

ANNOUNCEMENTS!

DUES TIME !!

Yes folks, it's that time of year again... **dues** time. That'll be \$40, or 26 pounds sterling for European members, sent to either Dave Hardy or Dale Darby (addresses to the right). Special note: As of the next Pulsar, there will be an asterisk next to your name on the address label if your dues are due.

Please note if you have the asterisk. If you have an asterisk and don't have a check in to Dale or Dave in 30 days, you will be dropped from the membership (unless you give a great sob story). We have been known to work with people in the past. So be please alert to it. It's an idea long past due and will be easier for all concerned. Of course, there's always the lifetime membership for only \$350....

Web Surfin' Sites to check out :

http://iota.jhuapl.edu/lunar_leonid/
<http://www.eso.org/outreach/press-rel/pr-1999/pr-17-99.html>
<http://galileo.jpl.nasa.gov/newimages.html>
<http://pds.jpl.nasa.gov/planets>
<http://www-mipl/MIPS.html>
<http://www.spaceart.org/lcook/extrasol.html>
<http://www.retroweb.com/lander.html>
<http://sci.esa.int>
<http://opposite.stsci.edu/pubinfo/pr/1999/41/pr-photos.html>
http://www.flag.wr.usgs.gov/USGSFlag/Space/MGS_TES/
<http://www.jpl.nasa.gov/pictures/io>
<http://www.twins.proweb.co.uk/olympus.htm>
<http://photojournal.jpl.nasa.gov/cgi-bin/PIAGenCatalogPage.pl?PIA02507>
<http://www.jach.hawaii.edu/JACpublic/UKIRT/public/gallery.html>
<http://www.spacer.com/spacecast/news/mars-water-99b.html>



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Dec 99 / Jan 00

The Official Newsletter of the



**International Association of
Astronomical Artists**



The Milky Way by Mark Garlick

Mark shows a graceful, sweeping view of the Milky Way galaxy from above the galactic disk. More galactic images inside

Editor: Jon Ramer

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

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Announcements

Astronomical Feature of the Month :

-- AURORA --

Astoundingly beautiful, dancing across the sky like a living creature, aurora are caused by electrically charged particles from the Sun striking Earth's upper atmosphere. Auroras occur around Earth's north and south geomagnetic poles in regions known as auroral ovals. Southern aurora are called aurora australis; northern ones, aurora borealis. Auroras occur between 40 and 600 miles above the Earth.

Auroral light is similar to light from color television. In the picture tube, a beam of electrons controlled by electric and magnetic fields strikes the screen, making it glow in different colors. Auroral light is caused by charged particles, particularly electrons, raining down along the Earth's magnetic field lines and striking air molecules. The color of the aurora



Photo by Jan Curtis. More great photo at http://climate.gi.alaska.edu/Curtis/aurora/aurora.html#NEWEST_IMAGES



Photo of aurora australis. Source: <http://www.t3.rim.or.jp/~naito/Penguin/aurora/au08.html>

depends on the type of atom or molecule struck by the charged particles. Each atmospheric gas glows with a particular color, depending on its electrical state and on the energy of the particle that hits the atmospheric gas. High-altitude oxygen, about 200 miles up, is the source of the rare, all-red auroras. Oxygen at lower altitudes, about 60 miles up, produces a brilliant yellow-green, the brightest and most common auroral color. Ionized nitrogen

molecules produce blue light; neutral nitrogen glows red. Nitrogen creates the rare purplish-red lower borders and ripple edges of the aurora. Auroral displays vary from night to night and during a single night. Appearing within arcs are upward-reaching striations aligned with the magnetic field, giving the impression of curtains of light. Ripples and curls dance along the arc curtains and pulsating patches of light may appear in the morning hours. Source: <http://www.pfrr.alaska.edu/~pfrr/AURORA/>



NASA photo. Picture of aurora australis taken by the orbiter Discovery in 1995.

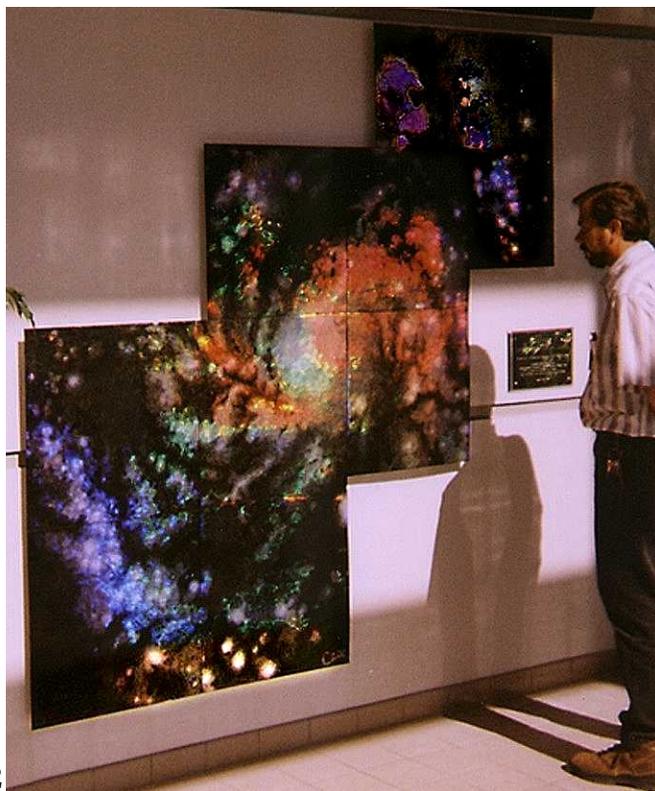
From the Editor-

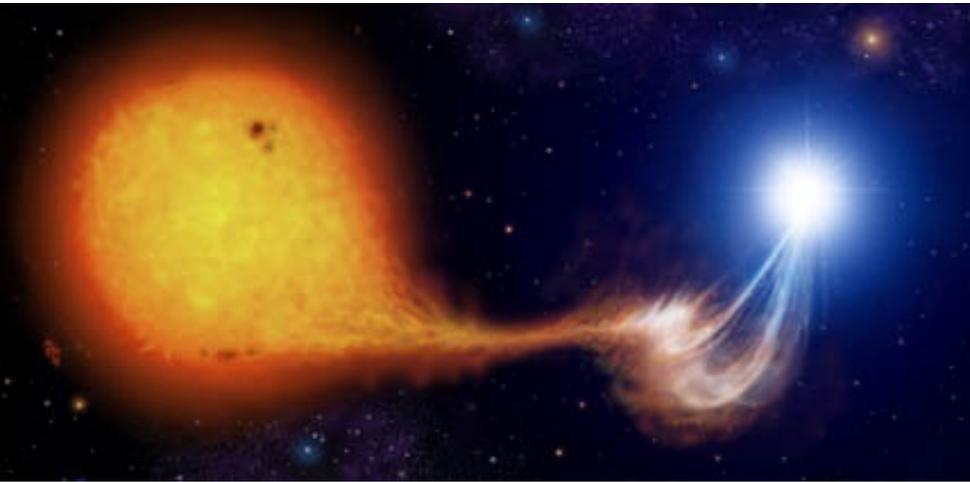
Hi Gang. Greeting and most felicitous holiday wishes to everyone! We're finally "going galactic" with several neat galactic images to look at. Also, there were some discussions on the listserv about aurora and the question of intelligent life in the universe. Thought those would make for a nice article or two. Enjoy! Next up - giant stars!

You!

Nebular Galaxy by Doug Czor

A brilliantly colorful and large work on multiple pieces. This work is hanging in the lobby of an Air Force research building on Kirtland AFB, NM.





Magnetic Accretion by Mark Garlick

This is an impression of a binary star system known as a polar or an AM Herculis star. It consists of a red dwarf which is losing material to a compact white dwarf which has a very strong magnetic field. The field is so strong that the material, on its way to the white dwarf, becomes caught up in the field and flows towards the compact star's poles. The situation is rather similar to what happens in an aurora, but on a much larger and much more energetic scale.



*From the Board and all your
fellow Members of the
International Association of
Astronomical Artists*

*All the Best
Holiday Wishes
to You and Yours!*



A Change in the Works...

From The President & Board

To All Members:

A few weeks ago, there was some rather intense discussion on the listserv about reintroducing different scales of membership. This was proposed as a way to enhance our 'public image' as a professional organization, as well as giving our members recognition for their standard or work, and in some cases a goal to aspire to. Since that discussion there has been a great deal of behind the scenes work on the same subject. The Board appointed an ad hoc committee to discuss it, and the results (as voted by the Committee and ratified unanimously by the Board) can now be announced. The levels and definitions are as follows:

#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.

#4) Transition between levels:

Members of (1) and (2) may at any time apply for advancement to the next higher grade. In both cases the appropriate new fee will be payable, and in the case of (2) to (3) the criteria stated above must be met.

#5) In the above usage, the terms 'astronomical art' and 'space art' are meant to describe astronomical and space-related themes expressed not only in painting and sculpture, but in any artistic medium or discipline, including photography and computer-aided artwork, as well as music, poetry and the performing arts, such as dance and drama.

The committee is still in session, in order to decide how Fellows should be selected. However, it is already agreed that all members will be able to take part in this process.

David A. Hardy
President, IAAA



In the Light of a Billion Suns by Michael Böheme
Human explorers in a far future marvel at the view the Milky Way gives from the outside.

ART TIPS

This month: Tidbits & flapdoodles - from a bunch of folks.

- Oil paint has a tendency strip underlying layers of paint.

This works great if you want to remove dried paint from the canvas! A coat of fresh oil paint applied on top of the old paint and allowed to sit for a couple hours, then wiped down with thinner, works better than any other method.

- If you have an old canvas that you want to recycle you might want to try removing it from its stretcher and soaking it overnight in water -- if you're lucky the water will penetrate the canvas from the back and lift the painting (and the ground) clean off the canvas.

- Use an 'oil painting medium' to slightly thin and shorten the drying time of oils. Here is Bonestell's formula for a nice oil painting medium: 2/3 Turpentine, 1/3 linseed oil (sun thickened is the best), a little Cobalt Dryer (use sparingly, too much will discolor the lighter colors), mix well, and those slow drying whites and reds will be touchable the next day or so. Use more, with a little clear out-of-the-tube medium for glazes.

- Some colors take longer to dry than others. Ultramarine and whites are particularly slow, you can use a quick drying medium (though this might, over time, slightly yellow the white) 'Wingel' from Windsor & Newton is one.

- When painting with oils, start 'lean' - that is, dilute the oil with lots of turps to thin it down. This is to put down the undercoat and block in some background color. Most colors should dry pretty quick this way and you should be able to go over the areas you want to build-up the next morning

is a step that had occurred in billions of civilizations across the universe, but it is a tiny step and we have only just made it. I think the societies of the galaxy simply leave emerging civilizations alone until they acknowledge to themselves that life DOES exist on other worlds. They know we are here, it's up to us to demonstrate we are civilized enough for them to come say 'Hi.'"

BJ Johnson said this:

"Scientifically speaking, there is always a first for everything, and we just might be it. This must be considered in any discussion of the existence of life in the Universe. The laws of probability, however, would state that we are not. My take on the search as it stands is that, if we are going to be successful, we are looking with the wrong tools and in the wrong place. Using the systems that we have we may find some serendipitous indirect evidence, but the chances are slim at best. Negative results may not be the data you wanted or expected but, it is good data just the same. As in any scientific experiment, it will at least eliminate that area of endeavor so that we may move on to others."

Gary Harwood summed it up beautifully:

"My own speculation is that while absence of evidence is not evidence of absence, the number of long-lived intelligent civilizations is probably very small and the number of spacefaring civilizations smaller still. No matter how we slice or dice it, we face the tyranny of space and time. Perhaps we are just in the wrong place at the wrong time. We presuppose that despite the awesome difficulties presented by interstellar travel there may be spacefaring civilizations. Why? I believe we are hampered in our speculation because we are tied to a purely human perspective. Though we've come a long way in a short time, I think our urge to expand and explore could be considered the hallmark of a race still struggling to come to terms with itself, plus the ever present specter of diminishing resources - and a couple of million years or so of instinct.

Kudos Korner

- Bob McCall and Cathie Yankovich are participating in the Millennium Reflections Exhibit at Phoenix Sky Harbor International Airport (Terminals 2, 3, and 4) from Nov 1999 to Jan 2000. The purpose is to explore the significance of the millennium as interpreted in art

- Kudos to "The Prez" for his image of the new planet detection at Tau Bootis which is being seen all over the net. Multiple appearances in various newspapers and on the news too - nice one, Dave!

- Check out the December 1999 Astronomy Now. Alan Bean has the cover plus four paintings inside. The issue features four articles about space art, including one written by Dave Hardy illustrated by four of his own paintings! Great articles Dave & Alan!

- Pat Rawlings and Ron Miller each have an image in the December 1999 Scientific American, Pat showing a Lunar observatory and Ron a nice view of Europa with Jupiter in the sky

- The January 2000 issue of Astronomy has three digital images of the future Earth done by Walt Myers - well done Walt

- Astronomy's "Exploring the Universe" has one of Lynette Cook's great extra-solar system planets - check it out!

CLASSIFYING GALAXIES

There are trillions of galaxies in the Universe. Surprisingly, most of them are very similar in shape. Edwin Hubble recognized this and introduced the classification scheme illustrated in the figure below. This diagram is often called the tuning fork diagram, and separates most galaxies into elliptical, normal spiral, and barred spiral categories. These are then sub-classified into categories with respect to properties such as the amount of flattening for elliptical galaxies and the nature of the arms for spiral galaxies. Galaxies that do not fit into these categories are classified as irregular galaxies. Spiral galaxies, like the Milky Way, are shaped like pinwheels; irregulars have no discernible shape at all; and ellipticals are round- or oval-shaped objects.

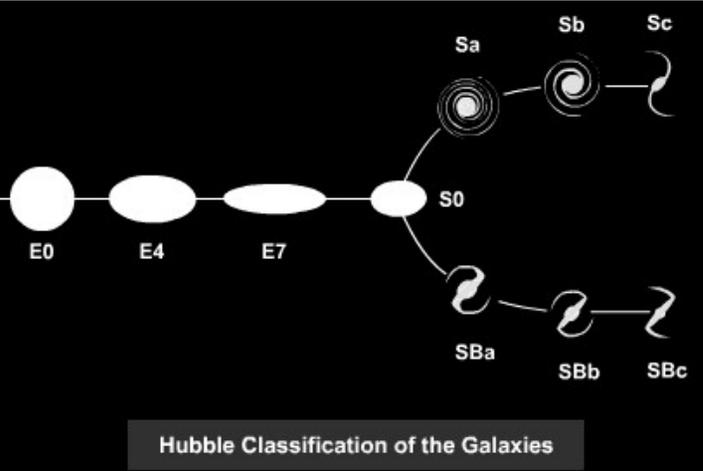
Spirals and irregulars are typically sites of ongoing star-formation and contain young stars. Ellipticals, having used up their supply of fresh gas, cannot form stars any more and contain mostly very old stars.

Spiral galaxies are a composite of stars and gas in a disk surrounding a central bulge. Waves in the disk form the spiral arms and cause the gas to collapse and form new stars. Therefore, the disk is rich in young stars. Older stars are typically found in the bulge. Sometimes those waves form in straight lines, those galaxies are called "barred spirals."

In the Hubble sequence, the number E0, E1, ... E7 is related to how flattened the ellipse appears to be, with E0 corresponding to no flattening and E7 to a very elongated ellipse. The masses of elliptical galaxies cover a large range. The smallest of the elliptical galaxies, which are called dwarf ellipticals, may be only a little larger than globular clusters, while the giant elliptical galaxies are among the largest galaxies in the Universe. This is a much larger range in size than is seen for the spiral galaxies.

There are other sub-types too. Peculiar galaxies, which are galaxies that look unusual in some respect; colliding galaxies, when two or more galaxies are distorted by the gravity of another galaxy; and active galaxies, where the nucleus of a galaxy is extremely active.

Source: <http://csep10.phys.utk.edu/astr162/lect/galaxies/hubble.html>



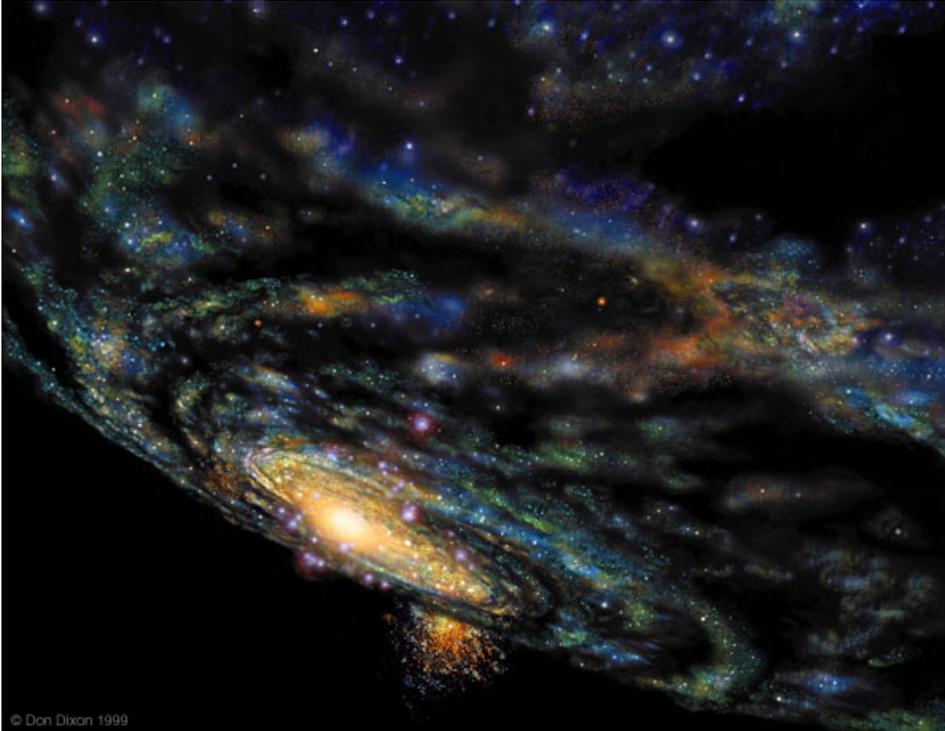
- Examples of specific galaxies:
- M81: Sb spiral
 - NGC2997: Sc spiral
 - M95: SBa barred spiral
 - NGC1365: SBb barred spiral
 - Leo I: E3 dwarf elliptical
 - M110: E6 elliptical
 - Small Magellanic Cloud: Irregular

Profile: John Doe

"John Doe? Who the heck is that?", I hear you think. "A new member?" Well, yes and no. In the past six months we've had many new members join the ranks. This is wonderful! Unfortunately, the rest of the IAA doesn't know anything about these new folks because some folks are a little shy and don't want to share their profile with the rest of us. Please don't do that! This issue I actually have NO profiles to print. If you're new, please take a few minutes to jot down a few notes about yourself and send them to me at either ramerj@worldnet.att.net or Jon Ramer, 5007 Rhine Way, Dayton, OH, 45458, USA. I'm as eager to learn about new members as everyone else is - so please tell us a little about yourself! THANKS!

Our Galaxy by Don Dixon

Based on radio maps of hydrogen clouds, this painting accurately depicts the structure of our Milky Way Galaxy as it might appear from a viewpoint 1,000 light years south of the galactic equator. The bright red star in the dark region slightly above and right of center is Betelgeuse. Our own sun is invisible at this distance. The painting was featured in the October, 1998 issue of Scientific American.



© Don Dixon 1999

IS ANYONE OUT THERE?

A Listserver Discussion

A couple of issues ago, the Pulsar featured an article about the Drake equation and the question about life in our galaxy. The topic always brings out great discussions so when Doug Macary brought it back up on the listserv, I thought the discussions would make for an interesting article....

Doug started it with:

"With the absence (so far) of any intelligible radio signals from other civilizations, has anyone here ever considered the idea that we're the first to get to this point technologically? The idea intrigues, saddens, and frightens me, all for different reasons. Could it be our destiny (not that I believe in that) to bring Terrestrial life into the Universe?"

This got a lot of replies, first from Bob Eggleton.

"Interestingly, a lot of SF authors have started proposing the same thing. There's been a dearth of any novels that have classic 'alien contact' in them and a proliferation of books/stories about Artificial Intelligence, alternate history and near future, earth based SF. Many authors claim 'we would have heard something by now' and have given up at least on alien contact stuff. James Cameron (Director, TITANIC) gave a speech at some space symposium basically damning things like STAR TREK and STAR WARS for 'making it look too easy' (space travel, alien contacts) and thinks SF media should depict the

hardships and 'reality' of space travel and the fact that even if there are other intelligent races, we'll probably never meet them."

James Smith said:

"I suppose it's possible, but given the fact that our sun is much younger than many others, it would seem unlikely that we're the first to evolve intelligence and technology. As far as radio astronomy, it is possible that this invention is a

Passing the Bar

by Jon Ramer

A pair of planets are drifting through intergalactic space after having been ejected from their home galaxy.



uniquely human invention, and that even if there are other intelligences in the universe, they are not transmitting or scanning the sky. Of course, in this discussion we have to say almost anything is possible, since it is all speculation. The only thing in life that really, REALLY scares me is the thought that we might be the only intelligent beings that ever have or ever will inhabit the universe. 'What an awful waste of space', to borrow from the movie adaptation of Contact."

I had to wade in with some comments too:

"I don't think we're the first. The universe is (by current best estimates) about 12.5 billion years old. Our solar system is only 4.5 billion. That leaves EIGHT BILLION YEARS for others to have risen and fallen. Now count the TRILLIONS of galaxies with billions of stars and factor in how many planets we are finding with the meager tech-level we have today. I personally think the life - intelligent life - is out there in droves and watching us closely without us knowing. The difference is that the others have technology we probably would call magic, so we really don't see them watching. They don't have to really, we're sending out so many radio signals anyway. They do not interact with us for the same reasons that we don't waltz into the middle of a pride of lions or group of gorillas, the native animals would freak out and immediately turn violent. And mankind has some pretty destructive playtoys."

Don Davis came back with this:

"We could very well be alone, or virtually alone. Maybe we are the first ones, although this instinctively seems unlikely. If there's one lesson we have pried from the Universe it is the statistical unlikelyhood of being at the center or beginning or the end of anything profound. We're just somewhere in the stream of things. I doubt we are in the 'cosmic zoo' scenario, looked over by invisible civilizations, but I wonder if our Solar System has ever been visited by probes over the billions of years. If something like a self replicating probe can indeed be built at all they should be filling the galaxy fairly quickly in terms of geologic time. if one percent of light speed is all they can muster then you have at least one branch of the 'tree' of travelling probe paths crossing the galaxy in not much more than 20 million years, even allowing for generous 'regeneration' times. But how would all this data be collected? Maybe..there are no widely traveled civilizations which overwrite their environments like we do, (roads, lights, noise etc.) Perhaps such 'signatures' of intelligent manipulation of the environment are all over the place but we will not know until some resolution threshold is reached in future all sky surveys. I think that current SETI efforts are valuable and at the moment are the best hope for finding radio chatter from beyond. Somehow I think only a small fraction of civilizations use anything like radio we would recognize as such."

Sorry folks, but I have to reply to Don!

Didn't mean to imply I think Earth was an exhibit in some 'Cosmic Zoo' - or that aliens have 'duck blinds' set up on Earth to watch us - I don't. I mean that I feel the universe is filled with life, including intelligent life that is quite aware of humanity's first steps down the road of sophisticated technology. It