Orbit

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Roger Hill, Editor

I love the Fall. The bright days with sharp sunshine, Fall fairs, the incredible colours of the Maple, the wonderful rustling sound of freshly fallen leaves, the crisp bite of a freshly picked apple. Really, are there any better places to be on the planet at this time of year?

Astronomically, it's the time when it's possible to observe the winter constellations at less than bone-shattering temperatures; when Andromeda is high in the sky in the evening, and you get to lament that it's been a long time since you saw M31 naked eye from your backyard. For me, it's a time when I get to do the Burlington seminars, and this year was a treat!

Unlike the last two, this year we did not provide, or build, telescopes. A year ago we brought in a dozen Galileo Scopes, and ran a telescope building workshop, which worked quite nicely, but the 'scopes were not the best. In the Spring, we managed to acquire a dozen Celestron First Scopes, and although these were a better scope, and took less set up time, it was a lot of work to get them here. Both times we were also cursed by generally poor weather.

This year, three of the four nights were usable to some degree, and since we were not going to have a "Telescope building night" then the final two nights had to be revamped.

I have been doing one of the nights with a presentation called "How High is the Sky", and it goes over very well. It's got lots of good science in it, along with mystery, some neat people (Tycho Brahe and his metal nose, for instance), and is the history not only of humanity's quest to know more about the universe, but also how we found this out. A good discussion normally takes place, too, about science, and I hope that the people leave knowing a bit more about how the scientific method is the best way we have of making sure we don't fool ourselves.

The second part of that night is how to use the planispheres they're given.

In times past, the first night was all about telescopes, so no change there. The second night used to be about what you could see through telescopes, the third night was How High is the Sky, and the fourth was building telescopes. This last series was different. The first night was the same, How High is the Sky and the Planisphere was done the second night, and the third and fourth evenings were dedicated to a look at the current state of what we know about our Universe. It's divided into two parts with the first one being the Solar System and the second being what's outside it.

It's the second one where you get into the huge numbers. When you start to talk about the densities of white dwarf stars and neutron stars, the numbers get truly awesome. Discussing how bright supernovae are, to be seen across hundreds of millions of light years or gamma ray busts so powerful they affect the Earths atmosphere from 50,000 light years away.

With some people, their eyes glaze over as they try to fathom the titanic forces and vast distances involved, and frequently fail. Others just lap it up, almost as if they're in a sort of sensory overload.

And that is one of the joys of armchair astronomy...the contemplation of realms far beyond the mundane reality of day to day life.

For me, it was back to mundane reality, though. Over the summer, my observatory roof started to leak. It's hardly surprising, really. I built the thing in 1998 for $500, and although I've invested in some things for it, I've tried to keep true to it's original premise: to build an observatory for half what people thought it could be done for.

So, several of those nice crisp days were devoted to removing the old painted chipboard roof and installing a new plywood one.

One of the areas where I had noticed a deficiency was that I had not used any sort of drip guard on the edges of the roof. So, some 16 feet of 4" aluminum flashing was purchased. The paint I'd used originally was a high gloss oil based porch paint. What was great was that water beaded on it's surface, and snow just slid straight off until the first cracks appeared. So I used the same sort of paint. The plywood was fairly thirsty stuff, and, as usual, the first coat used about a third of the gallon of paint I'd bought. Two more coats used up another sixth, or so, leaving me with a bit less than half a gallon, so I painted the entire remainder of the outside walls of the observatory, and it now looks so much better. The drip guard works very well indeed, too.

The only issue was that I had to adjust the rollers that the roof used, which resulted in raising the leading edge and lowering the trailing one when the rood opened. This meant that the telescope as it normally sat on my pier was now too tall.

My usual parking position for the scope, though was to point the tube at the horizon, due west. In a fork-mounted SCT, this is puts one of the fork arms further from the floor than any part of the tube. I liked it this way because it meant that nothing was blocking the GPS sensor from seeing the sky. By pointing the tube at the horizon, due west, I dropped the apex of the scope by a couple of inches, and that was more than enough room for the roof to close.

The drip guard (caulked beyond all reasonable bounds, naturally) works like a charm, and I spent a happy few minutes during one rainstorm recently watching the water pour off the roof with nary a drop being seen inside.

What it meant, though, was that my telescope was out of commission for a few days while the roof was being redone. What was also annoying was that the power distribution board inside the clubs Paramount was being sent back to the manufacturer, putting our lovely 16" RC out of commission. On the Saturday evening of Thanksgiving weekend, I could stand it no longer and loaded up my 12" SCT, tripod, laptop, camera and eyepieces into the van and headed for the clubs observatory.

Bert was already there, of course, and a few other people also showed up: Mike Ducak among them. Mike has only been observing for a couple of years, but is rhyming off NGC numbers with the best of them! New Guy Jason Blane showed up on the Friday night, but not the Saturday...ah well.

Anyway, a pleasant evening was had by all. I showed Rick Cudmore the "Iterative Method of Polar Alignment", but he kept running into a problem with his hand controller. It must have been contagious, because mine has been finicky for a while now, and really gave me trouble that night. I've had to really push down on the contacts to get it to work. I've since visited Sayal in Mississauga and picked up one of their Rubber Keypad Repair Kits. I may get a chance to use it prior to the meeting on Thursday evening, if I can get Orbit finished in time.

Also, I got word from Andy yesterday evening that the Paramount is now electrically happy. However, it needs polar aligning and a T-Point model done before it's back to operational status.

Finally, we're on the lookout for a meeting room again...contact me if you know of a place where it's cheap (like me!), and close to major highways for ease of access. If we can't find someplace in time, we'll be meeting at the Observatory in January...bring your long johns!

Clear skies, one and all,

Roger Hill
Orbit editor and President.

Still A Good Comet

For most of last month, we had a wonderful chance to follow Comet 103P Hartley 2 as it quickly trekked across northern skies. By October 8, it was close the Double Cluster in Perseus. At that point, Hartley was showing up on photos but one was still hard pressed to see it visually. By the 20th, our cosmic visitor was making its closest approach to Earth at a mere 18 million kilometers. Eight days later, the comet came closest to the Sun and is now on its way back to deep frigid space.

As November opens, Hartley is now in Gemini and quickly moving south. The Moon is no longer a glowing obstacle and will be new on the 6th. On November 1, Hartley will be at magnitude 4.7 and is an easy target to the naked eye from dark sites. Its tiny 1.5-kilometer nucleus is producing a coma about the visual size of the full moon. In fact, Hartley appear similar to Comet Holmes that graced our skies around this time – three years ago. My how time has flown by.

The big difference in October 2007 is Holmes was a magnitude 17.5 comet one night and the next night suddenly gave off a vast amount of new material from within. With this fresh icy debris Comet Holmes surged in brightness by one million times and instantly gained naked eye status. Hartley is a 6.46-year periodic visitor what will return in April 2017. Until it fades or just gets too low in the sky to locate, go out as often as possible to observe, photograph, sketch and share with your neighbours. Other than its next return, who knows when the next bright comet will grace our skies?

This month we will point our telescopes down to Piscis Austrinus. This constellation is so low as seen from Canadian skies, the northern constellation boundary with Capricornus and Aquarius is positioned at declination minus 25. Such low star groupings do not remain above our southern horizon too long. The stars that make the fish lying on its back range from magnitude 4.2 to 4.4 and mythological states the fish is drinking water from Aquarius. The magnitude 1.3 alpha star is named Fomalhaut – from the Arabic phrase meaning "the mouth of the southern fish." This sun is registered as a class A1 star with at surface temperature of 8,500 Kelvin and luminosity 16 times that of our Sun.

Fomalhaut made news back in November of 2008 with the first ever image taken of a planet around a distant star thanks in part to the Hubble Space Telescope. Listed as the 18th brightest star in the night sky, Fomalhaut is only 25 light years from Earth. However, even at this somewhat close distance it would take a spacecraft an estimated 420,000 years to travel there one way. The exoplanet is four times farther from Fomalhaut than the planet Neptune is from our Sun.

As a side note, the first ever family of planets imaged from ground based telescopes was accomplished by the Keck and Gemini Telescopes also in November 2008. The three planets orbit at 3.8 billion, 6 billion and 10.5 billion kilometers from the sixth magnitude star HR 8799 located in Pegasus and lies 130 light years from us.

Let us now look at a small but quaint galaxy, NGC 7229. This face appears face on galaxy is only 2.0 by 1.2 arc minutes wide. Depending on your telescope’s aperture, you might be able to count its many galactic arms. Moving on to a small group of galaxies headed by NGC 7172. This edge on island of stars is listed as magnitude 11.9. Below NGC 7172 we find NGC 7173 – a tad fainter at magnitude 12.1 followed by NGC 7176 at magnitude 11.8.

Jupiter is of course the prominent planet this month. The King of planets is well up by sunset meaning our distance from each other is lengthening and Jupiter is getting a bit smaller. Since Earth is moving faster in its orbit, Jupiter appears to be moving westward with the stars. This is called retrograde and will end when Jupiter resumes its easterly motion from the 19th. Be sure to follow the many shadow transits Jupiter has to offer. A list of events can be found on pages 235 and 236 of the 2010 Observers Hand Book of the Royal Astronomical Society of Canada.

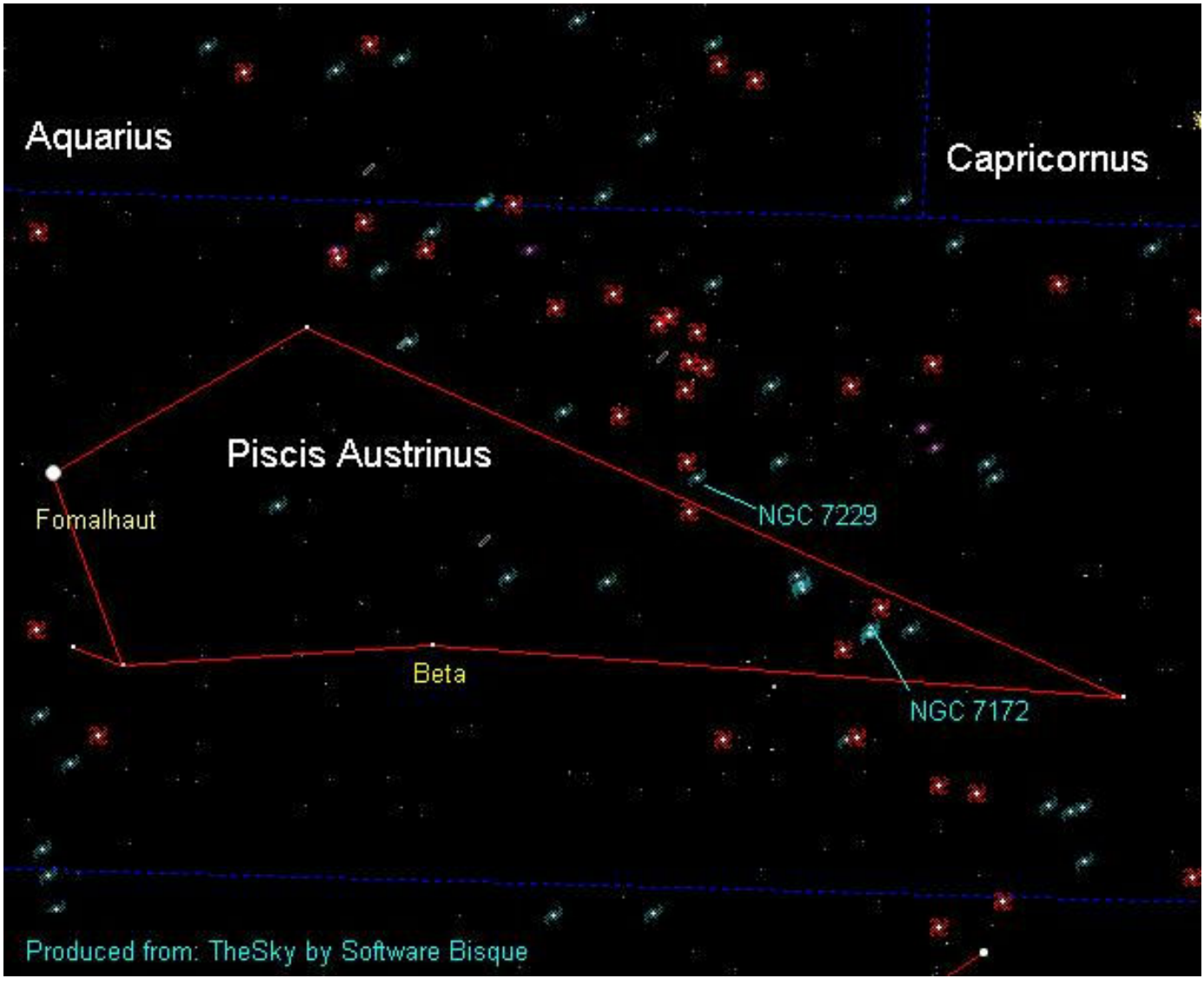
As for Mercury and Mars, they are getting lower in the west as time goes by. On November 6, Mars is one degree north of M80. Moving to the morning skies, Venus and Saturn are slowly pulling themselves from the solar glare. In a few short months, we will be enjoying Saturn's rings again and at a decent hour.

This is the month when we get to enjoy an extra hour of sleep. Sunday Nov 7 we move the clocks back an hour (where applicable) and thus become Eastern Standard Time. Also remember to subtract that hour when converting from Universal Time for various astronomical events such as the transit of Jupiter's moons.

Ten short nights later will be the peak of the Leonid meteor shower. The Leonids is a variable shower with rates changing from year to year depending on what ribbon of debris Earth flies into. This shower is not expected to be spectacular like a few years ago with the meteor storm. The prediction is only 20 meteors per hour per single observer.

And finally the November 21 full moon is called the Beaver Moon. I can imagine those busy little beavers are getting ready for another Canadian winter. Even though it is cold, winter is a great time to enjoy the night sky.

Until next month, clear skies everyone.



New Galaxy Clusters Revealed By Cosmic Shadows

An international team of scientists led by Rutgers University astrophysicists have discovered 10 new massive galaxy clusters from a large, uniform survey of the southern sky. The survey was conducted using a breakthrough technique that detects "shadows" of galaxy clusters on the cosmic microwave background radiation, a relic of the "big bang" that gave birth to the universe.
In a paper published in the Nov. 10 issue of Astrophysical Journal, the Rutgers scientists and collaborators at the Pontifical Catholic University of Chile (PUC) describe their visual telescope observations of these galaxy clusters, which were essential to verify the cosmic shadow sightings. Both observations will help scientists better understand how the universe was born and continues to evolve.

The research began in 2008 with a new radio telescope in the Atacama Desert of Chile - one of the driest places on Earth.

The instrument, known as the Atacama Cosmology Telescope (ACT), collects millimetre-length radio waves that reveal images of the otherwise invisible cosmic background radiation. Millimetre waves are easily blocked by water vapour, hence the telescope's home high in the Andes Mountains of northern Chile, where there is barely any atmospheric moisture.

"The groundbreaking observations at Atacama, led by Lyman Page of Princeton University, surveyed large areas of the sky to reveal shadows that pointed astronomers to these previously unseen massive galaxy clusters," said Felipe Menanteau, a research scientist in physics and astronomy, School of Arts and Sciences, at Rutgers.

Theorists Rashid Sunyaev and Yakov Zel'dovich predicted the shadow phenomenon 40 years ago, now known as the Sunyaev-Zel'dovich effect, or S-Z effect. Shortly thereafter astronomers verified it by observing shadows cast by previously known galaxy clusters.

ACT, the Atacama Cosmological Telescope, at 17,000 feet above sea level is the highest permanent ground based observatory on the planet can be seen below and to the left of Kevin Hobbs in this picture taken by Roger Hill

The higher sensitivity and resolution of ACT now makes it practical for astronomers to essentially reverse the procedure - to search the cosmic background radiation for shadows that indicate the presence of unseen clusters.

"The 'shadows' that ACT revealed are not shadows in the traditional sense, as they are not caused by the galaxy clusters blocking light from another source," said Jack Hughes, professor of physics and astronomy at Rutgers.

"Rather, the hot gases within the galaxy clusters cause a tiny fraction of the cosmic background radiation to shift to higher energies, which then makes them appear as shadows in one of ACT's observing bands."

Cosmic background radiation was first observed by two Bell Labs astronomers in New Jersey back in the 1960s, a discovery that earned them the Nobel Prize in Physics in 1978.

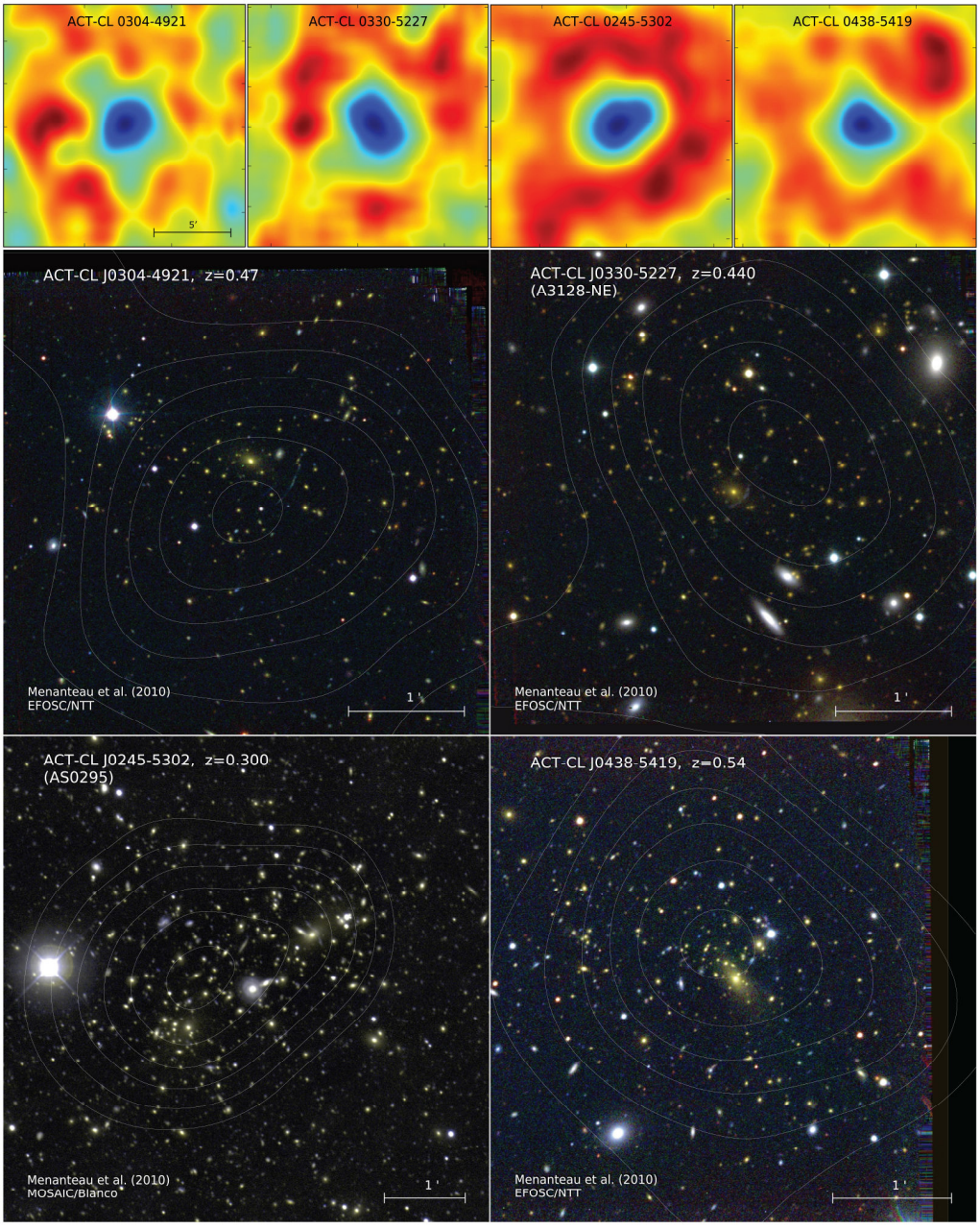
Hughes and Menanteau worked with Chilean professors Leopoldo Infante and Felipe Barrientos to collect optical images of dozens of candidates, which led to the discovery of ten entirely new massive galaxy clusters.

The Rutgers and PUC team, which also included PUC undergraduate student Jorge Gonzalez, worked on two optical telescopes in Chile over the course of seven nights during October and December of 2009.

"We knew the experiment was working when we could see the giant clusters clearly, even in the raw images as they came through the telescope," said Menanteau.

"The technical challenges involved in exploiting the S-Z technique are daunting, and it is fantastic to see this method working so well," said Priyamvada Natarajan, professor of astronomy and physics at Yale University and a leading theoretical cosmologist not affiliated with the study.

"It will build our inventory of the most massive and distant clusters in the universe, which will provide important constraints on the currently accepted cosmological model."



World's biggest telescope to be located on Cerro Armazones, Chile

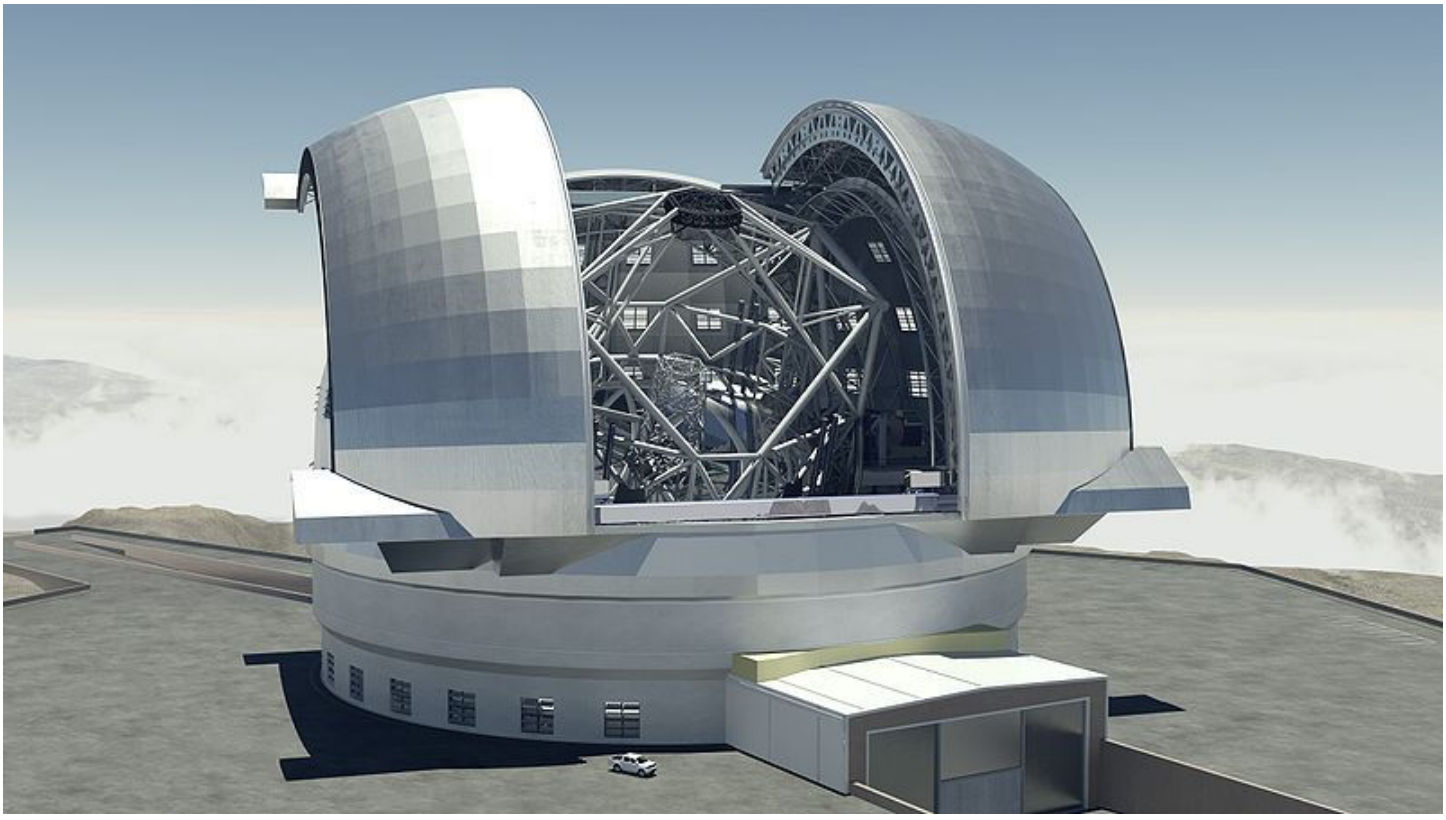
On April 26, 2010, the European Southern Observatory Council (ESO) selected Cerro Armazones as the baseline site for the planned 42-meter European Extremely Large Telescope (E-ELT). Cerro Armazones is a mountain at an altitude of 10,000 feet (3,060 meters) in the central part of Chile's Atacama Desert, and about 12 miles (20 kilometres) from Cerro Paranal, home of ESO's Very Large Telescope.

"This is an important milestone that allows us to finalize the baseline design of this very ambitious project, which will vastly advance astronomical knowledge," said Tim de Zeeuw, ESO's director general. "I thank the site selection team for the tremendous work they have done over the past few years."

ESO's next step is to build the optical/infrared E-ELT with a primary mirror 138 feet (42 meters) in diameter. The E-ELT will be the world's biggest eye on the sky — the only such telescope in the world. ESO is drawing up detailed construction plans together with the community. The E-ELT will address many of the most pressing unsolved questions in astronomy and may, eventually, revolutionize our perception of the universe, much as Galileo's telescope did 400 years ago. The final go-ahead for construction is expected at the end of 2010 with the start of operations planned for 2018.

The ESO Council made the decision on the E-ELT site. The group is the governing body of the organization composed of representatives of ESO's 14 member states. The choice was based on an extensive comparative meteorological investigation that lasted several years. The majority of the data collected during the site selection campaigns will be made public during this year.

In anticipation of the choice of Cerro Armazones as the future site of the E-ELT and to facilitate and support the project, the Chilean government has agreed to donate to ESO a substantial tract of land contiguous to ESO's Paranal property, which contains Armazones, in order to ensure the continued protection of the site against all adverse influences, in particular light pollution and mining activities.



Thanks, to all you who contributed to IYA 2009

On 2010 May 5 the RASC was presented with an International Year of Astronomy 2009 Certificate of Appreciation by the International Astronomical Union, signed by the president of the IAU, Professor Robert Williams, former director of the Cerro Tololo Inter-American Observatory (CTIO), and of the Space Telescope Science Institute (STScI), and Professor Catherine Cesarsky, IAU past president and former Director General of the European Southern Observatory (ESO).

This certificate is a public acknowledgement of the energetic and impressive effort of the RASC working as a national organization composed of centres and individuals to make IYA2009 such a success. All RASC members can feel proud of their national effort, which contributed to the impressive figure of nearly 2 million Galileo moments, achieved in partnership with the FAAQ, CASCA, and unaffiliated astronomy clubs and amateur astronomers.

Many individual RASC members also received IYA2009 Certificates of Appreciation from the IAU, and to all we offer our thanks and congratulations. The Canadian achievement on the 400th anniversary of Galileo's epochal telescopic discoveries provides a firm foundation upon which to further our education and public outreach.

This link will take you the RASC Web site to view and/or download the certificate.

So, if you gave someone their first look through a telescope in 2009, thanks!

Audouin Dollfus (1924 November 12 – 2010 October 1)

By Randall Rosenfeld, National Office
Oct 14, 2010, 01:50

It is with sadness that we report the demise of RASC Honorary Member and distinguished planetary scientist, Audouin Dollfus. He was 85.

Dollfus was known for his important polarimetric and reflectance studies of solar system objects. These included among other results the successful determination of the iron oxide nature of much of the Martian regolith. On 1966 December 15 he discovered one of the inner Saturnian moons (Saturn X). He conducted highly-technical astronomical observations from innovative aerostatic balloons in the mid '50s. A master of studies involving electronic detectors, some of which he designed and made himself, interestingly Dollfus did not neglect scientific visual observation, and indeed he was a very gifted and accurate planetary artist.

Dollfus' many contributions to the history of astronomy included, not surprisingly, papers and books on the first scientific balloon flights, his mentor Bernard Lyot, his predecessor Christiaan Huygens, the development of Meudon Observatory, where he spent much of his scientific career, Arago's polarimetry, and the Pic du Midi Planetary Observation Project: 1941-1971, of which he was an important member.

He remained scientifically engaged to the end of his life. Asteroid 2451 Dollfus was named in his honour. He was a member of many distinguished scientific organizations. He was created a chevalier de la Légion d'honneur in 2009, and was a recipient of the Société Astronomique deFrance's prix Jules Janssen in 1993.

A more complete obituary will be published in the December 2010 Journal.

Jupiter and Ten

by James T. Fields (1817-1881)

found in Anthology of American Poetry, pp. 234-235, edited by George Gesner, Published by Avenel Books / Crown Publishers, New York, 1983.

Mrs. Chub was rich and portly,
  Mrs. Chub was very grand,
Mrs. Chub was always reckoned
  A lady in the land.

You shall see her marble mansion
  In a very stately square, --
Mr. C. knows what it cost him,
  But that's neither here nor there.

Mrs. Chub was so sagacious,
  Such a patron of the arts,
And she gave such foreign orders,
  That she won all foreign hearts.

Mrs. Chub was always talking,
  When she went away from home,
Of a prodigious painting
  Which had just arrived from Rome.

"Such a treasure," she insisted,
  "One might never see again!"
"What's the subject?" we inquired.
  "It is Jupiter and Ten!"

"Ten what?" we blandly asked her,
  For the knowledge we did lack.
"Ah! that I cannot tell you,
  But the name is on the back.

"There it stands in printed letters.
  Come tomorrow, gentlemen,
Come and see our spending painting,
  Our fine Jupiter and Ten."

When Mrs. Chub departed,
  Our brains we all did rack,--
She could not be mistaken,
  For the name was on the back.

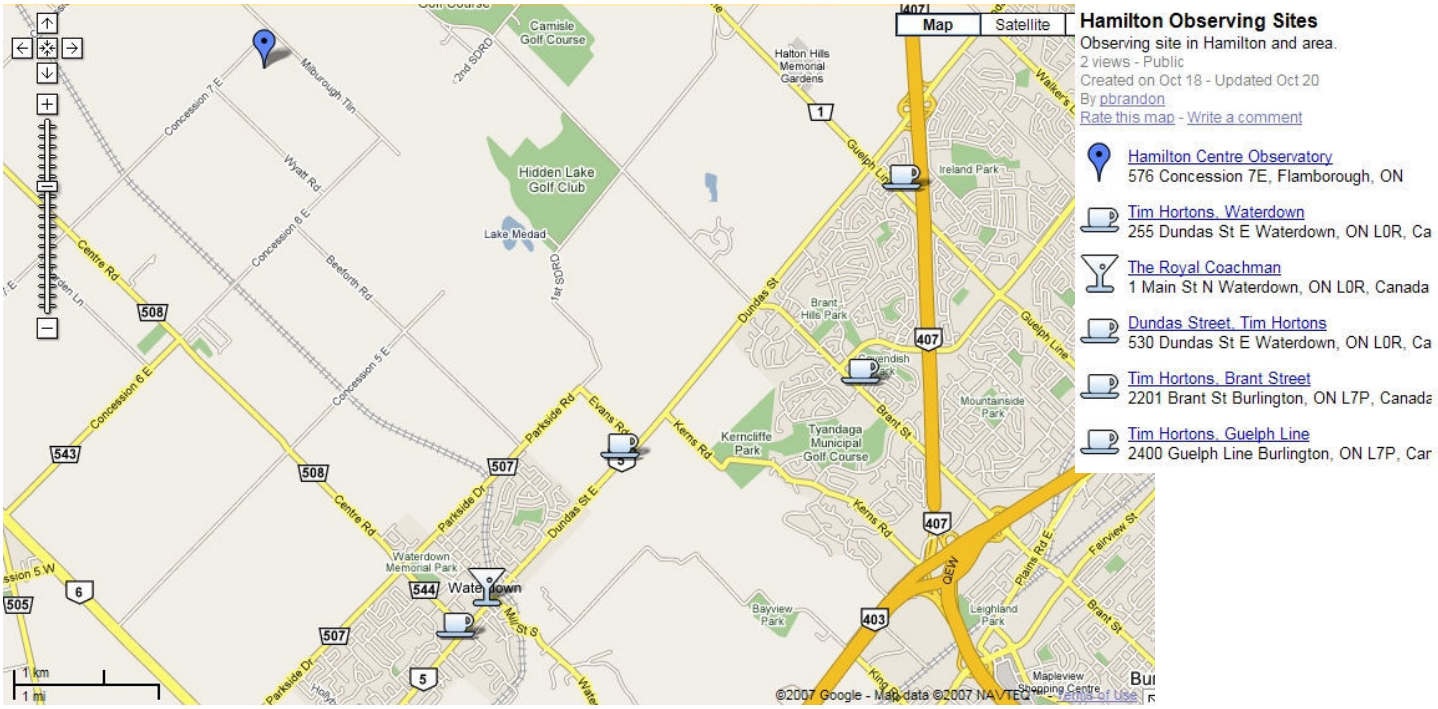
So we begged a great Professor
  To lay aside his pen,
And give some information
  Touching "Jupiter and Ten."

And we pondered well the subject,
  And our Lemprière we turned,
To discover what the Ten were;
  But we could not, though we burned!

But when we saw the picture,--
  Oh, Mrs. Chub! Oh, fie! Oh!
We perused the printed label,
  And 'twas Jupiter and Io!

What you missed in October...!

October saw a very interesting speaker: Robert (bob) Morrow, the Project Manager for Tomatosphere. A fascinating program to try to get Canadian children to have a more visceral experience of the Space program by seeing if there is any difference between seed that have been in orbit, and seeds that have not. He has talked about this program to tens of thousands of kids, and he fascinated everyone who was present in October. Colin Haig and Glenn Kukkola also had things to say.



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What you Missed pictures by Ed Mizzi. Front cover photograph by Roger Hill