In this issue

Occultation by cometary fragments

Comets have always created awe and wonder in human mind, and inspired curiosity among star gazers. Efforts have been made by the latter to understand the nature of these objects in which all tools known to the scientists have been employed. Photography, photometry, spectrometry, polarimetry, etc. of such objects have been made whenever they came near us and were visible in our skies. In the last decade the periodic comet Halley was subjected to such detailed analyses, not only with the help of the earth based telescopes, but also by specially equipped space probes approaching very close to this enigmatic object. These efforts have given us a much clearer insight into the composition and dynamics of this class of objects, which are believed to hold vital clues to our queries about the origin of our solar system.

Nature has brought now a golden opportunity for us to probe much deeper into these objects. One of the many comets while passing close to the massive planet Jupiter was subjected such strong tidal forces that it was disrupted into many fragments, which are now in orbit around Jupiter. According to recent calculations by Brian Marsden this appears to have happened on July 7.8, 1992 and the disrupted assemblage was spotted by Gene and Carolyn Shoemaker and David Levy on 24 March 1993. Such broken pieces along with the dust envelope will approach Jupiter again in July this year and will actually impact the planet.

Several groups are at work all around the world to study the changes in brightness of the fragments and the spatial distribution of the grains, using direct imaging. A high resolution mapping of the density of the dust in the coma and tail of the fragment is possible by observing stellar occultations. The fragments on their respective orbits are going to come in the way of light of some distant stars, and during those short moments many more details of the obstructing bodies can be estimated. The problem is when and where to look for these events.

R. Vasundhara (**page 355**) has tackled this problem; she has compared the position of some of the fragments with the position of the stars in their path and estimated the locations and times when such special observations can be attempted. The series of events have already started, but many more are likely to take place this year; the paper gives very valuable information to all scientists wishing to probe into the science of comets and solar system cosmogony.

J. C. Bhattacharyya

Azadirachtin structure

The neem tree has, for sometime, been a favourite starting point natural products for chemists hunting for new molecules with novel and useful biological properties. Indian folklore provides testimony to the many marvellous attributes of neem. Ironically, the best known natural product from this source, azadirachtin-A was isolated a quarter of a century ago, in the West. Azadirachtin-A possesses amazing activities, including the ability to act as an antifeedant for over two hundred species of insects, at very low concentrations. The possibility of controlling insect populations without environmental damage, has spurred a great deal of research on azadirachtin, by many teams of chemists and entomologists. The structure of azadirachtin provided a stiff challenge for spectroscopy and the determination of its constitution by NMR in the 1980s was a major accomplishment. Crystallographic work in the area has been restricted to a study of a detigloyl derivative, with the parent molecule providing recalcitrant to crystallization. T. R. Govindachari and his collaborators reported crystallization of azadirachtin-A recently (*Curr. Sci.*, 1994, **66**, 295–297). On **page 362** of this issue they describe the molecular structure determined by X-ray diffraction. While there are no real surprises, a loose end in the azadirachtin story seems to have been neatly tied up by the Madras group.

P. Balaram

Sardine and mackerel fishery

For India, with a coastline of about 6000 km, marine fishery is an important industry. It involves over 9 million fisherfolk, 2.4 lakh fishing craft (1.8 lakh of traditional variety) and exports this year are expected to exceed Rs 2300 crores. Most of the fishing is at present restricted to the near-shore waters. The pelagic fishery, which includes sardine, mackerel, anchovy and tuna, accounts for about 45% of the total landings in India. This fishery is seasonal and shows wide interannual fluctuations. It sometimes collapses, as found during the forties in the present century. What causes these fluctuations? In this issue Madhupratap *et al.* (**page 340**) address this question which involves coupling between the physics, chemistry and biology of the coastal region of India. The fish times its appearance to coincide with the food-rich conditions (determined by the physical and biochemical processes) to ensure maximum survival of its larvae and juveniles. The biological cycle is not understood sufficiently well to determine causes behind the interannual variations in the fishery output. It is important to understand them, so that the fishery is judiciously exploited. The paper highlights some of the problems that need to be addressed and proposes research directions that need to be pursued.