

an explanation for the Orionids' overall activity pattern.

Orionid meteors are fast, and often leave persistent trains resulting from ionisation of the high atmosphere: in 1993, 33.6 percent of all Orionids left trains, compared with 8.7 percent of contemporaneous sporadics. The most spectacular Orionid train was undoubtedly that seen by Colin Henshaw from Botswana, left by a mag -4 meteor which appeared at 0013 UT on Oct 17. The train lasted for 36 minutes, drifting gradually against the star background from Fornax to Tucana.

Mid-November's Leonids were awaited with some interest, given the likelihood of increased activity around the perihelion of the parent comet (P/Tempel-Tuttle) in 1998. Following the last return, an intense meteor storm occurred in 1966, with excellent activity for several years to either side. Contrary to the popular misconception that no Leonids are seen away from the 'storm years', the 1980s and early 1990s have seen observed rates of up to 10 meteors per hour. The 1993 return brought the possibility of a step up to higher levels. Although weather conditions were less than ideal, sufficient observational data are to hand to show that nothing out of the ordinary happened last November. Leonid rates peaked at a ZHR around 20 on Nov 16-17 and 17-18.

Detailed summaries of both Leonid and Orionid activity are available from the Director on request.

A highlight for meteor observers towards the end of 1993 was Geminid maximum, free of moonlight, on December 13-14. Past experience shows this to be a difficult time of year at which to obtain clear skies and, for example, Dec 12-13 was a complete wash-out! On maximum night, however, observers in the British Isles were lucky, with a cold front clearing southwards, to give excellent skies at most locations for at least part of the night. Observers who waited up until the clearance arrived were well rewarded.

As of mid-January, some 140 hours of watch time, from 40 individual observers, and from a group in the Isle of Man AS, had been received, amounting to almost 4000 meteors. A preliminary analysis suggests a peak ZHR around 90-95 for the Geminids, around 02-03 hrs UT on Dec 15. Observed rates were certainly good, and the Geminids in 1993 affirmed their reputation as one of the year's most productive showers. For instance, Terry Moseley, watching from a dark site in Ireland, reported up to 6 meteors per minute from the Geminids around midnight.

Numerous bright Geminids were seen, and the shower again proved worthwhile for photographers. Many trails were recorded, and analysis of these by Steve Evans - extending the Section's long-term study of Geminid radiant structure and motion - is

underway. Steve recorded a single, 3-line, Geminid spectrum on maximum night, while Andrew Elliott obtained further low-light video footage.

By the time these notes appear, the Perseids will again be looming large. The 1994 return is very favourable with respect to moonlight, and the possibility of unusual activity in the wake of P/Swift-Tuttle remains. Whatever else happens, we can

expect the 'regular' maximum on the night of August 12-13, conveniently, a Friday. Individuals and society groups planning to observe this year's Perseids are invited to contact the Meteor Section Director as soon as possible for instructions on how best to obtain useful results.

Neil Bone, *Director*

Ida's new moon

The first ever photograph of a moon of an asteroid has been obtained by NASA's *Galileo* spacecraft. The picture, of asteroid 243 Ida and its newly discovered natural satellite, was taken by *Galileo*'s CCD camera on 1993 August 28, about 14 minutes before the spacecraft's closest approach to the asteroid, from a range of 10,870 km.

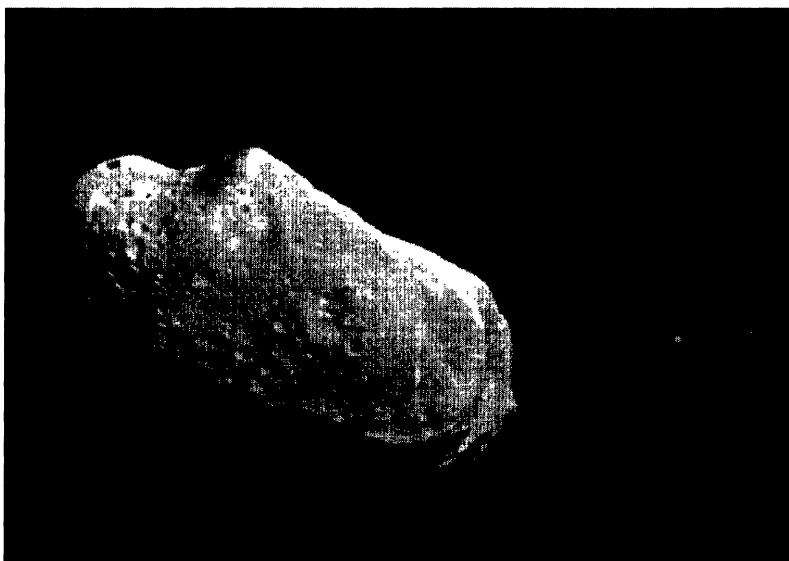
The image was not transmitted to Earth and released by NASA until March of this year, because the *Galileo* spacecraft can only send back data at a very slow rate using its low-gain antenna. Although one close-up portrait of Ida - a mosaic of five separate frames - was received shortly after the flyby, later pictures had to wait because telecommunication conditions became unfavourable as *Galileo*'s distance from the Earth increased. Other images, including those showing Ida's satellite, were stored on *Galileo*'s onboard tape recorder awaiting playback this spring.

From the imaging and spectrometry data, NASA scientists estimate that the small natural satellite is about 1.5 km across, and

appears to be at a distance of about 100 km from the centre of Ida. The parameters of the moon's orbit can reveal information about Ida's mass, which when combined with measurements of its size and volume, will tell scientists the asteroid's mean density, offering clues to its composition. Ida is about 56x24x21 km in size.

It is believed that the tiny moon may have been created at the same time as Ida and other members of the Koronis family of asteroids, when a larger asteroid perhaps 200 to 300 km in diameter was shattered in a collision with another body, giving birth to dozens of smaller asteroids. Alternatively, it is possible that Ida was hit by a smaller object more recently, forming a crater on the asteroid and throwing off material that became the small moon. In any event, *Galileo* scientists think it is virtually impossible that the new moon is a captured object that happened to wander near Ida and was caught in its gravitational field.

John Mason



The first picture to be transmitted to Earth from the *Galileo* spacecraft that shows both asteroid 243 Ida and its newly discovered satellite. The new moon appears to be rather closer to Ida in this image than is actually the case, because it lies slightly in the foreground, closer to the spacecraft than Ida itself. (NASA)