

The Night of the Geminids

By Albert Brakel

The Geminid meteor shower is one of the better showers of the year, and is active from 7 to 17 December. Although the radiant near Castor is low in the sky at our latitude, and we are not as favorably placed as observers in the Northern Hemisphere, we can still see an impressive display.

The cause of the meteoroid stream is believed to be an extinct comet, represented by the asteroid 3200 Phaethon, which has the same orbit as the Geminids, and is probably the volatile-depleted remains of the nucleus. On rare occasions Phaethon can just achieve unaided-eye visibility at magnitude 6 and come as close to Earth as 1.6 million km, but you'll have to be patient -the next occasion will be in the year 2287.

The Geminids slam into the atmosphere at 36 km/second, and burn up between 100 and 80 km high. The meteoroid swarm in its orbit has a cigar-shaped cross-section, with a central core much denser than the outer envelope. Over the last couple of centuries the stream has gradually drifted across Earth's orbit, because of orbital precession, causing variations in its activity and the time of its peak. Before 1750, Earth did not intersect the orbit of the stream at all. The meteors were first noticed in 1838 as a weakly active shower, as our planet had begun to encounter the outer fringes of the swarm. Thereafter the rates increased only slowly, until round about 1920 the rates suddenly shot up when the dense central core was intersected for the first time. At that time, the activity pattern was one of a sharp rise to maximum, followed by a gradual decline over the following week.

Continued drifting of the stream's orbit resulted in the peak occurring later each year, until by about 1965 the peak was appearing in the middle of the activity period. Now in the 1990's the pattern is a gradual build up to the peak, followed by a sharp decline - the reverse of the situation in the 1920's. By early next century Earth will miss the dense core completely, and the shower will once again become weak and barely noticeable. After another century we will stop encountering even the low-density outer fringes, and the Geminids will be no more, for perhaps a thousand years.

With the peak of the 1996 Geminid meteor shower predicted for just 2 days after New Moon, at 3 am on Saturday 14 December, this was too good an opportunity to miss. So Vello Tabur organized a group to observe it from Denver Baines' property, a suitably dark sky site about 40 minutes' drive north of Canberra. As this was the first time in memory that our Society has arranged a meteor watch, we looked on it as a learning experience, with the main aim being to enjoy the spectacle rather than attempting any serious meteor counts. That was just as well, because cloud ended up covering much of the sky, and the number of meteors seen was only part of the actual number present.

By 1:30 am, all of the small group had arrived, and were lying down comfortably on ground sheets and blankets, or in one case a portable hammock (sheer decadence and definitely the best choice). The western half of the sky was cloud-covered, but the cloud front was very slow-moving, and most of the action was in the east anyway. As an indication of the meteor frequency, I counted 13 between 1:45 and 2:15 am, 4 of

them sporadics. Mostly they were whitish or had a yellow tinge, but Denver Baines spotted several green ones falling from the radiant directly down to the horizon. By 2:15, the cloud had moved steadily eastwards, and more cloud came up over the eastern horizon, leaving only 10% of the sky still clear. Only the occasional Geminid could be seen through this gap, so we retired for coffee to Denver's shed.

When we compared notes, Denver had seen 30 meteors, Steve Johnston got 20-25, and I scored 17. Vello had not kept a count. Several were seen streaking through Vela and Crux, and although they were going in the right direction to be Geminids, the general rule is that meteors cannot be seen further from their radiant than four times their visible length. On checking a table of meteor showers, we found that a number of minor showers were also active on the night, such as the Puppis-Velids, Sigma Hydrids, Monocerotids, and Chi Orionids. The Vela and Crux meteors were probably Puppis-Velids.

After coffee, the sky had got worse, and despite it being allegedly a summer night, a cold wind had sprung up. There were now two categories of observer: those in freezer suits and those who wished they were, so we called it quits. But although conditions had not been ideal, we had seen enough to be impressed by a shower whose years may be numbered. We intend to continue meteor observing from time to time (it's quite a change from the usual style of astronomical observing), and the next occasion will probably be the Eta Aquarids in early May.