characteristics of the absorbing material may be wavelength dependent as well as the relative intensities of the involved bodies. Furthermore, the chopping frequencies and the time constants of the infrared equipment induce differences of technical origin.

Previous experience and additional tests showed that the difference in shape as well as the time delay of 0.4 s is about what is to be expected for the 1 m recording because of technical reasons. This means that both telescopes recorded the event simultaneously within an unavoidable error of the order of 0.1 s imposed by the chopping procedure. This, the smooth regular profiles and the clear sky are enough to rule out an occultation by a body close to the Earth (e. g. Earth satellite, cloud, contrails).

A look at the ephemeris of minor planets showed that no catalogued one was in that area. We blinked Schmidt plates taken by H. E. Schuster and O. Pizarro in the following nights 48 hours apart and could not find any unknown moving object down to the 17th magnitude. Closer inspection of the field for fainter, slow moving bodies did not show any object down to the 19th magnitude. Moreover, the probability of such an occultation by a body neither associated with the Earth nor with Neptune, i.e. an asteroid, is extremely low. The coincidence with the Neptune appulse makes the case for the latter association overwhelming, excluding, however, the influence of Neptune's known satellites Triton and Nereid, which were at that time not close to the line of sight.

The orbit of the third satellite proposed by Reitsema et al. (1982) appears to be remarkably similar to that of our object if we assume them to be in the equatorial plane. It is not possible to give a more accurate distance because there was no occultation by the planet itself. The duration of the event combined with the supposed sky-plane velocity of Neptune of about 20 km/s and the shape of the light curve show that we recorded a much smaller body having a chord length of the order of 10 km. On the other hand, the probability of detecting a satellite in that manner is not large and it is nearly impossible to record that new satellite twice. Therefore, in order to enhance the probability we were led to imagine a full ring of bodies of various shapes and sizes circling the planet at a distance of about 3 Neptune radii. This would explain why occultations are not always detected when the orbit passes in front of a star. In particular, we did not detect the second crossing of the orbit which occurred about 1 hour after the first one. However, the irregular nature of this ring does not necessarily imply large, satellite-sized bodies. A ring composed of smaller particles showing an irregular width and optical depth can fit the observations as well. In fact similar rings are known in the Uranus system and perhaps also in the Saturn system. A summary of all these considerations was again sent to the IAU Central Bureau for Astronomical Telegrams at the end of July (Haefner and Manfroid, 1984).

These observational facts imply some theoretical problems: Assuming equal densities for planet and ring material, this ring is located beyond the Roche lobe which conventionally is thought to constitute the outer limit for the existence of such structures. Besides this, the retrograde motion of Triton is sometimes argued to have such an influence that no ring at all can exist. On the other hand the classical resonance theory combined with empirical arguments predicts a possible formation of a ring, although closer to the planet than what we observed (Rawal, 1981). It would then have been formed by tidal disruption of a satellite. This simple resonance law is grossly obeyed within the solar system but there are many exceptions, e.g. as has been shown by the Voyager spacecraft for the fine structure of the Saturnian rings. In fact no satisfactory theory has been worked out so far to explain all ring phenomena in detail.

Five months after our observations we received notice that a nearly identical occultation event had been recorded at the same time by a group of American astronomers working at the Cerro Tololo observatory situated about 100 km south of La Silla (Hubbard, 1984). According to a communiqué from the University of Arizona they "were unable to see the brief event on the computer print-out their telescope generated for every 3.4 s of data". Unaware of our IAU Circulars they did not check their high-speed photometric data (fortunately stored on magtape) before December 1984. These additional observations strongly favour the existence of at least part of a ring having a width of roughly 10–15 km over a length of at least 100 km. This is an unexpected and nice confirmation of our conclusions.

Hopefully more details of the nature of this fragmented ring will be obtained after the launch of the Hubble Space Telescope and during the Voyager 2 rendezvous with the Neptune system in 1989. Probably this spacecraft will need reprogramming to avoid the ring zone on its way to Triton, Neptune's extraordinary satellite.

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