

MEMBERSHIP OPS

Renewals are coming up. As before, there are three tiers of membership:

Associate - For non-artists: collectors, publishers, anyone who is interested in space art and keeping up with our news. \$40/£26

Artist - For artists/illustrators who produce space art in any form. Artists get first choice for places at workshops, etc. \$45/£28

Fellow - This is an honour to which a member in good standing must be elected by a Committee of Fellows. Fellow members may place the designation FIAAA after their signature on works that they produce, indicating their position of stature. \$50/£31

As to who to pay, see below right.

EXHIBITION & GALLERY NEWS

The IAAA travelling exhibit, **The Artists' Universe**, has returned to the United States. No new show dates are scheduled; more information will appear in PULSAR and online when and if arrangements are made.

In the Next Issue of PULSAR:

We'll return to covering many of our usual departments, and we'll offer a detailed discussion about how and why the Hubble Space Telescope sees what it does and which photos are published, distilled from emails from John M. Stoke of the Space Telescope Science Institute. We'll also bring you the second part of our look at terrain generators and our special feature on galaxies.

IAAA AND PLANETFEST '04

The IAAA has been approached by The Planetary Society to participate in an exhibit and demonstration of space art at Planetfest '04 in Pasadena, California, which will coincide with the first Mars Exploration Rover landing. More news in the next PULSAR and online!

PULSAR is published at least four times per year as part of the membership benefits from dues paid. All contents are ©2003 International Association of Astronomical Artists (IAAA) except where noted. Individual artists and writers retain copyright to works contributed to this publication.



INTERNATIONAL ASSOCIATION OF ASTRONOMICAL ARTISTS

BOARD OF TRUSTEES

Kara Szathmary
Dave Hardy
B.E. Johnson
Walt Barrows
Dirk Terrell
Don Davis
Richard Bizley
Paul Hoffman
Rick Sternbach

OFFICERS

PRESIDENT
Kara Szathmary

VICE PRESIDENT
Dirk Terrell

VICE PRESIDENT, EUROPE
David A. Hardy

MEMBERSHIP
Dirk Terrell

TREASURER
Beth Avary

MEMBERSHIP, EUROPE
Richard Bizley

EDITOR, PULSAR
Rick Sternbach

DIRECTOR OF FELLOWS
Don Davis

DIRECTOR OF EXHIBITIONS
Joy Day

IAAA POINTS OF CONTACT

MEMBERSHIPS/US SUBSCRIPTIONS:

Dirk Terrell
9292 Galway Rd.
Boulder, CO 80303 USA
Tel: 303-541-9778
email: terrell@boulder.swri.edu
Annual rates by member type, \$40, \$45, or \$50.

Make all payments out to "IAAA"

VICE PRESIDENT, EUROPE & UK SUBSCRIPTIONS:

David A. Hardy
99 Southam Road
Hall Green, B28 0AB, England
Tel: (44) 121 777 1802
email: Dave@astroart.org
Annual rates by member type, 26, 28, or 31 GB Pounds.

Make all payments out to "IAAA"

Nov-Dec 2003

Incorporating Catch-Up material from Mar-Apr 2003

IAAA PULSAR

The Official Newsletter of the
INTERNATIONAL ASSOCIATION OF ASTRONOMICAL ARTISTS



"Warriors of Dawn" by Kelly Freas

The Official Newsletter of the
INTERNATIONAL ASSOCIATION OF ASTRONOMICAL ARTISTS

From the Editor –

Let's Do the Time Warp Again

In real time, it's November 2003, but this issue incorporates material from back in the spring. We'll be caught up within the next month, since your editor has finally beaten back the complications and frustrations of Real Life™. Anyone who either renewed or joined up in 2003 will still receive their full complement of at least four PULSAR issues.

We're proceeding with our theme features, this one focussing on asteroids, meteoroids, and similar rocky bodies sailing through the solar system and occasionally hitting Earth. Of course, asteroids have hit just about everything in the solar system, forming craters a few centimeters across (and smaller) to giant basins thousands of kilometers wide. Asteroids, along with comets, have affected and perhaps even helped begin life on Earth, and in the future may cause incalculable damage to civilization. Tracking and cataloguing of these objects is ongoing, and concepts continue to be developed to deflect potential impactors away. These plans, made popular in films such as *Meteor*, *Deep Impact*, and *Armageddon*, typically involve the dramatic measure of blowing asteroids and comets apart with nuclear devices. Ultimately, solid bodies and so-called "rubble piles" might be nudged away slowly - and some say more safely - by spacecraft with low thrust, high specific impulse nuclear-electric engines.

Space Art and Computers — Brushes vs. Bits?

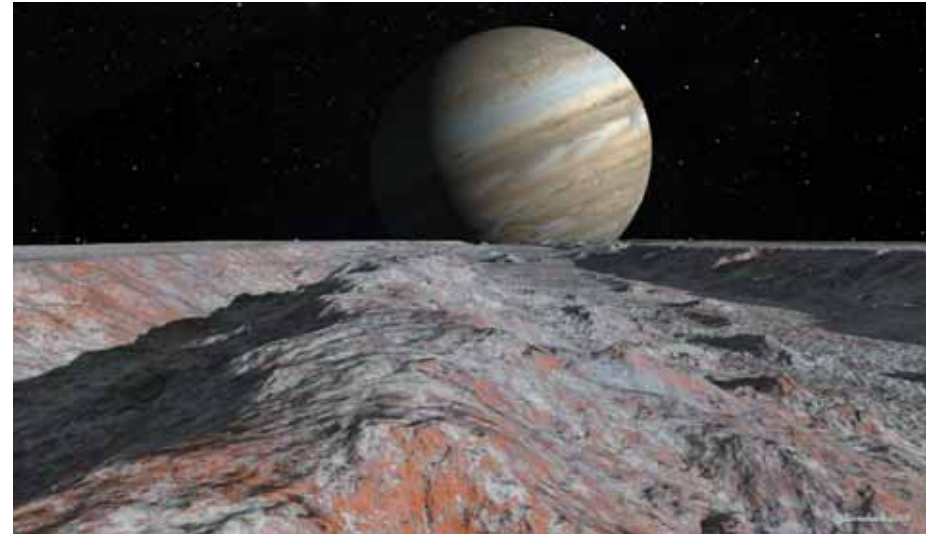
We're beginning a series of features on the use of the computer in astronomical art, particularly those programs capable of rendering photorealistic, textured landscapes. As applications like Bryce, Terragen, and Vue d'Esprit become more capable, familiar questions arise again. Are we seeing a continued retreat from brush, airbrush, and illustration board? Are 3-D modeling programs like Maya and Lightwave now the tools of choice for rendering worlds and spacecraft? When scene renderings and diagrams can be assembled and published, seemingly in hours instead of days, are art directors looking exclusively for *digital* solutions for their space art needs? Beyond the technical aspects of producing digital space art, we'll also examine how well traditional artists' tools and materials coexist with apps, LCD screens, scanners, and graphic tablets.

Rick Sternbach

Cover: "Warriors of Dawn" by Kelly Freas

Laura Brodian Freas explains: "Kelly has a fantasy asteroid piece called Warriors of Dawn, in which the asteroids are about to be chunked down on a planet. The rendering is so good you think you can feel the holes if you touch it. It was a cover for the novel of the same name published by DAW Books in the late 70s or early 80s. The mother ship, which is egg shaped, is dropping the asteroids on the planet below. When they hit, of course, they act like bombs. The painting is in acrylic on 15" x 20" illo board." Copyright 2003 Kelly Freas.

Ed. Note: The IAAA embraces various styles and subcategories of art depicting celestial objects and space exploration, from the photorealistic to the nonrepresentational. Kelly Freas has been painting evocative space scenes in science fiction for a very long time, as well as doing his artistic best in promoting real spaceflight with programs like Apollo and Skylab.



"Europa Valley" by Rick Sternbach ©2003

Rick: Do you sometimes render only the landscape to composite with a sky made with another app?

Paul: I will render the landscape without a sky if I'm going to do starscapes - I have a detailed real-sky panorama which I can copy & composite in. I also like to generate random starfields with the Universe program from Diard Software.

Dave: I don't think I've ever finished up with just a TG sky. It may be good for terrestrial scenes (in fact it can be very good), but I've done my own for Mars, Venus, Titan, etc.

Ron: Yup. Doing something like that right now. What I've done on occasion to render the sky and landscape separately in TG in instances where the lighting on the landscape would not be what I want it to be.

Rick: In cases where there isn't DEM data available, do you try to get your homegrown gray maps really close to the reality of the object, or can you be a bit looser because the view might only encompass a small piece of terrain with little large-scale structure to compare it to?

Paul: I try to express the "reality" of the object - or the "sense of the reality". Some large-scale structure in the image is always helpful from a composition standpoint.

Dave: I do try to get it as right as possible at that stage, 'just in case'.

Rick: Do you pay much attention to the slope constraints on where the layers put texture?

Dave: I find this aspect quite difficult, and a lot of experimentation is necessary.

Ron: Sometimes.

Paul: I'll tweak the colors and slope parameters if I don't like what Terragen does in an initial render. I don't think I've run into a problem changing altitude or angle, but I would definitely change the settings if I didn't like what was happening in the render.

Rick: Does it depend on the planet or moon?

Ron: Yes.

Rick: Also, do the surfaces you make for one view of an object still work if, say, you decide to raise your altitude and see a wider angle, or do you find you have to redo the layers?

Ron: Never had any problem. **cont. next issue in Part II**

In the meantime, check out Paul Hoffman's tutorial on making lava flows in Terragen:

http://www.digitalspaceart.com/digi_art/lava_stages.html



“Pluto and Charon” by Ron Miller

more delicately), but usually end up having to do a lot in Photoshop. I have an end-result in mind, and will do whatever is necessary to achieve it - I'm rarely satisfied with a TG terrain just as it comes off the production line.

Ron: Hours and hours and hours! Just forever, over and over again, almost exclusively in Photoshop. It's very difficult to get TG's tools to work in the cramped terrain window. I will occasionally use them to raise an area (which I will then save as a raw file and further refine in PS).

Paul: Haven't done any gray map tweaking.

Rick: How do you handle the polygon shadow problem in TG?

Ron: Hand repainting in Photoshop after the fact. Tedious, but no big deal. [One thing that can be done that might make this a little easier is to render the landscape twice, once the way you want it and once with the light moved---more or less---about 180 degrees. Place the original rendering on top of this new one and then just erase the hard-edged shadow shapes with soft eraser. You can then adjust the lightness and darkness of the lower layer so that the area still looks shaded. I've only done this once, though. The second time I tried it, it didn't work so hot.] I laboriously retouch them by hand. In one instance I rendered a landscape twice, with the lighting from two different directions. I placed the one with the large, black poly shadows on a layer above the second image and carefully erased them, allowing the underimage to show. The only time I did this was in the Mars flood image that is on my website.

Paul: Clean them up in Photoshop afterwards (although setting the render options properly in Terragen helps - I do use the Ultra-Smoothing).

Dave: This really was my biggest problem when I first started using TG, and I exchanged a number of e-mails both directly to Jo Meder and on the TG Mac list. I had some horrendous black triangles. I now always use 513 x 513, often use multidirectional lighting even though there is only one light source, and always switch on Ultra Antialiasing in the Render Settings. If there are any left, it's down to Photoshop again.

WORKSHOP NEWS

At the present time there is one workshop given an official green light:

• **May 2004** — Italy/Sicily, including Mt. Vesuvius and environs. **Contact:** Jon Ramer (ramerj@worldnet.att.net) From IAAA President Kara Szathmary comes this message:

“Dear Honorable Members of the IAAA,

The IAAA Board is in the planning process of hosting our next Workshop at Mt. Vesuvius in southern Italy for late May 2004. In order to make this an *Official* IAAA Workshop we need to know whether our organizer, Jon Ramer, ought to continue his work, gathering information, rent vehicles for transportation, accommodations, and plan an itinerary. The Board needs your help.

We need to learn who would like to attend this workshop. It takes time, effort and money to organize these things. Similarly attendees too have to get their ducks in a row - flights planned, clothing and art supplies to take, resources required, arrange your time away from your regular life habits, et cetera.

The whole point of our Workshops is to meet our colleagues in landscapes that emulate strongly and/or nearly the geology of the worlds we are creatively painting. It's also an opportunity to be together in one place, travel, work and get to know each other as we can. I have attended nine previous workshops and have met a great number of our members in this fashion. The bonding between colleagues is a life long benefit. And I recommend it each and everyone of you, to give it a try. Certainly we will all learn and teach each other about our individual art approaches and forge friendships at the same time.”

The following potential workshops continue in the planning stages:

• **Late 2004** — Death Valley. **Contact:** Rick Sternbach (rsternbach@earthlink.net). We have received the following information from the Furnace Creek Ranch, our possible headquarters for a one week event; this was sent out over the IAAA general email list but is repeated here for those who might have missed it as well as for our members not online: “We are delighted that you are considering a return trip to Death Valley for your Workshop (after only 21 years). We can offer you the following dates and rates:

Arrival: Early to Mid November. Ranch Room Rate: \$110* per night (Regular 2003 rate \$137)

Arrival: November 15 - 22; November 28 - December 20, 2004. Ranch Room Rate: \$95* per night (Regular 2003 rate \$137)

Number of Rooms: 20-30 Meeting Room: \$150/day

*Rates are net non-commissionable based on single or double occupancy and subject to sales tax, currently 9% and a \$2.50 energy surcharge. Third person in a room with existing bedding is \$20.00 per day. Rollaway beds are \$20.00 per day. Suggested portorage is \$4 per person and maid gratuity is \$1 per person per day.”

Ed. Note: While some possible attendees have expressed a desire to camp out to save money, it should be noted that in order to get the room rates, do art and computer work, as well as conduct meetings and talks, we need to commit to a minimum number of rooms or look for another location. If anyone has any better ideas, I'd certainly like to hear them.

• **May 2005 or 2006** — Columbia Ice Fields. **Contact:** Paul Hoffman (paul@digitalspaceart.com)



“Saturn from Iapetus” by Ron Miller ©2003

Landscape Generation in Space Art - I

Since the early days of computer-generated imagery (CGI), artists have been building landscapes from polygons, shading them, and lighting them for rendering for a wide variety of final uses. We space artists, like our brethren in academic computer labs and motion picture visual effects houses, have kept up with the latest 2-D and 3-D applications and are using them every day in making new views of distant worlds and phenomena. Terrain generators help us create views of objects from asteroids, comets, and icy moons to desert worlds, ancient Earth landscapes, and everything in between. Surface data can be imported from satellite images and radar or laser altimeter (as in the case of the Mars Orbiter Laser Altimeter or MOLA on board the Mars Global Surveyor spacecraft). Textures can be computed by the program (procedural), or draped over like a painted canvas (texture map).

One of the more popular terrain generator apps for the desktop computer is Terragen, developed by Matt Fairclough and ported to the Mac by Jo Meder. Jo, by the way, is a friendly and helpful fellow from New Zealand who has also worked on apps like Mojoworld. Terragen can be downloaded from <http://www.planetside.co.uk/terrigen/>. Other terrain generators of note are Bryce, Vue d'Esprit, and World Construction Set, with Flaming Pear's LunarCell a popular planet plug-in for Photoshop. These apps and more can be easily found on the web with a few choice Google searches. Though it does not have as complete a set of controls as Vue or WCS, Terragen is not terribly expensive (\$79 for TG vs. \$995 for WCS, for example), and boasts a user interface that is simple to use, once the different landscape and texture functions are learned. TG has a large following online, with tutorials and user examples posted. Like the other apps mentioned, TG applies bits of texture to polygonal meshes; this technique presents certain rendering problems, as in creating proper shadows, but there are a few workarounds and post-processing tricks to minimize the often jagged and triangular shadow edges.



“A New Planet” by David Hardy ©2003

DAVID A. HARDY: BLAZING NEW TRAILS IN SPACE ART

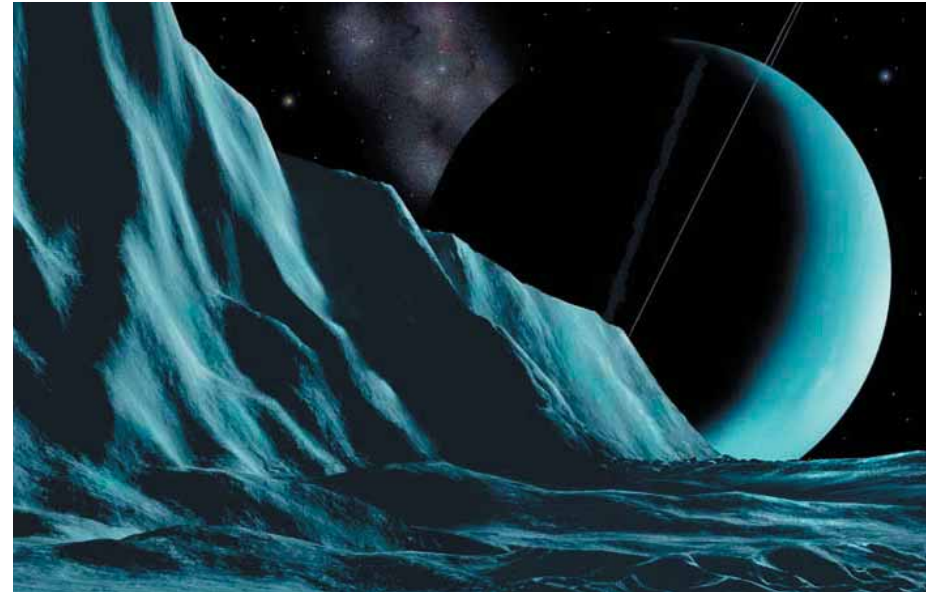
by Ron Miller, FIAAA

David Hardy is our Grand Old Man of space art, having been in the business now longer than any other one of us (he's three years senior to Bill Hartmann). Inspired by Chesley Bonestell's "The Conquest of Space", David created his first space art in 1950. When Patrick Moore published Hardy's artwork in "Suns, Myths and Men" in 1954, a collaboration was born that would last half a century (and which will be celebrated in a forthcoming book from Artists' and Photographers' Press). Probably the most famous of these collaborations was the spectacular "Challenge of the Stars", a work which can be compared to such space art classics as Rudaux's "Sur les Autre Mondes", Pesek's "The Moon and Planets" and "The Conquest of Space" without suffering in the slightest. He has written several of his books himself, including the definitive history of space art, "Visions of Space". He held his first one-man exhibition in 1968 and has been widely exhibited since. A long-time traditional painter, David was one of the first to make the transition to digital art. A member of the IAAA from its founding, David is also a long-time fellow of the British Interplanetary Society. He has participated in numerous IAAA workshops and has served in several different official capacities.

Asteroids

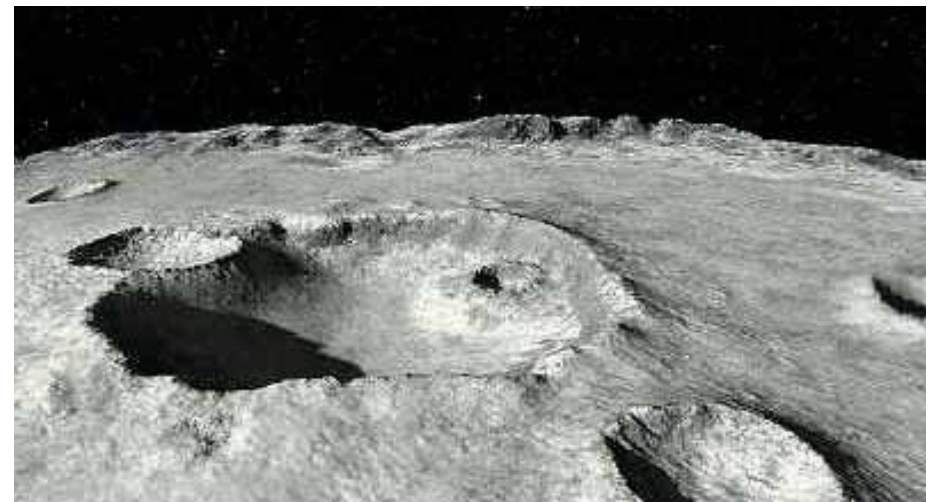


“Impact” by David Hardy ©2003



“Miranda” by David Hardy ©2003

Like every graphic program, TG and its cousins should be used to best effect, so it's important to know what a particular app can and cannot do, and it is doubly important to *minimize* the CGI “look.” In many, many cases, particularly with artists who are starting out on the computer or who rely on the computer alone to create realistic terrains, the resulting images appear obviously computer-made due to poor control over textures or lighting. What we will present in PULSAR over the next few issues will be not so much a tutorial on how to get it right but a discussion of how some of us have made use of the app, as well as dealt with its shortcomings, with accompanying art. **Cont. on p.6**



“Satellite Scape” by Paul Hoffman ©2003

The Terragen Roundtable

Your editor posed a number of questions to Terragen users Ron Miller, David Hardy, and Paul Hoffman as the four of us worked with Terragen in 2003. The answers have been edited into something of a roundtable discussion and supplemented by explanations of particular terms and procedures.

Rick: When you create a grayscale heightfield map for a body (lighter shades equal higher elevations), do you study that body and then create the map from scratch, or do you modify an existing map like one from USGS or other DEM (digital elevation model) sites to fit the general look of the landscape? Do you try to find 3-D data from spacecraft missions like MGS?



“Valles Marineris Under Morning Fog” by Rick Sternbach ©2003

Dave: I have not yet used an actual map, though I do have MacDEM and intend to at some point – now that I’ve finished using TG for an actual book and the pressure is off and I have time for some experimenting (or shall soon)!

Paul: I have worked usually with DEM files - there’s a lot available for Mars. For Venus, I simply did some random generation of a landscape in Terragen, smoothing it out to get the proper erosion, and used it when I felt it expressed the sense of Venus (without worrying about being a particular place on the planet.)

Ron: Yes to all – and occasionally combinations such as when I might take part of a DEM (which may already be cut and pasted together) and hand-render the remainder of the map. The MGS data works great for what people like Kees Veenenbos are doing, but since I usually place my viewpoint on the surface of Mars, the information is of much less use to me. It’s good to have for orbital views, however, such as scenes set on the moons.

Rick: In creating the surface layers, do you find that a few layers will do, or do you add child after child in varying amounts and bumpiness?

Ron: Just zillions and zillions of children - trying to build up the same sort of richness and depth to the texture that I get when spattering a painting. I just pile ’em on endlessly.

Dave: I’ve never used more than a couple. It looks to me as if most people who use TG need more layers to add grass, vegetation, etc. We rarely need to do that. I found it most useful to add the dark organic layers on Titan and Iapetus, and of course snow and ice on some worlds, in varying amounts.

Rick: How much tweaking do you have to do to a surface to get it just the way you like?

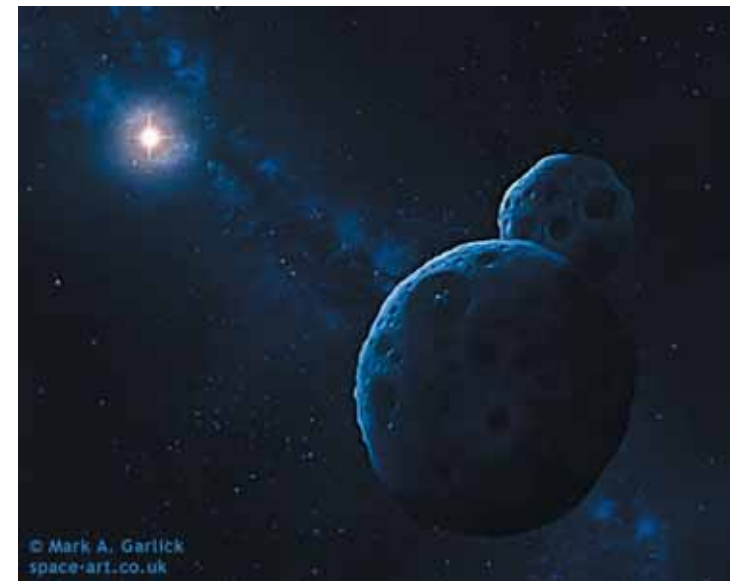
Dave: I do as much as I can in TG (but would like to be able to zoom in so that the tools can be used

cont. on p.14

Asteroids



“Near Earth Asteroid” by Michael Carroll ©2003



“Partners” by Dr. Mark A. Garlick ©2003

Asteroids

Observing asteroid satellites is important since they provide a direct means of determining the density of the primary asteroid (through application Kepler's Laws), which is a key clue to its composition and internal structure. Understanding the various mechanisms by which they might have formed can provide constraints on internal structures beyond those possible from the observations alone and can help us better understand their diverse evolutionary histories.

Since collisions are the dominant geologic process affecting main-belt asteroids today, it is plausible that most of the satellites there are by-products of cratering and/or catastrophic disruption events. Our own Bill Hartmann was the first to suggest that the complete fragmentation of a parent asteroid might result in the ejection of some fragments with very similar veloci-



"Earth Approacher" by Dr. William K. Hartmann ©2002



"Bombardment" by Dr. Mark A. Garlick ©2003

ties, resulting in mutual capture between ejected fragments into gravitationally bound pairs. In other cases, ejecta from merely large cratering events may end up in trajectories around an asteroid that allows the debris to accrete in orbit into a small satellite.

Among the near-Earth asteroids, where several satellites have been discovered by radar observations and through anomalous eclipses in some lightcurves, very close encounters with the terrestrial planets, have resulted in the tidal disruption of many small asteroids (much like the disruption of comet Shoemaker-Levy 9 when it passed close to Jupiter). The gravitational reaccumulation of some of the fragments can result in orbiting satellites or actual binary asteroids, where both components of the system are comparable in size. In fact, the observed frequency of satellites in the near-Earth population (about 15% or so) explains very nicely the statistics of doublet impact craters on the Earth (like the Ries and Steinheim pair in Germany and the Clearwater East and West craters in Quebec). – Dan Durda

ASTEROIDS

A PULSAR Special Feature
Commentary by Dr. Dan Durda



"Deadly Visitor" by Frank Hettick ©2003

A Sparse Asteroid Belt

We're used to seeing asteroid belts portrayed in movies as swarming fields of tumbling boulders, our heroes dodging to and fro in their battered spaceships. In reality, the main asteroid belt between Mars and Jupiter is a pretty empty place. Sure, there are indeed many millions of asteroids larger than a football field, but they are spread through a very large volume of space.

One way to appreciate the true emptiness of the asteroid belt is through the help of a scale model. If we represent the Sun as by a common 12-inch diameter globe, then the Earth would be about the size of a BB, orbiting just over 100 feet away. A mustard seed at 160 feet stands in for Mars and a ping-pong ball more than 550 feet from the globe represents Jupiter. Since all the asteroids combined amount to a pile of rock less than half the size of our Moon, we can picture the asteroid belt in our scale model in this way: crush a grain of sand into dust and scatter the remains randomly around you as you walk in a circle around the globe nearly 300 feet away! Far from dodging asteroids, real spacecraft navigators often have to work very hard in order to arrange for asteroid flybys on the way to other destinations. As artists we may paint fields of space mountains in order to depict the concept of a belt of planetary building blocks, but if you were standing on any random asteroid in the main belt none of your nearest neighbors would be visible to the naked eye.

Asteroids



From the Mural "The Origin of Meteorites" by Joy Day & B.E.Johnson ©1999

ASTEROID SATELLITES

The exciting discoveries of what is now a growing suite of asteroid satellites have motivated new, ongoing searches with both ground-based telescopes and the Hubble Space Telescope and have renewed interest in the diversity of mechanisms that may lead to the formation of small-body satellites and binary pairs. The surprising number of recent discoveries suggests that asteroid satellites are not unusual, but rather a consequence of common, on-going processes associated with the evolution of asteroids.



"Basin-forming Impact" ©2002 by William K. Hartmann



"Dark Menace" ©2003 by Dr. Mark A. Garlick