



THE APPULSE

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PROPELLING ASTRONOMY EDUCATION TOWARD THE ACHIEVEMENT OF SCIENTIFIC EXCELLENCE AMONG FILIPINOS

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This image of the LDN 886 was taken by John Nassr from the Stardust Observatory in Baguio City, Philippines. This dark nebula lays southwest from the star Sadr in constellation **Cygnus** and is composed of unknown dusts that scatters the colorful hydrogen clouds and dense star field* in that region.

INCLUDES Monthly Sky Map, PAS Meeting Report, Constellation of the Month and more.

ASTRONOMY PRONUNCIATION GUIDE

by Space.com Staff

Some astronomical names can be a little difficult to pronounce. For example, the constellation Boötes is pronounced “boo-OH-tees” not “Boots” or “Booties”. In some cases careful pronunciation may be necessary to avoid embarrassment as in the case of Uranus, which is pronounced “Yoor-anus”, not “Your-anus”.

The pronunciation guide will help you learn how to correctly pronounce the names of hundreds of celestial objects from different categories such as stars, constellations and planets.

Planets & Moons

With the recent demotion of Pluto from planet to “dwarf planet”, there are now 8 planets in our solar system. All planets except Mercury and Venus have moons around them.

Name	Pronunciation
Adrastea	ah-DRAHS-tee-ah
Aitne	et-NEE
Amalthea	ah-mal-THEE-ah
Ananke	a-NAN-kee
Ariel	AIR-ee-el
Atlas	AT-lus
Autonoe	aw-TON-oe-ee
Belinda	be-LIN-dah
Bianca	bee-AHNK-uh
Caliban	KAL-e-ban
Callirrhoe	ka-LIRR-o-ee
Callisto	ka-LIS-toe
Calypso	ka-LIP-soe
Carne	KAR-mee
Chaldene	kal-DEE-nee
Charon	CARE-en
Cordelia	core-DEAL-ya
Cressida	KRESS-e-da
Deimos	DYE-mos
Desdemona	DES-de-MOAN-a
Despina	de-SPEEN-a
Dione	dye-ON-ee
Earth	URTH
Elara	EE-lahr-ah
Enceladus	en-SELL-ah-dus
Epimetheus	EPP-e-ME-thee-us
Erinome	err-IN-o-mee
Euanthe	ewe-AN-thee
Euporie	ewe-POUR-ee-e
Europa	you-ROE-pah
Eurydome	ewe-RID-o-mee
Galatea	GAL-aTEA-a

Ganymede	GAN-eh-meed
Harpalyke	har-PAL-e-kee
Helene	he-LEAN
Hermippe	her-MIP-ee
Himalia	HIM-ah-lee-ah
Hyperion	hye-PER-ee-on
Iapetus	ee-AHP-eh-tus
Io	EYE-oh
Io	EYE-o-KAS-tee
Iocaste	eye-SON-oe-ee
Isonoe	JAY-nus
Janus	JEW-lee-ette
Juliet	JEW-pi-ter
Jupiter	KAY-lee
Kale	KAL-e-kee
Kalyke	la-RISS-a
Larissa	LEE-dah
Leda	lis-ih-THEE-ah
Lysithea	MARZ
Mars	MEG-a-KLYE-tee
Megaclite	MIRK-you-ree
Mercury	MEE-tis
Metis	MYE-mus
Mimas	mi-RAN-dah
Miranda	moon
The Moon	NYE-ad
Naiad	NEP-toon
Neptune	NAIR-ee-id
Nereid	OH-ba-ron
Oberon	oh-FEEL-ya
Ophelia	or-THOE-see-e
Orthosie	PAN
Pan	pan-DOOR-ah
Pandora	pa-SIF-ah-ee
Pasiphae	PAS-e-thee
Pasithee	FOE-bos
Phobos	FEE-bee
Phoebe	PLOO-toe
Pluto	POR-sha
Portia	prak-SID-e-kee
Praxidike	pro-MEE-thee-us
Prometheus	PRO-per-oe
Prospero	PRO-tee-us
Proteus	PUCK
Puck	REE-a
Rhea	ROS-a-lind
Rosalind	SA-turn
Saturn	SET-e-bus
Setebos	se-NO-pee
Sinope	SPON-dee
Sponde	ste-FAA-noe
Stephano	sun
The Sun	SICK-o-RACKS
Sycorax	tay-IJ-e-tee
Taygete	tah-LES-toe
Telesto	

Tethys	TEE-this
Thalassa	tha-LASS-a
Thebe	THEE-bee
Themisto	the-MISS-toe
Thyone	Thy-OE-nee
Titan	TYE-tun
Titania	tye-TAIN-ee-ah
Trinculo	TRING-kew-loe
Triton	TRY-ton
Umbriel	UM-bree-el
Uranus	YOU-rah-nus
Venus	VEE-nus
Eris	EE-ris
Quaoar	KWA-oh-ar
Gabrielle	GAB-ree-ell
Sedna	SED-na
Constellation	Pronunciation
Name	
Andromeda	an-DROM-eh-da
Antlia	ANT-lee-uh
Apus	APE-us
Aquarius	ack-KWAIR-ee-us
Aquila	ack-WILL-lah
Ara (The Altar)	AY-rah
Aries (The Ram)	AIR-ease
Auriga	or-EYE-gah
Bootes	bow-OH-tease
Caelum	SEE-lum
Camelopardalis	ca-MEL-oh-PAR-dal-iss
Cancer	KAN-surr
Canis Major	KANE-es MAY-er
Canis Minor	KANE-es MY-ner
Capricornus	CAP-rih-CORN-us
Carina	car-EE-na
Cassiopeia	KASS-ee-oh-PEE-ah
Centaurus	sen-TOR-us
Cepheus	SEE-fee-us
Cetus	SEE-tus
Chamaeleon	kah-ME-lee-un
Circinus	SIR-sin-us
Columba	ko-LUM-ba
Corvus	CORE-vuss
Crater	CRAY-ter
Crux	Kruks
Cygnus	SIG-nus
Delphinus	del-FYE-nus
Dorado	doh-RAY-doh
Draco	DRAY-ko
Equuleus	eh-KWOO-lee-us
Eridanus	eh-RID-uh-nuss
Fornax	FOR-naks
Gemini	GEM-in-eye
Grus	GROOS
Hercules	HER-kyou-leez

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OBSERVATIONAL ASTRONOMY AND THE AMATEUR ASTRONOMER

by Raymund John Ang

Most, if not all, amateur astronomers have become fascinated with astronomy because of the jaw-dropping celestial sights they have seen, peering through the eyepiece of binoculars or telescopes in star parties or observation sessions conducted by astronomy clubs. Amazed by the spectacular views of the heavens and hooked to the intricacies of the cosmos, observational astronomy has thus become a lifelong passion to some observers, investing huge amount of time and money just to satisfy the urge to acquire the latest and most sophisticated equipments. The universe, indeed, has a lot of wonders for both amateurs and professionals to savor and to enjoy. No wonder amateur astronomy still prospers to this day.



A group of amateur astronomers enjoying naked-eye observations of the Lyrid Meteor Shower. Meteor observation is one area of amateur astronomy where one doesn't need expensive equipments. Our eyes are the best optical aid we can have.

-PAS file photo

Observation is a vital component and important catalyst in amateur astronomy. An amateur astronomer would usually start out as a naked-eye observer, watching constellation patterns, lunar phases, and motions of the brightest planets against the background sky. He would then try to improve his seeing by acquiring a pair of binoculars or a small telescope, usually the refractor type. With this, he can now start looking at magnified views of Saturn and its rings, Jupiter and its cloud belts, the phases of Venus, and the most prominent lunar craters on the surface of the moon. And when he has already saved up enough cash, he can buy himself a quality astronomical telescope, even with GOTO capabilities. Having such advanced instrumentations would allow him to take breathtaking photos of heavenly bodies and to participate in serious research and public education.



A Group of astronomy enthusiasts observing the night sky using a telescope.

-PAS file photo

Numerous astronomical institutions and organizations throughout the world have been established to promote observational works of amateurs. Notable organizations, such as the Association of Lunar and Planetary Observers (ALPO) and the American Association of Variable Star Observers (AAVSO), have been successful in showcasing works of members and observers in various astronomical journals and scientific conferences. Without the observational thrust of these organizations, they might not have been successful in their goal of promoting the science of astronomy to the public.

To very few fortunate individuals, astronomical observations have given them honor in the international astronomical arena. Three Filipino astronomers have gained worldwide prestige for their keen observational skills. The first was Fr. Leo Boethin who discovered a comet in 1975 thus named after him – Comet Boethin. The second is Fr. Victor Badillo, president of the Philippine Astronomical Society and head of the Manila Observatory for decades. The International Astronomical Union named a minor planet (Badillo 4866) after him. The third is Christopher Go, a member of the Astronomical League of the Philippines, who discovered Red Spot Jr. Mr. Go discovered that a previously white spot on Jupiter's surface became reddish in appearance, much like the Great Red Spot. He then alerted the astronomical community of this discovery. The rest is history, as they would say.

Quite a handful of experienced and seasoned amateurs have made the next step by deciding to pursue research in astronomy.

Using telescopes and binoculars commercially accessible in the market, they make systematic and precise observations of selected celestial objects; make careful records of their findings; and submit their results to various astronomical organizations for archiving. Amateur or professional astronomers are then given access to use these data in preparing scientific manuscripts for publication or presentation in conferences.



If you want to delve into observational research in astronomy, sometimes, a good quality telescope or a pair of binoculars is all you'll ever need.

-PAS file photo

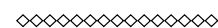
With respect to serious intent in pursuing research, it is generally more productive for a non-academically prepared amateur astronomer to engage in observational works than to delve into astrophysical research since theoretical studies in astronomy and cosmology requires rigid formal academic training in the university. Taking non-formal courses in advanced physics and astrophysics cannot guarantee the research capability of a hobbyist, though these could help him prepare for undergraduate and graduate studies if he later decides to pursue astronomy.

Observational astronomy has been and will always be an integral part of amateur astronomy. It is essential in sustaining public interest and in developing new breed of amateur and professional astronomers.



About the author.

An amateur astronomer from Bacolod City, Raymund John Ang is currently an active member of the Philippine Astronomical Society and Astronomical League of the Philippines. His main interest includes binocular astronomy and promoting education and research in astronomy.



A PART OF HEAVEN CALLED BADILLO 4866

by Maria Isabel Garcia

The new breed of PAS members and the young PASers hardly know the “veterans” and “institutions” of the Philippine Astronomical Society. If there’s any PASer who is most worthy of emulation and who deserves all the honor and accolades, he is no other than the very humble and unassuming Fr. Victor Badillo. We need not say more. This previously published most interesting article says all.

Ms. Maria Isabel Garcia is a science writer and curator of The Mind Museum at Bonifacio Global City.



Van Gogh lost his mind wrapped in the deep wringings of his own soul but he made a lasting impression of the heavens that has captured our imagination through the ages. I invite you to look at his *Starry Night* painting again and you will understand why (you need not go to Amsterdam to see the original; you can view so many images of it on the Web). It is the only painting where I have actually seen people silently shed tears looking at it in the Van Gogh Museum. Van Gogh’s expression of his soul’s meaning was born in the language of light, in his painted stars against the landscape of an inhabited earth. His heaven was portrayed so closely to the earth that they almost touch each other. Not only were the heavenly bodies painted as if they spoke; Don McLean in his song *Vincent*, sang his musical impression of the painting -- “whirling clouds in violent haze” -- with the heavenly bodies speaking in a nuanced language of light -- in hues and color -- from tender to cobalt blues, reticent creams to raging yellows.

There was no obvious wringing of soul when I visited someone who also made the stars speak to those of us who are bound to the earth, even in terms of the direction of our wonderings. There were also no canvases or easels around but I knew I sat before a point of light in the person of Fr.

Victor Badillo, 75, the Jesuit astronomer who headed the Philippine Astronomical Society and the Manila Observatory for almost two decades, when I visited him in his hospital room at the Jesuit Residence at the Ateneo de Manila. I found it curious that I was going to talk to a priest to ask him about a different kind of heaven -- the cosmos. I had a happy reason to do so. In June this year, the International Astronomical Union, the authority responsible for naming small heavenly bodies, has bestowed the honor of naming a “minor planet” (Asteroid 4866), 13-30 kilometers wide, after him. Fr. Badillo spoke to me in a soft voice and a manner subdued but like all scientists I know well into the moonrises of their lives, he had a characteristic child’s sparkle in his eyes and smile, undiminished by the passing of youth.

“It is beyond my wildest dreams,” replied Fr. Badillo when I asked him how he felt about the honor. “I think others deserve the honor much better because I am only an amateur astronomer,” he continued. I told him about this amateur astronomer now in his late 80s who has become the inspiration for a film called “A Sidewalk Astronomer.” I have read about this sidewalk astronomer who spent all his life coaxing people on the streets of San Francisco to take a peep at the heavens through a telescope he invented with the cost and technology that is within the reach of amateur astronomers (called the Dobsonian telescope). Fr. Badillo then said to me: “Dobson. His name is John Dobson. I have met him.” I was so pleasantly surprised that his name rang a bell in Fr. Badillo’s memory tower. I should have guessed that they did meet since they belonged to a group of astronomers who not only looked at the stars but inspired and worked to tug at the others’ minds so that common people, ordinarily discouraged by the science and the distance of the stars and other heavenly bodies, will be encouraged to look up and consider their place in the vast cosmos.

Fr. Badillo has a doctorate in Physics from St. Louis in Missouri and was guided to the stars by a 1971 invitation from an American embassy official, Philip Wyman, who founded the Philippine Astronomical

Society. Being told that I am a widow of a physicist, he told me, “You know how it is, we physicists, among all the other kinds of scientists think we can understand everything so when Philip wanted someone from the sciences to join his efforts, he invited a physicist.” Fr. Badillo said that in jest but my personal experience with physicists made me suspect that there is a layer of seriousness and truth in that statement that I cannot altogether dismiss. In two years after the invitation from Wyman, Fr. Badillo headed the PAS and the Manila Observatory for the next two decades. During that time, they had members from all walks of life, from all collars of work, who were bound by a common desire to let the heavens speak to them through their telescopes. The group met regularly and talked about what they saw on those clear nights that they engaged their instruments with the same curiosity that drove Aristotle, Kepler and Galileo to look up.



Fr. Badillo mentioned the first observatory in Manila and I asked him why there was an observatory built in a low-lying area and he corrected my notion of observatories as places that were only meant to observe the heavens. He said that the original Spanish notion of an observatory was really for the most obvious and broadest purpose of all: to observe Nature. And this included all kinds of natural phenomena and not just the heavens. I once had a reader who dropped me a note once simply asking: “Is there a place where those who wonder can wonder together?” In that old classic observatory in Manila that Fr. Badillo spoke of, we could have all found a home for our collective wonderment. I think we should resurrect these kinds of places so that we not only get our fuel or wounds from the daily shellings of media headlines. Places like observatories and scientists like Fr. Badillo who breathed life and inspiration to them turn the cold science that often repels the ordinary man into the kind of science that Ralph Waldo Emerson spoke of

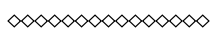
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A part of ... *from page 5*

that as an “extension of man, on all sides, into nature, till his hands should touch the stars, his eyes see through the earth, his ears understand the language of beast and bird, and the sense of the wind; and through his sympathy, heaven and earth should talk with him.”

Asked if he were confident that astronomy for commoners will continue even when he is now retired and ill, he says with firm and soothing conviction: “There are others who are still looking up.” He then went on to tell me about the younger Filipino astronomers now who still keep cosmic vigil with their astronomical finds. I commend these star-seekers persisting in a culture like ours who often makes us forget that we are creatures who can look up as well as down.

Close to the end of my visit, I began to think that as if for every heavenly body that he spotted in his telescope all his life, Fr. Badillo was given a portion of light to keep for himself because he now shines from deep within him. His face reminds me of the “weathered faces lined in pain” the song Vincent spoke of but this time, soothed by his own deeply cultivated wonder that he, being made of starstuff, as well as we are, has the gift to gaze into the stars themselves and in his own placement of his eye on the lens of his telescope, have the universe thinking of itself, contemplating a feast of lifetimes and sharing it. Thank you, Fr. Badillo, for bringing the stars closer to our experience of what it means to be starstuff now alive in this hallowed blue planet.



Astronomy... *from page 3*

Horologium	hor-uh-LOW-gee-um
Hydra	HY-druh
Hydrus	HY-drus
Indus	IN-dus
Lacerta	la-SIR-ta
Leo (The Lion)	LEE-oh
Leo Minor	LEE-oh MY-ner
Lepus	LEE-puss
Libra	LEE-bra
Lupus	LOUP-us
Lynx	links
Lyra	LIE-rah
Mensa	MEN-sa
Microscopium	MY-krow-SKOH-pee-em

Monoceros	mon-OSS-er-us
Musca	MUSS-ka
Norma	NOR-ma
Octans	OCK-tens
Ophiuchus	Oaf-ih-YOU-kus
Orion	oh-RYE-un
Pavo	PAY-vo
Pegasus	PEG-uh-suss
Perseus	PURR-see-us
Phoenix	FEE-nix
Pictor	PICK-tor
Pisces	PIE-sees
Piscis Austrinus	PIE-sees oss-TREE-nus
Puppis	PUP-iss
Pyxis	PICK-sis
Reticulum	reh-TICK-yuh-lum
Sagitta	suh-JIT-uh
Sagittarius	sa-jih-TARE-ee-us
Scorpius	SKOR-pee-uss
Sculptor	SKULP-tor
Scutum	SCOOT-um
Serpens Caput	SIR-pens CAP-ut
Serpens Cauda	SIR-pens KAW-dah
Sextans	SEX-tens
Taurus	TOR-us
Telescopium	tell-es-SCOPE-ee-um
Triangulum	tri-ANG-yuh-lum
Tucana	too-KAY-nah
Ursa Major	URR-sah MAY-jer
Ursa Minor	URR-sah MY-ner
Vela	VEE-la
Virgo	VER-go
Volans	VO-lans
Vulpecula	vul-PECK-yoo-la

Stars
Over 6000 stars are visible without optical aid. The brightest of these have been named.

Name Pronunciation

Acamar	AH-kuh-mar
Achernar	AK-er-nar
Acrux	A--krucks
Acubens	ACK-you-benz
Adhara	ad-HAR-a
Al Kaprah	al-KAP-rah
Al Nair	all-NAYR
Al Niyat	all-NEE-yaht
Al Suhail	all-soo-HAIL
Albaldah	al-BAL-dah
Albireo	al-BEE-ri-oh
Alchiba	al-CHIH-ba
Alcor	AL-kor
Alcyone	all-SYE--o-nee
Aldebaran	al-DEB-ah ran
Alderamin	al-DER-a-min
Aldhafera	al-da_FER-a
Alfirk	All-firk
Algedi	all-JED-ee

Algenib	al-JEN-nib
Algieba	al-GEE-bah
Algiebba	al-GEEB-bah
Algol	AL-gall
Algorab	ALL-gor-ab
Alhena	al-HAY-nah
Alioth	AL-lee-oth
Alkaid	AL-kade
Alkalurops	al-ka-LOOR-ops
Almaaz	ALL-maaz
Almach	ALL-mahk
Alnasl	all-NAH-zul
Alnilam	ALL-nil-ahm
Alnitak	ALL-nit-ahk
Alphard	AL-fard
Alphecca, Gemma	al-FECK-ah, JEM-a
Alpheratz	AL-fer-rats
Alrakis	all-RAH-kiss
Alrescha	all-RESH-ah
Alshain	all-SHAIN
Altair	AL-tair
Altais	ALL-tays
Altarf	al-TARF
Alterf	al-TERF
Aludra	al-UDE-rah
Alula Australis	a-LOOL-ah ow-STRAH-liss
Alula Borealis	a-LOOLah bor-ee-AH-liss
Alzirr	ALL-zirr
Ancha	UNG-ka
Ankaa	ANG-kah
Antares	an-TAIR-ease
Arcturus	arc-TOUR-russ
Arkab	AR-kub
Arkab Posterior	AR-kub
Arkab Prior	AR-kub PREE-or
Arneb	AHR-neb
Ascella	ah-SELL-a
Asellus Australis	ah-SELL-us ow-STRALICE
Asellus Borealis	ah-SELL-us bore-ee-AL-is
Asellus Primus	ah-SELL-us
Asellus Secundus	ah-SELL-us
Asellus Tertius	ah-SELL-us
Asmidiske	ass-mid-ISS-kee
Aspidiske	ass-pid-ISS-kee
Atik	AH-tik
Atlas	AT-las
Atria	AH-tree-a
Auva	
Avior	AV-i-or
Azha	AH-za
Baham	ba-HAHM
Barnard's Star	BARN-ards star
Baten Kaitos	BUT-en KYE-tos
Beid	BYED
BEED	

To be continued.

ORIONID METEOR SHOWER

The Orionid meteor shower is one of several major that occur on roughly the same date each year. The Orionids typically “peak” (are at their greatest level of activity) around October 21st. The Orionid shower’s

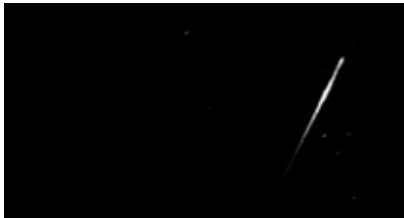


Photo by Roland Roldan

name is derived from the fact that its meteors appear to fan out from a point in sky, called the shower’s “radiant”, which lies within the constellation .



Orion Constellation - the Orionids’ radiant Photo from Starry Night Pro 5.0

As is the case with most meteor showers, it will be possible to see Orionid meteors for several days before and after the peak on the 21st. In fact, it is sometimes possible to see some Orionids as early as October 15th and to continue to spot a few up to October 29th. At this shower’s peak observers can typically see as many as 20 “shooting stars” per hour under dark skies (away from city lights). However, the Orionids, as compared to other meteor showers, present a highly variable celestial show. The number of meteors visible at the shower’s peak can change quite a bit from year to year in an unpredictable fashion. Also, the exact date of the peak activity and the number of meteors visible on days before and after the peak are quite variable from one year to the next.

The shower’s radiant rises above the horizon around 11 PM local time, though it will be possible to see Orionids earlier in the evening. The radiant reaches its highest point in the sky around 3:30 AM. In general, the best time to view meteors is between midnight and dawn. Don’t worry if you’re not a night owl, though, for it is usually possible to spot at least some Orionids early in the evening. ..The moon will be in its (almost full) when the Orionids peak on October 21st, so the Moon’s light will make it harder to see meteors. However, the Moon will set in time for the best meteor observing period each night, which is between midnight and dawn.

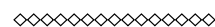
The Orionids are actually bits of dust that have been shed over the centuries by ! The dust, which from the comet’s each time it , gradually spreads out over the entire orbit of the comet. If Earth’s orbit happens to cross the , the swarm of debris scattered along the comet’s orbit is visible to us as a meteor shower. Since the Earth

crosses the comet’s orbit at the same time each year, each meteor shower is predictably visible at the same time of year, year after year. Earth actually crosses the of Halley’s Comet twice each year. The eta Aquarids, another meteor shower visible in May, mark the other time each year that our planet passes through the debris that Halley’s Comet has left scattered along its orbit.

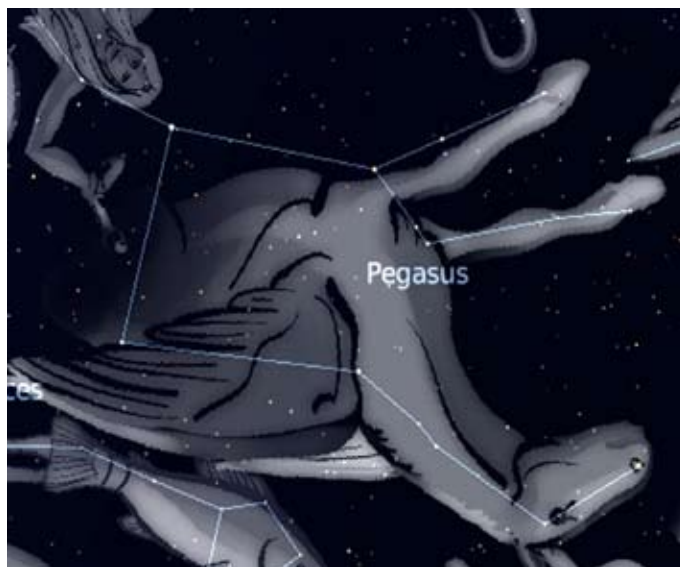
Most meteors in a shower are quite small, about the size of a grain of sand. Orionids are among the fastest-moving meteors. These meteors typically strike our atmosphere while traveling at speeds around 66 km/s (about 148,000 mph). Because of their high speeds, Orionids typically leave long, glowing trails in the sky. Only the Leonid meteors, which are visible in November, move faster than the Orionids. Leonids typically have speeds around 72 km/s.

The Orionids were discovered around 1839 or 1840 by Edward C. Herrick. The first precise observations of the shower were made by Alexander Herschel in 1864, who determined the location of the shower’s radiant the following year. The first measurements of the peak rates of meteors from this shower were made in 1892. Charles Olivier speculated in 1911 that the shower was associated with Halley’s Comet, although it was several years before this connection was generally accepted by astronomers.

Source: *Windows to the Universe*



Constellation of the Month



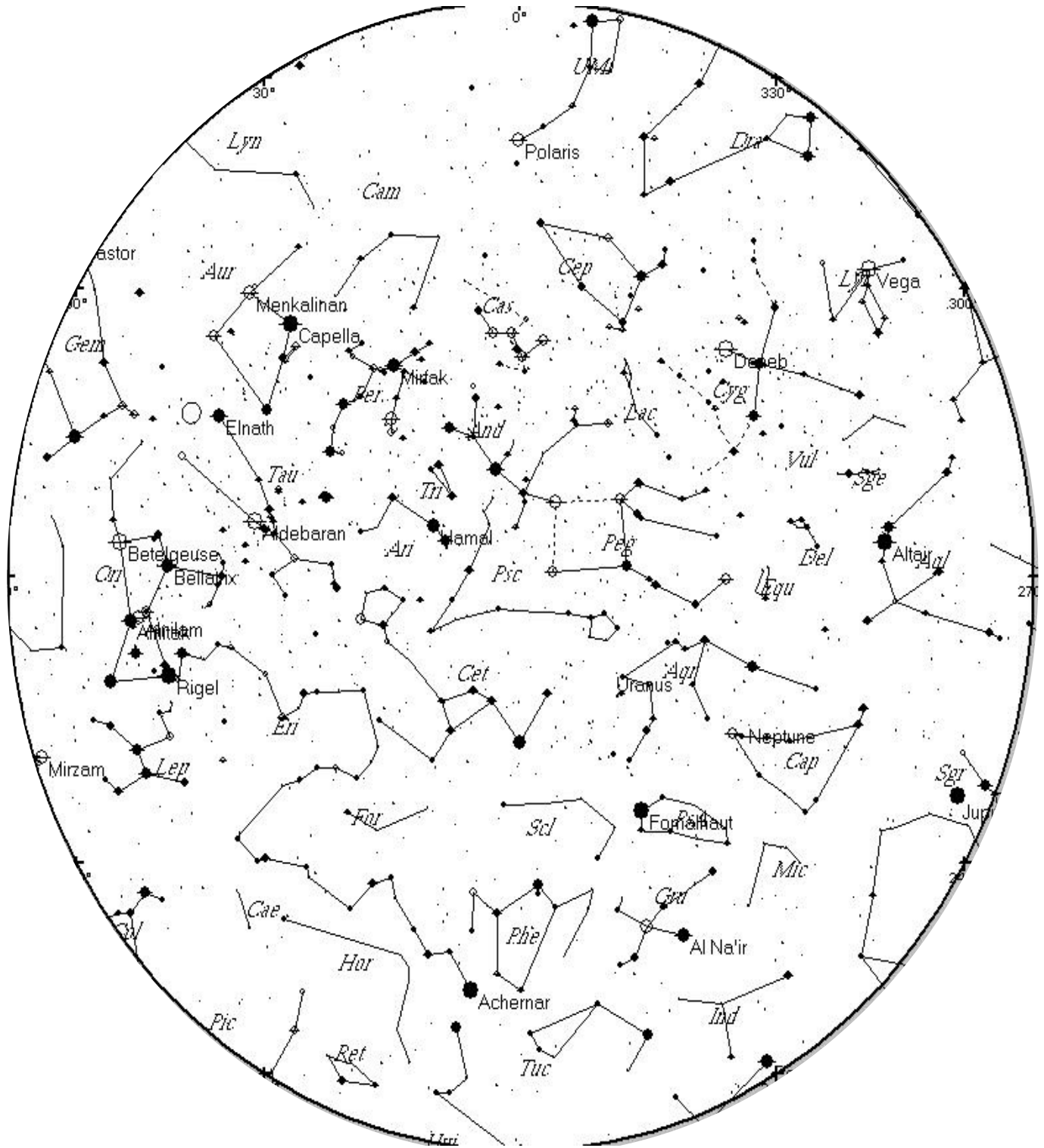
Pegasus, the Winged Horse (the Great Square)

The stars of Pegasus supposedly form the shape of a winged horse (only the horse’s front half is in the sky); in fact, its shape more closely resembles a great square in the sky. Pegasus is the seventh largest constellation. To the east, Pegasus is bordered by Andromeda; on the west, Pegasus is bordered by Delphinus and Cygnus.

Associated Mythology - Pegasus, created by the power of Poseidon, sprang from the blood of Medusa after Perseus had decapitated her.

Credits: CoM entry excerpted from *Your Guide to the Constellations*, by Lowell L. Koontz, former Planetarium Teacher at Edison High School, Fairfax County Public Schools. Image from Stellarium Software.

Monthly Star Map – November 2008



This map was prepared by the Observation Committee of the Philippine Astronomical Society using SkyMap Pro 9 software.

This map shows the sky at 9pm on November 15, 2008 as seen from the latitude of Metro Manila, Philippines with North on top and the zenith at the center. The large circle represents the horizon. Star limiting magnitude is 5.5. Deep sky limiting magnitude is 7.0.