONTH'S MEETING

by Pierre Lourens

Neville Young started by giving a quick review of the observations of the Venus transit at the University of Pretoria. Members of our Centre set up telescopes on the lawn in front of the "Ou Lettere Gebou". Interested people came to have a look through the telescopes. From the roof of the Physics Department, two members recorded the transit and made a regularly updated telecast of it on the website of the University. Neville showed several photographs of the proceedings and also images from the website.

Wayne Mitchell then went into the details of performing prime focus astrophotography. He explained the practical difficulties of doing this at length.

Johan Smit followed with What's Up. After discussing a few noteworthy astronomical phenomena that can be seen in July, he presented us with an interesting quiz. We had to guess which astronomical events occurred on

a certain date in July of some given year.

Barbara Cunow then gave us a talk on her observations of Saturn over a period of 24 years. She already started making these while still at school, after her parents gave her a 15 cm Newtonian reflector. She made all her subsequent observations of Saturn with the same telescope. She showed us sketches she had made of the planet and its ring system and the shadows they make on one another. These change all the time because of the changing orientation of the planet relative to Earth. The northern hemisphere was tilted towards Earth from 1980 to 1991, and the southern from 1993 to 2003.

She has published an article on this topic in MNASSA, vol 63 nos 5 & 6, June 2004, p.76.

She also discussed the mission of the spacecraft Cassini and the measurements the Huygens probe will make once it lands on Titan.

## LAST MONTH'S OBSERVING EVENING

By Johan Smit

About 12 people were present at the Pretoria Centre observatory. The 12" Newtonian was used to look at Jupiter, M6, M7, the Jewel Box and Omega Centauri.

## ASSA SYMPOSIUM

The Astronomical Society of Southern Africa will hold its 6th Biennial Symposium from October 14-16. The Thursday and Friday will be dedicated to paper sessions, and the Saturday will include visits to Broederstroom and HartRAO. The venue for the paper sessions will be the War Memorial Auditorium in Johannesburg, adjacent to the Zoo.

At this stage, there is a call for papers, and anyone prepared to give a paper should contact Brian Fraser at 016-366-0955 or [fraserb@intekom.co.za](mailto:fraserb@intekom.co.za).

**NOTICE of the  
ANNUAL GENERAL MEETING of the  
PRETORIA CENTRE of the  
ASTRONOMICAL SOCIETY of SOUTHERN AFRICA**

The AGM will be held during the July monthly meeting of the Centre. As usual, it replaces Beginners Corner and does not take longer than 20 minutes. At the AGM, the Chairman and Treasurer read their reports and the committee for the next year is elected. At its inaugural meeting, the new committee choose officers for the various portfolios.

Please do not avoid the July meeting for fear of a drawn out formalities and the chance of being bludgeoned onto the committee. Astronomy is our business, so we get the formalities out of the way as quickly as possible. We have sufficient nominations to make up a committee, as per the list below. At the meeting further nominations will be accepted. Objections can also be raised to any nominations. A vote will be taken on the final list of nominees.

The following members in alphabetical order have accepted nomination for election to the 2004/2005 committee:

Mauritz Geyser  
Lorna Higgs  
Wayne Mitchell  
Johan Smit  
Tony Viljoen  
Neville Young

Mike Haslam  
Pierre Lourens  
Michael Poll  
Johann Swanepoel  
Rynhardt van Rooyen

Further nominations will be accepted until the election.

The following committee members are standing down:

Tim and Janet Cooper are taking a breather from committee duties, but you will be glad to know they will still be centre members. Frikkie le Roux has clashing work commitments but remains a centre member.

**SKY GUIDE AFRICA SOUTH**

There are still copies of this guide for sale @ R40.00 for 2. Contact our Membership Secretary if you are interested.

## WATER ON MARS - PART 1. by Michael Poll

### Introduction

The first close up images of Mars came from the fly by of Mariner 4 in 1965. The images showed that Mars was not the “abode of life” imagined by Percival Lowell, nor was it the Mars of science fiction. The surface appeared battered, dry and lifeless, with a surface similar to that of our moon.

Since then a great diversity of surface features has been revealed by orbiting spacecraft. Mars has the tallest volcanoes in the solar system, and the most complex canyon system. Parts of Mars are crater free, indicating that erosion and redistribution of material has occurred within the geologically recent past.

### Water inventory

It has been difficult to estimate the volume of water on Mars. Originally attempts were made to compare the

abundances of Martian atmospheric gases with those on Earth, but the inventory of water on Mars derived by this method was very small – if all the water predicted was evenly distributed over the surface of Mars, it would be only 100 metres deep (compared with 3 km for Earth).

However, the inventory of water on Mars implied by atmospheric assays is at odds with the features seen on the surface, which suggest that a large reservoir of water existed throughout most of Mars’ history

### Surface features that are evidence of water activity

Since 1965, evidence of water, both past and present, has been found almost everywhere. There are scoured out depressions tens of kilometres wide (*Figure 1*), hundreds of kilometres long, and up to a kilometre deep. There are enormous channels, created by ancient



A large outflow channel, 20 km wide, emerges from the depression at left and continues eastward toward an even larger channel called Simud Vallis.

## WATER ON MARS - PART 1 continued

flood waters, and delicate gullies that may be fairly recent.

Most of the major out flow channels lie along a transition region between the highlands in the south and the lower lying northern plains. The features seen in these channels – their abrupt emergence from disrupted terrain, and the large areas of braided beds - suggest that they were formed by catastrophic floods.

### Proposal that there was a global ocean

Images from the Viking orbiters, which showed possible shore lines, led to the suggestion in the 1980s that Mars may once have had an ocean covering the northern plains. The plains are flat and relatively featureless compared with the heavily cratered highlands to the south. Altimetry measurements from the Mars Global Surveyor found that at least one of the proposed shorelines was at a constant elevation, and it has also been found that the plains are smoother below the proposed shoreline. The most likely explanation of these features would be erosion caused by a standing body of

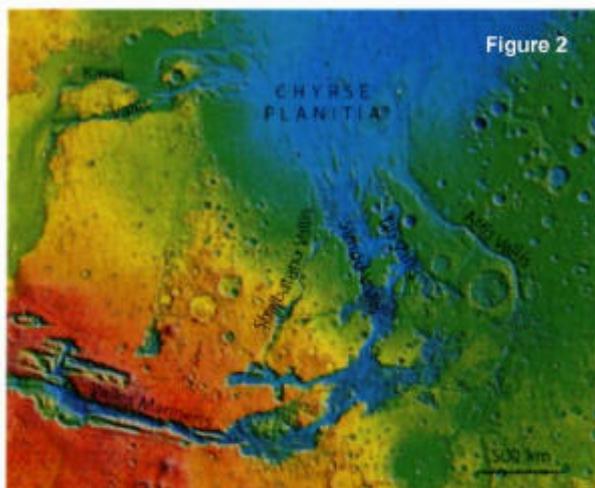
water. In addition, the great flood channels flow out on to the northern plains (*Figure 2*). These major channels, six in all, originate just to the north of the Valles Marineris canyon system, and empty out into Chryse Planitia, at elevations within 350 metres of each other, over a span of 2 200 km, and within an elevation within 180 meters of one of the proposed shore lines. The proposed ocean would have covered 27 000 000 square kilometres, with an average depth of 620 metres. The volume of water would have been about one third of that in the Atlantic Ocean.

### The case for an ocean early in Mars' history

One theory is that the ocean on Mars formed shortly after the planet formed. The argument for this is that, when the floods were most active, the southern highlands stood 4 kilometres above the lowest point of the northern plains. The water could only have been stored at such high elevations if it was confined under a thick layer of frozen ground, but early in Mars history the heat from the decay of radioactive elements within the crust would have prevented freezing. The primordial, still warm planet would have an unfrozen crust, or a crust that was frozen at the top, but not very deeply, allowing the water to drain naturally onto the northern plain. If the current north-south elevation difference existed early on, then a deep ocean would have existed.

### The case for formation of the ocean later

The original theory was that the ocean would have formed mid way through Mars geologic history. Repeated thawing of subsurface ice, possibly by volcanic activity deep within the crust, by impacts,



Throughout the middle of Martian geologic history, evidence suggests that catastrophic outflows repeatedly discharged huge floods onto Chryse Planitia ("Plain of Gold") from storage reservoirs in the planet's southern highlands. Similar events, elsewhere on the planet, may have occurred within the past billion years.

## EXPANDING UNIVERSE

by Harald Pauler

or by changes in the tilt of Mars axis would result in the outflow from the discharge channels. To get all this water onto the surface at any one time would require perhaps dozens of discharges over long periods of time.

Another theory for the outflows is that it was the existence of the ocean itself that led to the catastrophic floods 2-3 billion years ago. As Mars' internal heat dwindled, the existing ocean and the crust elsewhere started to freeze from the top down. Pressure from ice in the north forced deep lying water southward, and uphill into the southern highlands. However the frozen crust was still not thick enough to prevent hydraulic pressure creating breakouts at weak points. The floodwaters flowed northwards onto and under the existing ice slab.

### The gullies

It has been noted that possible water cut gullies exist inside crater rims and other steep slopes, and the origin and age of these gullies remain topics of intense debate. The gullies generally lie about 100 to 500 meters below the surrounding terrain and they are fresh looking, which suggests they may have formed comparatively recently. Opposition to this view states that the outer crust of Mars is frozen so solidly, any remaining liquid water would lie far below the surface, and in any case, the water that "created" the gullies would be so shallow that it would freeze. In addition, the locations of the gullies do not correspond to areas of geothermal activity, and they tend to occur most on poleward facing slopes.

*To be continued.*

Can we conclude that all objects in space which are observed with a red-shift effect, are moving away from us at an receding velocity, or is there another explanation to this phenomenon? According to some scientists (see following magazine report) there actually is. It is called 'tired light'. In simple words it can be explained that the frequency of light changes, if light is travelling far distances and through billions of years, through a not so empty space. It is continuously absorbed, diverted, filtered, refracted, subjected to gravitational forces and swallowed by black holes on its way and spat out as radiation. Could we be victims of an illusion, and based our knowledge of the properties of light on the assumption that nothing can change or influence the passage of light?

The following is a modified translation by myself from German to English of an article in a magazine called P.M. (web page: [www.pm-magazin](http://www.pm-magazin)) title 'The cosmos lives forever'.

"It is a dogma of cosmology that far away galaxies are moving away from us into infinite space and that their light appears to be red shifted. Yet there is another explanation: light gets 'tired', therefore it shifts to the red. This theory shatters our present vision of the universe. It has neither beginning nor end. The 'big bang' theory becomes obsolete and many unresolved mysteries get explained.

....light particles (photons) which are on the way for say 10 billion years are losing energy on the way, since they cannot lose speed (speed of light must re-

## EXPANDING UNIVERSE continued

main constant), the particles get 'tired'.

How does this establish itself?

.....energy is not related to the speed of light, but subject to the wavelength or frequency. Reference to Max Planck formula  $E=h\nu$  for a photon. The higher the frequency ' $\nu$ ', the more energy 'E' it possesses. Translated to the light: redshifted light is weaker on energy, blue shifted light has, because of its higher frequency, more energy. Example: infrared light which is harmless because of its lower frequency, compared to UV light which is dangerous because of its higher frequency. On the higher scale X rays are even more dangerous because of this very high frequency. On the lower end radio waves with their low frequency are totally harmless.

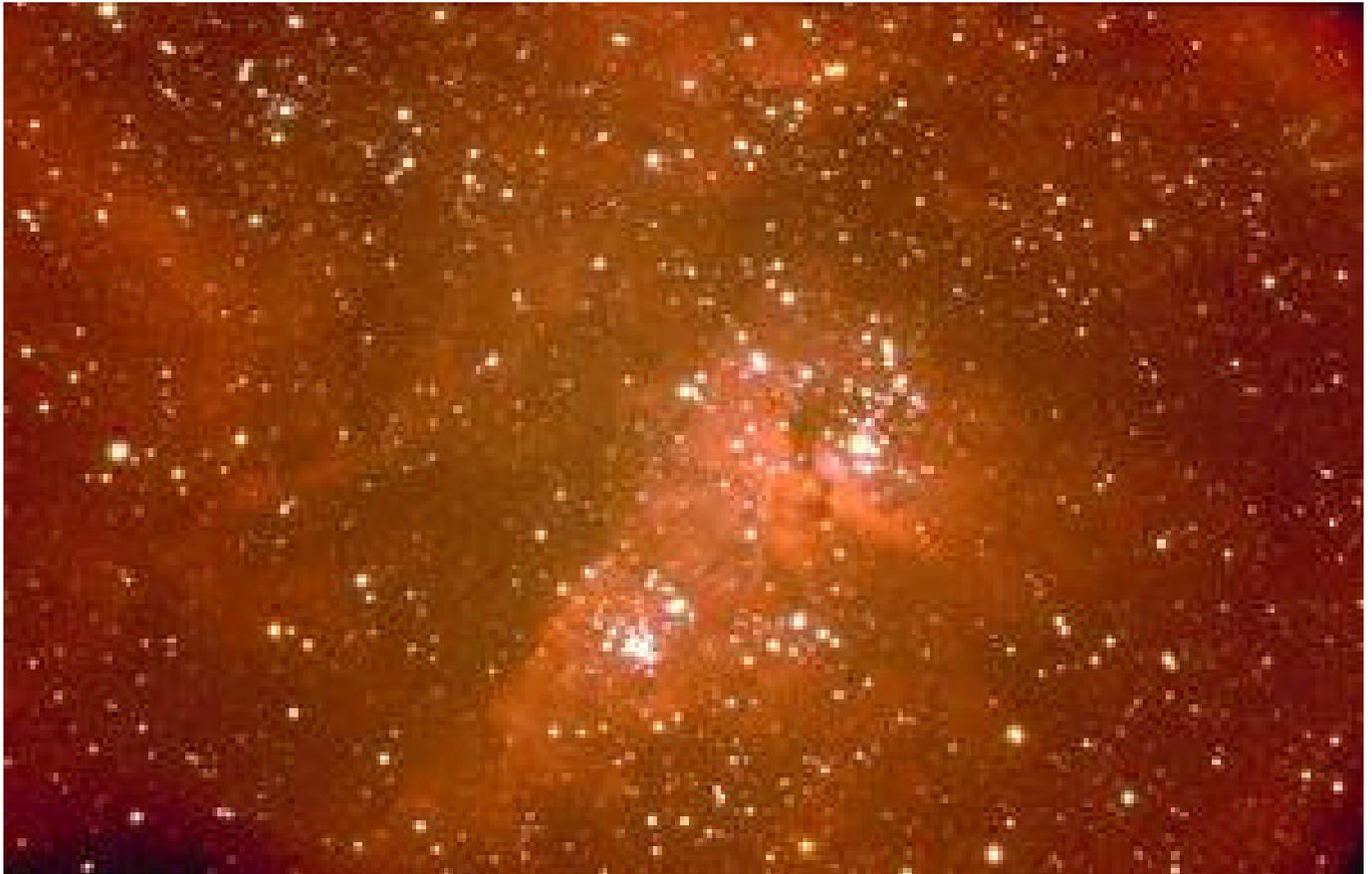
The astronomer Edwin Hubble discovered (1929) that light from galaxies shift more to the red, the further they are away from us. His colleague, Fritz Zwicky (astrophysicist), interpreted these findings already in 1929 as 'tiredness' of light, caused by refraction through interstellar & intergalactic matter and dust particles. Hubble later favoured this idea by saying that this hypothesis of 'tired light' was simpler and less irrational. Simpler and less irrational than what?

Fact is: the interpretation of the 'cosmological redshift' as 'tiredness' of light does not appear in any official declaration to describe the state of the cosmos. The whole world believes the redshift is the direct result of far away objects escaping from us, probably because of the other explanation, called Doppler effect: receding objects appear as redshifted and approaching objects appear as blue-shifted.

Science can thank the Belgian Catholic priest (and later cosmologist) Georges Lemaitre for the term 'big bang', since in 1931 he most probably was one of the first to come up with this theory. His idea was soon accepted in the scientific world for reasons of the then discovered redshift and further because it fitted well into the religious beliefs of the time. Any criticisms of this theory was later belittled and almost treated as dogma and it became virtually impossible to discard it without being called a heretic, mostly to the disadvantage of science."

Summarizing, the question of how light loses its energy while travelling through space, can be explained by three options: 'light refraction', 'gravity influence' with its absorption & re-emission and lastly the third option is too ludicrous to contemplate: 'expansion of space'. If space expands into 'hyper space', as followers of the 'big bang' theory state, all matter within this space should also have expanded. How much has our galaxy or, for that matter, our solar system expanded and further, how much bigger has earth grown because of this so-called 'expanding space'? The problem is: we will never know because all our scales of measurement or reference have also increased in size, so any attempt to answer this and any other questions about expanding space is irrelevant.

Any response to this article will be appreciated, whether positive or negative. Harald Pauler fax: 012 335 0397 or email: [haraldp@absamail.co.za](mailto:haraldp@absamail.co.za)

**ASTROPHOTOGRAPHY**

The Eta Carinae nebula and its surroundings. Photo taken by Wayne Mitchell, a committee member of our Centre. Exposure time: 10 min.

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