Hamilton Amateur Astronomers

Event Horizon

February 1997 Volume 4 Issue 4

Hunting in the Heavens - Planispheres and Star Atlases

If you profess to be an amateur astronomer, you must have a map of the heavens as a guide. Even if you have a telescope that **finds** objects for you, you have to know enough to tell it what to look for.

"A planisphere is one of the most useful tools for learning the constellations and the names of brighter stars."

A planisphere is one of the most useful tools for learning the constellations and the names of brighter stars. It usually consists of a pair of rotating disks that, when you hold it overhead and face in the correct direction, will show your entire sky view on a given date at a specific time.

Even if you know the night sky quite well, a planisphere is still useful answering for you such questions as: "At what hour will Orion be near the meridian (due south) in mid-November?" "What constellation is just rising at 3am on February 14?" "What months see the Big Dipper high overhead in the early evening?"

It's even fun to just play with one, comparing hourly changes with those from month to month. Phillips and Miller are two good planispheres. They are made for different latitudes, so make sure it roughly matches yours. Current magazines have charts of the sky for the first few hours of the evening, but don't expect to be able to go out at 3am in January with a January-issue sky chart.

A search for faint objects, such as most galaxies and nebulas, requires more detailed star charts. Popular astronomy books such as "NightWatch" or "The Backyard Astronomer's Guide", contain a selection of these, if not a full set, to whet your appetite and to get you started.

You really need a collection of maps covering the whole northern sky for the whole year- a star atlas. They come in several classes dependent mostly on the faintness of the stars shown. Atlases for beginners show stars to mag. 5 or 6 and deep-sky objects a few magnitudes fainter than that. The Messier list, brighter NGC objects, binary stars and variable stars are usually shown.

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Clyde Tombaugh Dead at 90

LAS CRUCES, N.M. -- Clyde W. Tombaugh, discoverer of the planet Pluto and father of the astronomy research program at New Mexico State University, died Friday, Jan. 17, at his home in Las Cruces. He was 90.

"He was truly one of the great men of science," said Jack Burns, associate dean of arts and sciences and former astronomy department head at NMSU.

Tombaugh was 24 years old when he made world news in 1930 by discovering the elusive ninth planet using a photographic telescope at Lowell Observatory in Arizona.

He remained active long after retiring as a professor emeritus in 1973, lecturing on an occasional basis and going to his office regularly. In the 1980s, he went on an extensive lecture tour to raise money for an astronomy endowment at NMSU.

Tombaugh is survived by his wife, Patsy; son, Alden Tombaugh, of Las Cruces; daughter, Annette Tombaugh, also of Las Cruces; five grandchildren and eight great-grandchildren.

Born on Feb. 4, 1906, on a farm near Streator, Ill., Tombaugh moved with his family to a farm near Burdett, Kansas, during his high school years. He shared his father's keen amateur interest in astronomy, and when he wanted a telescope more powerful than his 2 1/4-inch Sears

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inside...

Editorial

The last man to discover a planet in our Solar System, Clyde Tombaugh, has died. I hope that this is the last time to report sad news for a long time.

Sometimes begging is worth it. We have the first installment of "Ask the Expert" this month. One person who submitted questions expressed some concern that the questions were not at an appropriate level but they were excellent! Over the coming months I will endeavor to get all of them answered. Last month I said that you could remain anonymous and that is still true. The two sources of this month's questions gave their permission to publish their names. Please note that the "Expert" answering these questions will be one or more people scrambling to find the answers in various books or other sources since there isn't anyone who knows all the answers .

I had planned to put a separate article in this month's newsletter about a weekend up at the Granview Inn near Huntsville, Ontario but this month's issue is already bursting at the seams. So, in brief, on the weekend of April 11-13 there is an event focussed around comet Hale-Bopp. Terence Dickenson will be the featured speaker and the event will include observing the comet at a site chosen for it's dark skies. The whole weekend including accommodation and most meals will be $259 per person based on double occupancy. The number to call is 1-800-461-4454.

I am usually asking people for pictures to put in Event Horizon but this month there was no room! Don't get the idea that I don't want as many articles next month - the more the merrier.

Stewart Attlesey
attlesey@interlog.com

Chair's Report ...

Amateur astronomers are a diverse bunch. Even though I have been an amateur for 25 years now (gulp!), the variety of ways in which amateurs enjoy astronomy still astounds me.

My personal preference has always been the scientific side. Observing variable stars attracted me early on. I also enjoyed tracking minor planets ("asteroids") and have seen over a hundred different ones - although, to be honest, they all look pretty much alike! On nights when the moon was very bright, I used to try to measure how the brightness fell off with distance from the moon. I enjoyed spectroscopy and along with Rob Dick and Kai Milliard, I built several spectroscopes and put together an atlas of the solar spectrum - something that is surprisingly easy to do.

However, there are a miriad of other ways to "do your thing" and the HAA is an excellent place to sample most of them. Some folks watch the Sun, some sketch planets and the moon. Others search for distant galaxies and nebulae (a.k.a. "faint fuzzies"). A few count meteors. There is the occasional astrophotographer in the crowd (easily spotted by their old clothing and second mortgage.) A recent breed is the cyber-astronomer who spends cloudy nights (and, if the truth be known, many clear nights) getting their fix of astronomy on the Web. We have communicators who do public education, builders who aluminize mirrors, people who create craters with firecrackers (don't try this at home - better yet, don't try it at all!), sci-fi enthusiasts, meteor bounce observers, imaging afficionados, eclipse chasers, space art-lovers, comet observers, telescope-makers, ... It is truly a versatile, deep, and rich hobby.

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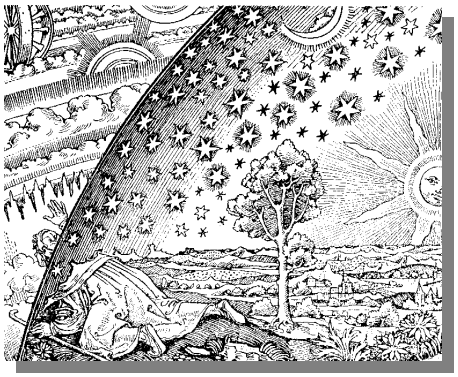
HAMILTON AMATEUR ASTRONOMERS

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 10 times a year.



Bad Astronomy

Bad Astronomy: The seasons are caused by the change in the distance of the Earth to the Sun.

Good astronomy: The seasons are mostly due to the axial tilt of the Earth. The change in distance of the Earth to the Sun is a very minor player.

How it works: This is one of the most pernicious types of ideas: one that sounds reasonable, and so it propagates easily. Unfortunately, it's wrong. Well, not completely wrong; certainly the Earth's distance from the Sun has something to do with the temperature, but it is a relatively minor effect.

First, a sanity check: The Earth's orbit is an ellipse. The Earth reaches perihelion (the point in its orbit closest to the Sun) in January, and it reaches aphelion (farthest point from the Sun) some six months later. If that were all that governed weather, we'd have summer in January, and Winter in July! This may be true for our Southern Hemisphere friends, but not up in the North. Something else must be going on.

We can check our qualitative conclusion above with some (simple!) math. The math involved in calculating a planet's gross temperature has been known for a long time. Basically, the temperature depends only weakly on distance changes; the temperature goes as the distance to the one-fourth power (the square root of the square root!). In other words, if you double the distance of a planet from the Sun, the temperature will drop by 2^(1/4) or 1.18. Doubling the Earth's distance from the Sun will only drop the mean temperature by about 44 degrees Celsius The Earth's average temperature is about 283 degrees Kelvin or 10 Celsius.

283 - (283/1.18) = 44 degree drop.

The Kelvin scale is absolute, which means it starts at 0, which is why I used it for the calculation.

At perihelion (nearest point) the Earth/Sun distance is about 146,000,000 km, and at aphelion (farthest point) it's about 152,000,000 km. The change in temperature is then (152,000,000 / 146,000,000) ^ 1/4 = 1.0085 or only 0.85 percent! This turns out to be only 2 degrees Celsius, which is quite a bit less than the temperature change we see between winter and summer! Obviously, something else must be going on.

The largest contributor to the change in seasons is the tilt, or inclination, of the Earth's spin axis with respect to its orbital plane (the ecliptic). The usual explanation is as follows: take a flashlight and a piece of paper. Shine the light straight onto the paper, so you see an illuminated circle. All the light from the flashlight is in that circle. Now slowly tilt the paper, so the circle elongates into an ellipse. All the light is still in that ellipse, but the ellipse is spread out over more paper. The density of light drops. In other words, the amount of light per square centimeter drops (the number of square centimeters increases, however, so the total amount of light stays the same--you expect that, as the light from the flashlight has not changed).

The same is true on the Earth. When the Sun is overhead, the light is falling straight on you, and so more light (and more heat) hit each square centimeter of the ground. When the Sun is low, the light gets more spread out over the surface of the Earth, and less heat (per square centimeter!) can be

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Rob'serving Report

Hale-Bopping It or
The Second Annual Spring Cometfest

No matter what you call it, we are in for a treat again. I won't even think of trying to compete with the six articles plus many side vignettes in the three major publications (and I haven't seen Sky News' March/April contribution, yet.) If you are planning to do some photography of the comet, one or more of these March issues is a must. Techniques, key photo opportunity dates and the best new films are discussed.

Let's just try for a short "when and where" until the end of March. Get out of the city to darker skies, preferably with a low eastern horizon. The comet is expected to double in brightness through February to mid-March. If much of a tail develops, expect spectacular views, even with the naked-eye.

The comet will be passing Cygnus along the lower edge of the Milky Way, through Andromeda to Perseus by mid-April (see enclosed map.) In addition to knowing where Hale-Bopp is, it's also very important to keep track of the phases of and whereabouts of the Moon.

Up until Feb. 18 there will be no Moon to interfere with early morning
views. From Feb. 19 to Mar. 5 the Moon will be bright and up most of the night. On Mar. 6 Hale-Bopp rises about 1 hour before Moonrise and for about a week and a half until Mar. 19 the Moon will again co-operate with us, providing dark skies. It is at this time that the comet becomes both a morning and evening event as it just moves into Andromeda.

For evening viewing of the comet, the sky will be free of moonlight

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Bad Astronomy ...

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absorbed. Since the Earth's axis is tilted, the Sun is higher when you are on the part of the Earth where the axis points towards the Sun, and lower on the part of the Earth where the axis points away from the Sun.

For the Northern Hemisphere, the axis points most toward the Sun in June (specifically, around June 21), and away from the Sun on December 21. This corresponds to the Winter and Summer Solstices, or the midpoints of summer and winter. For the Southern Hemisphere, this is reversed.

There is more, too. In the summer, the Sun is higher, and therefore the days are longer. This gives the Sun more time to heat the Earth, so it gets hotter. In the winter, the sun is lower, and the days are short, giving the Sun less time to heat the Earth. This is a secondary effect.

The distance of the Earth to the Sun is a smaller effect yet, but it does exist! So the Southern Hemisphere gets slightly hotter summers and slightly colder winters than the North. But only by a couple of degrees, and only on average.

Your mileage may vary!

Phil Plait
http://www.astro.virginia.edu/~pcp2g/bad/bad.html

Submitted by Grant Dixon

Attention AAVSOers

UPERNOVA 1997X IN NGC 4691

We have been informed by the Central Bureau for Astronomical Telegrams (IAU Circular 6552) that S. Nakano, Sumoto, Japan, reports that Masakatsu Aoki, Tsukioka-cho, Toyama, Japan, has discovered a supernova at CCD magnitude 13.6 on nine unfiltered CCD frames taken February 1.76 UT with a 0.43-m f/6 reflector. No object was present on patrol films taken by Aoki on January 16. Y. Kushida, Yatsugatake South Base Observatory (YSBO), Japan, also reports that no object was present on a CCD patrol frame taken by R. Kushida, YSBO, on January 6. The supernova has been confirmed spectroscopically.

A position has been provided by Y. Kushida, using an unfiltered CCD image taken Feb 1.816 UT with an 0.40-m f/5 reflector by R. Kushida:

R.A. = 12h 48m 14.28s Decl. = -03o 19' 58.5" (2000)

For more information on this discovery and finder and 'e' scale AAVSO preliminary charts for this object please see the following ftp address:

ftp.aavso.org (198.116.78.2), /pub/alert236

or the AAVSO web site:

http://www.aavso.org

OMICRON CETI

The Mira type variable star omicron Cet is currently having a very bright maximum. The brightness at maximum of omicron Cet can vary significantly from cycle to cycle. The last maximum of this star to be recorded in the AAVSO International Database was in early March of 1996, when the star reached a mean maximum magnitude of 3.6.

AM CASSIOPEIAE

The dwarf nova type (SS Cyg subclass) cataclysmic variable AM Cas is in outburst.

BV CENTAURI

The dwarf nova type (SS Cyg subclass) cataclysmic variable BV Cen appears to be in outburst

Please monitor these and other variable stars closely and phone-in, fax, or e-mail your observations to the AAVSO.

Good observing!
Rebecca Pellock
on behalf of
Janet A. Mattei

Those who wish to subscribe (free of charge) or unsubscribe to NEWS FLASH may do so by sending a message to:
observations@aavso.org

Chair's Report ...

(Continued from page 2)
Despite all these differences, there are common threads. When a comet like Hale-Bopp graces our skies, everyone puts down their favourites for a few moments and we all stand and stare with the same wonder, knowing that we are privileged to be part of that experience. When it comes down to it, we are more like than different.

During the next two months, be sure to try and communicate your wonder to those who ask you about the comet. It is indeed a special time and the people in this group are in a special position to help others understand this phenomenon and to help put it in perspective.

Doug Welch
welch@physics.mcmaster.ca

Hunting in the Heavens ...

(Continued from page 1)

A few examples of these 10-12 page beginner atlases are: "The Cambridge Star Atlas", "The Mag 6 Star Atlas", "The Color Star Atlas" and "The Bright Star Atlas". Mag 6 has descriptions and useful information on the page opposite each chart.

The next step is to graduate to an intermediate atlas, Will Tirion's "Sky Atlas 2000.0" probably the finest. It shows over 43,000 stars down to mag. 8 and about 2500 deep-sky objects on 26 large charts. It is produced with black stars on white, white on black and full colour, all of which can be purchased with weather-proof lamination, if desired.

Serious advanced observers use the two-volume "Uranometria 2000.0", showing stars down to mag. 9.5 and thousands of deep-sky objects on 473 charts! Sets of "Astro Cards" are also available. These 3x5-inch cards usually show a single deep-sky object amongst the stars needed to fix its position. There
are sets for the Messier objects, NGC objects, binary stars and targets for large telescopes.

Whatever map you use, you need to know exactly how it compares with your view of the sky. Your naked-eye view may not match the directions in your finderscope which in turn may not match those in your telescope.

<<<<***Knowing your directions***>>>>> is most important. On star charts, north is up and east is left. A straight-through finderscope, refractor or Schmidt-Cassegrain has north down and east on the right side:- simply turn your chart upside-down. These same scopes, equipped with star diagonals have views that are upside-up but reversed left to right:- turn your chart over, hold it over a light and look from the back! If you can print your own computer-generated charts from a program such as "Earth Centered Universe", one axis can be reversed, matching any view:- a decided advantage.

<<<<***Knowing your viewing size***>>>> is also important. Using your finderscope, scout around to find the angle from one side to the other. Try Orion's belt or stars in the Big Dipper, for example, or you may already know the diameter of its field of view. Construct a circle of wire or on plastic to match the same view on your chart. Now, wandering over your star chart, you know what to expect to see in your finderscope. You can do the same with the widest-angle eyepiece for your telescope.

Observers use different plans of attack. Searches for complete sets of objects are common. The 110-object Messier list is usually the first quest, to be followed possibly by the Caldwell list or a galaxy-only list. Another approach is to pick a specific area, a constellation or a square on one of your charts, and try to find all of the objects therein.

None of this even begins to cover observing guides, handbooks, catalogues or almanacs, not to mention atlases of the Moon. There's an incredible wealth of observing information available. The truth is out there- find it and use it!

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Rob preparing to "hunt" for some coffee at the Huronia star party in 1995.

Clyde Tombaugh ...

(Continued from page 1)
Roebuck model, he began grinding mirrors and making his own.

Using a hand-made 9-inch telescope, he made meticulous sketches of Jupiter and Mars and sent some of them to the Lowell Observatory. He thought he might get some advice from the professionals. Instead he was offered a job. It happened that the observatory was looking for a good amateur astronomer who could operate a new photographic telescope.

Tombaugh was hired in 1929 as a junior astronomer to join in the search for a "Planet X" beyond Neptune, a search begun in 1905 by Percival Lowell. Working through the nights in a cold, unheated dome, he made pairs of exposures of portions of the sky with time intervals of two to six days. These were scrutinized under a device called a Blink-Comparator in hopes of detecting a small shift in position of one of the hundreds of thousands of points of light -- the sign of a planet among a field of stars.

On the nights of Jan. 23 and 29, 1930, Tombaugh made two such photographs of the region of the star Delta Geminorum. On the afternoon of Feb. 18, comparing the plates with the Blink-Comparator, he detected the telltale shift of a faint, starlike image. The discovery was confirmed with subsequent observations and announced to the world on March 13, 1930.

Tombaugh continued searching the skies at Lowell Observatory over the next 13 years, with time out for a college education. No more planets showed up, but he discovered six star clusters, two comets, hundreds of asteroids, several dozen clusters of galaxies and one super-cluster.

During those same years, he entered the University of Kansas on a scholarship (1932), married Patricia Edson of Kansas City (1934), earned his bachelor's degree in astronomy (1936) and went on to get his master's (1939).

After teaching at Arizona State College (now Northern Arizona University) and the University of California at Los Angeles, Tombaugh moved to New Mexico in 1946 to become chief of the Optical Measurements Branch in the Ballistics Research Laboratory at White Sands Missile Range, where German V-2 rockets were being tested. He came to New Mexico State University in 1955 and started the Planetary Group, an astronomy research program.

He was instrumental in designing and obtaining funding for the university's Tortugas Mountain Observatory, a 24-inch telescope that captured its first images in 1967 and is still in service taking data for the National Aeronautics and Space Administration.

Tombaugh was largely responsible for the astronomy program

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Interview with Dr. Robert Thirsk, Canadian Astronaut

Dr. Robert Thrisk is Canadian Astronaut who flew on the STS-78 Shuttle Mission last summer. He was the co-leader on the 17 day flight. It was the most successful mission ever flown. There were 43 experiments to do. Most of these experiments involved weightlessness, muscle atrophy, loss of muscle strength endurance, and motion sickness, their effect on the human body, plants, animals, and embryos. Doctors hope that these experiments will help mankind on Earth fight disease and disabilities, to help people in space when they build the International Space Station Alpha, and when they colonize Mars.

I had the opportunity to meet, and interview Dr. Thirsk at McMaster University. Here are some of the questions and answers :

Have you ever been outside of the shuttle in space? - No

Did you have the Canada Arm? - No

Was it fun ? " Yes, with a capital F".

What was the food like ? - First two days fresh food (fruit & bread), then dehydrated food.

Do you have a home page on the shuttle? - Yes - **http://shuttle.nasa.gov**

How long have been an astronaut ? - 13 years, "I was in Grade 3 when I wanted to be an astronaut " .

Are you going up again ? - " No, and I will be to old to go to Mars " .

Did you do any secret experiments ? - No.

The worst thing that happened was that a cable short-circuited. The best thing that happened was that Dr. Thirsk received Bobby Orr 's hockey jersey, and Stanley Cup Ring and wore it during the mission. The newest thing on the mission was the use of laptop computers, and live Real Time video to Earth, and voice commands to work cameras.

He was very entertaining, and it was exciting to talk to a real astronaut.

Matthew Goulet
Grade 6 - 11 years old.

Astronomy in Paradise

With the great skiing weather we have been having, with a wee bit of cool temperatures, I thought it would be nice to write a bit to warm your cool hearts. Back in September, Oksana and I had to go to Hawaii, well, we really didn't HAVE to go, but as we were honeymooning, we thought it would be a nice change, so off we went.

The first week of the two week holiday was spent on a cruise ship, but since this is an article on astronomy, I shan't bore you with such details as luxury accommodations, food ten times a day, basking in the tropical sun, entertainment, volcano watching, feeling heat from lava while watching it flow into the sea. No, I will not mention anything like that. So what will I mention? Thought you'd never ask!

We arose at 2 am one morning, grabbed a bite to eat, hopped on a shuttle van, fitted ourselves with winter gear, which included a helmet. Will explain the helmet later. Off we journeyed up to the top of Mount Haleakala, elevation 9740 feet, to witness the rising of the sun.

Let me digress a spell. On the way up the mountain, with our noses glued to the windows of the van, we could see in all their glory, many many constellations. There was Orion, Cassiopeia, Ursa Major and so many others that it just it brought tears to our eyes, thinking how much we were enjoying this, and of course thinking of our friends back at HAA.. End of digression.

The sunrise was spectacular. It is quite an awesome thing to be up above and looking down at the clouds. At this time of the morning, the temperature was 2 C and as it grew lighter, I looked around and there had to be two hundred brave souls up there in the cold, to watch the sun come up. Then I shifted my gaze further to the north east, and what did I spy? An observatory. None other than Mauna Kea, in the flesh? So near and yet so far. The most I could do was take a few photos, and drool. We were within walking distance, but it was off limits. These are the times when we need a little pull from the right people (Doug) maybe. Nonetheless, it was an awesome sight.

Now, the reason for the aforementioned helmet: we were on a tour called Maui Down-hill. We rode bicycles down the mountain. Just imagine, 35 miles down hill. Two Kilometres, a hairpin turn, two Kilometres, a hairpin turn until we got to the bottom where the temperature was 27C.

The second week was spent on the Island of Oahu, but you would not be interested in snorkeling, or watching the sunset from Waikiki beach, or walking through all those gorgeous hotels and enjoying the free entertainment, so I'll stop.

On our way back to Canada, we stopped in San Jose, California, and guess what? There in the distance on top of the hill was the Lick Observatory. Again, so near and yet so far. Ah well, perhaps next time. Oh, by the by, we will not be at the next HAA meeting, because we HAVE to go to the Winter Star Party in Key West. See you in March. Till then, happiness is a pizza.

Oksana and Lou Darcie
Astronomaires Extraordinaire.

Rob'serving ...

(Continued from page 3)

from about Mar. 26 through to Apr. 8. It
should reach maximum brightness and size on or around Mar. 28. It has the potential to outshine Mars and even Sirius and could have a 10-15 degree tail. If your observing has been dormant for a while (and whose hasn't been, around here, lately?), get out and have a look at what may be the comet of the decade or even of the century.

Monthly In-Sights

February

- 14- crescent Moon moves through the Hyades in Taurus.
- 16- Saturn moves N of the celestial equator until the year 2010.
- 24- Moon 3 deg. S of Mars.

March

- 7&8- BCA observing nights (check first!)
- 17-3am Mars at opposition to the earth.
- 22- Hale-Bopp's closest approach to Earth.
- 23- partial (92%) lunar eclipse. Mars 4 deg. N of eclipsed Moon (photo opp?)
- 25- Hale-Bopp 5 deg. N of M31 (photo opp?)
- 31- Hale-Bopp's closest approach to the Sun.

- Saturn is disappearing into the SW evening twilight.
- Mars rises mid-evening brightening to mag. -1.3 by Mar. 17.
- Mars is in retrograde loop from Virgo back to Leo.
- Jupiter, Neptune and Uranus are low in the dawn sky, but rising earlier each day.
- Venus is lost in the early morning glare of the Sun.
- Mercury is in the eastern morning sky for February. After passing the Sun, the best evening views are in late March/early April.

Rob Roy
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NASA Hubble Fellowships

Two NASA Hubble Fellowships Awarded to McMaster Astrophysicists

Two of the dozen prestigious NASA Hubble Fellowships for postdoctoral work in astrophysics have been awarded to Dr. Patrick Cote and Dean McLaughlin, both graduates of the Astrophysics programme in the Department of Physics and Astronomy at McMaster. These fellowships "for highly qualified, recent postdoctoral scientists to conduct independent research that is broadly related to the mission of the Hubble Space Telescope (HST)" are widely recognized to be the best such positions available and it is rare for two to be awarded to graduates of the same institution in the same year.

"Obviously, we are thrilled! Pat Cote and Dean McLaughlin are both first-rate and it is very rewarding to see that recognized internationally,"

Dr. Patrick Cote is currently a National Research Council Research Associate at the Dominion Astrophysical Observatory in Victoria, BC. He obtained his Ph.D. from McMaster in 1995 where he was supervised by Dr. Douglas Welch. His Ph.D. work was an observational study of star cluster and field star dynamics with special emphasis on new marginally-bound stellar systems. Since leaving McMaster, Dr. Cote has been Principal Investigator on numerous research programmes involving the Canada-France-Hawaii Telescope, the Keck Telescope and the Hubble Space Telescope. He will take his Hubble Fellowship at the Observatories of the Carnegie Institute of Washington which is located in Pasadena, California and operates one of the three major observatory complexes in Chile.

Dean McLaughlin is a Ph.D. candidate in the Department of Physics and Astronomy. His doctoral work provides a new theoretical framework for describing the gravitational collapse of molecular and protostellar clouds. He expects to defend his thesis in early 1997 and will take his Hubble Fellowship at University of California, Berkeley. Mr. McLaughlin's Ph.D. research was supervised by Dr. Ralph Pudritz and his M.Sc. was supervised by Dr. William Harris - both members of the Department of Physics and Astronomy.

In the seven years between 1990 and 1996, 86 Hubble Fellowships were awarded. This year's set of awards brings the total number of Hubble Fellowships awarded to graduates of Canadian Ph.D. programmes to four - and three of these obtained their Ph.D.'s from McMaster. Dr. Phil Fischer, received a Hubble Fellowship in the 1995 competition - and was also the first graduate of the then recently approved Ph.D. programme in Astrophysics at McMaster. He is currently at the University of Michigan at Ann Arbor.

"Obviously, we are thrilled! Pat Cote and Dean McLaughlin are both first-rate and it is very rewarding to see that recognized internationally," remarks Doug Welch, Associate Professor.

Dr. Cote and Mr. McLaughlin were at the American Astronomical Society meeting in Toronto when the results of this year's competition were announced.

Related URL's

Dr. Patrick Cote
http://www.hia.nrc.ca/STAFF/pjc/index.html

Dean McLaughlin
http://www.physics.mcmaster.ca/Grads/DEMcLaughlin.html

Hubble Fellow Programme
http://www.stsci.edu/stsci/HubbleFellow/AO.html

McMaster Dept of Physics & Astronomy
http://www.physics.mcmaster.ca/

Dr. Phil Fischer
http://www.astro.lsa.umich.edu/users/philf/

Ask the "Expert"

Looking at the photos taken by the Hubble Space Telescope, there is never a full square or rectangular picture. There always seems to be a bite taken out of them. Explain....

Oksana and Lou Darcie
Astronomaires Extraordinaire.

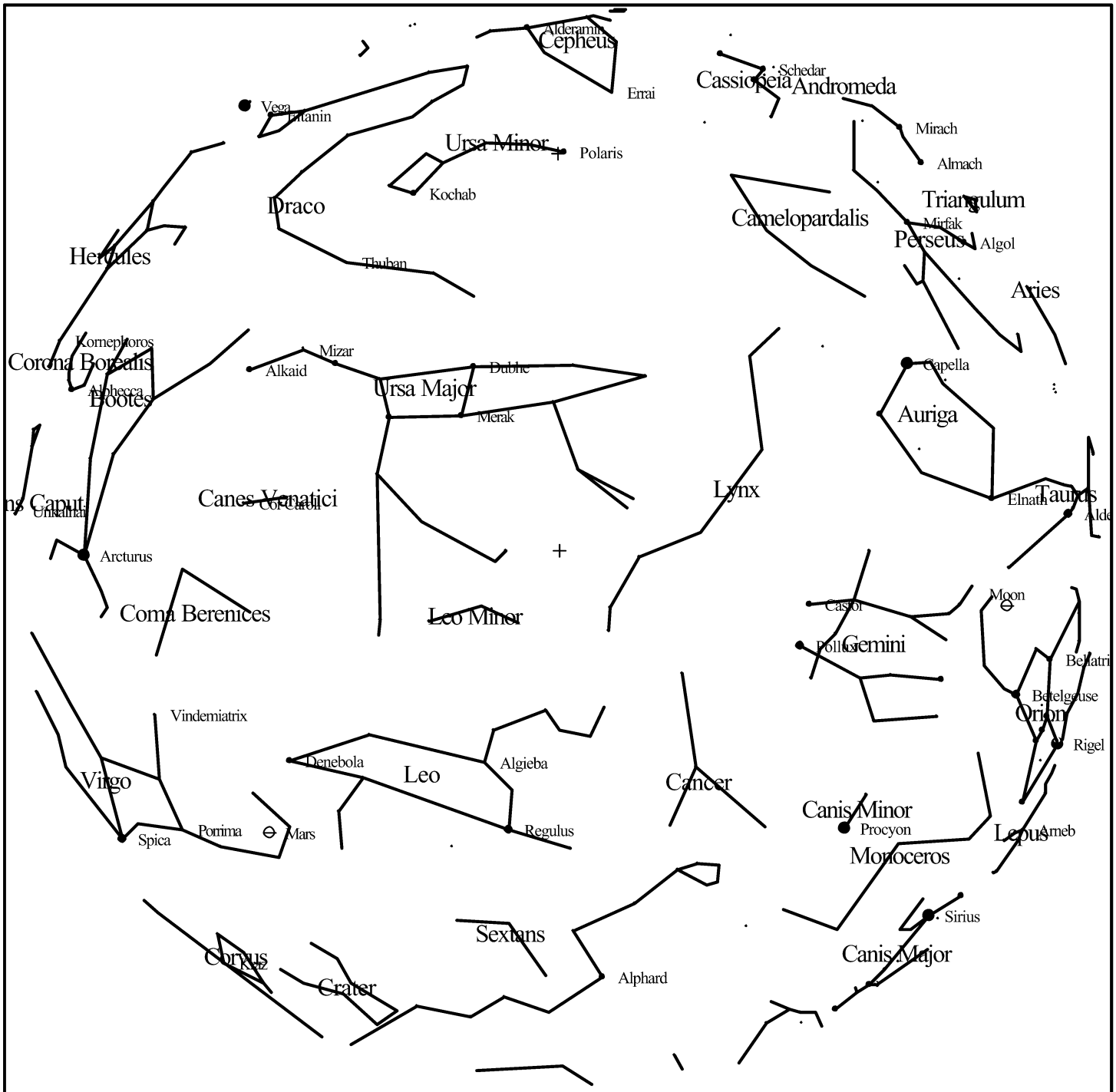
The pictures that you are referring to are actually a mosaic of four pictures taken with four separate detectors. The upper left one covers a much smaller area than the other three. The reason for this is that the detector at the upper left is being used to take pictures at a higher resolution using the same number of pixels. The result is that a much smaller area is covered.

Is the Andromeda galaxy the only object in the sky visible to the naked eye which is outside our own galaxy?

Brian Chire

In the Southern Hemisphere it is possible to see the Small and Large Magellanic clouds. Here in the Northern Hemisphere, the Pinwheel Galaxy (M33) is the only other object that can been seen and it requires very dark skies. It has been suggested that many reports of seeing M33 are in fact a nearby cluster in our own galaxy (NGC752).

March Night Skies



ECU V3.0 (Star Atlas Mode) - March Night Skies

UTC: 1997/03/16 at 03:30
LMT: 1997/03/15 at 10:30pm

RA=09h46.9m Dec=+43°05'
Field=180.0° Azim=088°45' Alt=+89°50'

Clyde Tombaugh ...

(Continued from page 6)
becoming a separate department at NMSU in 1970. Today the department is a member of the Astrophysical Research Consortium, which owns and operates the Apache Point Observatory in New Mexico's Sacramento Mountains. NMSU manages the observatory.

Tombaugh remained active long past retirement and never lost his passion for stargazing. When the Smithsonian Institute asked if it could have for its museum the telescope he made in 1928, "I told them I was still using it," he said in an interview. The 9-inch telescope, with which he made the drawings that impressed the Lowell Observatory staff, was built with parts of discarded farm machinery and a shaft from his father's 1910 Buick. Tombaugh
ground the mirrors himself.

Until frail health prevented it, Tombaugh continued observing the heavens through that 9-inch telescope and a larger one he made himself, from his back yard in the Mesilla Park community of Las Cruces.

While he was in his 80s, Tombaugh toured the United States and Canada with his wife, Patsy, giving 75 lectures during a three-year period to raise money to bring astronomers to NMSU for post-doctoral research. The Tombaugh Scholars Fund now is a permanent endowment.

"We have 120 applicants for the Tombaugh Scholar position that is open for the fall," said NMSU's Walterbos. That's an indication of how important this scholarship is."

Tombaugh, the former farm

boy with a fondness for corny jokes and puns, delighted in recounting the tale of his discovery of Pluto, which he compared to finding a needle in a haystack. It was tedious work but better than pitching hay on his father's farm, he liked to say: "I'd had my hay day."

By the time he retired, he and his NMSU astronomy staff had confirmed the rotation period of Mercury on its axis, determined the vortex nature of Jupiter's Great Red Spot, and developed a new photographic technique for the small Earth satellites search he was supervising.

Of the decades of discovery since he made the history books, and the
thousands of hours spent at his telescopes, Tombaugh often said: "I've really had a tour of the heavens."

CALENDAR OF EVENTS

♦ Tuesday, February 18, 7:00 PM	**HAMILTON AMATEUR JUNIOR ASTRONOMERS** - Mac Burke Science Building, Rm B148 (beside the planetarium) Topic to be "Challanges of Space Exploration". For more information contact Rosa Assalone at 540-8793
♦ Friday, February 21, 7:30 PM	**COUNCIL MEETING** - At the home of Alan Shinn. Call Doug at 525-9140 Extension 23186 if you are interested in attending.
♦ Thursday, March 6, 8:00 PM	**ROYAL ASTRONOMICAL SOCIETY OF CANADA Hamilton Centre** - General Meeting - McMaster University Medical Building Room 1A6.
♦ March 7,8 8:00PM	**BINBROOK OBSERVING SESSIONS** - Proposed observing nights. For confirmation or directions call Rob Roy (692-3245) or Ann Tekatch (575-5433)
♦ Friday, March 7, 11:59 PM	**EVENT HORIZON DEADLINE** - Please submit your articles and pictures to Stewart Attlesey, **attlesey@interlog.com** or modem (905)827-9105 or snail mail to 1317 Mapleridge Cres., Oakville, L6M 2G8
♦ Friday, March 14, 7:30 PM	**HAA GENERAL MEETING** - at the Spectator Building auditorium. Join us for our special comet night. Parking lot observing, weather permitting.
♦ Saturday, March 22, 8:00 PM	**COSMOLOGY DISCUSSION GROUP** - Room B148 (next to the planetarium,) Burke Science Building, McMaster University. The topic will be "Near,At, and Faster than the Speed of Light" For more information contact Bill Tekatch at 575-5433 or tekatcba@mcmail.cis.mcmaster.ca
♦ Saturday, May 24, 8:00 PM	**COSMOLOGY DISCUSSION GROUP** - Room B148 (next to the Planetarium) Burke Science Building, McMaster University. Topic will be "Reality". For more information contact Bill Tekatch at 575-5433 or tekatcba@mcmail.cis.mcmaster.ca