Hamilton Amateur Astronomers

Event Horizon

October 1998 Volume 5 Issue 11

The Three Wise Men

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You know, the more I travel, the easier it is to see how ethnocentric our history books really are.

Take ancient astronomy for example. If you ask someone to list some famous astronomers of yore, you'll probably hear names like Aristarchus, Ptolemy, Copernicus, and Kepler. It's right and good that these names stick in our memories. They were brilliant men and deserve recognition. Yet there are many other astronomers who are not commonly known, merely because they didn't live in the culture that gave rise to ours.

A case in point is that of China. This nation has had a long history of astronomical successes. For example, in 1054 A.D., astronomers in the Middle Kingdom recorded the nova that gave rise to the Crab Nebula. They noted the brightness of this "new star" and how it glittered for several months before fading from view. Yet the European record does not mention this astronomical event at all.

Chinese astronomical records also indicate that their observers were making remarkable discoveries long before their European counterparts ever drew breath. These ancient sages are known to have calculated the period of Halley's comet a full millennium before Halley himself saw the pattern, in a time when the gears of European science were slowed by religious persecution and the fall of Rome.

Yet during this dark time, on the other side of the world was well-lit -- a fact due in part to the astronomers of ancient China. Three men in particular are thought of as having made outstanding contributions. After reading about their lives, perhaps you will feel the same way.

Zhang Heng of the Eastern Han Dynasty

One of the premier intellects of the ancient world was undoubtedly Zhang Heng (78-139 A.D.). In his home country he is renowned for many things. First of all, he was one of Emperor An Ti's chief ministers. Beyond that, he excelled in writing and visual arts, in fact he is presently considered one of the four great painters of his era. To top it off, he was also the first man to invent seismograph and the odometer, or "mileage cart".

Yet Zhang's greatest contributions were in the field of astronomy. Intense powers of concentration allowed him to draw a detailed map of the heavens. His chart showed

Figure 1: Zhang Heng (79 - 149 A.D.) looking deservedly smug.

124 constellations consisting of a total of 2500 stars, 320 of which were bright stars with names. "This is not including [those] observed by sailors," he wrote. "Of the small stars, there are eleven thousand five hundred and twenty."

However, Zhang was not satisfied with his paper maps of the sky. When his charts were complete, hired craftsmen to build what may have been the word's oldest three-dimensional models of the heavens. The first globes were made out of bamboo strips, but eventually he commissioned a bronze version that was almost five meters in circumference. This in itself would have been a singular accomplishment, but Zhang took it one step further. He used the power of water to make his globe complete one rotation every

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inside...

Chair's Report

I would like to start this month's Chair's Report by thanking the council for the all the work they put in this year. Special thanks go to Rosa Assalone and Juliana Light for their last minute filling in for positions that went vacant due to people moving. On November 1st a new council will take over the duties of running the HAA. They say that time flies when you are having fun. This past year has gone by very quickly for me. It's hard to believe that the HAA will have its fifth birthday next month!

Before you buy yourself a telescope or accessory for Christmas make sure that you attend our December general meeting. We will cover subjects such as what to look for in a telescope, eyepiece filters, solar filters, choosing eyepieces, the best star charts and accessories that you can make for yourself.

There are two sites that I am recommending a visit to this month. The first one at ***http://liftoff.msfc.nasa.gov/realtime/jtrack/3d/JTrack3d.html*** is a really neat example of what can be done with Java. It is a simulation of 500 artificial satellites that are orbiting the Earth and you can choose the simulation speed. The next page at ***http://deathstar.phys.sci.chula.ac.th/~piak/astrmail.html*** is a list of astronomy related mailing lists. Among the lists is "NASA News" which covers NASA press releases and other information, "Online from Jupiter" gives updates about the study of Jupiter from NASA's Ames Research Center and "ATM" which is about Amateur Telescope Making. This page includes instructions on subscribing to these lists.

Don't forget about the upcoming meteor showers for October and November. The Orionids peak on the 22nd of October and the Leonids peak on the 17th of November.

Stewart Attlesey
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Editor's Report

There was an incredible response to my request for articles this month. Thank you, to everyone who contributed to this month's issue. So many people sent me articles that I couldn't fit them all in this month's newsletter. However, anything that did not fit will appear in the November issue.

Don't forget to check the calendar of events for a summary of the things happening in the next month so you don't miss out on anything exciting.

The deadline for the next issue is

Friday, November 6th. You can e-mail your articles and pictures to me at ***assalor@mcmaster.ca*** or call me at 540-8793 for alternative arrangements.

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HAMILTON AMATEUR ASTRONOMERS

Event Horizon is a publication of the Hamilton Amateur Astronomers (HAA).

The HAA is an amateur astronomy club dedicated to the promotion and enjoyment of astronomy for people of all ages and experience levels

The cost of the subscription is included in the $15 individual or $20 family membership fee for the year. Event Horizon is published a minimum of 10 times a year.

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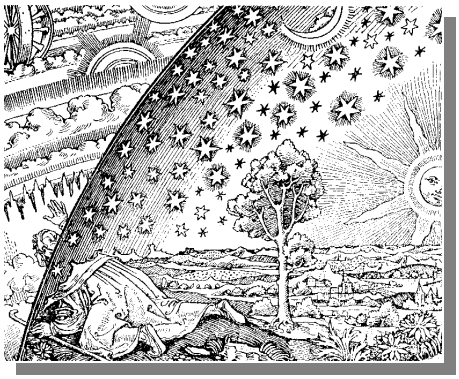

HAA Fall Star Party

For those of you who didn't show up at the HAA fall star party, this is what you missed. I have been observing for about 11 years and the conditions at Silent Lake were the best I have ever seen. I will go one step further and say that the conditions were spectacular. There was no wind, the temperature was comfortable and there were no bugs.

We knew that the sky was really dark so we checked the RASC handbook, which has a guide to rate the transparency. Each of us who tried was able to see the faintest star listed, which was magnitude 7.4! The Veil Nebula in Cygnus was easily visible in my 70mm f/6.8 at 14X with no filter. We may have glimpsed M33 naked eye but I wouldn't swear to it. At one point after midnight on Friday Atilla Denko, from the Ottawa Centre of the RASC, asked if we wanted to see Jupiter in his 25" Obsession that was equipped with binoviewers. He suggested that it would be worth losing our dark adaption. I wasn't prepared for what I was about to see. I have N*E*V*E*R seen such a spectacular view of the planet. It was like looking at the finest colour drawing. Of course, I had to see what my 20" scope could do. Jupiter wasn't as good as I expected so I decided to check my collimation. It was way off even though I had collimated it when it was first set up, as is my usual practice. Since then I have noticed that during the night collimation goes off and needs to be checked periodically. Before you get concerned about your Newtonian scope there are a couple of factors that contribute to this. A truss tube design means the scope is set up just a little different each time, which makes it necessary to collimate the scope whenever it is put together. On Obsession telescopes a nylon sling is used to radially support the mirror and this sling changes length with variations in temperature and humidity. With help, touching up the collimation takes only seconds so it is no real hardship. After that I was happy with the view. At 280X Jupiter was rock steady in the viewfinder. Jupiter's Great Red Spot was actually a dark rimmed pale oval with a small off-centre deep orange spot. There were 3 smaller spots leading away from the Great Red Spot. Another obvious feature was a large festoon on the North Equatorial Belt. Saturn at 375X looked wonderful, with pale brown banding on its "surface". You could drive the proverbial truck through the sharp edged Cassini's division. The B ring, which sits on the inside of Cassini's division, clearly displayed gradations in brightness and the C or crepe ring was obvious to me for the first time. When conditions are this good the time really flies. The first night we were up until 5 am. On Saturday night conditions weren't quite as spectacular but still better than anything you can see close to Hamilton. We only stayed up until 4am that night. As you can imagine, staying up late means that you don't get too much done during the day. In a way that's a shame since Silent Lake is such a nice provincial park.

Members of other clubs in southern Ontario outnumbered those of us from the HAA who went to Silent Lake. We had more inches of aperture per attendee than most star parties, with two 20" and one 25" scope plus other assorted scopes. We will repeat both our spring and fall star parties in 1999 so watch for the notices in Event Horizon.

Stewart Attlesey
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Magazine Discounts for HAA Members

As a member of the Hamilton Amateur Astronomers you are eligible for subscription discounts for the following magazines:

Sky and Telescope: $37 U.S. funds per year (12 issues)

Astronomy Magazine:$35 U.S. funds per year (12 issues)

The regular rates for Canadian subscriptions are:
Astronomy Magazine: $50 US
Sky and Telescope: $ 46.95 US

That's a savings of $10-15 US or $15.50-23.25 CDN!!

If you are interested in subscribing to either of these magazines or wish to renew an existing subscription at club rates, please contact Ann Tekatch at 575-5433. You need to fill our your subscription form with either an enclosed US money order, or with your VISA number filled in. All orders must be given to Ann, who will send them on to the appropriate magazine.

It's a Girl!

On Saturday, September 12, 1998, at 5:30am, Ann and Bill Tekatch became the proud parents of Alexandra Michelle Tekatch. She weighed in at a

Rob'serving Report

I'm glad to be coming back in November as observing director after a year's absence. Weather willing, let's make it a record year for observing at the Binbrook Conservation Area. Remember, you don't need a scope to participate! On Fri., Sep. 18, we had 8 people and 2 telescopes - it worked out just great. Besides, what better way to find out what kind of scope you might want to buy for yourself?

Binbrook observing nights are scheduled for the Fridays and Saturdays just before and after New Moon each month. See calendar and map handout for 1998. The calendar for 1999 is in the works and will included in the December issue of "Event Horizon". Call Rob Roy at 692-3245 for local weather conditions and to confirm. If you have any ideas for observing events for the upcoming year, please call or e-mail me: <***royrg@mcmail.cis.mcmaster.ca***>

As you read further, you can guess what one of my favourite objects is- Jupiter. I'm going to include Jupiter's Satellite and Red Spot Phenomena for as long as it's vis ible. PLEASE make use of the data- all of the hard work has been done for you! For your ease and convenience, times have been converted to Eastern Daylight Time (EDT) or Eastern Standard Time (EST) after Oct. 25. Now you have a good reason to carry your EH with you whenever you go observing.

Jupiter's Satellite Phenomena

Having just passed opposition on Sep. 15, Jupiter is visible for most of the night and has been spectacular! Possibilities are: a TRANSIT of a satellite or its SHADOW across the face of the planet, an OCCULTATION as it passes behind the planet, or an ECLIPSE by Jupiter's shadow.

Starting with this issue, shadow transit times will be listed which occur between evening and morning twilight. Times are converted to EDT or EST. The first time is the start of the shadow crossing (ingress) and the second is the end (egress). *- only one of the shadow's ingress and egress times may be listed when the other occurs before evening twilight or after
Jupiter has set.

A window of UT (Universal Times) will also be given so you can search in "Sky and Telescope" and in the "RASC Handbook -1998" for other events you may wish to observe. Events on either side of this window occur either before evening twilight or after Jupiter has set. To get your local EDT subtract 4 hours from the UT shown for each event until Oct. 25 after which you subtract 5 hours.

Oct 12 Io 04:15 EDT ---> *
13 Ganymede 19:51 ---> 23:02
14 Europa 01:00 ---> 03:40
15 Io 01:43 ---> 02:58
28 Ganymede 02:55 ---> *
28 Callisto 21:45 ---> 23:07
29 Io 03:34 ---> *
30 Io 22:03 ---> 00:18 (31st.)
31 Io * ---> 21:08

Nov 06 Io 23:59 ---> 02:13 (7th.)
07 Io 21:05 ---> 23:44
08 Io * ---> 22:42

For other events, search the table in the "RASC Handbook", page 165-6, between 00:00-08:00 UT until Oct. 25 between 01:00-07:00 UT afterwards. Jupiter is setting earlier each day. "Sky and Telescope" includes Jupiter's satellite phenomena in their monthly issues. It's great stuff to observe. Have fun!

Jupiter's Red Spot

I don't usually include times for the transit of the red spot across the centre of the disk (the meridian), but I'm going to as long as it remains visible and so spectacular. After each date the meridian transit time is given in (EDT or EST) to the nearest hour AHEAD, so you will see it near but not necessarily on the centreline of the disk. Because Jupiter's day is less than 10 hours, you often may have two transits in one day (morning then evening) or two per night on consecutive days (evening then morning). If you want exact transit times, "Sky and Telescope" lists them in Universal Time for each day of the month.

Oct 11(12am)(8pm), 13(1a)(9p), 15 (11p), 18(12a)(8p), 20(2a)(10p), 22 (11p), 25(1a)(9p), 26(6a), 27(9p), 29(11p), 30(7p)

Nov 1(1a)(9p), 3(2a)(10p), 6(12a) (8p), 8(2a)(10p), 10(11p), 11(7p), 13(1a).

Monthly In-Sights

October

- 18- Moonless two-week period for seeing Zodiacal light in the eastern sky before dawn.
- 19- Orionid meteor shower (visible only after 11pm)lasts for about one week peaking on Oct. 22 at 3am.
- 20- New Moon
- 23-3pm Saturn at opposition.
- 25- Daylight Time ends, Eastern Standard Time begins.

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November

- 03-2am S. Taurid meteor shower peaks.
- 04- Largest Full Moon of 1998.
- 05- Aldebaran occulted by the Moon. 7:31-7:56pm.
- 11- Mercury at greatest elongation, 23 degrees east of the western dusk
- horizon.
- 13-1am N. Taurid meteor shower peaks.
- 17-Possible Leonid meteor STORM!

- Mercury is an evening "star", visible in the Nov. western twilight sky, reaching its highest elevation on Nov 11.
- Venus is too close to the Sun for observation until Jan. 1999.
- Mars rises after midnight in Leo. Very small diameter- not much of a telescope object.
- Jupiter is visible in the evening until around 2am. Spectacular! Stationary on Nov. 14, after which it resumes direct eastward motion.
- Saturn is visible all night long. At opposition on Oct. 23 its 20" disk is the largest in over a decade. That and the appreciable tilt of the rings make it a nice fall object! Try to find the Cassini Division close to the outer edge of the rings. The three smaller satellites Rhea, and especially Dione and Tethys are challenges for small telescopes.
- Neptune & Uranus are a bit west of Jupiter in Capricornus in the evening sky.

Rob Roy

The next meeting of the Junior group is Tuesday, October 20th, 1998. If you know of any child under the age of 12 who is interested in astronomy, this is the group for them.

The group meets once a month on the third Tuesday at 7:00pm. Meetings are held in McMaster's Burke Science Building in room B148.

For more information call Rosa Assalone at 540-8793.

Did you know that....

Jupiter takes 12 years to circumnavigate the Zodiac, spending about one year in each constellation as it travels eastward.

Internet Searches in Astronomy

by Ray Badgerow

This article is about something I did a little while ago ,as I thought about something to write about.So I did some searches for various topics at the Astrophysical Data System (ADS) at ***http://adswww.harvard.edu/ads_services.htm***. This is a sample of what I did in only a half-hour while in the Mohawk College computer room.

Topic	Time Period	# of Articles
Space Missions:		
Viking Mars Mission	1976- present	2147
Voyager Mission	1979- present	2606
Galileo Jupiter Mission	1995- present	2175
Hipparcos	1993- present	336
Hubble Space Telescope	1990- present	7353
Mars Pathfinder	1992- present	2191
Comets:		
1P/Halley	1982- present	2387
P/ Shoemaker-Levy 9	1993- present	2706
C/1996B2 Hyakutake	1996-present	1567
Extrasolar Planets	1982- present	26928
	1995- present	5189
Doug "Macho Man" Welch	1982- present	137

Wise Men....
(continued)

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year, showing how the positions of the stars changed from one winter solstice to the next. Zhang Heng's invention is known as the water-powered celestial sphere.

By adding a few additional gears, Zhang was able to drive a pillar that demonstrated the waxing and waning of the moon. Remarkable, if one takes into account that Zhang Heng believed in an earth-centered universe. In one of his classic texts on the nature of the sky, he wrote that the heavens were like an egg with the earth in place of the golden yolk.

However, there were two other cosmologies known to the ancient Chinese. One stated that the earth was a large square, 400 000 kilometers on a side and the sky was a spherical canopy that rotated counterclockwise while the sun and moon moved in the opposite direction. A third theory boldly asserted that the sky had no fixed shape and the celestial bodies merely floated around in it.

Zhang Heng did not subscribe to this last view. Instead, his cosmology was like the value of 3.1622 which he once obtained for pi -- a good approximation and remarkable for its time, but not entirely accurate. Of course, the same may one day be said of Einstein's work.

Zu Chongzhi, Astronomer and Mathematician

Another great scholar who was concerned with finding the value of pi was Zu Chongzhi (429-500 A.D.). From a very young age, he was interested in astronomy and mathematics. Legend has it that when he was ten years old, Zu accompanied his father on a trip to a construction site, which it was his father's job to oversee. As they returned from the trip, young Zu wondered why the moon was so much thinner than when they had set out two weeks ago. The elder Zu did not know the answer, but gave his son a book to read. It was an astronomy text written by none other than Zhang Heng.

Zu's father fostered his son's interest in the stars by apprenticing him to He Chengtian, a learned man of the time. While studying with Scholar He, Zu noticed a discrepancy between a sundial's shadow and the official calendar then in use. His master agreed that the calendar had its problems and together they gathered enough data to correct them. He Chengtian's new system was called the Yuanjia calendar.

Yet even this calendar was not completely accurate. By the time Zu Chongzhi was a mature man, he noticed that it could not account for some of the solar eclipses so important to the imperial court.

Zu was successful in producing a new system, but, as so often happens in astronomy, the new idea got tangled up in red tape. Ministers of the imperial court spent two years arguing about whether they should use the new Daming calendar and might have gone on even longer if the emperor of the time hadn't passed away. With the death of the old emperor, discussion of what to do with the Daming calendar was postponed indefinitely.

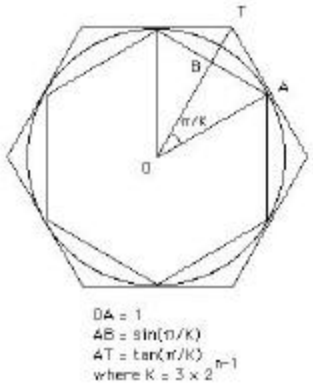

Figure 2: The method of polygons used by Aristarchus and Zu Chongzhi to approximate a value for pi.

But Zu Chongzhi wasn't disheartened by this setback. Instead, he turned his attention to calculating a value for pi. Zu wanted to see if he could obtain a more accurate value than Zhang Heng had done.

To perform the calculation, Zu Chongzhi used a method of polygons. This geometrical scheme was strikingly similar to the argument Archimedes used to achieve his famous result 223/71 < pi < 22/7. It was unlikely that Zu knew of Archimedes' work. Still, Zu understood that the circumference of a hexagon was equal to exactly three times its diameter. But if he cut off the corners off the hexagon and made it into a dodecagon, that ratio became slightly larger than three. Zu Chongzhi painstakingly drew and

Figure 3: A five yuan commemorative silver coin depicting Zu Chongzhi. To the left is a diagram similar to Fig. 2.

measured a polygon with 192 sides, eventually finding pi to be equal to 355/113 or 3.1415929, a value which is correct to six decimal places. Such precision was not surpassed until until the 15th century A.D., when Al'Kashi, a native of Samarkand (now Uzbekistan), calculated pi using a similar method.

Although Zu Chongzhi's perseverance in deriving pi is exceptional, it is even more astonishing when one considers that his work predated even the abacus. Zu had to do all his calculations using nothing more than wooden counting sticks.

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It was mainly for this contribution that Zu Chongzhi received a singular honor. He is one of the few Chinese mathematicians to have a lunar feature named after him. Crater Zu Chongzhi (listed in the IAU's handbook as Crater Tsu Chung Chi) is 28 km wide and is located about 20 degrees north of the moon's equator.

However, despite his mathematical victories, Zu Chongzhi never saw his Daming calendar put to use. It took years of effort by Zu's dutiful son before the calendar was at last recognized, a decade after his father's death.

The Brilliant Monk Yi Xing

Yet even though the Daming calendar was as accurate as Zu could manage, it too contained errors. Eventually it fell into disuse. Other calendars came and went, but they were little better than the one created by Zu.

By the year 721 A.D., the calendar was again in serious need of reform. The emperor at the time once waited an entire day for a solar eclipse so he could perform important rituals. When the predicted eclipse did not occur, the emperor was furious. The monarch promptly gave his advisor Yi Xing the job of revising the faulty calendar.

Yi Xing decided that he needed to take a detailed survey of the sky. However, the great bronze instruments used by previous court astronomers had been so neglected that they were no longer adequate. Yi enlisted the help of one Liang Lingzan to help build new ones. The learned men collaborated for four years and at last came up with a new type of instrument: the ecliptic armilla.

The device was cast in bronze. Its enormous weight was offset by carefully filling its various hollow parts with water. When perfectly balanced, the armilla was said to have responded to the touch of a finger. The device had several nested sets of circular rings. With them, Yi Xing and Liang Lingzan could determine the true solar time. They could also calculate the declinations of celestial objects and measure differences in right ascensions.

The two men also built a water-driven celestial sphere. It was based on Zhang Heng's design, but included separate tracks for a model sun and moon. These two orbs were calibrated so that they would circle the bronze globe once every 29 days and once every 365.25 days respectively.

With these instruments, Yi Xing was able to get more accurate data on the movements of celestial bodies. He finished the first draft of his new Dayan calendar just before his death in 727 A.D. The Dayan calendar was so accurate and well-organized that it remained in use until the sixteenth century A.D.

A century later, Jesuit missionaries brought European astronomy to China. For the first time in history, astronomers from the west and the far east began to exchange ideas. And as you'll see in next month's Event Horizon, it wasn't a one-sided flow of information.

Notes on Pronunciation:

Perhaps another reason why we don't often talk about Chinese astronomers is that there names are so hard to say! Try wrapping your tongue around these three names using the guide below.

*"**Zhang Heng**"*
zh : like the j in "judge" but with the tongue curled towards the back of the mouth
a : like the a in "father"
e: like the u in "blur"

*"**Zu Chongzhi**"*
z: like the ds in "suds"
u: like the u in "flute"
ch: as in English, but with the tongue curled back
o: like the o in "or"
i: like the ee in "meet"

*"**Yi Xing**"*
x: like the sh in "shine"

HAA E-mail Checklist

On Mon., Oct. 5, an e-mail notice was sent out so we can check and update our membership's e-mail address book.

If you DIDN'T get this notice it's because:
a- you're not on our list
b- you're on the list but we don't have your correct address
c- you don't even own a computer and furthermore you don't give a hoot!

If you fit into a or b and want to be included in notices sent out for events such as BCA observing nights or meeting dates and speakers, please send a message to ***royrg@mcmail.cis.mcmaster.ca*** and he will add you to the the address book.

Rob Roy

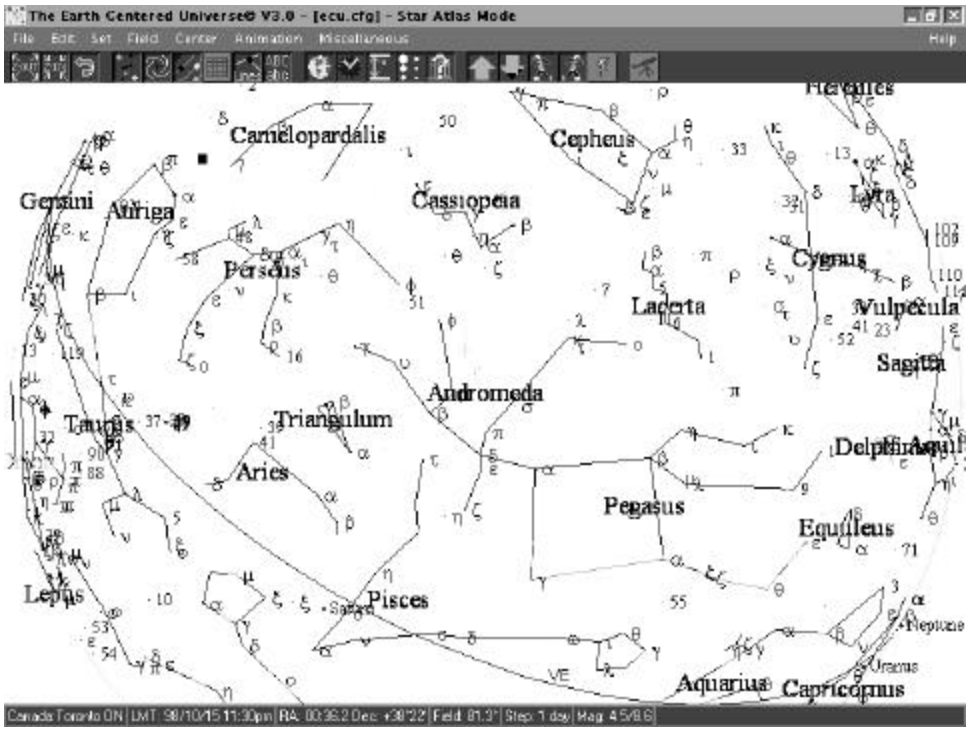
Constellation of the Month - Andromeda

by Margaret Walton

In our summer issue we heard the story of Cepheus. Andromeda is the daughter of King Cepheus and Cassiopeia. Cassiopeia claimed that she and Andromeda were the most beautiful in the world. This angered the gods and they demanded that Andromeda be sacrificed to the sea-monster Cetus. The form of the constellation is that of a chained Andromeda waiting for the sea-monster.

Perseus, who defeated the sea-monster, rescued her (more on this story next month, when Perseus is the constellation of the month).

In Mesopotamia, this constellation was dedicated to the Egyptian goddess of love and war, Astate. Astate was worshipped in temples located along the shores of Palestine, the same shore that saw the chained Andromeda.



Stars

Gamma - this is a beautiful double star. The brighter of the two is golden yellow or light orange, while its companion is greenish-blue. The companion is itself a close double.

Objects

M31 - The Andromeda Galaxy. This spiral galaxy is only 2.2 million light years away and is easily seen through binoculars and even naked eye. It has a magnitude of 3.5 and the NGC rates this (!!!). This galaxy has 4 visible companions described below.

M32 - This is a bright, large round galaxy with a magnitude of 8.2. It is a companion to M31 and is the smallest of the Messier galaxies. The NGC rates this (!).

M110 - This is another companion to M31. It is bright, large and somewhat elongated, with a magnitude of 8.0. It was not an original Messier object, but was added in 1967 by K. Glyn Jones.

NGC147 - This companion to M31 is a very faint, very large irregular/round galaxy with a magnitude of 9.3. It is physically paired with NGC185.

NGC185 - Another companion to M31, this is a bright, large round galaxy with a magnitude of 9.2.

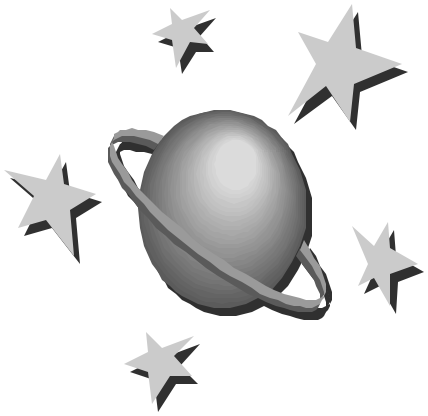
NGC404 - This is a bright, large round galaxy with a magnitude of 10.1.

NGC752 - This binocular object is an open cluster with about 60 stars. It is extremely large and has a magnitude of 5.7.

NGC753 - This is a bright, large round galaxy with a magnitude of 12.4.

NGC891 - This is an edge-on spiral galaxy with a broad dust lane. It is very large and very elongated. The NGC rates this (!).

NGC7662- The Blue Snowball - This is a bright planetary nebula that can even be seen through binoculars. It is very bright, small, round and quite blue. It has a magnitude of 8.3 and the NGC rates this (!!!).



COLLIMATE! COLLIMATE! COLLIMATE!

- by Rob Roy

What's the nicest thing you can do for your scope? In one word - Collimate. I used to think that my 8"/f10 SCT was quite well collimated; just a few weeks ago I had tweaked it a bit again. Lately there has been a lot of traffic on one of the Internet mail-lists about a 3-hole focusing and collimation mask. I have a 2holer which can only be used for focusing, but I thought would take a few minutes to make a 3-holer.

Essentially I made a disk of cardboard to fit in the large end of my scope and I cut three 1&3/8" holes near its outer edge 120 degrees apart. I also cut a central hole large enough to fit the mask over the secondary mirror support so I could easily get at the collimation adjustment screws at the front.

In use, when a fairly bright star (I used Altair) is out of focus you see three star images in the form of a triangle. As you approach focus, the three images converge. The three will only sit exactly on top of one another if the collimation is bang on. Mine was a little off. After some minor turning of the collimation screws, I thought, "If three little square inches didn't focus all in one spot as they're supposed to, imagine the visual mess that 64 non-concentric square inches would make!"

After careful collimation using this mask, I took my scope up to 454x (a la Sears $99 Saturday night special!) and for the first time was able to split a binary pair 0.8 arc seconds apart. "But an 8" scope is supposed to resolve 0.56 seconds.", you say. Not an SCT with a 14% central secondary obstruction! I am thrilled to get my scope to this point.

Do your scope (and yourself) a favour and make a 3-hole mask to collimate your scope. You'll be amazed at the difference.

RASC Calendars and Observer's Handbooks

The Observer's Handbooks and RASC calendars have been ordered and will be available at a future meeting. Handbooks will cost $14 and calendars $8. At these prices, they won't last long! Buy yours early!

CALENDAR OF EVENTS

- Tuesday, October 20th, 7:00 pm — **HAJA MEETING** - McMaster Burke Science Building, room B148. For more information contact Rosa Assalone at 540-8793.
- October 16, 17, 23, 24, 8:00pm — **BINBROOK OBSERVING NIGHTS** - For confirmation or directions call Rob Roy at (905) 692-3245.
- Wednesday, October 28th, 7:30pm — **HAA COUNCIL MEETING** - At the home of Rob Roy.
- Friday, November 13, 7:30pm — **HAA GENERAL MEETING** - At the Spectator Building auditorium.
- November 14, 20, 21, 8:00pm — **BINBROOK OBSERVING NIGHTS** - For confirmation or directions call Rob Roy at (905) 692-3245.
- Tuesday, November 17, 7:00pm — **HAJA MEETING** - McMaster Burke Science Building, room B148. For more information contact Rosa Assalone at 540-8793.