

Binocular Universe: Horsing Around

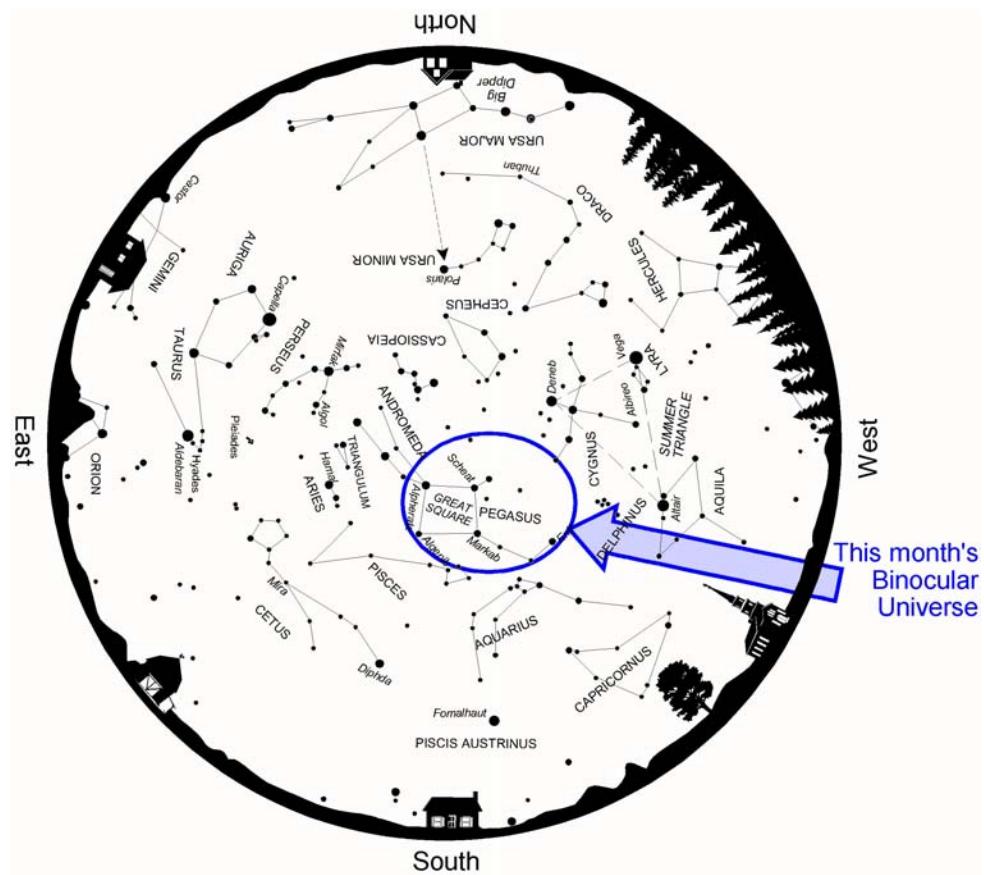
October 2013

Phil Harrington

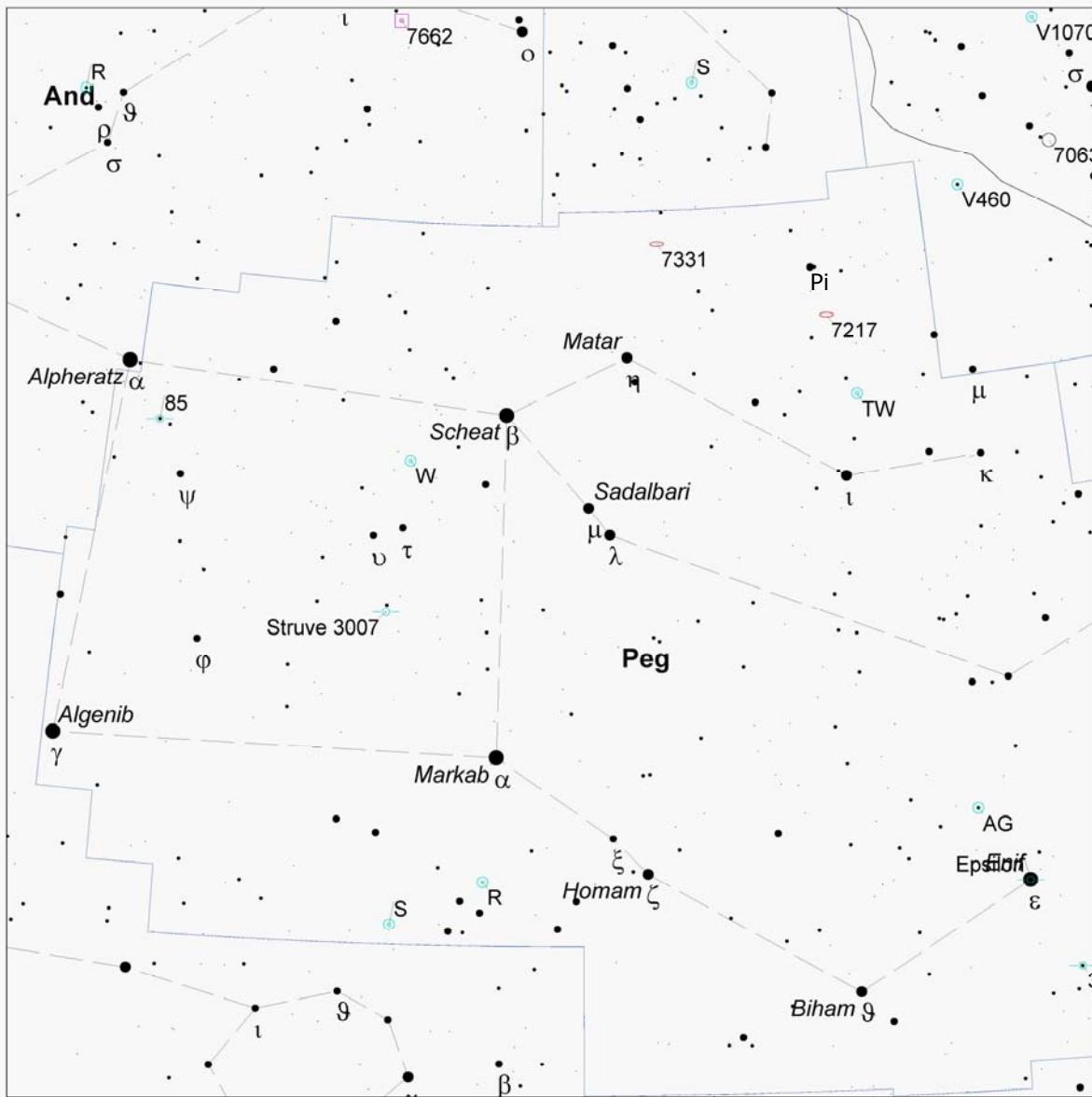


One look at any map of the northern hemisphere's autumn sky and it is clear that Pegasus, the Flying Horse, dominates the scene. Although none of the constellation's stars is brighter than second magnitude, the four framing the horse's body, better known as the *Great Square*, serve to frame the rest of the sky.

Trying to imagine a horse (let alone one that flies) among the stars of Pegasus is a difficult task. You might see him flying upside-down, with the Square representing the body. The Horse's neck and head curve from Markab to Enif, its front legs extend above the Square, but the tail end of the Horse is nowhere to be found!



Above: Autumn star map from [Star Watch](#) by Phil Harrington.



Touring the Universe Through Binoculars Atlas
RA: 22h 56m, Dec: 22d 56m, FOV: 38d, Mag: 7

● <= 1.0	Galaxy	☿ Mercury	♄ Pluto
● 1.0 - 2.0	○ Open Cluster	♀ Venus	❖ Sun
● 2.0 - 3.0	⊕ Globular Cluster	♂ Mars	☽ Moon
● 3.0 - 4.0	■ Diffuse Nebula	♃ Jupiter	♮ Asteroid
● 4.0 - 5.0	■ Planetary Nebula	♄ Saturn	☄ Comet
● 5.0 - 6.0	◎ Variable Star	♆ Uranus	∅ Unknown
> 6.0	■ Double Star	♇ Neptune	

Above: Finder chart for this month's *Binocular Universe*.
 Chart adapted from *Touring the Universe through Binoculars Atlas (TUBA)*,
www.phlharrington.net/tuba.htm

Since autumn is traditionally associated with baseball and the World Series, it might be easier to see a baseball diamond among the stars of Pegasus. Scheat is home plate, Alpheratz is first base, Algenib is second, and Markab is third. Matar [Eta (η) Pegasi] is our team's catcher. Two faint stars in the Square, Upsilon (ν) and Tau (τ) Pegasi, might be the pitcher and one of the managers talking about the next pitch, while Mu (μ) and Lambda (λ) Pegasi along the third base line, might even be the other team's manager arguing with the umpire. And just look at all the fans scattered all across the sky!

Baseball diamond, flying horse, or just a square of stars, Pegasus holds several fine binocular sights to behold, both within our Milky Way and beyond. We bumped into a favorite in last month's [Binocular Universe](#), globular cluster M15. Follow the link for a discussion as well as a sketch of that autumn showpiece.

M15 is west of the Horse's nose marked by the star Enif [Epsilon (ϵ) Pegasi]. Although it carries the "epsilon" designation, the 5th letter in the Greek alphabet, Enif is actually the brightest star in Pegasus. The four stars in the Great Square, designated as Alpha, Beta, and Gamma, are magnitudes, 2.5, 2.5, and 2.8, respectively. Enif shines at magnitude 2.4. (Notice I didn't mention Delta Pegasi. That's because there is no such star. At least not anymore. That star, properly named Sirrah, is now officially cataloged as Alpha (α) Andromedae and known as Alpheratz, mentioned previously.)

You may notice a yellowish glint to Enif through binoculars. That's because Enif is a spectral type K supergiant. Given a distance of 670 light years, Enif's total luminosity output is 6,700 times greater than the Sun's.

Binoculars also reveal that Enif has an 8th-magnitude companion star a little more than 2 arc-minutes to the northwest. That wide separation means that even the lowest magnifying pairs should have little trouble resolving the two. Many observers note the companion appears pale blue, offering a nice color contrast.

A more challenging pair of stars awaits us 4° southwest of Enif. The northernmost point in a small triangle of 6th-magnitude suns, **3 Pegasi** is a white main-sequence star some 285 light years away. Binoculars reveal it is accompanied an 8th-magnitude companion separated by 39''. That's resolvable through 10x50 binoculars. The companion star, SAO 126939, is classified as type F, yellow-white. Take a look and see for yourself.

AG Pegasi lies just over 3° northeast of Enif and has long been a favorite autumn variable star of mine. Across an erratic period, AG Peg varies from magnitude 6.0 to 9.4, and so remains bright enough for most binocular observers to follow throughout a complete cycle.

Studies conclude that AG Pegasi is a member of the Z Andromedae family of symbiotic variable stars. Symbiotic stars are close binary systems made up of relatively cool giant suns paired with very hot companions. The variations result

from pulsations of the cool star along with some material exchange between the two companions.

Inside the Great Square, we find **W Pegasi**, a long-period variable along our imaginary first base line. W pulses between magnitudes 8 and 13 across its nearly yearlong cycle. According to the American Association of Variable Star Observers (AAVSO), W passed maximum brightness just this past month and is now beginning to recede. Catch it while you can before it fades from view. As with other long-period variables, W is a red giant star and can be identified from its surroundings by its ruddy tone.

From Scheat, head northwest past Matar [η] Pegasi, my baseball diamond's imaginary catcher] to **Pi (π) Pegasi**. I should say "pi's" since there are two stars carrying that designation. Pi-1, the western star in the pair, shines at magnitude 5.6, while Pi-2 to its east is magnitude 4.6. They are separated by more than 9 arc-minute, forming a pleasant and easily resolvable double star. That's just 2 arc-minutes less than Alcor and Mizar in Ursa Major, making these a great naked-eye test under extremely dark skies. Both appear pure white to me through binoculars, although Pi-1 is a type G star and may impress other observers as subtly yellow. They are nothing more than a line-of-sight alignment, however; they are not gravitationally related to each other. Pi-1 is estimated to be 283 light years away, while Pi-2 is 252 light years from us.

Finally, let's shift from an easy target to a real challenge. Spiral galaxy **NGC 7331** hides a little more than 4° north-northwest of Matar and a little less than 6° east-northeast of Pi-2. The brightest galaxy in Pegasus, NGC 7331 looks like a miniaturized version of the Andromeda Galaxy in photographs and through telescopes. Actually, it is every bit as large as M31, but lies about 66 million light years away. M31 is comparatively close at 2.5 million light years. Binoculars show NGC 7331 as an oval, 9th-magnitude smudge of grayish light that diffuses rapidly away from a brighter core. But beware of imposters lurking about. From the [Internet Amateur Astronomers Catalog](#), Canadian observer Stéphane Meloche notes that through his 9x63 binoculars, "a tight alignment of 4 very weak stars (magnitudes between 10 and 11)" to the east of the galaxy also appears similarly diffuse.

Looking for more to look at? Here's a list of what else lurks within this month's Binocular Universe.

Object	Con	Type	R.A.	Dec	Mag	Size/Sep/ Period	Notes
(2000)							
R	And	Vr	0 24	+38 35	5.8-14.9	409.33 days	Long Period Variable
7662	And	PN	23 25.9	+42 33	8.9p	32"x28"	*TUB page 87-88*
V1070	Cyg	Vr	21 22.8	+40 56	6.7-7.7		Semi-Regular
7063	Cyg	OC	21 24.4	+36 30	7.0	8'	
V460	Cyg	Vr	21 42	+35 31	5.6-7.0		Irregular
S	Lac	Vr	22 29	+40 19	7.6-13.9	241.80 days	Long Period Variable
85	Peg	**	0 2.2	+27 5	5.8,8.6	76"	330°(1932);17175;Rapid
3	Peg	**	21 37.7	+6 37	6.0,8.3	39"	349°(1934);15147
Epsilon	Peg	**	21 44.2	+9 52	2.4,8.4	143"	320°(1913);15268;Enif
AG	Peg	Vr	21 51	+12 38	6.0-9.4	830.14 days	*TUB page 198* Z And type
TW	Peg	Vr	22 4	+28 21	7.0-9.2	956.4 days	Semi-Regular
7217	Peg	Gx	22 7.9	+31 22	10.2	3'x2'	Sb
7331	Peg	Gx	22 37.1	+34 25	9.1	10'x4'	*TUB page 198* Sb
R	Peg	Vr	23 6.6	+10 33	6.9-13.8	378.02 days	Long Period Variable
W	Peg	Vr	23 19.8	+26 17	7.9-13.0	344.92 days	Long Period Variable
S	Peg	Vr	23 20.6	+8 55	7.1-13.8	319.22 days	Long Period Variable
Struve 3007Peg		**	23 22.8	+20 34	6.6,8.9	88"	311°(1956);16713

Until we meet again next month, remember that for stargazing, two eyes are better than one.



About the Author:

Phil Harrington is the author of nine books on astronomy, including Touring the Universe through Binoculars. Visit his web site at www.philharrington.net for previews of each.

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