ANNOUNCEMENTS!

Well, it took several MONTHS to finish, but the Pulsar is finally ON-LINE! Now you can check out all your favorite Pulsar artwork in color, plus read up on the key articles in each issue. Check it out at : **http://home.att.net/~ramerj/epulsar/ep-index.htm**

Web Surfin' Sites to check out :

- http://www.sgi.com/features/2000/jan/haydn/
- http://oposite.stsci.edu/pubinfo/latest.html
- http://ltpwww.gsfc.nasa.gov/tharsis/mpl_hires.html
- http://pirlwww.lpl.arizona.edu/~jscotti/apollo.html
- http://www.jpl.nasa.gov/elnino
- http://near.jhuapl.edu/
- http://www.userfriendly.org/cartoons/archives/99dec/19991212.html
- http://www.brown.edu/Administration/News_Bureau/1999-00/99-060g.html
- http://xmmlaunch.esa.int/
- http://www.donaldedavis.com/PARTS/CENTURY.html
- http://www.roe.ac.uk/atc/news/clouds/index.html

BOARD ELECTIONS....

That's right - they're coming. Only four months until the next elections. That's only TWO issues of the Pulsar! If you are interested in being a Board member, please contact Dave Hardy (address to the right).

ATTENTION E-MAIL AFICIONADOS!

The world of the Internet is an ever changing one. Sometimes folks just have to change servers or e-mail accounts or whatnot. It's the way things are. But if you *do* change - please be sure to let Dale Darby and BJ Johnson know what your NEW e-mail address is! That way we can keep the membership roster and e-mail lists up to date, and keep YOU informed of what's going on with the IAAA....

INTERNATIONAL ASSOCIATION OF ASTRONOMICAL ARTISTS

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Feb / Mar 00

The Official Newsletter of the

International Association of Astronomical Artists

Triton Flyby By Molly Barr.
More ray-traced 3D art inside.

Editor: Jon Ramer

IAAA Website: http://www.iaaa.org

IN THIS *PULSAR*...

From the Editor-

Hi Gang. This issue we've got a GREAT art article from Joe Bergeron on the colors of space (thanks Joe!) plus long awaited news about the next IAAA workshop. I didn't get enough art work on giant stars, but I did find a bunch of neat 3D digi-images while surfing.
Check them out and we'll see you next month... *Jon!*

CHOOSING FELLOWS.....

The Board wishes to invite ALL members to participate in the opportunity to decide which members should (if they so wish) be elected to the new level of "Fellow." As far as possible, this will be by 'secret ballot.' We encourage as many members as possible to use the web-based on-line method of voting which has now been set up, as much for speed as anything and because a code/password system can ensure secrecy, which mail cannot.

By casting your ballots you can help complete the process we are all undertaking - that is, to position the IAAA as the world's leading professional body of artists who are the standard-bearers of this genre.

In order to decide who will form the Jury to select further Fellows, we need each member to nominate up to 10 current artist members whom they believe qualify as Fellows by dint of their expertise in whatever style and medium, including written work, i.e. books, articles, etc. - especially their contribution over time to our field in general and the promotion of it to the public at large.

From the ballots cast, the 'Top Ten' will be chosen as the initial set of Fellows and become our interim 'Special Committee of Fellows,' whose initial task will be to select other Fellow-Marquee artists by reviewing and jurying the body of work of our Artist Members.

For online voting, Dale Darby will send you a ten-character password by email. Then point your web browser at http://algol.boulder.swri.edu/IAAA/.

Enter your password and press the button to edit your votes. You will see 10 drop-down boxes with the names of IAAA members. Simply select the 10 (or fewer) people you wish to vote for. When you have made your selections, click the 'Cast Your Votes' button. Your votes are stored in a database and you can change them at a later time by repeating the above process. If you have trouble with the online voting, please send a note to Dirk at terrell@boulder.swri.edu.

Now: VOTE, VOTE, VOTE!... David A Hardy, President, IAAA

Astronomical Feature of the Month : -- GEMINI --

The Mercury program had been incredibly successful and President Kennedy had committed the nation to successfully launching a man to the Moon then bringing him home safely. The challenges before NASA were tremendous, there was so much unknown about space travel. Enter Gemini. Originally called the Mercury Mark II, Gemini was the stepping stone program between Mercury and Apollo that gave NASA the experience and practice to go to the Moon. Between 1961 and 1967, the Gemini program launch 12 rockets and 20 astronauts into orbit, achieving spectacular successes despite puzzling technical problems, rocket losses, and hair-raising near-disasters.

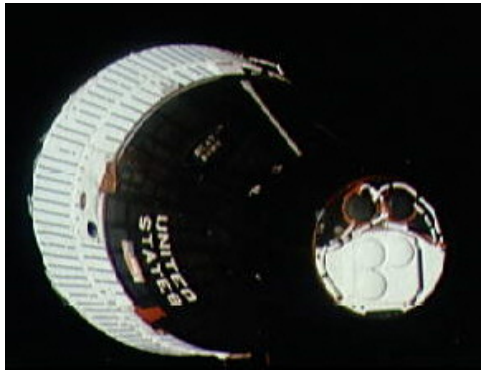
The Gemini program was actually started after the Apollo program. NASA's bid for the Moon began in 1960, but Gemini didn't begin until December 1961.

In the original design for the Gemini capsule, the reentry and recovery system was actually a large paraglider wing shaped like a hang glider. The capsule had three landing skids and the astronauts were supposed to fly the capsule to a landing on a hard runway.

In the event of a disaster during launch, Gemini capsules were equipped with ejection seats. NASA called these seats "rocats" - short for rocket catapults. After an astronaut bailed out, he would have used a hybrid balloon-parachute called a "ballute" to stabilize him as he fell back to the Earth.

All of the Gemini missions were launched atop the Titan II rocket. Originally designed as an intercontinental missile, the Titan II was selected for the Gemini program due to its simplicity, high reliability, and greater thrust than the Mercury program's Atlas booster. The Titan II used hypergolic nitrogen tetroxide and unsymmetrical dimethyl hydrazine for propellants. Since these liquids were storable and ignited on contact, equipment on both the pad and the rocket was simplified. Additionally, in the event of a disaster, the propellants of the Titan were less explosive than the Atlas. This fact affected the final design of the Gemini capsule by eliminating the need for an escape tower in favor of ejection seats.

Each mission during the Gemini program was highlighted by numerous advances in space travel. Gemini 4 achieved America's first space walk. Mission 5 was the first mission that was longer than the time to travel to the Moon. The first mission to succeed in having two vehicles meeting in orbit was actually two missions, Gemini 6 and 7. Mission 8 had the first orbital docking. Gemini 9 succeeded in docking and boosting the crew to the highest orbit ever achieved by a manned crew, and Gemini 10 both docked with an Agena and rendezvoused with Gemini 8's Agena. Gemini 11 conducted an artificial gravity experiment by hooking a tether to an Agena and spinning them both.



Gemini VI as seen from Gemini VII. NASA photo.

COLORS OF SPACE cont'd

brownish. The polar zones often appear gray. Festoons and other features in the Equatorial Zone often have a subtle but definite bluish-gray cast. The Zone itself is sometimes brighter and whiter than other zones on the planet. The only thing on Jupiter that can genuinely be considered "red" is the Great Red Spot itself, and that's only on its best days. When I first started observing Jupiter in 1972, the Spot was truly brick red and quite impressive. In 1980, I recorded it as salmon, and in 1982 as a very light orange. Over the years, it has waxed and waned, being sometimes almost invisible, apparent mainly as a white void where it used to be. Today it's sometimes called the Great Pale Orange Spot, an apt description.

Here's the good news - I can tell you that with good conditions and a good telescope, you can see an amazing and impressive amount of detail on Jupiter. Pamela Lee has done paintings which I thought were good renditions of true Jovian colors. Ron Miller, among others, is also good about not exaggerating the colors. Published colors of the main Jovian moons are also often exaggerated, especially Io, which is usually depicted as a pizza with olives. Its true overall color is yellow with shades of gray and faint green, something like the yolk of a hardboiled egg. No doubt it has details that are a little oranger.

Let me quote from my notes for the colors of Mars: (March 24, 1982, 8" telescope) "A pale white-orange-salmon disk... surface brightness much greater than Saturn's." (April 16, 1982, 8" telescope) "Strong dark markings of a sort of mauve-gray color. General disk color an attractive salmon."

I really don't much care what Venus and Mercury look like. Venus is basically a planetary ping-pong ball, while Mercury is just a big rock. That's a quick survey of my experience with the appearance of cosmic objects. Of course, my perceptions are not absolute, and others might disagree with them. I would be happy to offer any IAAA member who happens to be in my vicinity (which is a very changeable thing of late) a tour of the sky as seen through my own telescopes - an actual look is really the only way to form your own ideas. I would hate to be a landscape painter who'd never seen a lake or mountain except as a computer-enhanced TV picture.

Wherever you are, you should be able to contact a local amateur astronomy club, planetarium, or observatory and arrange to get a look at the sky. A warning: don't expect too much in the way of spectacle from your first few looks through an eyepiece. God may not be malicious, but he's not George Lucas, either. One last thing - no, my own paintings do not always adhere to reality, nor do I think they always need to. After all, we're supposed to be artists, and artists are supposed to be able to do any damn thing they please. Right?

Addendum: Since I wrote this, Sky & Telescope published the definitive article on the colors of the planets in its May 1999 issue, and I'm happy to say it agrees with me pretty well. It also contains some surprising info about Io which should send a lot of artists back to the drawing board.

Joe Bergeron

WORKSHOP NEWS....

From The President

ATTENTION ALL MEMBERS!

I am sorry to have to announce that the Iceland Workshop, which we had planned for this summer, has been cancelled due to the fact that insufficient members expressed interest.

** However, all is not lost! **

As you all know, Iceland is of interest to us as space artists mainly because of its volcanic nature and the presence of thermal areas and geysers -- analogues of Io and Triton, and of course Mars. But although it lacks the unique character, glaciers and actual active volcanoes of Iceland, there is an equally fascinating area much closer to home, at least for our US members, and accessible to all:

Yellowstone National Park, Wyoming.

Having been to both Iceland and Yellowstone, I can recommend the latter as a wonderful, weird area for sketching and photography. It contains hot springs, geysers, mud pots and fantastic natural sculptures which can be incorporated into art of alien worlds, as well as beautiful terrestrial scenery and wildlife. Hopefully the weather should be more predictable than Iceland, too....

The Board is proposing an IAAA Workshop to be held there, from Saturday 16 to Friday 22 September 2000 (i.e. after Labor Day, when it will be less busy with vacationers). Hotel prices appear to be in the region of $100-150 per room, shared by two (maybe more). We want to make this a 'traditional' IAAA Workshop, with time set aside for interaction between members, painting sessions, critiques, etc. It will also enable us to retrace the footsteps of our 'spiritual fathers' -- the Hudson River School of artists.

The purpose of this message is to assess interest in this workshop. If you are on the listserve, please reply via that so that we can all see how many are likely to go. If not, please reply directly to me.

Hope to see you there!

Dave Hardy

WHAT'S YOUR LABEL SAY???

Don't forget your dues! Yes - it's that time of year. But also don't forget the new membership structure for the IAAA. Here's a review :

#1) Associate Member:

Any non-artist interested in astronomical art or space art. Dues $40.

#2) Artist Member:

Any member who produces astronomical art or space art in any medium or discipline whether as a student, amateur, semi-professional or professional. Dues $45.

#3) Fellow Member:

Artists/ illustrators, who will either have submitted their work to a jury, or have been recommended to this grade by at least two other "Fellow Members" because of their known contributions to our genre, and been approved by a Special Committee of Fellows. These members will be entitled to use the initials "FIAAA" after their name. Dues $50.

Check the label of the envelope this issue of the Pulsar came in - if you have NOT paid your dues yet there will be an asterisk (like this - *****)" by your name. This means that if your dues are not paid within 30 days - your name will be dropped from the IAAA roster and that this will be you LAST issue of the Pulsar! (Don't let THAT happen!)

Membership is a wonderful thing, in addition to the Pulsar, you get to participate in workshops (see page 3) and vote for who gets to be the initial "Fellow Members." So - don't delay - pay your dues today!

or golds, or rubies - just subtle tints.

Moving in a little closer to home, we come to the planets of the Solar System. I have seen both Neptune and Uranus telescopically, and they are not bright green. Things are gloomy out there, two or three billion miles from the sun, so whatever color does exist is subdued. Let's see... at two billion miles from the Sun, Uranus gets about 0.25% as much light as we do. That's far from darkest night, and still amounts to the equivalent of many full Moons, but it doesn't favor saturated colors. Neptune is a dim, soft greenish gray, while Uranus looks like many planetary nebulae - a light, subdued blue-green tint. Saturn's pretty dim too, getting about 1% as much light as we do. Its disk color is very pale yellow, with hints of green at times, and subtle banding in a kind of golden brown tone. To me, the ring system often has an overall bluish cast, but that may result from contrast with the white-gold disk. Other than that, the A ring seems gray, the B ring white, and the C (crepe) ring a shade of burnt sienna, or sometimes slightly magenta. The whole planet-rings system often appears quite monochromatic, white with only a hint of yellow.

The public's perception of the appearance of Jupiter was not helped by the Voyagers, which dramatically exaggerated colors and contrasts, at least in the enhanced pictures which are usually seen. The Galileo pictures are more often shown in a more realistic palette. One of my disappointments about the film 2010 was its use of the vivid Voyager colors in is depiction of Jupiter, colors which simply do not exist with anything like that intensity. In presenting an idea of what Jupiter actually looks like, 2001 was much more successful than 2010. The overall color of the Jovian disk is a bright creamy white. The equatorial belts are usually sepia or burnt umber, with only moderate contrast. Other belts have even less contrast, except the South Temperate Belt,which can be prominent, and is also usually (cont'd page 10)

COLORS OF SPACE cont'd

Bright gaseous nebulae look greenish to the eye. They usually photograph pink or red, and so are often painted that way. The film is responding to the strong red emission called Hydrogen Alpha, to which the eye is not especially sensitive. The eye's peak sensitivity lies in the green-yellow range, convenient for detecting the green light of doubly ionized oxygen. Large telescopes may make it possible to glimpse pinkish areas in the most brilliant nebulae (like M42 in Orion), but in general, if you paint them as anything but ghostly green-gray, you're throwing realism to the stellar winds.

Many of the so-called "planetary nebulae" are intensely bright and strongly colored. They would be truly impressive objects at close range - immense spheres or rings of bright, blue-green light, maybe not fully saturated, but definitely and beautifully blue-green. Ray Crane, the staff artist at the Charles Hayden Planetarium in Boston, once had a display of planetary nebula paintings at an SF convention which I thought was exquisite. They were icy blue - no eye will ever detect the reds and yellows that glare out from photos of planetaries like the Ring Nebula - the colors are there, just too dim to register.

More bad news - there is no such thing as a red star. The light output of a "red" star is about the same as that of a low-power incandescent light bulb - distinctly warm, even golden, but hardly red. Seen at enough distance to look starlike, a light bulb looks just as red as almost any star, which means not very. Antares and Betelgeuse, famous "red giant" stars, have a heavy yellow color, but still give off plenty of blue and even UV light. If we lived beneath one of them, we would soon come to see it as white, just as we consider the yellow glow of a light bulb to be white when it's our only standard of reference. An "orange" star like Arcturus looks about as warm as a car's headlight. So much for The Bloody Sun and lots of paintings, including a number of mine. Ever wonder why Superman doesn't lose his powers under a light bulb?

One possible exception to this might be class N or Carbon stars, which are extremely cool suns whose atmospheres contain carbon compounds that act as red filters. These relatively rare stars look pretty red even in telescopes. Another exception has been brought out by recent discoveries. These are the so-called "brown dwarf stars", gaseous objects somewhere between Jupiter and red dwarfs in size and mass, too small to undergo thermonuclear reactions (and therefore not true stars at all) but big enough to have plenty of internal heat due to gravitational contraction. Their temperature is comparable to that of a bed of campfire coals or the heating element of a toaster - they must be quite red, certainly not brown. A better name for them would be infra-red dwarf stars, but that's not as cute as brown dwarf. The universe is probably littered with them, but they're too faint to detect at any distance.

The hottest stars do indeed look bluish, like welding arcs. But there is no such thing as a star with a pure, saturated color - no real greens, or purples,

Right: *Ocean Side* By Walt Myers

Left: *The Visitor* By BE Johnson

Kudos Korner

-Check out the Jan 2000 issue of *Astronomy Now.* Michael Carroll has FOUR images in it illustrating an article about the next 1000 years of space exploration. Great work Mikey!

- Not to be out-done, Lynette Cook also did four images for an article on extrasolar planets in the March 2000 issue of *Astronomy* magazine. Then she topped it by getting the cover AND another image in the same issue for an article on the formation of Jupiter. Well done Lynn!

- THAT'S IT?!?!? That's all the Kudos we've got for this month! Hard to believe that we've been THAT quiet out there, but this is all I could find. Com'on folks! If you're doing something noteworthy in the field of astronomical art, drop me a line so I can tell everyone about it!

Profile: Andrew Stewart

Hi Everyone, here's a little about me and how I like to work. I am a freelance artist with experience in general graphics and advertising, including posters, video covers, book covers and technical drawing. My particular skills and passion are in high quality airbrush work.

When I start a new painting, I spray the canvas jet-black and then I draw the design of the painting in white with three or four different airbrushes. Next I put in the very bright colors, highlights and shadows. When satisfied I finish the work with a protective varnish giving the painting a glass finish. I prefer to use acrylic inks and Liquitex paint as this gives a very high performance when working in the airbrush medium.

The airbrushes I use are Paasch V/VV and VJB, as they have a greater flexibility in the regulation of color and air without work stoppage. I also use the Devilbiss - a lightweight gravity feed spray gun - suitable for big paintings. My favorite airbrush is the ABL Turbo; a specialized instrument for fine line detail work: the turbine rotates at up to 20,000 revs per minute, reciprocating the fine needle. It is ideal for achieving extremely fine lines with no over-spray and is therefore perfect for fine detail.

I have always been into astronomy, fantasy and science fiction. What I like about 'space art' is that one can go anywhere in the mind's eye; opening new doors to the visual imagination. Painting forces us to synthesize everything we know from science nature.

Like many 'space artists', I was influenced as a teenager by the old master of space art - Chester Bonestell, the images that appeared in Astronomy Magazine and books like The Conquest of Space.

ART TIPS

This month: The Color of Space - From Joe Bergeron

Greetings. For those of you who don't know me, I'm a space artist, an amateur astronomer, and a former planetarium director. With those interests, it won't surprise anyone that I have a fascination with the appearance of astronomical objects, an interest I share with all of you. One thing that may set me apart from some of you is that I've spent a lot of time peering at the real things through telescopes. With this experience in mind, I submit to you a brief treatise on the real visual appearance of space objects, concentrating on their colors (or lack of). Perversely, I'm going to start from the outside in, going from the most distant objects inward to the Solar System.

Perhaps some of you are familiar with the appearance of remote astronomical objects only though artwork or long-exposure observatory photographs. These usually give a very inaccurate idea of how such objects might actually look at close range. Photographs or CCD images, by accumulating the light of faint galaxies and nebulae for long periods of time, reveal detail and color imperceptible to any eyeball view. Space artists, including me, usually base their paintings on the photographic, rather than the visual appearance of deep-space objects. To do otherwise would be to produce rather dim, dull pictures of little interest to fans of thick, candy-colored star-fields and multicolored nebulosity. There is much to be said for subtlety, but there is also much to be said for eating regular meals, and alas, in the illustration biz, subtlety does not always equal success. But for now, let's take a quick plunge into the icy waters of astronomical reality.

Suppose you found yourself hovering 300,000 light years or so above the hub of the Milky Way galaxy. A painter might depict its spiral arms clotted with blue and purple stars laced with clusters and nebulous patches. The arms would wind into a core ablaze with white or golden light. The Galaxy might also look that way in a long-exposure color photo. The real Galaxy, as seen by the eye alone, would present a much more subdued, delicate picture. It would be colorless - the light level would be insufficient to stimulate the retina's color sensitive cones. Detail would be limited, because the low-light rods of the eye are much coarser than the cones and give lower resolution. The spiral pattern would be visible. The hub would be a brighter glow, brightening suddenly at the center to a condensation like a fuzzy star. This is the actual nucleus, a small feature usually lost in photographs because of overexposure of the whole core region, and therefore hardly ever included in paintings. Most galaxies have such a star-like nucleus, often visible in good-sized amateur telescopes. The general effect would be a rather dim, mottled disk of gray light, arranged in an imperfect spiral, brightening to a stronger glow in the center. Only the brightest supergiant stars would be visible as individual points of light.

In an old painting called “Solitude” I included a somewhat realistically-painted galaxy; the effect was decidedly bleak. I included the star-like nucleus in it and in other galaxy paintings, but in many cases I was forced to take liberties with realism to keep the galaxies visible at all. Any significant light source in a picture would drown out a view of a galaxy as easily as a streetlight drowns out the starclouds of the Milky Way.

Under good conditions, a telescope gives views of deep-space objects essentially identical with what you'd see if you were really there. Unfortunately, telescopes are not able to make extended objects (like galaxies or planets as opposed to point light sources like stars) look any brighter than they appear to the unaided eye - the best they can do is make them look bigger while maintaining the same surface brightness seen by the eye alone. Don't take my word for this - seek out a good amateur astronomy manual to learn the limitations of telescopes. When you get to the point where the term "exit pupil" means something to you, you'll pretty much have it figured out. (cont’d page 8)

Flying High By Walt Barrows