

Summer Stars

By Paul O'Neill, Education Support Officer

Get away from the city lights and the summer skies may reward you with some great views of the Milky Way. If you go outside on a July or August evening and look towards the south east you will probably notice three bright stars which form a large triangle. These three stars are Deneb (in the constellation of Cygnus the swan), Altair (in Aquila the eagle) and Vega (in Lyra the harp). The Milky Way runs down through Cygnus (sometimes referred to as the Northern Cross) and into the constellation of Aquila.

Around the world, the summer sky is celebrated in folklore. In Japan 7th July is the Star Festival (Tanabatta). In China the festival is called Qi Xi. The Emperor of the sky (Polaris) had a daughter called Orihime (the star Vega). Orihime was a great weaver and the Emperor was always so

pleased with the beautiful clothes made for him by his daughter. But Orihime was not so happy; she had become a young woman and wanted to fall in love. She never had a chance for romance because of all the weaving she had to do. The Emperor decided to help out and arranged for her to meet Hikoboshi (Altair). They met and fell in love. Everything went well for a time but then the Emperor noticed that he wasn't receiving any new clothes. He therefore decided that his own self interests were more important than his daughter's happiness. He placed Orihime on one side of the celestial river (the Milky Way) and Hikoboshi on the other, allowing them to meet on just one night a year – the seventh night of the seventh month. On this night the heavenly boat man (the Moon) carries Orihime across the river to meet her lover.

The Shoshoni tribe of Wyoming explain the Milky

Way with this story: one day grizzly bear (the constellation Cygnus) decided he wanted to go hunting in the sky. He found a very high mountain and began to climb. As he got higher it became colder and colder, ice and snow stuck to his legs and paws. Eventually he got to the top and climbed out onto the sky, as he walked across the sky he left a trail of sparkling ice crystals which we can see as the Milky Way.

So what about the science of the summer stars? All three stars; Deneb, Altair and Vega are spectral type A stars. This means they appear bluish white to our eyes. Altair and Vega are quite close but Deneb is at least 2000 light years away. It is one of the most lumi-



Cygnus drawn by Johannes Hevelius for Uranographia published in 1690. Note that the view is reversed following the tradition of celestial globes which depict the celestial sphere as seen from "outside". Lyra is shown as a harp held in the claws of a vulture; ancient middle-eastern cultures saw the constellation as a vulture, only later was Lyra identified as a lyre

nous stars known; perhaps as much as a quarter of a million times more luminous than the Sun. Deneb's solar wind is perhaps tens of thousands of times stronger than the Sun's. If Deneb were as close as Proxima Centauri (our nearest stellar neighbour) it would be as bright as the full moon. Altair is only about 16 or 17 light years away. It is rotating so fast, about 60 times faster than the Sun that it is oblate – like a squashed football.

IRAS discovered a debris disc around Vega

Vega is a little further away than Altair – about 25 light years. It is the fifth brightest star in the sky, third brightest in the northern Sky. Since Vega is more luminous than the Sun it will use up its supply of hydrogen fuel more quickly, about ten times faster than the Sun, so Vega must be a young star. Back in the 1980's the very successful Infra-red Astronomy Satellite (IRAS), discovered a debris disk around Vega. Our own Sun may once have had such a disk around it before the newly formed planets had cleared their orbits of debris. Vega might have planets in orbit around it. Vega is also a fast rotator; in fact if it were rotating just 7% faster it would disintegrate.

There are other things to look out for amongst the summer stars. As I've already mentioned, the Milky Way is high in the sky at this time of the year. If you have binoculars you should sweep



Image Credit: Tokyo Tourist Information

Tanabata Crowds in Tokyo enjoy the festivities.

along it – you'll see that it is made of lots and lots of stars. As you sweep along the Milky Way you might notice some small clumps of stars; there are a couple of open clusters in Cygnus – M39 and M29. The second brightest star in Cygnus - called Albeiro is a double star, perhaps the most beautiful double star in the sky. The second brightest star in the constellation of Lyra is an eclipsing binary star with a period of almost 13 days. Its magnitude varies between 3.3 and 4.3. A binary star is two stars in orbit around each other; if they are very far away we won't be able to see them as two separate stars – they will appear as one star. If one of the pair is fainter than the other and passes in front of the brighter star it appears to us as though the star fades and brightens over some period of time – this is an eclipsing binary. There will be an article on variable stars in a later issue of Astronotes