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The Annual Reviews of Astronomy and Astrophysics contain definitive and timely review articles. Trying to review an issue of the Annual Review itself is a daunting and a somewhat superfluous task. For example, the issue for the year 2000 contains 18 articles covering a wide range of topics and is 850 pages long. Here I have tried to highlight some trends evident from these reviews, which also bring out the different aspects of modern astronomical research.

The discovery of extrasolar giant planets and the related topic of brown dwarfs are undoubtedly some of the most exciting developments in astronomy in the past few years. The formation, structure and evolution of these objects and their relation to the star formation on the one hand and the formation of a planetary system like the solar system on the other hand, are all hot areas of research involving rich, interesting physics. The very boundary between what constitutes a planet and a brown dwarf (a very low-mass star) is now unclear. The key issues in these fast-developing fields are summarized well in the two articles by Chabrier and Baraffe, and by Basri.

It has been repeatedly seen in astronomy that any new telescope or a new wavelength-window opens up a new field which is sometimes quite different from the proposed objective of the project. The present issue has three such examples: (1) The Hipparcos satellite was launched with the aim to determine accurate astrometric data for stars, in which it was successful and it has provided data for about 118,000 stars. The high-quality data from Hipparcos give accurate distances to stars and this information is now used as an important constraint in testing results from theoretical models of stellar structure as discussed by Lebreton. (2) The Infrared Space Observatory (ISO) was a successful mission; it was launched in 1995 and provided data up to 1998, a year longer than was expected. ISO was a versalite mission and provided detailed imaging and spectrophotometric data in the near, mid, and far-infrared. The ISO data on extragalactic objects, including high-redshift galaxies, have been summarized by Genzel and Cesarsky. The results on the young globular clusters in many colliding starburst galaxies, the barred spiral revealed at the centre of the strong radio source Centaurus A, and the 10 kpc ring of dust emission traced via far-IR in the Andromeda galaxy, are just some of the rich rewards to come out of ISO. Detailed analysis of the ISO data has led to a better understanding of the energy sources for the starburst galaxies and the AGN. (3) The extreme ultra-violet (EUV) band covering a range of wavelengths from 90 to 912 A, was at one time believed to be unproductive because of the likely absorption due to the interstellar medium. However, as Bowyer, Drake and Vennes point out, this premise was proven to be wrong when this band was explored by two satellites in the 90s, which has led to unique information on a variety of objects – from different types of stars, to the interstellar medium, to galaxies.

The deep surveys of high-sensitivity are necessary to provide information on the faint/distant objects and astronomers have always strived to obtain these. The deep survey of a small region of sky by the Hubble Space Telescope has yielded data of unprecedented sensitivity, reaching around 30 magnitudes in the V band. The north and south Hubble deep fields have provided invaluable information on the high-redshift galaxies and also on the stellar mass function in the galactic halo, as discussed by Ferguson, Dickinson and Williams. As the authors note, part of the impact of this work is due to the wide and fast availability of the data to everyone. This trend of sharing data is most welcome and is now being followed by others as well.

The various areas in astronomy are deeply interconnected and the progress in one field often triggers growth in another field. This is underlined in the article on Type Ia supernova explosion models by Hillebrandt and Niemeyer. The spectacular explosion at the end of the life of a massive star results in a supernova and understanding the physics of these explosions is a long-standing problem. Interestingly, in the last few years, supernovae have been used as 'standard candles' or distance indicators to yield crucial information such as the local expansion rate of the universe, which is used in cosmological models. This has now in turn led to a resurgence of activity in the supernova explosion models.

There are a number of interesting articles which I can only point to, due to lack of space: gamma-ray burst afterglows by Paradijs, Kouveliotou and Wijers; X-ray properties of groups of galaxies by Mulchaey showing that the dark matter in these is in the intragroup medium; the organic molecules in the universe by Ehrenfreund and Charnley; and a summary by Wallerstein and Oke of some of the important work done in the first 50 years (1949–1999) with the 200-inch Palomar Hale telescope.

The autobiographical article by Osterbrock is informative and written with characteristic modesty. Osterbrock has had a long and distinguished career and his name is synonymous with the study of gaseous nebulae and active galactic nuclei, on which he has written two classic textbooks. It came as a surprise to me that his Ph D thesis work (under the guidance of S. Chandrasekhar) was on a totally different topic, namely the acceleration of stars due to their gravitational interaction with the interstellar clouds. It turns out that this problem was worked out independently by Spitzer and Schwarzschild and was published in 1951, a year before Osterbrock's work could be published. This is the well-known Spitzer–Schwarzschild mechanism in galactic dynamics.

In summary, this issue gives a flavour of how the field of astronomy and astrophysics is exploding with activity, generated by the observations from a whole new range of telescopes and satellites.

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