

## THE STARRY SIDE

## Miracles of a balanced universe

BY GREELEY WELLS

## ASTRONOMICAL DETAIL

What is the sun, this machine of heat and light?

It's a balance of two unbelievably powerful forces. One, an inward force, is gravity—way stronger than our gravity because the sun is a million times bigger than earth is. Bigger objects exert a more powerful gravitational pull; smaller objects, like our moon, exert less. That's why astronauts can dance and jump on our small moon almost weightlessly. The second is an outward force: the sun is literally a hydrogen bomb! A huge and continuous explosion is taking place all over the star. Gigantic sprays and waves of energy, flames and other things are blasting out from the sun's surface. All this is going on 93 million mile—safely away from us. We are at the perfect distance: not too far, not too close. This is yet another miracle of a balance in our universe that benefits us.

## THE NIGHT SKY

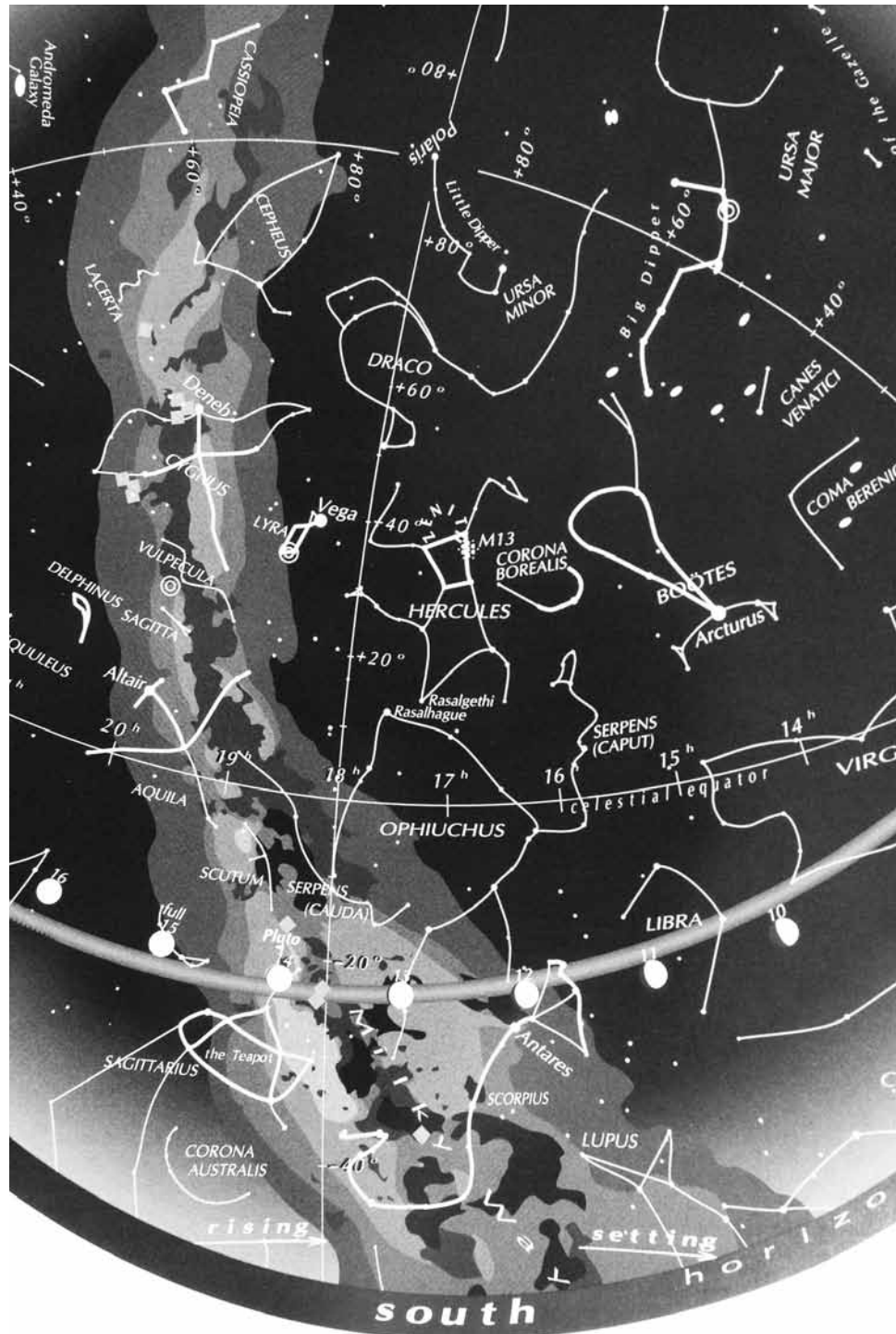
Writing this, I'm out at 4 am in April, but I'm seeing the summer sky. I often describe how early mornings give you a sneak preview of the next season. So spring mornings reveal summer nights, and I feel a kind of nostalgia for the next season's delights...in this case its warmth!

The beloved Summer Triangle is up fully in the east, made up of the three bright stars: Vega, Altair and Deneb. The bright Vega is overhead in Lyra. Altair is the brightest middle star in Aquila, to the south. (The three-in-a-row stars in the constellation of Aquila are like the Orion's belt of summer.) Deneb is at the northern end (top) of the Northern Cross.

The Northern Cross, with Deneb at the top, is really Cygnus the swan with her beautiful long neck, outstretched wings, and short tail. She glides gracefully south toward the center of our galaxy right next to the archer Sagittarius. If you've got a clear view of the southern sky, you will be able to see this constellation known by the English as the "teapot," of course. (They also call the big dipper "the plow.")

In the middle of all this is the beautiful Milky Way stretching across the sky from Cassiopeia (just behind my northern mountains to overhead) and on to Sagittarius in the south. The Milky Way makes an interesting split right overhead, in the middle of the Northern Cross, and then keeps going.

Sagittarius' small triangular spout on the right seems to spurt out the milky way, the milk for English tea. Our galactic center is close to the upper right of that triangular spout. For many years now, physicists and astronomers have been searching with strong telescopes and other sensing devices to see what is happening at our galactic center. Scientists are now sure there's a powerful black hole there;



Starting from the south, there's the Teapot and Scorpius. Hercules and Lyra are overhead and outside the Milky Way. Altair, Vega and Deneb make the Summer Triangle. What other fascinating stuff catches your eyes? Illustration: Guy Ottewill's Astronomical Calendar 2012.

the stars they can track spin extremely fast as they approach that center and spin back out. Those star motions help us imagine what we cannot see, since black holes themselves, logically, cannot be seen. Scientists have determined that this particular black hole is so far away that we have absolutely nothing to fear from it. In fact, it is doing us a great service as its strong gravitation keeps the galaxy moving on its path through the universe.

Look a little south and farther to the right of Sagittarius, and you'll see another three-in-a-row set. This one is vertically placed; it's the head and shoulders of a scorpion. Look to their left and another three-in-a-row appear: the scorpion's back (the bright one in the middle is Antares, the rival of Mars). Red, isn't it? Farther left or east are two small stars side by side; they are Scorpio's stinger, connected to the body by a long line of stars going down below, swinging up to the right, and connecting with the diagonal three-in-a-row. It's a good picture of a scorpion.

## THE PLANETS

Venus in June is low in the sunset dusk, playing with Mercury and Jupiter. Venus and Mercury are two degrees apart at dusk on June 20. (A degree is about one finger's width held at arm's length.) At dusk on the night of June 9, a slim crescent moon is visible just below Venus. The next day it's to the left of Venus and Mercury. On July 22 the blue/white Regulus, in Leo, joins the sunset play just one degree below the brighter yellow/white Venus. This is a good time to compare planet and star colors and actions; they'll be in one view using binoculars and telescopes. Note the blinking quality of stars and the relative steadiness of planets. That's distance for you. On August 9, dusk finds a crescent moon close to Venus, after being close to Regulus the day before.

Jupiter is falling in June, from below Venus to fading in the sun's glare by mid-month. July finds Jupiter in the dawn along with Mars. On August 31 a crescent moon visits Jupiter in the dawn.

Mars is not visible in June at all, as it's mainly in the sun's glare.

But in July Mars rises in the dawn with Jupiter. Near the end of July, Mars begins to rise bright and golden orange in the dawn to the upper left of the brighter yellow/white Jupiter. You should be able to get both of them together in a single binocular or moderate telescope view.

Saturn is high up in the sky at dusk close to Spica by month's end. The planet sinks from there all night to the west during June. On July 16 a half moon is right next to Saturn—a good way to find him. Saturn is setting around midnight at the beginning of August, and around 10 pm by month's end.

Mercury starts out in June above Venus, sinking to parallel with her by mid-month at dusk. By July's end he appears in the dawn with Jupiter.

## OF NOTE

Meteors of the Gamma Delphinids are "very favorable" this year on Tuesday, June 11. Near dawn is the best time to catch them, but any time gives you some meteors. Your patience and attention span are the two main ingredients to successful meteor gazing.

The summer solstice is June 21. The days are the longest and the nights the shortest—but most fun for stargazing.

The moon appears biggest on Sunday, June 23. This is because it is at its closest point to the earth, and simultaneously in its fullness. This June full moon is called the Flower, Rose or Strawberry Moon. July's full moon on the 22nd, is known as the Hay or Thunder Moon. The full moon on August 21 is known as the Grain or Green Corn Moon.

A late-July dawn gem: Pollux and Caster, the Gemini twins, are to the left of Mercury, Mars and Jupiter (with the rising Orion to the right) in the dawn sky as the month of July ends.

The Delta Aquarids are active in the last week of July. The best nights will be July 30 and 31. At the same time, a minor shower of Alpha Capricornids are "very favorable."

The grand finale of meteors is the Perseids! Always on August 12-13, these are the year's best, a must-see. No excuses this summer; it's warm, they are overhead, and the moon sets before predawn when the best viewing is possible (although any time will be rewarding). While you watch for them, you can gaze on Orion rising in the east as an early sign of the approaching winter.

Of special note is the first sighting of Comet ISON at the end of August in the dawn.

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