



Royal Astronomical
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Hamilton Centre

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Moon Rover, © Canadian Space Agency

Famous Astronomers Born this Month

June 8, 1652	Giovanni Domenico Cassini, Italian-French mathematician, astronomer and engineer who discovered four of Saturn's moons, born in Perinaldo, Republic of Genova (d. 1712)
June 10, 1927	Eugene Parker, American solar astrophysicist (Parker Space Probe named after him)
June 26, 1730	Charles Messier, French astronomer (cataloguer of "M objects"), born in Badonviller, Lorraine, France (d. 1817)

Data from www.onthisday.com



Letter from the Editor

I would like to open this issue with a thank you to David Campbell, Scott Barrie, and Ed Mizzi for their contributions to this month's issue of Orbit. I would also like to thank everyone who have contributed to previous issues of Orbit. I am pleased to see more people being involved in their club's newsletter. Without these contributions and additions, I do not know how I would be able to pull this together every month. I would also like to thank Gavin Hill for maintaining the observatory grounds.

After what was, for myself at least, a long wait for spring, it was delightful to start the warm weather with a lunar eclipse earlier this month, even if I was only able to see it remotely via my computer. The spring weather has been fickle as always, but summer is nearly here. More importantly, the June solstice is fast approaching, which means nights, and thus star gazing opportunities, will be getting longer once again.

After the procurement of a telescope from a fellow club member (thank you), I have no reason not to be able to enjoy these upcoming summer nights. I have already had the telescope out a few times to look at the moon, the only object easily visible early in the night when I have had some free time available. But now that I am finished with school and my work has slowed down, I look forward to being able to spend a little more time with the scope and the night sky. I even managed to find my old t-mount for my camera. Perhaps I can finally use that CAPS content I've been hoarding. Or, more realistically, I will go out and learn through trial and error and experiment. Maybe by the end of this summer I'll have something to submit to the photo contest for when club meetings resume.

Clear skies!

Abigail Hughes, Editor



Up Ahead — What to Look for In the June Night Sky

June 11th – 14:33 to 16:40 GMT—Double Shadow Transit and Great Red Spot on Jupiter

From time to time, the small, round, black shadows cast by Jupiter's four Galilean moons can be seen in amateur telescopes as they cross (or transit) the planet's disk for several hours. On Thursday, June 18, observers across Asia can see a double shadow transit. At 18:33 GMT, Ganymede's larger shadow will join Europa's smaller shadow already in transit. 40 minutes later Europa's shadow will move off the planet at 19:13 GMT, leaving Ganymede's shadow to complete its crossing hours later.

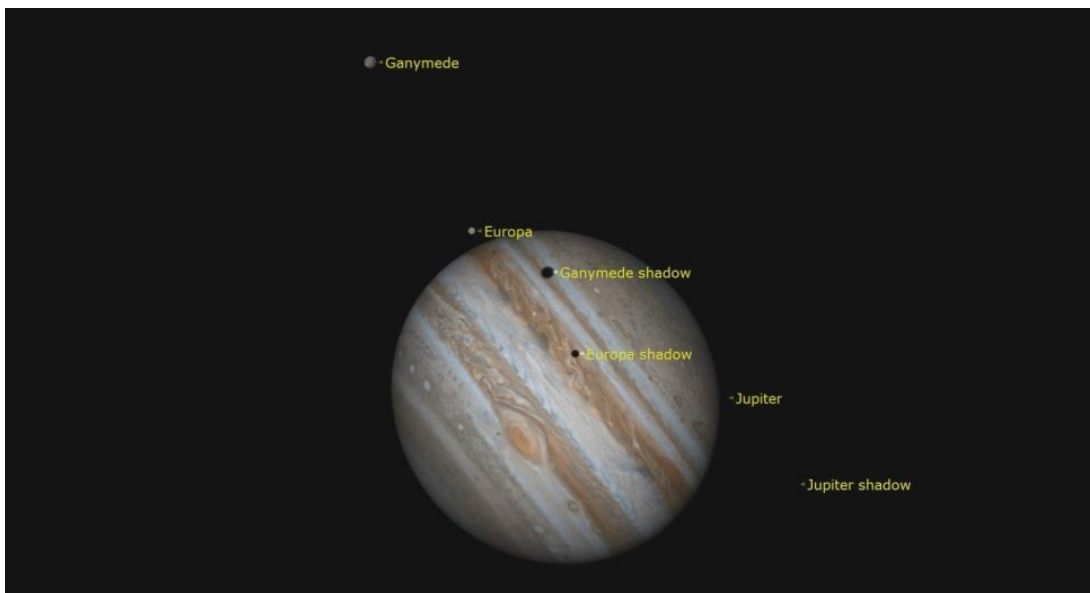


Image Credit: Starry Night

June 13 — pre-dawn—Half-Moon Near Mars

In the southeastern sky in the hours before dawn on Saturday, June 13, the waning half-illuminated moon will pass four finger widths to the lower left (or 4.5 degrees to the celestial southeast) of Mars. The duo will fit into the field of view of binoculars (red circle) and will make a nice photo opportunity when composed with some interesting landscape.



June 20 at 5:54 UTC —June Solstice

On Saturday, June 20 at 5:54 p.m. EDT, or 21:44 GMT, the sun will reach its northernmost declination for the year, resulting in the longest daylight hours of the year for the Northern Hemisphere and the shortest daylight hours of the year for the Southern Hemisphere. The solstice marks the beginning of the summer season in the Northern Hemisphere, and winter in the Southern Hemisphere.



Image Credit: Starry Night

June 27—evening—The Summer Triangle Arrives

After dusk in late June, Vega, Deneb, and Altair are the first stars to appear in the darkening eastern sky. Those three bright, white stars form the Summer Triangle asterism—an annual feature of the summer sky that remains visible until the end of December! The highest and most easterly of the trio is Vega, in Lyra. At magnitude 0.03, Vega is the brightest star in the summer sky, mainly due to its relative proximity to the sun – it's only 25 light-years distant. Magnitude 0.75 Altair, in Aquila, occupies the southern corner of the triangle. Altair is 17 light-years from the sun. By contrast, Deneb, which shines somewhat less brightly at magnitude 1.25, is a staggering 2,600 light-years away from us; but it ranks so high in visible brightness because of its greater intrinsic luminosity. The Milky Way passes between Vega and Altair and through Deneb, which sits high overhead as dawn begins to break.



A "Bored" Amateur Astronomer Stuck at Home

By David Campbell

Although it is not a whole lot different from just being retired, there are some "yearnings" that do not get satisfied during this COVID-19 isolation process we are going through. Yearnings such as star viewing with friends and/or club members, going to the observatory, visiting with grandchildren (boy that one really hurts sometimes!), or just going out for a nice bite with my Sweetieheart - to list just a few.

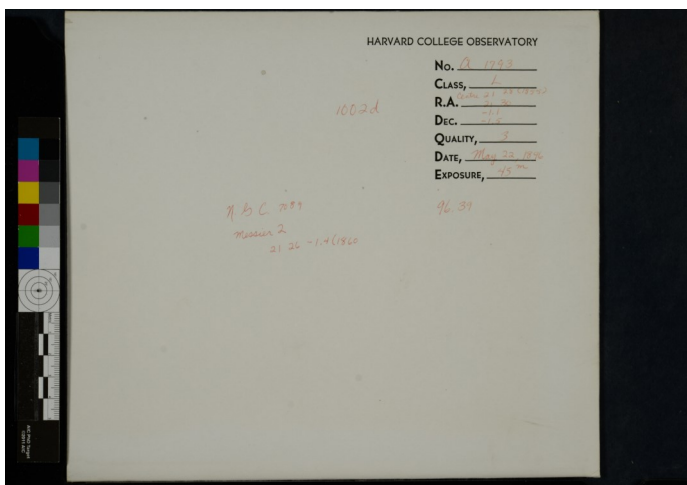
The question gets posed: "What does an amateur astronomer do during this very difficult time, especially when the weather is LOUSY?" Toward the answering of that question, the following:

I have a few large boxes down in the basement full of old magazines!!!

Well, what better time than this to become immersed in the past and go diving into a couple (or more, if this lasts too long) boxes and see what happens. One of those boxes contains old issues of astronomy magazines - yes, I know, that does not surprise anyone. So, settling back with a nice cup of java, I begin to partake of my old issues and a very strange set of occurrences happened today. I was reading a January, 2006 issue of Sky & Telescope, wherein there was a brief article about the Yerkes Observatory (pg. 27, in case you are going to look), discussing the Univ. Of Chicago's consideration of a couple of bids for the observatory "... home to the world's largest refractor." They were trying to decide whether to break it up and sell off the pieces, or sell the entire observatory to some group, which may preserve it intact as an educational resource.

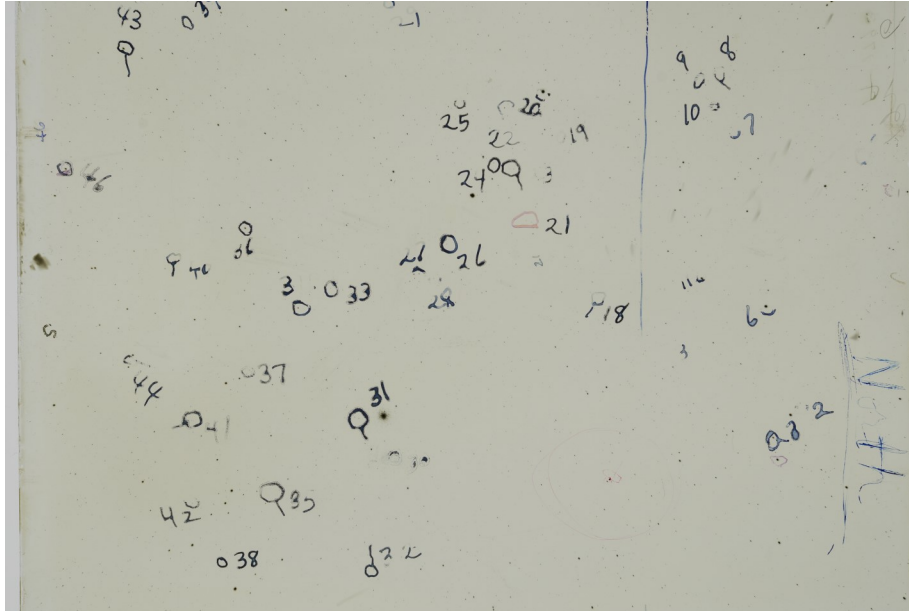
This led me to Googling (not sure if that is even a word) for more current information, as well as to just have a look around in the world of astronomy from a different vantage point. On one of the web sites I was looking at, there was some discussion of (and I also remember this topic in a presentation at one of our recent meetings) the very old archives of glass photographic plates and the extraordinary women who were doing the estimations of magnitude of stars. Do you know that it is estimated that there are TENS OF MILLIONS of these plates stored at many observatories, uni-

versities and other collections around the world? Not only that, but over 2.5 million of them have been digitized and made available on the internet. It takes a bit of searching, but there they are, waiting for bored amateur astronomers (and others, mind you) to go digging through them.



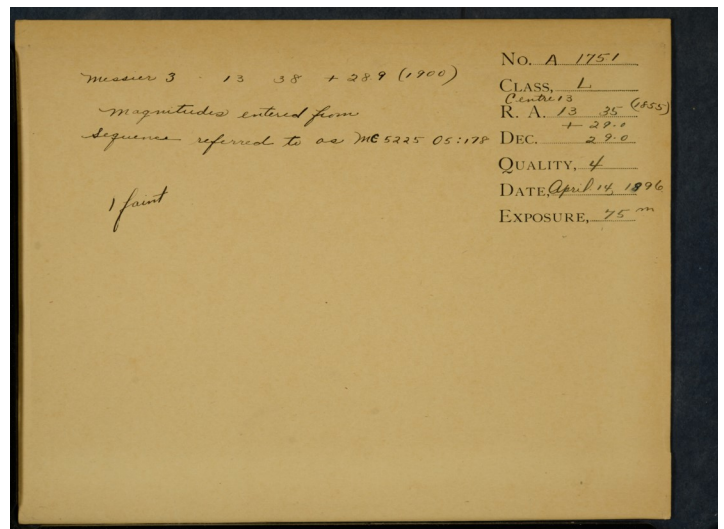
M2— The jacket

I arrived, eventually, at the DASCH (Digital Access to a Sky Century @ Harvard) web site. After about two hours of probing and learning, I began to formulate an idea. I wonder if I could get my Messier Observing Certificate by finding all of the qualifying objects in the list through, these photographic plates from the late 1800's and very early 1900's. Yes it is a bit of fantasy astronomical humour. Hmmmmm, I would probably have to "get special permission" to do it that way, and how would I even go about asking for such permission?



M2—The plate image

Well, anyway, that is a topic for later. What I really wanted to talk about here is how absolutely fascinating it is/has been for the past four or five hours, to be mesmerized by these old glass photographic plates. There are quite a number of available databases of them, so there is probably another three -or- five months of "unbored" searching. What I began to do, once I had the gist of these magnificent web sites, was start searching by galactic coordinates of my most favourite astronomical objects. I very quickly amassed several very large file folders of images of some of those objects, but while I was doing that, I was completely intrigued by these images, especially when I imagined the circumstances under which they were produced. Frankly, I could not quite fully get my head around the process of:- making a photographic plate of the appropriate "fit and finish," placing it into a holder at the focal point of a 63 foot long refractor (the Yerkes telescope) in a sleeve specially made for that job, opening the shutter and manually tracking the object for 75 minutes, with the controls of this massive telescope, removing the plate and then putting in another to do the same thing again, on a the same, or even different object - I can picture the astronomer saying to himself "I am not going to waste a night of really good seeing, by taking only one photograph, but by the end of taking eight or ten of these I know I will be exhausted" - and then planning the next phase of the job of getting those plates developed. "Do I have staff to do that for me?" Maybe he does, or maybe not.

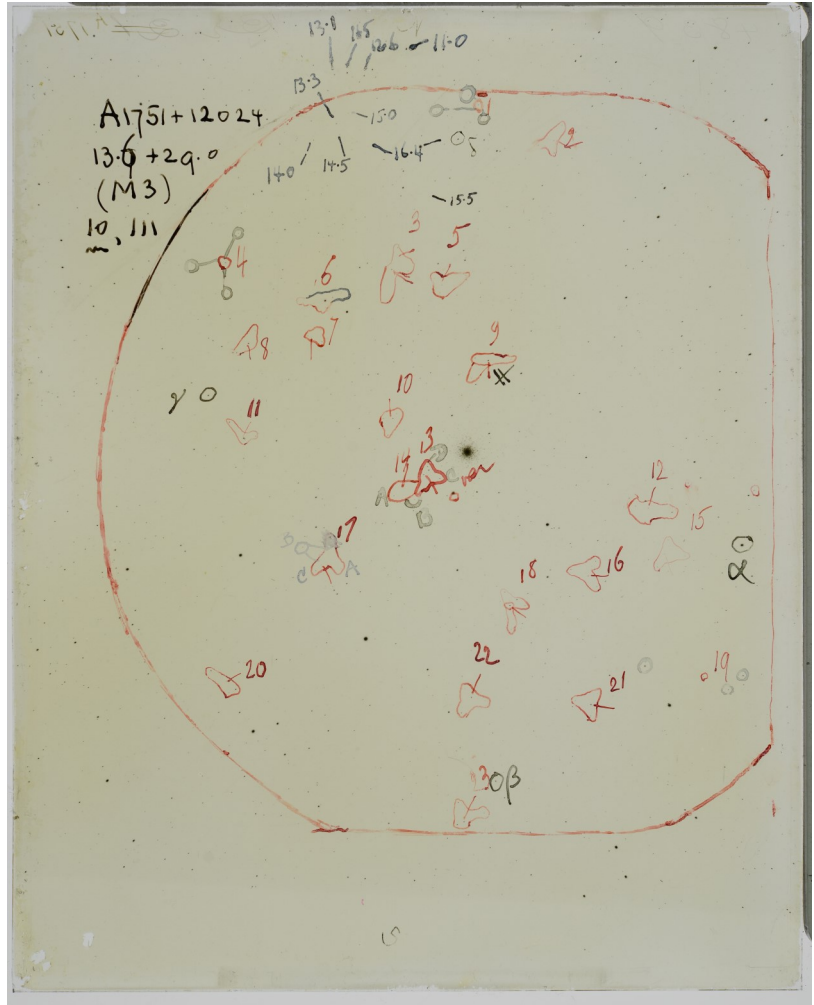


M3—The jacket



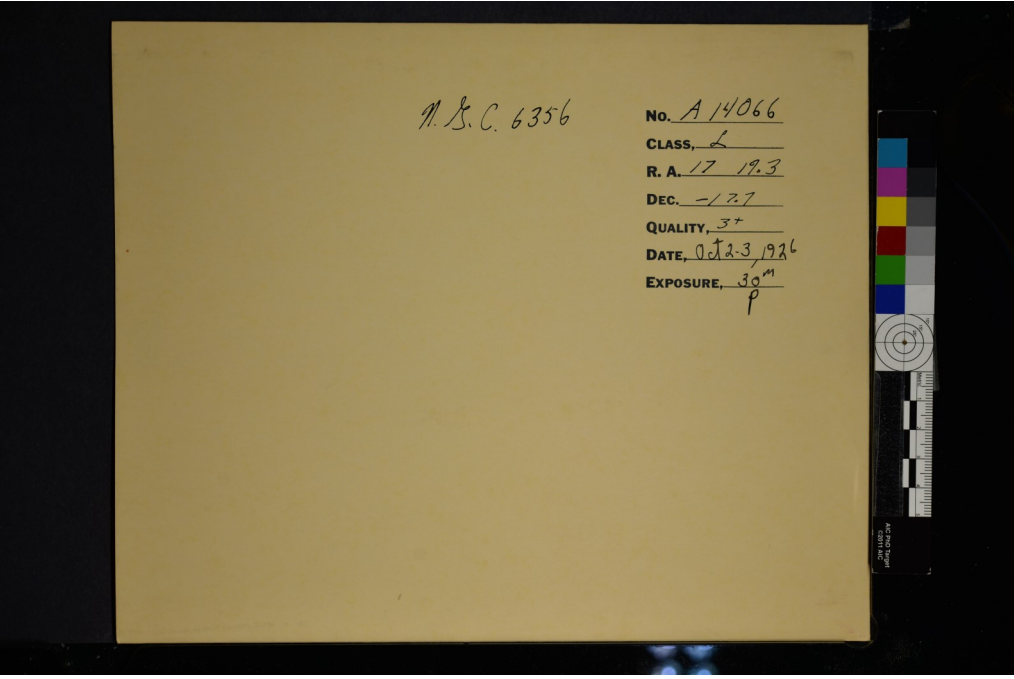
Goodness, I am almost exhausted just thinking about that enormous workload. The thought pattern I followed was an exercise in sheer admiration for the stamina of these dedicated professional astronomers, doing the thing that they loved so much and feeling huge pride in using the most advanced technology in the world available to them, to conduct their dogged investigation of the night sky above them. What utterly amazing people they were!

So, I thought I would put some of these thoughts down on "paper" and share them with you, and, yes, I am going to include a few of those absolutely amazing images, some of which you will see have been copiously annotated with the product of their investigations, by those amazing women mentioned above. I made it easy on myself and chose M1, M2, M3 and M4 to M13, for a start. The fascinating aspect of this search, especially by object name, is that the database provides a substantial number (in the thousands) of scanned plates that were taken - in the vicinity - of your search object (you can set smaller parameters), though not necessarily looking - for - your object, so you have to carefully scan the image, to see where the object you are looking for is located. Some of the plates are so very heavily annotated that you can hardly see any objects at all. A genuinely intriguing endeavour, and one that offers some satisfaction in finding objects in the images that were not necessarily the intended subject of the photograph in the first place. It is a wonderful adventure of looking way back into the astronomical past with an enormous amount of advanced technological hindsight.



M3—The plate image

Here are some "typical" and "non-typical" images, together with the images of the jackets which contained the plates. Please go and explore this database - you definitely have time to do it, and you may become so engrossed that you find days going by without you even noticing (and my wife can fully attest to that). Enjoy. I certainly did, and I am still going!!!



M9— The jacket



M9—The plate image



The Beauty of the Planets

By Ed Mizzi

I am very fortunate to have a backyard observatory and, even though my skies are light polluted, I can still easily see the closest and brightest planets. I have been doing astrophotography for a few years now and enjoy it immensely. But I have never lost my love for visual astronomy and, as with many amateur astronomers, looking at Saturn or Jupiter is still mind-blowing, even if it's the 100th time viewing it.

So there I was this past Monday evening, June 8, imaging the Elephant Trunk nebula with my new Esprit 100 telescope. I set my imaging software to collect 60 (240 sec) Ha photos and went to sleep. I set an alarm for 4:00 AM because I wanted to check on the progress of my imaging session, so I went outside to my dome (affectionately named the Ed Dome by a good friend). And there they were, as beautiful as ever, the Moon, Jupiter, Saturn and Mars, shining brightly and giving a show that rivals any fireworks extravaganza. I was mesmerized and could not take my eyes off of this celestial treat.



When my excitement calmed down, I went into my observatory to check on things, but upon exiting, and before going back to bed, I had to have another long look at the three planets and our neighbour, the Moon.

So, over the next several weeks, I encourage you to get out and see these heavenly bodies. And no, you do not have to be up that early to see all of them. At the moment, Jupiter and Saturn rise before 1:00 AM, and if you have a South East and South horizon you will simply be amazed. Of



course, do not expect that you will see the Moon when you look, as it travels much faster around our planet, and, at the moment, the Moon is waning toward New Moon, when the planets will look even brighter.

The images attached are from the software application, Stellarium, a free download for PCs, Macs and Linux computers. One displays the view on the morning of June 11, 2020, at 3:50 AM EDT. The other shows the view at 12:45 AM EDT. But if it's cloudy, keep trying subsequent nights. It's worth it!





New Views from Space

By David Campbell

The brief astronomy "epoch" of the early 2000's was an extremely superlative explosion of knowledge for the astronomical community. I have been rereading some of my old issues of *Sky & Telescope* this past few weeks, and I have discovered a truly amazing cosmological period, detailing some of the most fascinating results from new technological advances in astronomical instruments sent into space, within the first couple of years of this century.

I am not going to go on at any great length, but I think it is very well worth mentioning a some the truly amazing instruments discussed in this January 2005 issue of *Sky & Telescope*. History is being created. Many of the mysteries of galactic events and observations are being exposed, and data is being collected at an enormous rate. Clearly, this data will be studied and profoundly analyzed for many, many years into the future - even leading up our present day research, and probably even well beyond that.

Just to mention the four from this issue called "New views from Space," the Chandra X-Ray Observatory, launched in 1999, with its sharp resolution is providing outstanding and extremely revealing views of the universe that are mapping detailed features in the hot gas that permeates galaxy clusters; the Galex (Galaxy Evolution Explorer), launched in April 2003, is capturing ultraviolet light images of dark outer disks of galaxies, revealing light from stars that are less than 100 million years old and showing areas of star birth that were not even known before; the Spitzer Space Telescope, launched in August 2003, is capturing infrared light that is literally turning astronomers heads - the telescope requires its systems to be cooled to within 10 degrees of absolute zero, which limits its active life span to just a few years, but it is revealing so much that the mission scientists are saying there is no way they could have imagined the richness of the data they are/were accumulating, at the rate of 20 gigabytes per month; and finally the Swift Gamma Ray Burst Explorer, launched in November 2003, pursuing an investigation where seconds count, is able to instantaneously slew to a GRB at almost any point in the sky, to capture a detailed light curve and spectrum that can determine the burst's redshift and thus its distance from us.

The amount of data that these remarkable instruments have been able to beam down to Earth has been spectacular in the extreme. Over the period of a few short years these four spacecraft have been chronicling baby solar systems, whirling neutron stars, revealing black holes hundreds of millions of times our Sun and revealing the biggest explosions in the universe since the Big Bang. There is so much vastness of the light spectrum that cannot penetrate our atmosphere that it leaves even modern astronomers blind to huge areas of astronomical exploration. What these four instruments have in common is their ability to open our eyes to new light and provide amazing new images that are imparting knowledge about some of the biggest mysteries in astronomy.

To quote the defining sentence of this "New Views from Space" article - "In this *Sky & Telescope* special report, we take the pulse of four such missions, which collectively span the spectral equivalent of a piano keyboard nearly 25 octaves wide." What an absolutely incredible time to be a scientist - even an amateur astronomer - and witness the eruption of data about the familiar objects we are used to in the universe, seen in dimensions and degrees never before seen, with the belief that this vast new knowledge will so enhance our hobby beyond even our wildest dreams - and all this from a MAGAZINE no less!

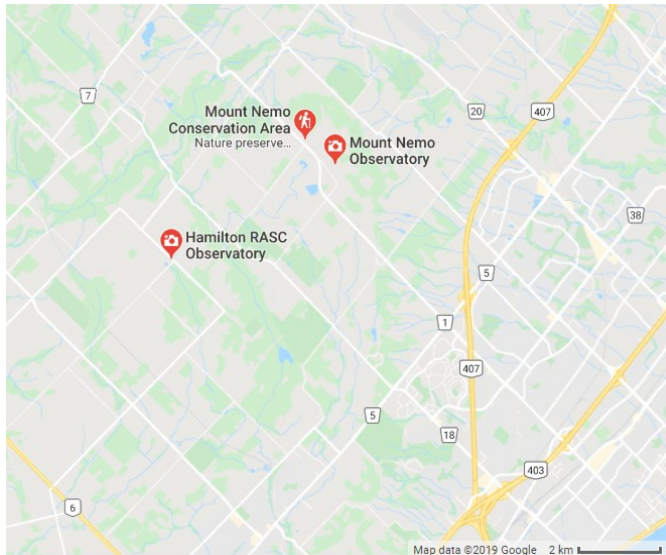


Historic Astronomical Events in June

June 2, 2003	Europe launches its first voyage to another planet, Mars. The European Space Agency's Mars Express probe launches from the Baikonur space centre in Kazakhstan.
June 4, 0781	Oldest Chinese recording of a solar eclipse
June 4, 1769	A transit of Venus is followed five hours later by a total solar eclipse, the shortest such interval in history
June 10, 1854	Georg F B Reiman proposes that space is curved
June 10, 1973	NASA launches Radio Astronomy Explorer 49 into lunar orbit
June 13, 1983	NASA's Pioneer 10 becomes the 1st man-made object to leave the solar system
June 15, 0763	Assyrians record a solar eclipse that will be used to fix the chronology of Mesopotamian history
June 16, 1963	Valentina Tereshkova (USSR) is 1st woman in space, aboard Vostok 6
June 18, 1178	Five monks at Canterbury report something exploding on the moon shortly after sunset (only known observation)
June 18, 1983	7th Shuttle Mission-Challenger 2 launches Sally Ride as 1st US woman in space
June 23, 1974	1st extraterrestrial message sent from Earth into space
June 29, 0512	A solar eclipse is recorded by a monastic chronicler in Ireland.
Data from www.onthisday.com	



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