The Remains of the Day
by Dana Berry

Greetings fellow IAAers! The rumors are not true! Pulsar LIVES!!! As the editor, I bear full blame for the lacuna in your subscription, and you may pummel me at any time, day or night, with rocks and sticks and anything else that suits your fancy, (use the TASER! Give 'im the CHAIR!!). In the meantime, I shall strive to prevent such lapses from occurring again.

But, ladies and gentlemen of the jury, I have an excusable, and its better than the old "ah, the dog ate my homework" line. (I tried to use that line on Dennis, but he wasn't fooled!) I suppose you've been vacating in another galaxy, you've probably heard that the Hubble Space Telescope has been fixed. And if you were vacating in another galaxy, then we probably have pictures of you!

Well, the news of HST's repair was the result of a carefully orchestrated imaging campaign that worked in tandem with spacecraft reconfiguration activities after the shuttle mission (STS-61) was over. Known within NASA circles as "ERO" or the "Early Release Observation" program, this campaign was designed to prove to the project scientists and engineers that their solutions for HST's optical problems were correct and, then to demonstrate to the general public the full range of HST's new capabilities. Scores of meetings occurred at all levels, and it was my duty to provide consultation on the aesthetic merit of each target during the planning of ERO, and then to determine things such as the cropping composition and even the composting of each image that came down from the spacecraft. The term "composting" refers to the process whereby different filtered images of a given target are registered and then "stacked" to make a naturalistic color image. All of the color images from HST are treated in this way, because the detectors, unlike the human eye, do not "see" in a continuum, but rather at specific wavelengths. Consequently, in order to mimic the range of the human eye, HST must make 3 observations of a given target at different wavelengths. Humans on the ground in physical resemblance between the ERO targets, me and a handful of other folks), would then render and collate the images according to the electronic scheme of RED, GREEN and BLUE to produce a "naturalistic" representation of the data.

The thrill of all this was in applying the rules of graphic design and photographic composition to scientific data. In my role as director of the Astronomy Visualization Lab, this has always been part of my duties. But, working with some of the most amazing astronomers and scientists during one of the most historically important moments in twentieth century astronomy gave me an emotional and inspirational high that may take months, perhaps even years to come down from.

And, now that the historical moment has passed, things will hopefully settle down into a new routine. I can already promise you that there will be a torrent of new images forthcoming. I have just finished work on the new "String of Pearls" (Comet Shoemaker-Levy) image done with the repaired HST, and will be preparing some animation sequences of the upcoming collision with Jupiter. Although the image is not yet ready for release as of this writing, I can promise you that you will be amazed when you see them. And, then there is some work being done on images of "proplyds" (proto-planetary disks) in the Orion Nebula. These images are extraordinarily tantalizing, to say the least.

I decided to name this article "The Remains of the Day", for a couple of reasons. In front of me on the floor is a copy of the Valley Edition of the L.A. Weekly, with a photo of earthquake damage in Los Angeles, and the title "Remains of the Day". The pun is from the movie of the same name, obviously, but there is something strikingly similar between that photo and my office. I look around, and realize that my office is filled in the detritus of the ERO campaign, with stacks of videos, papers, unopened mail and the like. But, there is more than just a physical resemblance between my office and Los Angeles. There is a metaphorical similarity as well, for L.A. will take some time to recover, but, in the end, it will come back, just as HST did.

So, stay tuned, and worry not, for Pulsar is BACK!!!

Art of the Cosmos
by Beth Avary

As you may recall, Art of the Cosmos opened at the Hayden Planetarium in November of 1991. From there it went to the Discovery Museum in Bridgeport, Connecticut in August of 1992 and was on display there for through November of that year. Then it traveled to the Arts and Science Center in Statesville, North Carolina, opening in January and running February of 1993. After that, it went to the Bergen Museum in Pavnamas, New Jersey where it showed May through September. It is now at the Maryland Science Center in Baltimore, Maryland, where it will stay until September, 1994. I had a little trouble booking it because the science museums are all into "interactive" these days. In other words, you can not just look at something anymore, you have to be able to push a button! These crazes always seem to go too far; when you can't just quietly contemplate anymore, but have to get physical...I don't know. Anyway, how is it.

I think your paintings will probably go back to you after their stay in Maryland, but there is one other place that might come through. I'll keep you posted. Good painting!!

The Carl-Zeiss Planetarium Stuttgart is featuring the work of...
Gabriele L. Berndt through 12th of September, 1993. Sorry, I don't speak German, or I would translate the words on the page into English. If no words are needed to understand or appreciate the six beautiful astronomical paintings that the Museum has on display, the work is hypothetical astronomical landscape with some paintings showing metaphysical overtones. Worth seeing.

Judy Asby Exhibit - "Space: A Multi-Dimensional View" is currently showing at the American Museum of Natural History - Hayden Planetarium in New York City through December 31, 1993. The show originally opened at the British National Space Hall of Fame last April.

"My space paintings are a synthesis of inner as well as outer space. I am interested in the inner and outer space, and I consider it important to make the present from the those of the human prehistoric past."

If you are an exhibit or know of an exhibit, please send me information to: at 70 Sioux Way, Portola Valley, California, 94028, tel: 415-851-3120, fax 415-851-3285.

Some Thoughts About Space Art by Beth Arvay, (Reprinted with permission from The Planeteurum)

Our Sun travels along the frontier of the Milky Way galaxy in a company of countless stars of various hues. The myriad stars in our neighborhood pool their photons in an interstellar fog of light. Like the fishing line on which one ingredient overpowers the rest, we might wonder if the starlight in our night sky is heavily flavored by a particular color. Photographs of spiral galaxies show that they normally have yellowish nuclei and bluish spiral arms. The reason is that in the hinterlands of the Milky Way's spiral arms, it seems reasonable to assume that the overall starlight should be bluish in color. The bluish stars give light that the bright, bluish stars of spectral class "O" and "B" are very rare while the dim, reddish, main sequence stars of spectral classes K and M are very numerous. Do the few bright blue stars outshine the many faint red stars in our part of the Milky Way, as color photographs of other spiral galaxies suggest?

Surveys of several surveys in the Sun's neighborhood yield a surprise answer. This can be an important question to answer for astronomers who wish to predict the faint sheen of light in the night sky. As it turns out, there is quite a bit of starlight shining down on us from what may be a collection of stars that have not been observed in the Sun's vicinity. Admittedly, even the most "colorful" stars have only a very delicate hue. Antares is probably considered to be one of the most "colorful" stars by astronomers, but as a comparison, Antares is predominantly white. The colors of the stars are subtle at best.

"An" is the name of the Sun's neighboring star. Another survey of the forty brightest stars in our night sky brighter than visual magnitude +2.0 reveals that eleven belong to the spectral classes "O", "K", and "M" while "G" and "F" stars are classified as "O" and "B". It is interesting to note that those "G", "K", and "M" stars produce a bit more light than the "O" and "B" stars. If we ignore the light from "A" and "F" type stars, as essentially colorless, it seems that at least among the brightest stars in the sky, the cool "G", "K", and "M" stars slightly outdo the hot "O" and "B" stars. Among the Survey of the forty three brightest stars, is the fact that more starlight is produced by stars of spectral class "A" than by any other type. This is not surprising as Sirius, a type "A" star, accounts for more than half of the total night sky light, but there are thousands of fainter ones shining up there as well. In addition to the forty three brightest stars already surveyed, a "software survey" of over one hundred million stars by the combined results of these two surveys appear in Figure 2 and show that cool "K" and "M" stars outshine the hot "O" and "B" stars by about fifty percent. Is the combined light from the stars at night amber and not blue after all?

A "red sky at night" was not what I had expected to find, and since my two surveys hardly resembled real research, I looked for more professional and comprehensive set of number on stars type. A detailed survey in Allen's "General Catalogue of Quantities" lists the relative number of stars of spectral class in every million cubic parsecs in the Sun's vicinity. To my surprise, a quick scan in this book showed that "G", "K" and "M" stars produce over twice as much light in the "O" and "B" stars in the solar neighborhood. The "K" and "M" stars alone outshine the "O" and "B" stars by more than fifty percent. On average, over one billion stellar in the Sun's vicinity having a volume of one million cubic parsecs will probably not contain a single "O" type star. Such a high density of stars with no dim at all, the Sun, would have a radius of only about sixty parsecs. But because of their high luminosities, "O" type stars are visible a long way and are very numerous. If the Sun were nestled in the nuclear bulge of the Milky Way, we could expect our sky to be awash in the amber light of old stars. But how can our night sky be dominated by cool stars when the Sun resides near the center of spiral arm? It is no surprise that its (supposedly blue) arms? Studies of H regions [the reddish hydrogen clouds underlying the spiral arm] show that although the Sun is in the Milky Way Galaxy show that although the Sun is in the territory of the spiral arms, it is not located in the center of one. Rather, if we are drifting in the wake of the Perseus arm, about a thousand light-years from its nearest trailing outsider, the Orion Spur. Instead of backing in the glare of young blue stars, we are immersed in the red glow of stars left behind by the lumbering galactic freeways. The prevalence of reddish starlight in the wake of scattered spiral arms appears to be confirmed in M51, the Whirlpool Galaxy.

It is thought that the prolific star formation within spiral arms results from the churning of density waves through the interstellar medium. The most numerous stars born in the spiral arms are the reddish "K" and "M" type stars. The predominance suggests that we see the brighter stars in the spiral arm neighborhood belong to this family, yet they produce only about three percent of the total starlight. Among these "K" and "M" stars, although hundreds of millions of stars swirl in great numbers, they are not responsible for the large amounts of reddish light found in our part of the Milky Way Galaxy. A small number of massive but short-lived blue stars would also be created during the passage of a star forming density wave. Their lives are so brief that they would not drift more than a few few hundred years from the recently passed Perseus arm, the giant stars of spectral class "K" and "M" number less than one half of one percent of all stars, yet they produce a quarter of the total starlight in our part of the Milky Way Galaxy.

Elliptical galaxies such as M86 and M87 are populated by many old yellow stars and this is reflected in their integrated spectral types. Although the spiral galaxies M33 and NGC 6946 have relatively small spiral arms and appear very blue in color photographs, their integrated spectral types are surprisingly neutral in color. Apparently, there are more cool stars burning in the outskirts of these spiral galaxies than their color portraits show.

Realistically, the trace of yellow, tingeing the starlight in our night skyes could not be observed with the naked eye. Color vision requires fairly bright light, and the starlight falling on the night time snows of Antarctica or the even dimmer leaks of Pluto will only appear grayish. So, should there be any real concern about something as insignificant as the perceptible color in the light from the stars? If the intent of the illustrator is useful, then good science is vital to the production of an accurate rendering, which may be the most important aspect of astronomical art.

MEMBERSHIP FEE REDUCED

The IAA Board of Trustees has voted to reduce the membership fee from $100. per year to $40. per year. The higher fee has been a hardship for many members to pay. We hope that the new reduced fee will bring back many past members to current membership status.