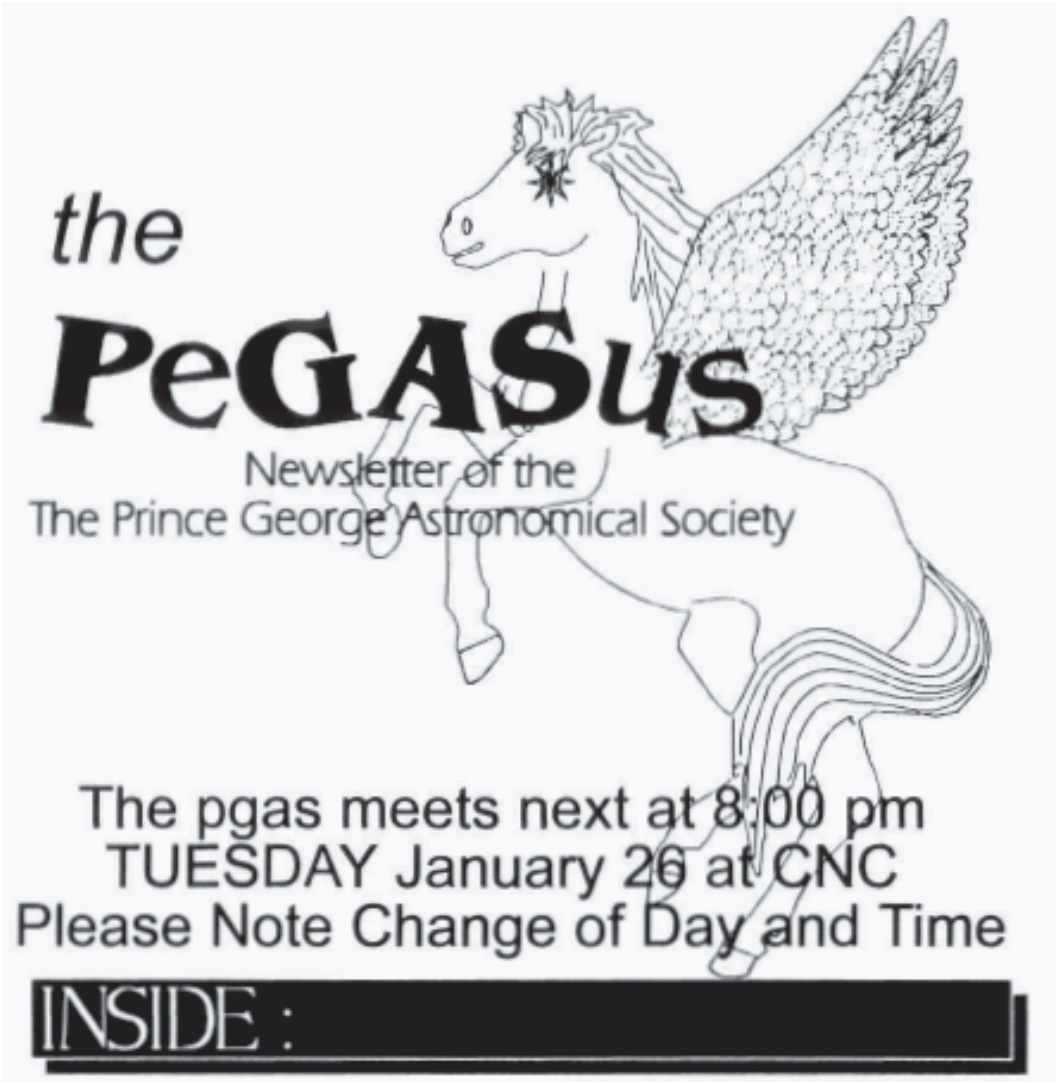
1999 JANUARY ISSUE #90



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the PeGASus is published monthly by the *Prince George Astronomical Society*.

Our pursuits are out of this world.
Our activities are astronomical.
Our aim is the sky.

Contributions to the newsletter are welcome.

Deadline for the next issue is

FEB 12

Send correspondence to
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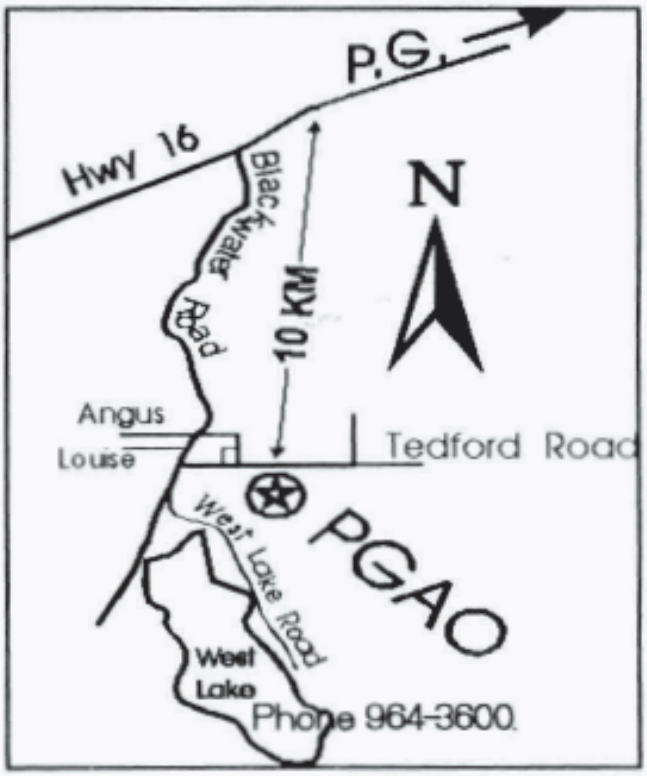

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Editorial

By Gil Self

Well we are in to it, everybody's talking about it. There is, it seems, at least one article in the paper about it every day. Magazines and television are stirring up the interest. And of course the question that is even bigger than whether Bill C. Did or Didn't —are you Y2K compliant?

So who can blame anyone for getting into the millennium. It's pretty exciting, there has been so much hype already and some serious promotion for this year end, not to mention big parties planned all over the world. If you want champagne, you had better buy it now – Give me a break!

But as you probably know, they are all wrong. But lets not get all-superior and point this out to everyone. First of all they won't believe you, - hey your one of those astrology guys" – no that's Astronomy—" astrology astronomy whatever same thing". Save yourself an argument, accept the invitation, go to his party, and drink his liquor. When you are back on your feet again first check your computer, then start plans for your millennium party.

Arthur Clarke in his normal foresighted brilliance first reminded us of the importance of the coming year in his now famous book, more than 30 years ago, 2001 A Space Odyssey. A. Clarke pegged the quantum leap in our evolution at the turn of the millennium. Now, our technology isn't up to what it was in the novel, but it isn't far behind. For a couple of hundred dollars I can buy software so that I can talk to my computer and it will perform what I tell it too. I hear that in a year or two you will be able to buy a seat on a sub-orbital flight, and with the discovery of water on the moon, we are close to plans for a moon base. Wouldn't it be a hoot to get there first and bury a big black thing where they were going to be digging to setup the moon base.—!

Ok, so I really liked the movie, it was the only movie I saw more than twice, I had to travel all the way to Calgary the "first Time" to see it in wide screen 70mm, the lights went down, the curtains just kept opening and opening wider and wider – this is a really big screen (I was only 20 feet away from it) and then the music started. – I 'm sorry I digress, the topic is the millennium.

If you find yourself in "that" discussion, what's the best way to explain why next year is truly the end of the millennium ? Try this.

We have only traveled around the sun 1999 times at the end of this year not 2000 times. Why? Because in that very first year of the new calendar (hypothetically), what do you suppose it said on all those birth certificates and chariot drivers licenses ? The date would have said Year - 01 or Year - 0001 (if they were year I k compliant). There was no year 00 or year 0000 (if they were year I k compliant). By the end of the first year they would change the date to 02 or 0002 (you know) but only one year has gone by. If you and 99 friends all take off your socks and count fingers and toes, but if the very first toe you count you call two, when you finish counting you will be one short 1999, one more toe/year to go. That's my story and I'm sticking to it.

Clear Skies

Coming Events

If you are involved with any astronomical or otherwise scientific activity on behalf of the PGAS, please list the activity here.

January 27— PGAS meeting At CNC 8:00pm
February 23 —PGAS meeting At CNC 8:00pm
March 5 Spring public open house begins

The Night Sky for February '99

by Bob Nelson, PhD
Hi Folks,

Well, winter is now in full force. As I write this, we've been inundated by yet another dump of snow – mounds and mounds of the white fluffy stuff are all around. Shoveling snow strengthens the arms but puts stresses on other parts of my middle-aged body (hips, back, etc.). At the observatory, we need to shovel off the dome before observing, since there hasn't been much of a wind to keep it clear. (Once you do that, it rotates quite well.) It's been quite mild, but that means few clear nights. On the good side, our wonderful neighbour, Tom Laing, has been keeping our driveway plowed. Thanks, Tom.

I have some good news. The 24" telescope (with its newly-cleaned mirrors) is now well collimated and gives superb images! This critical adjustment, by Gil and Bob, was accomplished by taking the four-shooter back to the lab and tweaking up the alignment, re-installing it on the 24" telescope with the aid of a laser alignment device, and making the final adjustment on a bright star. Star images are now round (with no spikes or fuzziness to speak of). Each view looks great and there is no tendency to keep reaching for the focuser. In addition, CCD images reveal that the brightest pixel is at the centre of each star image (as it should be). On the night of this adjustment, I looked again at the Orion Nebula and it was absolutely superb. Another improvement is that once you get an object centred in the eyepiece, it's also centred in the right and bottom eyepieces (no more offsets!). I'd now say that the big telescope is working better than it ever has. This augers well for public observing starting in March. In addition, it should be possible to get some club projects going.

In the meantime, here's what Redshift 3 tells me is happening in February (I don't have my 1999 Observer's Handbook yet!!).

MERCURY, in Aquarius, is visible in the evening in late February and early March. At mid- month, its sets about an hour after the Sun; at the end, it sets almost 2 hours after the Sun. It's not a particularly favourable apparition but is a 7" disk (in early March) of magnitude -1.2 to -1.4.

VENUS, in Aquarius (until Feb 17 when it moves into Pisces), is an evening object in 1999 until the middle of August. In February, it sets from 2 to
hours after the Sun and should be an easy object. It's a 11" disk at magnitude -4.0 for most of the month. If you look through a telescope, you'll see a gibbous shape if the seeing is good enough (or else you'll just see a 'blob').

MARS, in Virgo (until Feb 15 when it moves into Libra), is a morning object. On the first of the month, it rises at about 12:30 AM; at the end of the month, at about 11:3 PM. It's a 8-10" disk at magnitude 0.5 to -0.2. Watch for it rising in the northeast i you're staying up late.

JUPITER, in Pisces all month, is an evening object, setting lower and lower in the southwest each night. On the first, it sets at 9:10 PM (over four hours after sunset) but on the 28th, it sets at about 8:00 PM, only two hours after the Sun. On the 15th, it's 34" disk at magnitude -2.1. It should be possible to get good views of the equatorial bands, all four Galilean moons and possibly the Great Red Spot.

SATURN, in Pisces all month, is also an evening object but trails Jupiter by two-three hours. It's a 17" disk at magnitude 0.5. It should be located for fine viewing. See ho many moons you can identify (Guide 6 will help you there).

URANUS, in Capricornus all year, is lost in the glare of the Sun all month.

NEPTUNE, in Capricornus all year, is lost in the glare of the Sun all month.

PLUTO, in Ophiuchus all year, is a morning object in February. On the first, it rises a about 3 AM and on the 28th, about an hour earlier. As usual, it's a 0.1" disk (point like to all but Hubble, etc.) at magnitude 13.8.

CONSTELLATIONS to look for in February (at 9:00 PM, PST) are Taurus, Auriga Orion, Lepus, Canis Major, and Monoceros.

Taurus (the Bull) contains two well-known clusters: the Hyades (the horns of the bull and the Pleiades (M45). The former is closer, lying some 180 light years distant an the latter, 410 light years. Both are fairly young clusters, and indeed much nebulosity can be seen surrounding the central stars of the Pleiades. Both are steeped in lor (see Burnham's Celestial Handbook for further details). Look for the Hyades in binoculars (or a finder scope) and the Pleiades, in a modest scope at low power. Look also for the Crab Nebula, Ml, using the largest telescope you can get your hands on.

(continued on page 6)

Auriga (the Charioteer) contains the open clusters M36, 37 and 38 which are quite nice and easily found in binoculars or a finder scope.

Orion (the Hunter) contains (need we say?) the famous Orion Nebula, M42, which is probably the most spectacular object you can look at in the 24" telescope. Quite neglected is M78, a "featureless reflection nebula", but probably worth a look.

Lepus (the Hare) is a strange little constellation with little to see except M79, a fine globular cluster.

Canis Major (the Big Dog) contains of course Sirius, the brightest star in the night sky (at -1.46 mags). It's quite close, at 9 light years, and has a white dwarf companion that we can't see right now.

Monoceros (the Unicorn) lies in the Milky Way but has little of note except M50 and a few other open clusters.

Clear skies,
-Bob

Notes from the Chair

By the time you read this, your executive will have met to plan our activities for the next few months. As I take over the reigns from Jon, I'm determined to help steer our group to take some major steps to finish the observatory and move ahead with observing and promotional programmes. We certainly have no shortage of ideas (more than one "wish list" has been written). The trick, I think, is to pick a few things that we can do and ensure that they happen. Such things might be (for the telescope) to mount the C-8 on the 24" telescope with video output (using an image intensifier and video camera subject to availability of funds), and to upgrade the digital readout. On the building, it would be good to finish the floor, and to make some progress on finishing the basement. On the observing front, it would be good to get our newcomers involved with some introductory observing, and for the rest, to get a group project going (like measuring comet and asteroid positions, or just variable star observing). There'll be more on all the above in upcoming meetings and your suggestions are welcome.

On behalf of all members of the PGAS, I'd like to take this opportunity to thank Jon for his fine leadership of the society for the past few years.

Bob Nelson,
President

On a similar vein to Bob's article (Notes from the Chair), Bob sent me an E-mail some time ago. I thought I should share it with you . You may have something to add or something you might want to take on.

PGAS Some Goals for Discussion*

1. Telescope - Mount the club's C-8 on the 24" telescope (c/w new counterweights!)
    - Improve counterweight mounting system
    - Acquire a B&W video camera and image intensifier — display star fields on monitor (This would help enormously in acquiring targets & would look good to the public.)
    - Upgrade shaft encoder mounting hardware — this would improve accuracy & reliability.
    - Upgrade the 486-66 computer to run Windows 9x
    - Make thermostatically-heated box for 2nd 486-66 computer
    - Install The Sky level 4, TPOINT connect encoder output, test pointing accuracy
    - Get a focal reducer for the ST-6
    - Acquire a better CCD camera
    - Acquire a telecompresor
2. Building
    - Move stuff in little rooms to basement, Finish the dry walling & paint little rooms
    - Install modest furniture (bed?) in little rooms
    - Fill, sand (industrial sander) and paint the main floor (consider industrial linoleum
    - Frame basement walls using donated wood on hand
    - Install 3" conduit along basement ceiling for cables
    - Install insulation (& vapour barrier) in basement walls & ceiling
    - Bring heating ducts into basement
    - Finish basement by installing drywall; paint
    - Paint observatory exterior
    - Do maintenance on dome (fix leaks, lube & adjust mechanisms)
    - Paint dome
    - Install siding on all exposed wood
3. Public Programs
    - Acquire second and third projector
    - Work on software for multi-media programs
    - Write & produce programs for above (turn-key!)
4. Observing Programs
    - Resurrect NOVA and "How-To-Use-Your-24"-Telescope programs
    - Get some observing projects going. A good example (esp. if we get a better CCD camera)would be positional & brightness measurements of comets & asteroids.
    - Another example would be a supernova search

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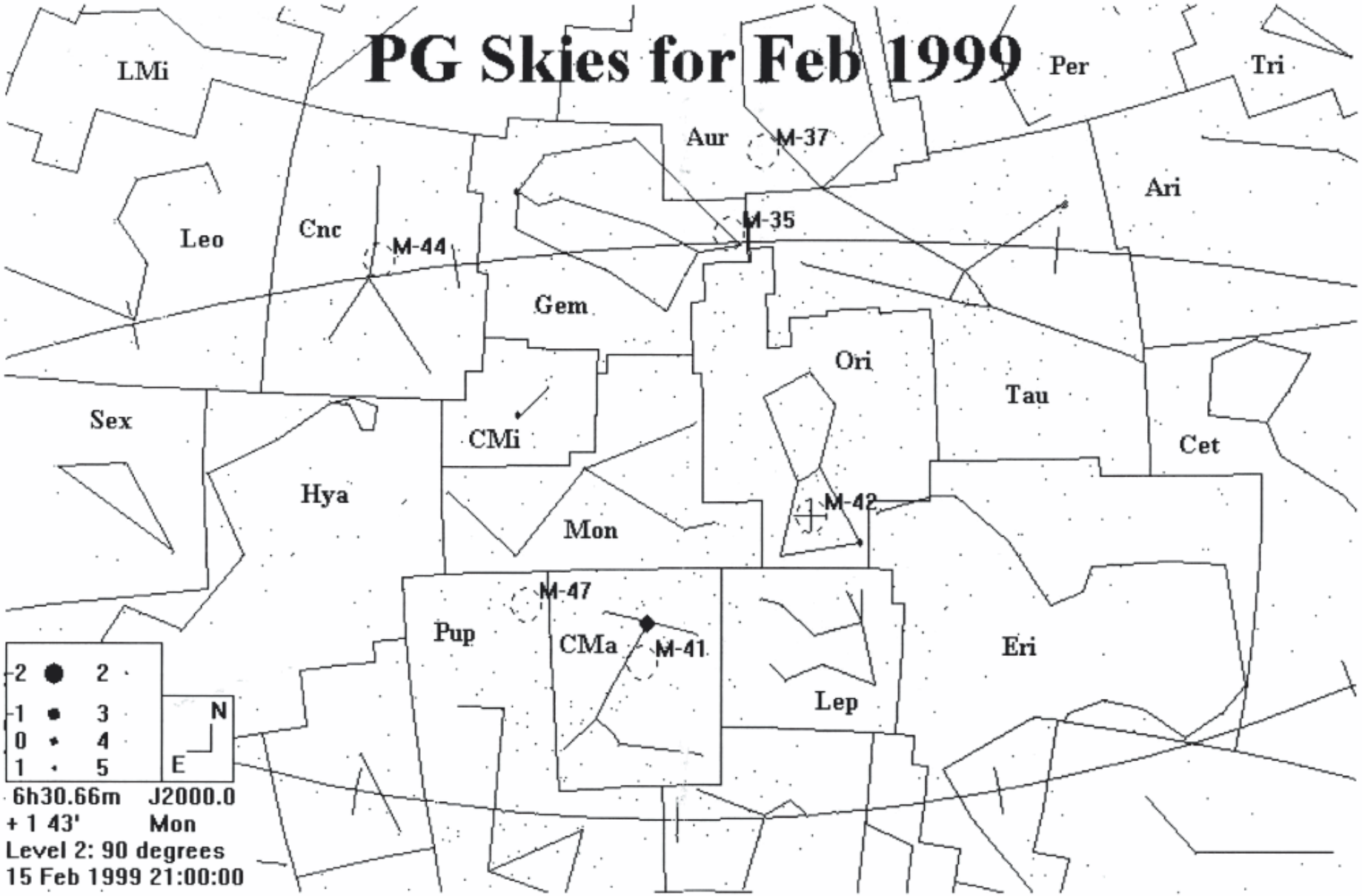

February 15 Skies for Prince George courtesy Dr Bob Neslon

M-42 Fuji 400 Superia – 500 mm F/8 ½ hour guided with the 24 inch. Oct 98

Photo specs:
Fuji Superia 400
24mm lens
10 sec exposure

Sagitarrius area, at MT Kobou Aug 98
24mm – 400 asa approx 15 min

Owen and the guys go camping

NEW BOOKS AT THE PUBLIC LIBRARY.

Yvonne Whebell.

LIFE ON OTHER WORLDS: THE 20TH CENTURY EXTRA-TERESTRIAL LIFE DEBATE.

By Steven J. Dick. Cambridge University Press, 1998

Steven Dick was a historian for NASA's SETI program and a member of the panel assemble by Al Gore to examine the implications of possible fossilized life within the meteorite from Mars. He discusses the history of the concept of extraterrestrial intelligence, SETI, UFO's, the origin and evolution of life, and the possibility of a 'universal biology'.

ROCKS FROM SPACE. Second Edition.

By. 0. Richard Norton. Mountain Press, 1998.

If you are searching for the one that flashed through our skies a few months ago, you might want to read this book. How to recognize a meteorite, meteorite craters, famous meteorites and meteor showers, description, classification, composition, origins are all covered in this work. The author includes many photos of metorites and craters, as well as celestial diagrams. YW

HUBBLE GOES TO THE LIMIT IN SEARCH OF FARTHEST GALAXIES

Stretching the vision of NASA's Hubble Space Telescope farther across space and further back into time than ever before, astronomers have peered into a previously unseen realm of the universe.

A "long exposure" infrared image taken with Hubble's Near Infrared Camera and Multi-Object Spectrometer (NICMOS) has uncovered the faintest galaxies ever seen.

Astronomers believe some of these galaxies could be over 12 billion light-years away (depending on cosmological models) D making them the farthest objects ever seen. A powerful new generation of telescopes will be needed to confirm the suspected distances.

"This is just our first tentative glimpse into the very remote universe," said Alan Dressier of the Carnegie Observatories in Pasadena, CA. "What we see may be the first stages of galaxy formation. But the objects are so faint that their true nature can only be explored with the advanced telescopes of the future."

"This observation is a major step toward fulfilling one of Hubble's key objectives: to search for the faintest and farthest objects in the universe," added Ed Weiler, NASA's acting Associate Administrator for Space Science.

In a separate discovery, Thompson also found that faint red galaxies matched up with compact blue knots of light seen in the earlier visible light image. "This means that some objects that appeared to be separate galaxies in the optical image are really hot star-forming regions in much larger older galaxies," he said.

Prior to the NICMOS observation, a ten-day long exposure called the Hubble Deep Field was Space Telescope's benchmark for the "deepest" view into the universe (with the exception of the cosmic microwave background that is farther away than any structures see in the universe).

Astronomers had to wait for the infrared camera to be installed on Hubble to look for unseen galaxies beyond the limits of the visible Jeep field photograph. Infrared sensitivity was needed because the expansion of the universe is expected to stretch the light of distant galaxies down to infrared wavelengths.

Thompson selected a portion of the original Hubble deep field and took long exposures with Hubble's near infrared camera. When the infrared and visible-light pictures were compared, Thompson found many new objects that were not seen in visible light.

In results to be published in the Astronomical Journal, Thompson precisely measured the infrared "colors" of the objects. mHe found some objects that had the expected color of a galaxy too distant to be detected in Hubble's optical deep field image.

Scheduled for launch in the year 2007, the Next Generation Space Telescope will take infrared spectra of candidate galaxies to confirm their distances, and its higher resolution will help reveal the shapes of these early objects.

EDITOR'S NOTE: Images and photo captions associated with this release are available on the Internet at:
http://oposite.stsci.edu/pubinfo/l 998/32 or via links in
http://oposite.stsci.edu/pubinfo/latest.html or http://oposite.stsci.edu/pubinfo/pictureshtml

SUBMILLIMETER WAVE ASTRONOMY
SATELLITE TO STUDY STAR FORMATION

NASA's Submillimeter Wave Astronomy Satellite (SWAS) will gather star-formation data, which have remained invisible from beneath the obscuring effects of the Earth's atmosphere.

The overall goal of the two-year mission is to gain a greater understanding of star formation by determining the composition of interstellar clouds, and establishing the means by which these clouds cool as they collapse to form stars and planets.

"During its mission, SWAS will observe hundreds of regions of ongoing star formation within our galaxy. The answers SWAS will provide are important not only to the understanding of the formation of future stellar systems, but also to the understanding of the processes that led to the formation of the Sun, the Earth, and the other planets and moons in our own solar system," said Dr. Gary Melnick, Harvard-Smithsonian Center for Astrophysics, principal investigator for the SWAS mission.

Further information about SWAS can be found on the Internet at:

http://sunland.gsfc .nasa.gov/smex/swas/
http://sunland.gsfc.nasa.gov/smex/
http://pluto.harvard.edu/cfa/oir/Research/swas.htrnl

LASER PROVIDES FIRST 3-D VIEW OF MARS' NORTH POLE

Measurements by **a** laser altimeter instrument orbiting aboard NASA's Mars Global Surveyor spacecraft are providing striking new views of the north pole of the red planet and the processes that have shaped it.

This first three-dimensional picture of Mars' north pole enables scientists to estimate the volume of its water ice cap with unprecedented precision, and to study its surface variations and the heights of clouds in the region for the first time.

The elevation measurements were collected by the Mars Orbiter Laser Altimeter (MOLA) aboard Global Surveyor during the spring and summer of 1998, as the spacecraft orbited Mars in an interim elliptical orbit. MOLA sends laser pulses toward the planet and measures the precise amount of time before the reflected signals are received back at the instrument. From this data, scientists can infer surface and cloud heights.

Approximately 2.6 million of these laser pulse measurements were assembled into a topographic grid of the north pole with a spatial resolution of.6 miles (one kilometer) and a vertical accuracy of 15-90 feet (5-30 meters).

The topographic map reveals that the ice cap is about 750 miles (1,200 kilometers) across, with a maximum thickness of 1 .8 miles (3 kilometers). The cap is cut by canyons and troughs that plunge to as deep as 0.6 miles (1 kilometer) beneath the surface. "Similar features do not occur on any glacial or polar terrain on Earth," said Dr. Maria Zuber of the Massachusetts Institute of Technology and NASA's Goddard Space Flight Center, Green-belt, MD. "They appear to be carved by wind and evaporation of ice."

The MOLA data also reveal that large areas of the ice cap are extremely smooth, with elevations that vary by only a few feet over many miles. In some areas the ice cap is surrounded by large mounds of ice, tens of miles across and up to half a mile in height. "These structures appear to be remnants of the cap from a time when it was larger than at present," Zuber said. Impact craters surrounding the cap appear to be filled with ice and dust that was either deposited by wind or condensation, or perhaps remains from an earlier period when the ice cap was larger.

The shape of the polar cap indicates that it is composed primarily of water ice, with a volume of 300,000 cubic miles (1.2 million cubic kilometers). The cap has an average thickness of 0.64 miles (1.03 kilometers) and covers an area 1.5 times the size of Texas. For comparison, the volume of the Martian north polar cap is less than half that of the Greenland ice cap, and about four percent of the Antarctic ice sheet.

The estimated volume of the north ice cap is about 10 times less than the minimum volume of an ancient ocean that some scientists believe once existed on Mars. If a large body of water once existed on the red planet, the remainder of the water must presently be stored below the surface and in the much smaller south polar cap, or have been lost to space. But such a large amount of unaccounted-for water is not easily explained by current models of Martian evolution.

During its mapping of the north polar cap, the MOLA instrument also made the first direct measurement of cloud heights on the red planet. Reflections from the atmosphere were obtained at altitudes from just above the surface to more than nine miles (approximately 15 kilometers) on about 80 percent of the laser profiles. Most clouds were observed at high latitudes, at the boundary of the ice cap and surrounding terrain.

Part Two

Owen Salava

The next part in the continuing saga of our hero - Owen - who is attempting to design and build a nice scope for himself.

Things are continuing slowly at this point. The reference text has arrived, and I have spent many hours poring over its contents. The scope will be a truss tube dobsonian mount. The order is in for the mirrors, a set of f/5 12.5" beauties. This will give me a scope that at most I, being short, will only ever need a single step stool to use. Though I might skydive (ok, 4 years ago) I hate heights, and ladders in the dark, excluding our lighted dome, don't do it for me! The optician tells me that the mirror should be complete late in the summer.

Once things are up and running - i.e. built - the scope will bear a significant resemblance to Bob's variable hunting beast. Lacking a big van to haul it around in, I will be making it more easy to take apart for observing trips - such as my now mandatory trek to Mt Kobau in August.

And lastly, the first cheque is off as downpayment on the mirror... the first of many payments needed for the scope!

Owen

There are three kinds of people in the world...
Those that can count, and those that can't.

(continued from page 7)

*Several points:

1. This is a suggested list compiled by me for discussion purposes. Many will want to add items I have forgotten or modify existing ideas.
2. ll expenditures involving any substantial money must be approved by the executive.
3. There are way too many goals to accomplish in one year; therefore we have to put things in priority.
4. Every goal or project must be spear-headed by someone who is enthusiastic about it and willing to follow through, or else it won't happen. Possibly it might be a good idea to have two people for each goal or project.
5. I'm prepared to do many of the items in section 1 (but if anyone would like to help, feel free!).
6. The main goals that are adopted should have target dates.
7. Let's concentrate on the things we can accomplish and not be over-optimistic.

BN

In the coming year, there are a great number of things to be done around the observatory to both improve it for the use of the members and to present a great face to the community. Donations of time and materials in the coming year will be highly appreciated as we work as a society to improve the capabilities of the equipment, and increase thc comfort and usability of the building overall.

PGAS CONTRIBUTORS

The PGAS would like to thank the following individuals, corporations and government agencies who, since 1991, have donated money, goods or services to the construction and operation of the Prince George Astronomical Observatory.

Ministry of Adv. Ed. Training and Tech.	$25,000
BC Science Council	16,000
BC Lotteries	3,900
Helmar Kotsch (Acme Mas.)	1,932
Northwood Pulp and Timber	1,665
Electrical Services Ltd.	1,583
Royal Bank of Canada	1,500
Regional District of Fraser-Fort George	1,000
Prince George Rotary Club	1,000
The Pas Lumber Co	750
Rustad Broth & Co Ltd	750
Canfor Polar Division	744
Bisque Software	500
Xerox Canada	500
Canfor Clear Lake	500

The greatest contributors to the construction and operation of the observatory are from PGAS members who have generously contributed their time to this project. The value of their contribution surpasses all external contributions.

The PGAS is a non-profit organization dedicated to the advancement of astronomy and science in genera! in Prince George and the neighboring northern communities. Donations of money or materials to the society are greatly appreciated and tax deductible.