

## In this issue

### Star clusters in Magellanic Clouds

A fundamental question in the theories of stellar and galactic evolution is whether the shape of the initial mass function (IMF) of stars that are born in a star-forming region is universal in time and space or whether it depends on parameters like metallicity, age, environment, etc. The answers are still unknown but they are crucial for studies that attempt to describe the spectral, photometric, and chemical evolution of integrated stellar systems ranging in complexity from star clusters to galaxies because mass is one of the primary parameters which dictate the evolution of stars. The questions can be answered in a direct way if one observes many young (age  $\leq 10^8$  yr) star clusters with different ages, abundances, etc., because they contain an almost coeval set of stars located at the same distance with the same metallicity. In this respect, star clusters of the Magellanic Clouds (MCs) are of extreme importance because they differ from those of our galaxy in many important respects, e.g. they occupy regions of age and metallicity domain which are not populated in our galaxy. This might be due to the fact that the evolutionary history of the MCs has been very different from that of our galaxy. The young populous star clusters in the MCs are therefore the ideal laboratories for providing an answer to the astrophysically important question of the universality of the shape of the IMF in time and space. Consequently, in 1988, BV CCD photometric data were obtained by Ram Sagar & colleagues for five young star clusters located in different parts of the Large Magellanic Cloud (LMC) and their IMF slopes derived (see page 293). The individual values of the IMF slopes agree with each other within errors and their mean

value is 1.1. They therefore conclude that the IMF slopes of the young LMC star clusters are not too different from the solar neighbourhood IMF of Salpeter with a slope of 1.35. The value of the IMF slopes of the young galactic star clusters derived from accurate observations using reliable membership criteria are also close to 1.35. Considering the fact that the MCs have experienced a quite different evolutionary history and open star clusters are located in different regions of the Galactic disk, one may think that the similarity of the slopes of the IMF in the young LMC and galactic star clusters support the idea of universal IMF.

### Raman Effect

Earlier we wrote about the Raman Effect in the skies. The actual observation of Raman lines in symbiotic stars, the broad bands emitted by these stars were interpreted by Schmid as due to Raman scattering. We also reproduced an article 'Raman scattering, spectropolarimetry and symbiotic stars' which appeared in *Gemini*. We thought that it would be appropriate to have a review article on all extraterrestrial Raman scattering by an author who has been working in this field for some time. See page 301.

### Thyroid and reproduction

'Thyroid gland' so termed by Thomas Wastorn in 1656 has always been a major interest among endocrinologists. The gland attracted serious attention after Gundersnatsch (*Arch. Entw. Mech. Org.*, 1912, 35, 457) showed that the frog tadpole metamorphosis can be dramatically precipitated by feeding them bits and pieces of horse thyroid gland.

The thyroid gland has retained its basic morphology and function almost throughout the vertebrates and hence any discovery in any vertebrate has important implications in the human and animal medicine. The major functions attributed to the thyroid hormone so far involve regulating metabolic rates and the growth of body in infants. Its role is very well established in cretinism (due to thyroid hormone deficiency where subjects become dwarfs and idiots) and in hyperthyroidism where the subjects show symptoms such as protruding eyes and hyperexcitability.

Involvement of thyroid in reproduction, especially in the functioning of ovaries and testes, is so far known to be very indirect. But the recent work by Samir Bhattacharya and his group (see page 327) demonstrating its direct involvement in the ovarian functioning opens up hitherto unrealized roles for the hormone.

In an earlier work this group has observed that the ovaries of the perch (a fish they have been working with), have the receptors for the thyroid hormone. They thence studied whether the oocytes of this species could be induced to release the progesterone by exposing them to thyroid hormone. Progesterone is a steroid hormone generally known to be regulated by the brain-pituitary axis. They found that the oocytes treated with the thyroid hormone exhibited a dose-dependent release of the progesterone which could be prevented by the known inhibitors of thyroid action. Further they have also shown that the thyroid hormone causes this effect through a proteinaceous regulator. The finding, besides being significant in understanding the role of thyroid in reproduction, opens new questions regarding other unrealized but plausible functions of the hormone.



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