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PERSEIDS 2015

Ken Tapping, 12th August, 2015

One day, centuries or millennia ago, a collision or close encounter put a roughly 10 km diameter lump of ice, dust and organic chemicals onto a new orbit, one taking it into the inner Solar System. Where it was originally orbiting, in the permanent extreme cold and darkness out beyond Pluto, the body could remain unchanged almost indefinitely. However, that collision doomed it to be slowly evaporated and disintegrated by the Sun.

Its new orbit was an almost direct fall toward the Sun. By the time it passed the Earth's orbit on its way sunward, it was moving at a speed of well over 200,000 km/h. The object did not hit the Sun, so it shot past, curved around it and headed back out into the outer Solar System, where it came from. However, when it reached the outermost point in its new orbit, it was moving too slowly to remain there, and started to fall back sunward again, to repeat its visit to the inner Solar System, again and again and again.

It did not complete each visit to the inner Solar System unscathed. Each time it passed closer to the Sun, the heat evaporated some of the ice and other volatile substances glueing the body together, allowing some of its dusty materials to drift off into space. These form the magnificent glowing head and tail we call a comet – one of the most beautiful spectacles we see in the sky. Since this spectacle comes at the cost of partial disintegration, comets are not long-term members of the cosmos. After a while the path of a comet becomes a long trail of disintegration debris, eventually filling the entire orbit. The object we are discussing here was first identified in 1862, independently by two astronomers named Swift and Tuttle, so the comet is named Comet Swift-Tuttle. It visits the inner Solar System every 133 years. However, what makes this comet special is that it is one of the few having orbits that intersect with the Earth's. We pass through the orbit every 12 August. So far we have managed to miss colliding with the comet, but we still have to pass

through a stream of debris: mainly dust and ice particles, streaming along at over 200,000 km/h. Every time we pass through we sweep up a good number of these particles. At that speed the friction with our atmosphere heats them to white heat and vaporizes them. We see them as short-lived glowing streaks across the sky. Sometimes the streaks persist for only a fraction of a second, sometimes for up to a few seconds. These are often called – wrongly – “shooting stars”. “Meteors” is the proper name for them. As we pass through the stream, we can see anything from a few to hundreds an hour. When we look “upstream” the meteors appear to radiate from one point in the sky – known as the “radiant”. They are not really radiating. All the particles are on parallel paths, just like railway tracks, which appear to converge into the distance. The radiant of the 12 August meteors lies in the direction of the constellation of Perseus, which is why we call these meteors the “Perseids”. This constellation is low in the North East in the evenings at this time of year.

To enjoy them all you need is a dark sky, preferably with a good view into the northeast. You will not need a telescope for this, although a pair of binoculars would be nice for exploring the Milky Way between meteors. Take a blanket to lie on, with enough spare material to cover you. Even in August the nights can be a bit cool if you are lying still for a significant amount of time. Relax and take in the misty path of the Milky Way and spot the odd man made satellite moving slowly across the sky, and of course, enjoy the spectacle of this year's Perseids.

Mars, Venus and Jupiter are now close to being in line with the Sun, and lost in the glare. The only bright planet easily available these evenings is Saturn. Look for a moderately bright, amber starlike object, shining steadily in the southwestern sky after dark. The Moon will be New on the 14th.

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