

CD-ROM: ASTRONOMY

Personal Planetaria

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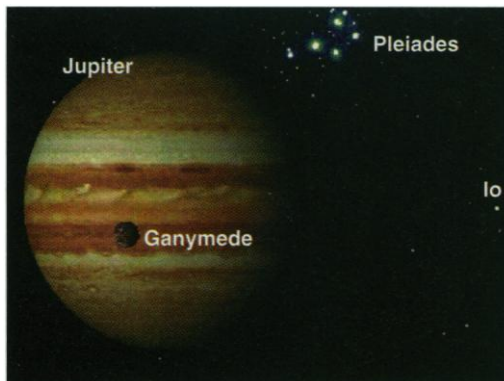
gene therapy and to investigators in the field who are looking for a quick update on topics outside of their areas of expertise. Its particular strengths include a comprehensive, up-to-date summary of existing vectors, the superb chapter on emerging viral vectors by D. Jolly, the chapter on angiogenesis by J. Folkman and co-workers, and the chapter on apoptosis by J. Reed. Given the recent improvements in gene-delivery technology, we will soon be facing important new ethical issues about both germ-line gene therapy and enhancement therapies designed to effect heritable traits such as height, weight, strength, and even intelligence. E. Juengst and L. Walters lucidly discuss these approaching dilemmas in their chapter on the ethics of gene transfer research.

In spite of these strengths, readers may come away from the book disappointed. Like almost all multi-author compendia, the volume suffers both from a lack of cohesiveness and from significant redundancies among related chapters. Students, in particular, could have benefited from the inclusion of summary chapters that compared the different approaches to gene therapy, the different vector systems currently in use, and the types of diseases that might be targeted with this technology. More important, although the book is more than 700 pages long, it, somewhat surprisingly, lacks coverage of many important topics. For example, none of the chapters considers gene-therapy approaches to cardiovascular disease, autoimmune disorders, serum protein deficiencies, or dermatological diseases. Similarly missing are descriptions of germ-line gene modification and alternative ways to alter gene expression (including the use of antisense oligonucleotides, ribozymes, artificial chromosomes, or homologous recombination). There is no discussion of new approaches for regulating transgene expression *in vivo* or recent advances in gene delivery devices. Many of these topics represent the future directions of the field, and their inclusion would have both strengthened the book and increased the longevity of its usefulness.

Despite these deficiencies, *The Development of Human Gene Therapy* is a timely and useful book that highlights the significant recent advances in the field. At the same time, it illuminates the important hurdles that remain to be overcome en route to a clinically useful reality. As Pasteur would have predicted, our ability to move gene therapy forward into the clinic will depend entirely on continued basic scientific advances. The recent rapid pace of these advances augurs well for the future of the field.

As you hover over the outermost Galilean satellite Callisto, you see the bold orange and cream-colored clouds of Jupiter slowly brighten while the sun rises over the planet's limb. Although this may sound like the latest science-fiction movie, it is actually a view you can easily set up on your home computer with Starry Night software.

Albrecht Dürer's woodcuts of the constellations (1515) were the first printed star charts. Like more modern star charts, they depict the positions of objects in the night sky visible from Earth. Early computer-driven star charts were also Earth-centered, although producing maps of the heavens, even fairly simple ones, on the computer offers significant advantages over paper versions. Users can view the sky from any location on Earth at any specified time; they can also



Orbiting Jupiter. Starry Night's depiction of the Galilean moon Ganymede viewed from 2000 km above the north pole of Callisto at 22:00 UT, 30 September 1999.

follow the picture forward (or backward) through time. Some more recent astronomy software packages provide views from extraterrestrial locations, but the possibilities are limited and the graphics remain simple. Starry Night, which can be run on both Windows and Macintosh platforms, represents a substantial improvement in this class of software.

Upon starting the program, the user is presented with a view of the current sky over their home location. Various easy-to-use graphical menus allow manipulation of

the time, location, direction, and field of view. Starry Night Pro lets the user choose locations on (or above) nearly any solar system object or anywhere within 20,000 light years of Earth. One can scan the skies from Pluto; enjoy the view from Halley's Comet as it approached Earth in 1910; or position oneself a few hundred million kilometers over the sun's northern pole, compress time, and watch the planets speed along their orbits.

Other astronomical software packages provide many of the same functions, but Starry Night has additional features that set it apart. As more detailed maps of the surfaces of solar system objects become available, these images can be loaded into the software's files. Additional objects, such as the two irregular moons of Uranus reported last year, can be entered into the virtual solar system, allowing accurate charting of the motions of newly discovered comets, asteroids, or moons. The Pro version allows users to add custom data files and to substitute photographs or charge-coupled device images for the default pictures. Starry Night is somewhat limited in the information it provides on celestial objects. The 110 Messier objects (nebulae, galaxies, and star clusters), for example, are displayed with only limited descriptive data. Although the LiveSky feature indexes more detailed information and images, an Internet connection must be maintained for its use. Other packages might be better suited for amateurs desiring an Internet-independent, comprehensive deep sky database complete with high-quality graphical images.

As an educational tool, Starry Night is excellent. The integrated Hipparcos stellar data can be used to generate dynamic Hertzsprung-Russell diagrams (plots of absolute magnitudes against spectral types) for star clusters or groups. With the movie function, views of any celestial event can be recorded and saved in the standard QuickTime format; the resulting electronic movies can be played back with the common Internet browsers.

Sienna supports Starry Night through an extensive electronic help manual and a detailed web site. Users can also download updates and additional information on celestial objects. For a reasonable price, the Starry Night package provides all the basic functions of an electronic star chart along with the utility of a small planetarium, detailed images of celestial objects, and limited physical data on the many wonders of the night sky.

Starry Night Pro
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