

* Event Horizon *

Volume 2 Issue 8

June 1995

Editorial

I find it difficult to type and scratch my mosquito bitten body at the same time. Ah, the price one pays to play out under the stars. A few of us have started to hunt for some of the brighter Herschel objects, which seem to be quite a challenge for my 6" f6 reflector. One object that stands out in the crowd is NGC6144, maybe because it makes a pretty picture nestled along side M4. Charles was rambling through the astronomy newsgroups and noticed a fair crowd of amateurs focusing on this particular faint fuzzy. It was adequately described as "strictly a threshold observation" which I could truly relate to. This gives me even more encouragement to finish polishing my second 8" mirror. (The first had to be masked down to a 7" due to haze around the edge) Live and learn!

In the past two months, we received another 5 memberships to our club. We are pleased to welcome Ed Bertoli, Tom Wingfield, Ken Wall, Rick MacDougall, and long time friend John Gauvreau to the gang. Actually, there's a special place in my heart for John; he was my astronomy teacher who formally introduced me to the wild world of stargazing.

Oh yes, I should mention, we plan to have a "Summer Issue" of Event Horizon. It will depend on the amount of articles that are sent in. I'll make the **DEADLINE JULY 15TH**, and let's hope that we can pull something together, even if it's a little thinner than usual. Thanks to those who came together this month to appease your hysteric editor.

Patricia Marsh

Chair's Report

Here we are at the end of the season already! Actually, it's only the end of the *formal* season, not the business season. It seems that some bright bulb has decreed that the HAA year should run from November to November, rather than the usual September to June. In retrospect, I suppose this is logical because the heavens don't turn out the lights for the summer.

Membership continues to grow in a variety of ways. Ottawa members **Peter Ceravolo** and his wife **Darlene** presented the HAA with a brand new baby boy, who of course is an astronomer in the making. There is even a rumour that Peter has bought his son his first six-inch mirror blank. Closer to home, **Patty** and **Charles Baetsen** are eagerly awaiting their new member, who is due to arrive about the time of our annual camping excursion. Well timed, kids!

In fact, this is an exciting time for two other members of our Ottawa contingent, as **Rob Dick** and **Jeannette Southwood** have finally tied the knot! The relationship between the HAA and Rob and Jeannette is so close that we

were invited to share in their honeymoon at the Perth Observatory. In spite of the antics of honeymoon hecklers, it has been reported that the newlyweds are still in love.

Congratulations and best wishes to all of you from your friends in the HAA!

Yesterday, the combined picnic for the **Hamilton Centre of the RASC** and the **Hamilton Amateur Astronomers** was held at the Les Powis Observatory. While the rain kept the crowds down, it certainly didn't dampen the enthusiasm or appetites of those who attended. At the end of the event, we all looked like well-fed drowned rats. Standing as I do overlooking a gargantuan middle, I must confess that I resented watching **Richard Petroni** consume half a cow without so much as a telltale bulge. I gain weight eating lettuce! Since we had such a great time, we all agreed that we should do this again; the suggested date is this coming September.

Meanwhile, there are some special events planned for this summer. On the weekend of June 24 and 25, our **Second Annual Star Party** will be held at a glider field north of Fergus. We've already had enquiries from local clubs wanting to attend, as well as two

Inside This Issue

- | | |
|---|--|
| <input type="checkbox"/> HISTORY OF SPACE FLIGHT Pt 2 | <input type="checkbox"/> BARGAIN BACKYARD BINOCULARS |
| <input type="checkbox"/> H.A.A. 2ND ANNUAL STAR PARTY | <input type="checkbox"/> CEPHEIDS OF MACHO |
| <input type="checkbox"/> PLANNING YOUR OBSERVING Pt 2 | <input type="checkbox"/> OFF THE BEATEN PATH |
| <input type="checkbox"/> SKYNEWS | <input type="checkbox"/> WHAT'S YOUR I.O.? |
| <input type="checkbox"/> GREEK IN THE ROUND | <input type="checkbox"/> GATEWAY TO THE UNIVERSE '95 |
| <input type="checkbox"/> ELECTRICITY IN THE FIELD | <input type="checkbox"/> WM. J. McMALLION |
| <input type="checkbox"/> POLE TO POLE | <input type="checkbox"/> CALENDAR OF EVENTS |

commercial ventures that wish to set up displays. Oh, dear! What started out as a bunch of us seeking clear skies seems to be taking on a life of its own! **Ann Tekatch** has commented that lately, every time she looks into her mirror, the ghost of **Andreas Gada**, like that of Dickens' Christmas Past, stands behind her with hand outstretched, imploring her to turn back before it is too late.

Last year, a small contingent of the HAA turned up at the **Huron Star Party** and had a wonderful time. As in Hollywood, one success almost invariably spawns a sequel. This year's party is being held July 27 to 30. An expanded group of us is planning to attend; please call me at (905)627-3683 if you wish to join in this revelry.

Starfest, the granddaddy of the star parties, will be held August 25 to 27 at River Place north of Mount Forest, Ontario. In 1994, about 30 HAA members attended this event. Since we have our own hill on the grounds, there is plenty of room for setting up tents and gear, so don't be shy! It's much more fun than staying home to cut the grass, and the skies are beautiful! For details, come to the June meeting of the HAA.

For those of you who *like* cutting grass, there will be many evenings of observing, heady conversation, and doughnut quaffing right here in Hamilton-Wentworth. If you are interested, be sure to give your name to either Ann Tekatch at (905)575-5433 or Rob Roy at (905)692-3245. This way, when the skies are clear and the shout of "stars!" goes up, you'll be called.

And finally, if you still miss your astronomy cohorts even after three star parties and innumerable observing jaunts, log on! Our Web page (<http://www.science.mcmaster.ca/HAA/index.html>) contains the tree-friendly form of *Event Horizon*, our calendar and general information, plus links to astronomers around the world. If you haven't a browser, check out the Hamilton FreeNet service, which is now carrying our home page as one of their features.

So, while you sit in your garden, sipping mint juleps and contemplating the universe, give a little thought to me, your poor Chair, who at this moment is beating the bushes searching, yea, crying out for, exotic speakers for next season.

Grant Dixon

Chair

e-mail

"dixon@dogwood.physics.mcmaster.ca"

A Brief History of Space Flight: Part II-The Race for the Moon

Early on in the Space Age, the Soviets began focusing on the moon and the rest of the solar system. On 2 January 1959, the Luna 1 probe came within 5 000 km of the moon's surface, but unfortunately it became the first artificial satellite of the Sun. Later, Luna 2 was launched on 12 September 1959, and landed near the crater Archimedes. A third probe, Luna 3, was the first satellite to photograph the far side of the moon. Its magnetic measurements revealed that the moon has little or no magnetic field. On February 1961, the first attempt to send a satellite to another planet was made. Venera 1 was sent to Venus, Earth's closest neighbour. Venera 1 failed, however, because its radio communications link went down (things don't change much do they!).

The rockets used in America were derivatives of Germany's V-2 rocket. They were tested in New Mexico in hopes of making a intercontinental ballistic missile (ICBM). Safety precautions were almost non-existent.

One V-2 made an unauthorized visit to Mexico, landing on a cemetery in Ciudad Juarez! An international incident was averted only because it was Fiesta time, and the revellers roared with appreciation at the new firework.

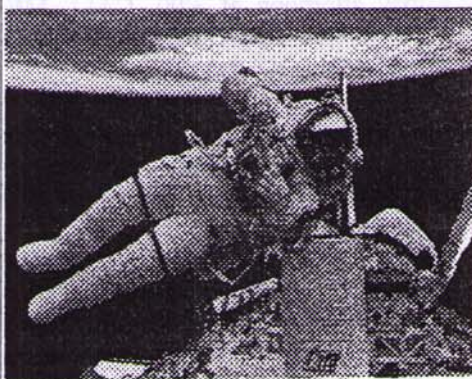
Werner Von braun, who was employed by the US Army, later joined the newly formed space administration NASA in 1959. There he started work on "Project Mercury", which was to put the first American in space. The Mercury space craft had to withstand the shocks of take off, the heat of re-entry, and the orbit in between. At first, mice and then chimpanzees were sent up to determine the effects of their ordeal. While project Mercury was on, NASA was also developing its moon-landing program Apollo. Little more than a month after Gargarin's flight, on 25 May 1961, President John F. Kennedy gave his historic speech, "I believe that this Nation should commit itself to achieving the goal, before the decade is out, of landing a man on the moon and returning him safely to earth". On 5 May 1961, Alan B. Shepard became the first American in space. He flew in a Mercury-Redstone rocket combination. He did not however go into orbit but made only a ballistic shot. He experienced only about 5 minutes of weightlessness, and the entire trip lasted 15 minutes. Later on 20 February 1962, John Glenn Jr. became the first American to orbit the earth. He made only 3 orbits. Instead of the Mercury-Redstone combination of Shepard's flight, "Friendship 7" was launched in a Mercury-Atlas configuration. Atlas rockets are still used today to place payloads in orbit between shuttle flights, because of their reliability. When Glenn was re-entering the earth's atmosphere, his capsule tumbled due to a defective thruster and a wandering gyroscope. He had to take control of his tumbling ship and re-enter manually. This proved to disbelievers that man was not just a passenger in space, but was needed to control the vehicle if something went wrong. Project Mercury ended with Gordon Cooper's flight in Faith 7 on 15 May 1963. He made 21 orbits.

NASA then began its second stage for a moon-landing, project Gemini. The Gemini capsule would hold 2 pilots with enough fuel and O₂ for an extended stay in orbit. The purpose of Gemini, was to determine how to fly space craft towards an unmanned target, dock, undock and change orbits. On 23 March 1965, Gus Grissom and John Young flew the first Gemini Spacecraft and blasted into orbit using a Titan II booster. As time went on Gemini space craft, along with Russian Voskhod space craft, demonstrated man's ability to stay in space for an extended period of time.

On 25 October 1965, Gemini 6 was to rendezvous with the unmanned target Agena. The Agena module failed to fire its outer engine and disintegrated in the atmosphere. Instead NASA decided to fly Gemini 6 and 7 together. The two crafts managed to float side by side, and at one time, only had a 30 cm clearance. Gemini 7 had spend 14 days in orbit before it came down again. On 23 January 1967, Gus Grissom, Ed White and Roger Chaffee were testing out the Apollo 204 capsule and perished because of an electrical short in a pure O₂ environment. After this incident, America's space craft changed from a pure O₂ environment to one of reduced concentration.

During this race to the moon, various probes were sent to the moon to determine what astronauts would expect when they got there. The first successful craft was Luna 3 launched by the Soviet Union in 1959. It was the first craft to photograph the far side of the moon. On 23 February 1964, Ranger 7 was launched and successfully photographed the moon. In February 1966, the Soviet Luna 9 was the first probe to soft land on the moon and sent back televised photographs of earth. Later on 30 May 1966, Surveyor 1 from the U.S. also soft landed on the moon successfully. On 15 September 1968, Zond 5 was launched from the Soviet Union on a secret mission. The craft looped around the moon and returned back to earth for a soft landing. An on board tape recorder radioed back data, and even a recorded voice of a

Russian cosmonaut. The capsule landed in the Indian Ocean and was shown to be the same size as the re-entry capsule of a manned Soyuz ship. On board were turtles, to see if there were any harmful side effects of sending someone to the moon. On 11 October 1968, Apollo 7 lifted off the launch pad 34 at Cape Canaveral, Florida. This was the first operation flight of Von Braun's new Saturn 1B booster. The Saturn 1B ran on O₂ and Kerosene. Later on 21 December 1968, Apollo 8 was launched with a Saturn V rocket, the most powerful booster ever fired. The Saturn V is 36 storeys high and weighs 3 000 tons. Visitors to the Cape Canaveral Space Centre in Florida can see one



stretch out in the front lawn. On 23 December 1968, Apollo 8 crossed the "Great Divide" when lunar gravity takes over from earth's. On 24 December 1968, they were orbiting the moon 70 miles high. Later Apollo 9 was launched. Its mission was to fly the Lunar Excursion Modular (LEM) that would carry 2 astronauts from the command module to the moon. Once in orbit, "Gumdrop" (the name given to Apollo 9's command module) pulled away from "Spider" (the name of the LEM) and turned 180 degrees facing towards Spider, and docked. Explosive bolts holding the LEM inside its shroud were blown and the combination was put in a higher orbit. In May 1969, Apollo 10 made a voyage to the moon. They tested the LEM docking again and piloted the LEM, dubbed "Snoopy", to

just within 10 miles of the moon's surface; and then returned to the command module "Charlie Brown". Now all the ground work for a moon landing was in place. Meanwhile in the Soviet Union, engineers were about to launch its 'superbooster', the G-1, of its pad at Balconour. Within seconds of launch it exploded, destroying Russia's chance at any moon landing. It was later revealed, in Gorbachev's era of Glasnost, that the G-1 rocket never flew successfully. In addition, the planned lunar excursion module was little more than an enclosed bulldozer, with levers for controls and no computers. The Russians realized that America would succeed in its first launch to the moon and they tried to downplay its importance by landing a remote controlled probe Luna 15 to gather moon rocks from the surface and fly it back.

On 16 July 1969, Apollo 11 was launched. Its mission was to land on the moon! On 20 July 1969, Neil Armstrong and Buzz Aldrin landed their LEM, "Eagle" successfully on the moon's surface. This is probably the greatest day in the history of science. On 24 July 1969, the three astronauts were back at home, spending less than 24 hours on the moon's surface.

In total there was only 6 attempts to land on the moon in total. As many may recall, Apollo 13 turned out to be a hair raising experience for both its crew and the world. When they reached about midway between the earth and the moon, an explosion occurred in the service module. This resulted in a O₂ leak, and in order to survive the crew had to retreat to the lunar module until they could re-enter the earth's atmosphere. They had to swing around the moon and direct the ship back towards earth. On the 6th day of the flight the crew returned to the command module and dropped off the crippled service module as well as the LEM. As it turned out, incorrect equipment was installed in the ship's O₂ tank and the tank itself had been damaged during assembly.

Sadly, the last visit to the moon

occurred in December 1972 in Apollo 17. After this, NASA concentrated on putting up Skylab, America's first space station, and the design and building of the space shuttle.

Charles W. Baetsen
charlesb@dogwood.physics.mcmaster.ca

Hamilton Amateur Astronomers' 2nd Annual Star Party



Where: York Soaring
Association, Arthur, Ontario

When: Friday, June 23rd. -
Sunday, June 25th.

How to get there: From Hamilton, take highway #6 north to Arthur. Turn right (east) onto highway #9. On highway #9, travel about 2.5 - 3.0 miles to Line 5 Garafraxa. Turn right (south) onto Line 5. It's about 1/2 mile to the York Soaring Association.

Cost: \$3. per site per night.

Facilities: Flush toilets, showers, hot water. NO hydro.

There are no scheduled activities planned for the daytime. There's plenty of antique shopping in Arthur and surrounding area. Perceptor (the telescope shop) is up highway #9 about 80 kms. in Schomberg for anyone contemplating the purchase of things astronomical. The Soaring club offers glider rides at \$35. Hiking in the Elora Gorge is another possibility. Or you can just hang out with your friends and plan

what you want to observe!

If the weekend weather is forecast as absolutely dreadful, there is a very good possibility that our star party will be cancelled. (I'm assuming no one wants to camp in a field in the pouring rain for two days!) If the forecast is for clouds and rain is only a possibility, we will go ahead anyway and pray to Ev's astronomical gods for a break in the clouds!

It would be a great help to me if you could let me know ahead of time if you intend to come out. Please call and let me know.

I will make the decision whether to cancel the star party or not on Friday afternoon at 3:00. CALL ME FOR CONFIRMATION IF THE WEATHER SOUNDS IFFY.

Ann Tekatch
HAASP '95 Co-ordinator
(905) 575-5433 Home
(905) 527-9153 Office

Planning Your Observing Sessions - Based on the Weather! Part 2

Have you ever noticed Don Parker's outstanding photograph's in popular astronomy magazines?

While Don does outstanding work, one of the things that he has going for him is that he lives in Florida. Florida tends to have some very steady viewing, due to large, broad high pressure areas that settle over the Southeastern United

States. Florida is towards the "termination" of what we call the westerlies, that is the progression of weather systems generally from west to east, and near-the-beginning of the "easterlies", that of course being the slow but steady movement of weather systems from east to west in the Tropics. Being near that intersection means many a time when there is little going on aloft, and thus very little turbulent air to deal with.

Weather systems elsewhere in the U.S. and all over the world, sometimes "mimic" this stalling out of weather systems, and we will discuss that and sky clarity issues here, to help determine the best opportunities for viewing.

In part 1 of this 2 part series I suggested what kinds of objects you should view given different kinds of weather scenarios. Here, in part 2, I will outline the weather features for much of the United States and the world, that should deliver the best skies!

I have definitely taken up a new weather hobby: Trying to figure out which systems will produce the most STABLE weather conditions for astronomical viewing. I have to admit, that I haven't quite figured it out yet, it may take years of trial and error.. but there are a couple of hard and fast rules, that you can use, to help plan on what to view in advance. Below I will discuss the easy weather-features that you can pick off on your local weathercaster's weather map... and what they will likely do to your skies:

1. Cold frontal passages

Atmospheric clarity is pretty easy to forecast, so let's start with the simple stuff. If you have a cold front that has just come through, with High Pressure on it's way in.. you know you are in for some good clarity. As long as skies clear behind the front, you should be in for some good viewing of deep space objects, because as moderate to strong cold fronts first sweep in, they do the needed housecleaning to get the haze out, and the pollutants too.(no, not the light

pollution, sorry!) However, if you are doing planetary work, look out! The air is often unsteady behind these fronts, especially in the winter. Also, scopes that do not have a super steady mount will suffer from gusty winds in this kind of weather setup, so take appropriate action! (ie. . shelter the scope from the wind using a car, or other obstacle, etc) On the other side of the coin, when cold fronts first approach, the loss of atmospheric stability can be a particular problem, especially in the summer, as thunderstorms may brew. In addition to the approaching thunder, clouds and rain often precede cold fronts, so your best bet is to wait until it passes by.

2. Warm frontal passages

Warm fronts are usually associated with clouds as they move in, but often it clears behind them. Especially in the Eastern U.S. though, this will be followed by hazy conditions, not conducive for deep sky viewing, but often satisfactory for planets, especially if the winds go light.

3. High pressure systems

These are what good skies are made of, but often not until they pass by! Assuming you are reading this in the mid-latitude Northern Hemisphere, then you would be best off for planetary viewing just after the High has moved over you and on it's way to the east. (to the west in S. Hemisphere...) This will usually produce stable and clear skies. When High pressure first moves in, often the skies are the most clear, but somewhat unsteady. This is because the air is cold aloft relative to near the ground, so much so, that the atmosphere tends to "churn", and mix, to try to make up for this imbalance.

The one catch with High pressure systems, is that after they move by, cirrus clouds, or summer haze may follow suit. Thus, just when you are about to get the most stability, you lose some clarity to the sky.. so timing is everything!

4. Low pressure systems

More commonly known as "storm systems", these cyclones produce bad weather, and lots of clouds. Breaks in the

cloud deck often occur nearby low pressure systems though, especially on their south side. You may find decent viewing in these breaks, especially in summer, when the wind is less of a problem.

One interesting note:

You can actually view right through certain kinds of clouds. Fast moving, low cumulous clouds (the cottony ones) are sometimes thin enough to see through, but more often, you have to settle on viewing between them. That goes for broken stratus (layers) clouds as well, you should pick out the breaks. Cirrus clouds, made of ice crystals will blur the vision of objects, but when very thin can be successfully viewed through. When they start thickening up to an overcast of cirro-stratus though, you are out of luck! You will often see a "halo" around the moon as the cirrus deck thickens..and rain or snow may follow the next day.

I have been contacted by many

ASTROPHOTOGRAPHY CORNER



The Milky Way through Sagittarius - taken by Charles Baetsen last year at Starfest. He used his newly constructed barn door camera mount with a five minute exposure on 400 asa film.

folks hoping I can shed some light on what kind of viewing to expect when local weather phenomena happen, ie. seabreezes, Santa Ana winds, etc. Well, I have not figured it all out yet, and will probably spend much of my life "second guessing" local weather conditions, and what kind of skies they will produce. The best I can say is that when you introduce a layer of air that is not like the rest, as in a seabreeze, you are likely to cause "some" distortion as the light moves from one temperature air mass, to the other. Hopefully, I will be able to follow up with even more info. on atmospheric conditions and astronomy at a later time!

Until next time... clear skies!

Amateur Astronomy buff, and
weatherdude..

Todd Gross

Channel 7 Meteorologist, Boston

Email address: Toddg@shore.net

Work Phone#: (617)725-0777

SkyNews

A few days ago, a 9x12 manila envelope sporting a beautiful art stamp and the return address of Terence Dickinson came across my desk. In it was the premier issue of a new magazine called *SkyNews*, sent to the HAA with the compliments of the editor.

Well, it's not actually a *new* magazine, but a revitalized version of the magazine put out by the National Museum of Science and Technology. Because we were favoured with a copy of the premier issue, I felt it was only right to review it.

The magazine's editor is Terry Dickinson, and the idea of reviewing it has caused me to suffer nightmares because of a review I wrote several years ago about another of Terry's publications. In the previous review, I praised the book but condemned the artwork on the cover. Bad move! My wife labelled me an unfeeling troglodyte, a bumpkin with no artistic sense. Her criticism had more sting than usual because she runs her own graphic design business and therefore speaks with some authority. It didn't end there, however, as shortly thereafter I found myself in the middle of a maelstrom of emotions, fists, spilled beer, and hot tempers in a local pub, when a number of usually sedate astronomers vehemently sided with her. No matter ... I stuck to my guns and feel no remorse to this day.

So here I am again, facing possible ostracism and verbal abuse.

The new rendition of *SkyNews* is a small (32 pp.) bimonthly magazine which will retail for \$3.95 Cdn. Printed on superior hi-gloss paper, it has good clean text, a professional 3-column layout, and excellent photographs. It even has a centrespread -- a night sky chart for May and June! The articles are of a homey nature, written for entry-level astronomers. While this issue appears to

be a Terry Dickinson/Alan Dyer show, I assume that this will change as more people submit material. Most refreshingly, the magazine has a definite Canadian flavour. And don't let the size of the publication deter you, as it is all meat and no filler (hardly any ads!).

An interesting tidbit of trivia is that the first article is devoted to Peter Brown, our guest speaker last month, and the next article concerns Doug Welch, famous HAA member and the speaker booked for this month's meeting.

Now for the personal critique: I like the general layout, I appreciate the fine photographs, and I enjoy the Canadian approach. But, for me, I found the technical level was too elementary. Considering the burgeoning popularity of astronomy these days, perhaps this is a good thing. Perhaps not. Is it possible to successfully combine articles written for different levels of expertise in one magazine, or would it be better to make each article become increasingly complex the farther you read into it?

I think it best to give *SkyNews* a fair chance to succeed over several issues, as I feel it has good potential as a magazine devoted to Canadian astronomy.

Grant Wm. Dixon

Greek in the Round

Reprinted from Orbit 1993, June.
As you continue to watch the southeastern rising sky, be sure to look for the two inconspicuous constellations Capricornus and Aquarius. Although dim constellations, their stories are bold and significant.

CAPRICORNUS

This dim constellations is one of the most ancient and has survived to the present in the same form for at least 5 or 6 thousand years. These stars became identified with Ea Oannes, the most powerful god of the Sumerians.

He was pictured as a goat with a fish's tail and is almost certainly the source of the constellation figure which has come down to us through the Greeks and Romans as Capricornus.

When the babylonians eventually superseded the sumerians as rulers of Mesopotamia, they claimed that their own god Marduk was the eldest son of Ea and had taken over many of his father's original powers and authorities. However, in earlier times, Ea had been not only "lord of the Waves," but also known by the title Enki, meaning "Lord of the Earth".

Ea, who saw all things, was the lord of wisdom and the protector of man. It was Ea who told the man Uta-Napishtim to build an ark in which to gather males and females of all species to survive the flood which Enlil the sky god would sent to destroy the creatures of a world turned evil. Does this sound familiar to you? Isaac Asimov has mentioned the possibility that Noah's worldwide flood only concerned Mesopotamia and occurred perhaps in Sumerian times. He also speculated that the disaster could have been caused by a great meteor falling in the Persian Gulf. (Moreover, he points out, the traditional final resting place of Noah's Ark is in the ancient land of Ararat, upstream from Sumeria - and most ordinary floods would carry a ship downstream).

But how did Ea come to take the strange shape of the sea-goat, our Capricornus? Some say he roamed the Earth as a goat to see all and hear all, but fought a battle against a monstrous fish-man, to win this part of the Zodiac. His fish-tail developed when he assumed his conquest and swam in this region of the heavens.

It is interesting to note that

Capricorn has been a constellation for so long that there has even been a notable change in one of its stars, Alpha Capricorni, called Algiedi (Arabic for the goat). To a naked eye observer in our time it appears as a double, but in the time of Hipparchus they were much closer together and appeared as one star.

Supposedly the Chinese claimed they saw a great conjunction of all five classical planets in Capricornus in 2449 B.C. and according to the Babylonians, who flourished after 2000 B.C. believed that the world would be destroyed by a great fire when all the planets met here. Fortunately for today's observers, this did not happen, and we are still here to enjoy the patterns and activities of the legendary constellations and their lore.

AQUARIUS

The name Aquarius means "the water carrier" or "the water bearer". The ancient Egyptians imagined the setting of Aquarius caused the rising of the Nile, as he sank his huge urn in the water to fill it. The annual flood of the Nile did at one time coincide with the rising of Sirius, which the Egyptians once used to mark their New Year. At

that latitude, Aquarius set as bright Sirius rose. The most commonly depicted character in Aquarius was Aristaetus. He was the chief god on the Greek isle of Cos. His name, meaning "very good" or "the best," was a title applied to Zeus in Arcadia. Pindar writes that Aristaetus, having been fed nectar and ambrosia, was transformed into both Zeus and Apollo.

Why was Aristaetus associated with Aquarius? He may have been the child of Apollo by the powerful maiden Cyrene, who gave birth to him on the North African coast where the Greeks eventually erected a city named for her. Aristaetus later travelled to Cos where Sirius, the Dog Star, was combining its heat with the Suns to cause a terrible drought. Aristaetus learned the Dog Stars' wrath was directed at the islanders for harbouring alleged murderers. Aristaetus had the murderers executed and then prayed to the Dog Star for forgiveness. His actions and prayer seemed to work; rains came and ever after the Etesian winds have helped cool Greece during the hot summers. Perhaps this is where the expression "The Dog Days of Summer" comes from.

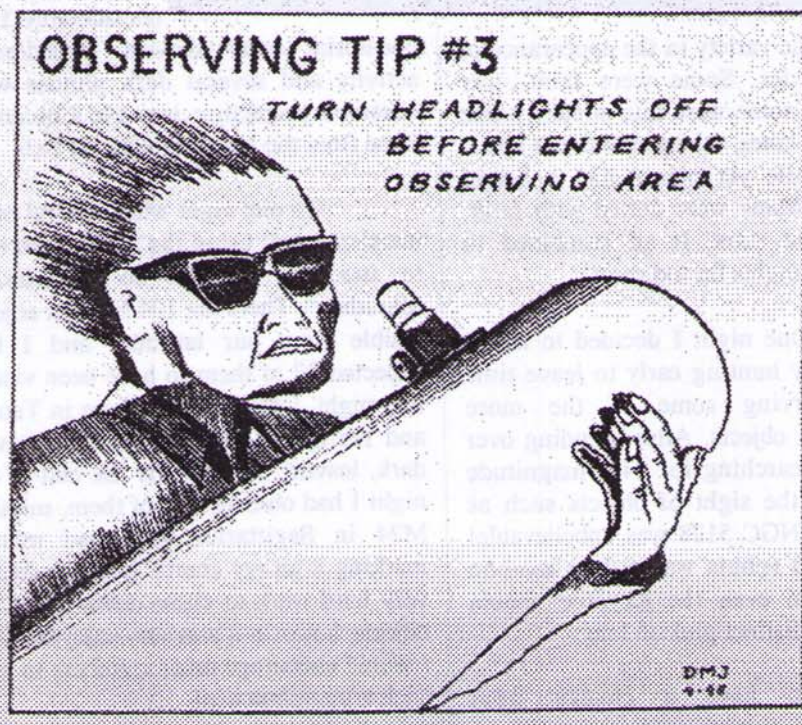
Ev Butterworth

Electricity in the Field

Ever been stuck out observing somewhere, and needed a little juice to run a laptop, camera, motor, timer, or something?

Well, a little gizmo called a StatPower power inverter may just do the trick. These guys are available from places like Radio Shack for about \$120-\$200 depending on your power requirements. Basically, the StatPower Inverter plugs into the lighter socket in your car, and provides you with a single AC outlet. This box is about the size of a Walkman, and is packaged in a heat-dissipating aluminum case. The device takes input DC power from any 12 Volt source (like a car battery, motorcycle battery etc.), and steps it up through a switching circuit and toroidal transformer to give you acceptable 120V AC at up to about 1 Amp. This is usually enough for most applications. When the input voltage gets below about 11V, it will start making this irritating beep noise, and may shut down. But it at least won't kill your battery. There is another product called a PortaPac which is about the size of a large first-aid kit. This has the inverter and a battery in one package. Its available from places like Canadian Tire. I have not used one personally, but have heard good things about it. Another cool thing are 12 Volt Solar Panel Battery Chargers available at Radio Shack (\$39), and (10 bucks cheaper) at Canadian Tire. These produce about 100ma at 12V in full sunlight. They are weatherproof, and are designed to be trickle chargers for batteries. They have bigger panels as well. These can be a handy way to get a little free current from the sun. Unfortunately, it takes many sunny days to get enough current to charge a battery up sufficiently for a nights observing.

-by Colin A. Haig, M.Sc.





Pole to Pole

Meeline! Just hearing the name invokes thoughts of red earth, scattered scrub, silence, and DARK skies. After missing out for the last two years, this year I was able to spend almost two weeks in that astronomical haven, having a fantastic time, especially when for several nights I had the 17.5" telescope to myself!

The first thing which stood out at night was the bright zodiacal light in the west. Extending from this along the ecliptic was a faint band of light. This was the zodiacal band, and it was visible until it merged with the brilliant star clouds of the Scorpius Milky Way. Near Spica in Virgo, the Gegenschein was easily observable as a circular glow about 10° in diameter. With these so easily visible the skies must have been dark, and checks on the naked eye limiting magnitude showed that it was mostly around 7.2, with the best night being 7.4. Surprisingly, the following night the sky was very much brighter and the limiting magnitude was only 6.9! Over the next few nights, the skies slowly darkened again to below 7. Why a drop of half a magnitude in one day should have occurred when there was no cloud or even dew, is unknown. Perhaps there was some minor solar activity which caused an increase in skyglow.

For the three nights I had the 17.5" to myself I decided to undertake some galaxy hunting in Virgo, using the Uranimetria 2000 star charts. In about 11 hours of observing over the three nights, I managed to cover just over 1 chart, and

observed over 230 galaxies! How many nights it will take to cover the whole constellation I do not want to think about! I also observed the Coma Berenices galaxy cluster, which is some 10 times further away than the Virgo cluster. 37 members of this group were visible including 14 in one field! Most of these objects were fainter than 14th magnitude. It was also interesting to ponder that in the 100 minutes that I was observing this group, it moved away by about 42 million kilometres, about the distance from Earth to Mars!

One of the most interesting aspects of these observations was the



remarkable variety in the appearance of the galaxies. Some were faint, tiny smudges, some were thin streaks, some had dark lanes, others prominent spiral arms, while yet others had a bright nucleus. Many were dotted with faint, foreground stars. It all combined to make the nights far too short!

One night I decided to finish my galaxy hunting early to leave time for observing some of the more prominent objects. After spending over 5 hours searching for 14th magnitude galaxies, the sight of objects such as M83 and NGC 5128 was unbelievable! The Trifid nebula was a deep maroon colour and even the Keyhole nebula showed a distinct pinkish hue.

To have a change from

galaxies, I spent 2 nights observing planetary nebula and globular clusters in Lupus and Norma, sighting nearly 40. Again there was a fascinating variety in the appearance of the objects, especially the planetaries.

By the time dawn was approaching Jupiter was almost directly overhead, which made for ideal observing conditions. Although viewing Jupiter (which was bright enough to cast easily seen shadows) through a 17.5" telescope after observing very faint objects all night, was quite a painful experience! In all I made 16 observations of Jupiter, and very steady seeing conditions enabled considerable detail to be observed. Some

of the most interesting activity was in the region of the Great Red Spot. There appeared to be 2 white ovals immediately south of the G.R.S., in the South Temperate Belt, and the interaction of these with the G.R.S. had disturbed the belts considerably. Both

equatorial belts showed considerable activity and several dark plumes were observed projecting into the Equatorial Zone from the North Equatorial Belt.

On one night when several other members were using the 17.5", I decided to use the 8" and do a "Messier Marathon". There are 104 Messier objects visible from our latitudes and I had expected 97 of them to have been visible that night. Unfortunately those in Taurus and Auriga had set by the time it was dark, leaving only 92. By the end of the night I had observed 91 of them, missing M24 in Sagittarius as I had missed marking it on my charts. It was certainly very hard work to chase down all of the objects, however it was very enjoyable and I would encourage other members to give such a marathon a go.

On the final night of telescopic observations, I concentrated on special objects. The first of these was the Carina Dwarf galaxy. Very large and faint, this galaxy was only suspected. Next was the faint galaxy ESO97-G13 in Circinus. This faint galaxy was easily seen as an elliptical patch of light with a bright nucleus. A very challenging object was the globular cluster UKS0923-545 in Vela. Because it is relatively large, this cluster has a very low surface brightness and was just visible as a faint misty glow. One of the most interesting objects was the star carinae and the surrounding Homunculus nebula. With the excellent seeing conditions, considerable detail could be seen in the nebula, but even more interesting was the colour, a deep burnt orange. Seen against a very dark background, it was an exquisite sight.

Apart from telescopic observations, photography of various deep-sky objects was undertaken each night with some very good results. Photography of meteors was also undertaken on the last few nights in an attempt to record some meteors from the Aquarid meteor shower. In addition to the photographic observations of the Aquarids, about 11.5 hours of visual observations were made which resulted in over 600 meteors being recorded.

411 deep-sky objects; 91 Messier objects in a Messier marathon; 11.5 hours observing the best meteor shower for the southern hemisphere; 88 photographs plus meteor photography; 16 central meridian timings on Jupiter; plus many miscellaneous observations such as the zodiacal band and the Gegenschein. What a busy time! But what a fantastic time. Especially when in the middle of all this observing there were 2 nights of lightning, thunder, and heavy rain which resulted in mud, flooded roads, invasions of frogs, bugs and large, viscous spiders. It was never a dull moment! I can't wait for the next expedition.

Maurice.

The Bargain Backyard Binocular Astronomer



r, why I insist I don't need a big telescope

-by Colin A. Haig, M.Sc.

So, you want to get started in astronomy, but everyone says, Save your money to buy a good telescope, don't buy one of those department store cheapies, you'll hate it. Or maybe you already have a Great Telescope, you know, the one that weighs 100kg and takes 2 burly fellows to set it up, and 2 hours to align the mirrors after being bounced down the road in your van. Well, if you fit into either of these two camps, then you might want to become a Bargain Backyard Binocular Astronomer. Just think, a low-cost, ultimately portable, wide field, high-quality, go anywhere, do anything, answer to your problems. Behold, the lowly pair of Binoculars! And just think, you no longer have to use one eye and squint the other one shut to see the universe. You were born with two eyes, so let's use them! Binoculars can be a great way to tour the universe, and are a lot less expensive than making that big telescope purchase.

So what do you need? Well, for starters, you may already have all of the ingredients in your own home, and may not know it! My set-up includes a decent pair of binoculars, a camera tripod with a quick-release, and a binocular bracket to attach the binos to the tripod. If anyone in the house has any camera gear, they may already have a tripod. The binoculars are probably collecting dust in one of those handy boxes with the carry strap at the back of the storage closet. The only missing piece is a gizmo to hook the binoculars to the tripod. This is just a right-angle bracket with a 1/4-20 threaded hole in

the base to fit the tripod head, and a 1/4-20 screw to fit the front of the binoculars. And if you aren't a first class machinist, take your binos to a local camera store (not a chain store), and ask them for a bracket. (Among many places, CAMTECH on Concession St. in Hamilton has them for around \$20). Before you go get a bracket, check the binoculars that you have to make sure they have a screw hole for a mounting bracket. This is not obvious. Usually, there is a screw-in cover for this hole, and it is usually on the outward-facing end of the centre shaft that has the focusing knob. This cover usually has the manufacturers name on it (like Minolta, Nikon, Bushnell, etc.), a round button-sized cap. Sometimes they pull out, sometimes they unscrew. And they are usually made of plastic.

Now that you've figured out the binos and bracket, you need to figure out the tripod. On the top of the tripod there is usually a mounting screw, or what's called a "quick release" post. The best tripods for this kind of observing have a Quick Release Post that screws into the bottom of the camera or the bino bracket, and then quickly clicks into the top of the tripod head. Companies like SLIK and Velbon make tripods with Quick Release posts. Personally, I use a SLIK U-212 D Universal tripod. I like SLIK because you can buy the posts separately for about \$10 (see CAMTECH or others), and you can leave one permanently screwed into the bottom of all your gear (camera, bino bracket, camcorder, etc.), so it's ready when you need it. The other nice feature is that this tripod expands to over 1.8m (6 feet) in height, and has adjustable legs for nearly any terrain or surface, and when folded, it's only about 2 feet (60cm) high. You might want to get a carry strap or carry bag for it. (Blacks' add a great deal on tripod bags). So, you can carry your tripod and bracket in the bag, and throw your binos around your neck. Minimal bulk! And this stuff is lightweight enough you can even take it hiking or bird watching.

So, what if you don't have a

decent pair of binoculars? The criteria for "decent" can be summed up by Quality, Price, and Features. Quality and Features are the most important places to start. First of all, the binos should be made with Multi-Coated lenses. Low quality binos will have a blue or purple coating (single coating) on the objective lenses (the big end), that will reflect a lot of light. These are often almost mirror-like. The best lenses have a greenish or orangish coating, just like camera lenses. Reflections are minimal, and these optics will allow for the best light transmission and highest contrast. If you have the single coated lower-grade lenses, they will still work, but the colours will be kind of washed out, and it will be harder to distinguish features. Other important features are adjustable focus for one eyepiece. Most binos have a little adjusting ring that lets you focus one eye differently from the other. This is usually designated by a +/- setting around the right eyepiece. The idea is it lets you get both eyes in perfect focus. This is Very Important for stargazing. Even people with "perfect vision" have minor variations in their sight. So, in the day time, focus on something very distant, like an antenna tower, or billboard sign, and then adjust this ocular focus so both eyes see equally well. And then don't mess with it. For those of you with glasses, many binos have roll-down rubber cups over the eyepieces, so you can get closer in while still wearing your glasses. This is a handy feature. Now, the next big thing is the issue of Magnification and Objective Size. You might think (like so many do) that BIGGER is BETTER. WRONG! The secret here is BALANCE. Get the biggest objective that you can comfortably, and steadily hold, without the tripod. There will be many times when you just want to take them, forget the tripod, and go. So weight and size are a concern. The other issue is Magnification. Remember, this is not a telescope, and you want to be able to look at lots of sky, and get a good look at many objects, some of which can scan a couple of angular degrees. So, you are best with something in the range of 7 to 10 power (abbreviate 7x to 10x). To meet the weight restrictions, and yet to capture

enough light, you need about a 50mm objective lens. So, this translates to a 7x50 or 10x50 binocular. A 10x70 is probably too heavy, but will let in more light, so you will have brighter images. For such a big pair, you will definitely need the tripod. 7x35 binoculars are probably too small to give really bright images (35mm translates to 50% of the light gathered by a 50mm lens). Personally, I use a pair of Minolta 10x50s, which have an extra wide field (almost 8 degrees). These binos are rubber coated, and so will take a little more abuse. At the edges of the field, they exhibit a slight astigmatism, causing stars to turn into slight arcs, but this seems typical of many wide-field binos. Most brand-name binoculars are of decent quality, but it is very important to check that the lenses are multicoated, and that there is a mounting hole to attach the bracket. Bargains can be had in the Used Equipment section of most bigger camera stores, and at garage sales, where people just don't appreciate the value of something that they may have. If you pay retail prices, you can easily spend \$250+ for a new pair. When compared to low-end telescopes, the type that sell for \$200-\$400 dollars, a pair of \$400 binoculars will almost always outperform, with the exception of magnification. And even the telescopes that are advertised with 100x eyepieces can usually only be used at 20 to 30x maximum because of the low quality of the optics. And a lot of small telescopes have only 50 to 60mm objectives, which are the same as the binos. So, DONT WASTE YOUR MONEY! Spend it on a good pair of binoculars instead!

Now, what can you do with these babies? I personally enjoy looking at planets and Messier objects. I find the binos are a great way to hunt down celestial objects, particularly clusters which are often hard to locate in urban areas because of the light pollution. The binos show you a big piece of the sky, and you can quickly learn relationships between stars and objects, and best of

all, everything is right-side up, so it makes "navigation" a lot easier. Last fall I started hunting down Messier objects with just the binoculars, in the city, and I have already built a decent collection. This project would go a lot faster in a rural area, with an unobstructed view of the heavens. However, I get great satisfaction from it. And its a lot easier than fiddling with a bulky telescope! And for those of you with Great Telescopes, binos make a great finder - you can quickly go star hopping, find something interesting, and then swing your telescope over to zoom in for more detail.

The Cepheids of the MACHO Project LMC Survey

Many months ago I described some of the background behind the MACHO Project and the search for evidence of "microlensing" of background objects. Along the way, the Project has to identify all the variable stars in the studied fields and remove them as potential microlensing candidates. Since this survey represents the most precise and extensive variable star survey yet attempted, I was immediately interested in studying this data "chaff", especially the classical Cepheid variables.

Cepheids in the Magellanic Clouds have played a very important role in our understanding of the universe. Since all of the objects in the LMC are at a common distance, differences in apparent brightness can be directly interpreted as differences in actual luminosity. This is not the case for Cepheids in the disk of the Milky Way which can be located at all sorts of distances from the sun. It was in the SMC that Henrietta Leavitt first recognized that the Cepheids which take longer to go

through their pulsation cycle are apparently (and therefore intrinsically) brighter than their shorter period counterparts. She also recognized that if this relationship could be calibrated, it could be used to determine the distance of any object containing Cepheids.

While visiting Lawrence Livermore National Laboratory in Livermore, CA, I examined the variable star data that had been culled from the first year's observations of 22 LMC fields. This dataset contained about 1500 classical Cepheids as well as many other types of variables. (A total of some 40,000 stars were identified as variable in these fields - most of them were low amplitude red giant variables. This is roughly equivalent to the number of **known** variables in the General Catalogue of Variable Stars!) Since this survey used CCD's rather than photographic plates and point spread function fitting photometry programs rather than eye estimates of photographic images, much lower variation amplitudes could be detected.

It has been known for some time that Cepheids pulsated in two different ways. In the first way, called the fundamental mode, the entire star expands and contracts. In the second way, called the first overtone mode, there is a radius - not too deep into the star - which is stationary and the pulsation timescale is shorter as a result. This is the stellar atmosphere equivalent of plucking a guitar string. It can vibrate with a low frequency (hence, long period) or, if you hold your finger down at some point in the middle, with a higher frequency (hence shorter period).

Over 950 fundamental mode Cepheids were identified and only about 45% of these were known before. The remaining 550 Cepheids were pulsating in the first overtone and as a result, they pulsate with a smaller lightcurve amplitude. Only about 5% of this sample had been found before. Photographic surveys had missed most of these because they varied by only a few tenths of a magnitude and this was

indistinguishable from noise in those surveys.

How does one name new variables like this? We could give them a running number with RA like the NGC. However, this creates confusion if there is more than one catalogue from the project. It also means that the cross-identification between old and new work is not obvious. Its major benefit is brevity. We opted to follow IAU recommendations and give the stars rather long names based on the equinox J2000.0 position. Hence, a star might be referred to as MACHO*05:23:13.1-69:45:23. This plus the information regarding brightness and lightcurve (period) will uniquely identify the star although it is still a mouthful!

The most exciting result of might work at Livermore was not the discovery of new Cepheids, which might be cast as "more of the same", but in the discovery and characterization of a fairly rare type of classical Cepheid called a "double-mode" or "beat" Cepheid. These are stars which pulsate in **both** modes simultaneously! Their lightcurves look pretty complicated until you recognize what is going on. Only 14 are known in the Milky Way, out of about 700 stars. Probably more are lurking in the poorly studied faint bins of the GCVS. In any case, the MACHO Project LMC data was the perfect place to go hunting for these things, which can have low amplitudes for a good fraction of their lightcurves. Out of the 1500 Cepheids, I discovered about 45 beat Cepheids - nearly four times the known sample. But even more exciting was the fact that 15 of these stars were pulsating in the first and second overtone modes at the same time - all but one of the Milky Way sample pulsate in the fundamental and first overtone modes. This showed conclusively that the second overtone mode is excited in the atmospheres of Cepheids under certain conditions - a matter which has been under debate for some time.

But there was more! With two

period present, you can determine the **ratio** of the periods. Since this only involves the accurate measurement of time, it is one of those few things in astronomy that you can measure with high precision! The fundamental/first overtone period ratios were systematically **different** in the LMC sample than in the Milky Way sample. Since the period ratio is expected to be a sensitive measure of the metallicity of the Cepheid atmosphere, this shows us that the short-period Cepheids in the LMC are structurally different than Milky Way beat Cepheids - a fact which may result in implications for the distance scale.

On my second trip to Livermore in March and April 1995, I found an additional 20 first/second overtone beat Cepheids, indicating that these are very common among the lowest mass and least luminous Cepheids. All in all my association with the MACHO Project has been very rewarding for me and I look forward to continuing to work with them in the next few years - there is still much "good stuff" to be extracted from the data.

If you have access to the Web, it is possible to access a copy of the paper which appeared in the April 1995 issue of the Astronomical Journal. The URL is:

http://www.physics.mcmaster.ca/MACHO_Preprints.html

(Note that case is important in this address.)

-Doug Welch

Did You Know That ...

Our sun reduced to a region with a 2 mile radius would become a black hole.

Off the Beaten Path

A month or two ago, two of our most active observers received their Messier Certificates. After that day I am sure they must of asked themselves "Is there life after Messier?" The answer to that, is of course, YES! A few Saturdays ago a few of us decided to start our next big astronomical adventure - The Herschel list! The Astronomical League puts out a booklet called "Observe the Herschel Objects", which describes each and every object in some detail. In addition, they publish a list of the 400 (of the 2700+) brightest Herschel objects visible in the continental US on their web page:

<http://bradley.bradley.edu/~dware/al.html>

The following is a list of Herschel objects visible this month. All of these objects can be viewed in a 6" or larger scope from any suitable dark site.

NGC 4030 - Yet another galaxy in the Virgo region. This is perhaps the easiest one in the area to identify, as it is located by itself roughly half way between Eta-Vir and Beta-Vir.

NGC 6144 - Located in Scorpius, this globular is a wonderful sight in a wide field eyepiece that will show Antares and M4.

NGC 6284 - This globular is much brighter (mag 9.0) than most of the rest of the Herschel objects in this region. It is located in Ophiuchus roughly 2 degrees north of the bright globular M19.

NGC 6287 - At magnitude 9.2, this globular is located on the ecliptic another 2 degrees north of NGC 6284 in Ophiuchus. It is certainly a challenge from the skies around Hamilton.

NGC 6235 - This faint globular (mag 10.0) is located approximately 12 degrees west of NCG 6287..

NGC 6451 - Located near the Scorpius - Sagittarius boarder this globular at magnitude 8.2, this object not a bad object to end the night off with.

With any luck you will be able to find most of these objects on that next clear night. Be adventuresome and go off the beaten track. Enjoy the new scenery.

Charles W. Baetsen
524-0148
charlesb@dogwood.physics.mcmaster.ca

What's Your I.O.

The warmer weather has arrived as I was told it would. I've been teasing you for about a year now and also learning from you. The four seasons are wonderful. Who'd believe the Earth could have so many wonderful temperatures and surface activities to offer. Can't wait to write home. Have you seen the Summer Triangle yet. I recently had it shown to me. What a spectacular view. The Milky Way runs through the centre and a binocular view is astounding. Check it out. Here's the answers to last month's questions:

- 1) Professor Sir Francis Graham-Smith.
- 2) Arion. According to the story, Arion was a famous singer who always won every competition for which he entered. When returning by ship from one competition, together with his prizes, the sailors threw him overboard, but he was rescued by a kindly dolphin and brought safely to the shore. When the dolphin died, at an advanced age, it was rewarded with a place in the sky.

3) Alphonsus, which is in the lunar highlands south of Ptolemaeus. All the other craters in the list are in the Mare Imbrium.

4) False; Vega is steely blue in colour. The only single naked-eye star which is said to have a greenish tint is Beta Librae, but most people will certainly call it white.

5) Sinus Iridum: Bay of Rainbows. Mare Nubium: Sea of Clouds. Lacus Mortis: Lake of Death. Mare Frigoris: Sea of Cold. Oceanus Procellarum: Ocean of Storms.

6) Percival Lowell, mainly to carry out his studies of Mars. It is today one of the world's major observatories.

I hope you answered these questions outside on a beautiful sunny warm day. Hiking around the area can be a peaceful and rewarding way of watching the wonders of your Earth in action. Take along a note pad and pencil. Stop by a lake, field or wherever, and record your sightings. I'll be taking some time off to visit home for part of the summer. I also want to enjoy some of your cool summer weather. Enjoy your basking temperatures here on your home planet. **It is a heck of a lot hotter.** I've enjoyed all the seasons and the beautiful weather here and will be back in time to begin teasing you in September.

IO, Keeper of the Flame
Jupiter Co-ordinator

Gateway to the Universe '95

The 5th annual Northern Festival of Astronomy is being held at Munro Park, Powassan, Ont. July 21 - 23, 1995. Informal tent talks prior to observing are scheduled for Friday and Saturday evenings. There are rec. facilities in the park or sight seeing enjoyment in nearby North Bay. Admission is \$15.00 per person and an additional \$10.70 per night for camping. (each additional person camping rate is \$2.14) Please contact Ron Marcoux at 692-5166 for directions and registration forms. Nice t-shirts too!!

William J. McCallion Honoured

William J. McCallion is well-known to the Hamilton Amateur Astronomers as the person for whom the Planetarium is named. Twice President of the Hamilton Centre of the RASC, he worked tirelessly to ensure the acquisition and smooth day-to-day operation of McMaster's first planetarium. Started in the early 1950s using a Spitz Mark I planetarium projector and a discarded parachute from World War II, he initiated the tradition of educating the Hamilton public, especially the children, in the beauty and wonders of the heavens. He did all this while maintaining an active and progressive career in continuing education at McMaster University, where he earned the love and respect of students and colleagues alike.

On June 1, 1995, in Hamilton Place, an Honourary Doctoral Degree was conferred upon Professor McCallion at the Spring Convocation of McMaster's Faculty of Science. It is a mark of the esteem in which he is held in the university community that Mr. McCallion has been so honoured.

I was fortunate to have been able to witness the presentation, but in more ways than the obvious. Actually, I attended the Convocation ceremony as a proud parent: my son Christopher received his B.Sc. in Honours Physics. It was a very happy occasion all around!

Grant Wm. Dixon

For Sale

Focuser, 1 1/4 " metal, rack and pinion, asking \$50.00
Please call Colin Broughton at 387-4767.

Editor's Address

Please submit all articles, thoughts, or ideas to this address:

Patricia Marsh
21 Kendale Crt. Apt. # 111
Hamilton, Ont. L9C 2T8

or via modem- 575-4191
or via e-mail at:
marshp@dogwood.physics.mcmaster.ca

Important Astronomy Phone Numbers

Mount Hope Weather Office:
679-3361
Sky & Telescope News Line "Skyline":
1-617-497-4168
Universal Time Signals from the
National Research Council in Ottawa at:
1-613-745-1576

CALENDAR OF EVENTS

- ♦ Mon. June 12, 1995 7:30 pm
- ♦ Fri. June 16, 1995 7:30 pm
- ♦ June 24-25 1995
- ♦ Tues. July 4, 1995 7:00 pm or
Wed. July 5, 1995 7:00 pm
- ♦ July 15, 1995
- ♦ July 21-25, 1995
- ♦ July 27-30, 1995
- ♦ August 25-27, 1995
- ♦ Thurs. September 7, 1995 8:00 pm
- ♦ Fri. September 8, 1995 7:30 pm
- ♦ Fri. September 15, 1995 7:30 pm
- ♦ Fri. October 13, 1995 7:30 pm

AMATEUR TELESCOPE MAKERS MEETING- at the home of Jim Winger in Caledonia. Please call Jim at 765-4649 for directions and details.

COUNCIL MEETING- at the home of Barb Wight. For details please call Grant Dixon at 627-3683

H.A.A. 2ND ANNUAL STAR PARTY- for details please call Ann Tekatch at 575-5433

JOVIAL SATELLITES- Solar/Lunar Observing Session - being held the Rock Chapel Conservation Area. Please call Ev at 632-0163 for details.

DEADLINE for Event Horizon. Please submit your articles to the above address

GATEWAY TO THE UNIVERSE - North Bay Star Party. Call Ron Marcoux at 692-5166 for details and registration forms.

HURONIA STAR PARTY- held by the South Simcoe Amateur Astronomers. If interested, please call Ann Tekatch at 575-5433 for details and directions

STARFEST- held by the North York Astronomical Association. For details and directions, please call Otmar Eigler in Scarborough at (416)299-0579

ROYAL ASTRONOMICAL SOCIETY OF CANADA Hamilton Centre-

General Meeting- McMaster University Medical Building Room 1A6. Everyone Welcome

H.A.A. GENERAL MEETING- Spectator Auditorium - Guest speaker: Peter Ceravolo. He will discuss what he has learned over the years about telescopes.

COUNCIL MEETING- for details please call Grant Dixon at 627-3683

H.A.A. GENERAL MEETING- Spectator Auditorium - Speaker: Phil Stooke



July Evening Skies - created by Earth Centered Universe

UTC: 1995/07/16 at 03:30

RA=17h46.6m Dec=+43°39'

LMT: 1995/07/15 at 10:30pm

Field=180.0° Azim=357°27' Alt=+90°00'

Mr. Charles W Baetsen
#308-1928 Main St., W.
Hamilton, Ontario
Canada, L8S-1J4
June 1995