

ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

VOL. 49, No. 11 – November 2001

Speaker, General Meeting, November 14

Joe Jordan

Atmospheric Wonders: Light and Color, Fire and Ice in the Sky

Joe Jordan obtained a B.A. in Physics at Oberlin College in 1976 and an M.S. in Computer and Information Sciences at UC, Santa Cruz in 1981. He works at the NASA Ames Research Center at Moffett Field near Mountain View, CA.

He has been involved there with a variety of projects, including in-flight data acquisition and management on the world's only airborne observatory (for infrared astronomy), planning for the space station, a large orbiting telescope to atmospheric modeling and mission flight support for the ongoing investigations of the problems of stratospheric ozone depletion and global climate change. In the winter of 1988-89 he was in Norway and at the North Pole on the international Airborne Arctic Stratospheric Expedition.

Recent research involves the design efforts on SOFIA (Stratospheric Observatory For Infrared Astronomy) and use of artificial-intelligence software to search for new types of infrared astronomical objects from satellite observation databases; the search for extra-solar-planets; supernova shock-wave calculations; airborne earth/ocean/atmosphere imagery analysis; and color correction of Mars lander/rover images (from the 1997 Pathfinder/Sojourner mission).

Joe built a 6-inch Newtonian reflector telescope, and coordinated short expeditions for the U.S. Naval Observatory (to time occultation's of stars by mountains on the edge of the moon). He has also done an intensive geology field course (stratigraphy) in Wyoming, and worked on farms there and in Virginia.

PLEASE NOTE: THE OCTOBER 17 GENERAL MEETING MAY BE MOVED DUE TO THE RECENT FIRE – PLEASE CHECK THE HOTLINE OR THE WEBSITE BULLETIN BOARD TO VERIFY THE LOCATION!!!!!!

San Francisco
Amateur Astronomers

Web Page:
www.sfaa-astronomy.org



Sharing the Wonders
of the Universe

Information Hotline
(415) 566-2357

2001 Club Officers & Contacts

<i>President</i>	Al Stern (415) 929-7035	<i>City Star Party Coordinator</i>	Toney Burkhart
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<i>Board Members</i>	Lorrie Boen Jason Burkhart Dan Christian	Nancy Cox Rita Nossardi Stern	Fraser Reich Dennis Tye
<i>Alt. Board Members</i>	Randy Taylor	Jim Webster	

Club Telescopes

The SFAA owns 3 club loaner telescopes, Dobsonian/Newtownian reflectors: 6" f/10, 8" f/7, and 10" f/8. These are available for extended periods (30 days or more) to SFAA members. These are generally very fine scopes, easy to use and well-suited for deep sky, planets, and star parties. The loaner custodians are Pete Goldie & Sarah Szczechowicz, located in San Francisco. If you are interested in borrowing a scope, or if you have items you can donate for the loaner program (eyepieces, star maps/books, collimator, etc.) please contact them via email (pg@lbin.com) or phone (415-206-9867). Email communication is preferred and strongly recommended for a quick and accurate reply.

Important Dates

Board Meeting – November 7 - 7:00 p.m.
Western Addition Library, Scott & Geary Sts., SF

Mt. Tam Star Party
October 20 at 7:30 p.m.

SFAA General Meeting – November 14
Morrison Planetarium, Golden Gate Park
Refreshments at 7:00 p.m.
Speakers begin at 7:30 p.m.

City Star Party
October 27 at 7:00 p.m.

Above the Fog is the official bulletin of the San Francisco Amateur Astronomers. It is the forum in which club members may share their experiences, ideas, and observations. We encourage you to participate by submitting your articles, announcements, letters, photos, and drawings. We would also like to hear from our new members. Tell us about yourself – what you have done in the past and what other clubs you have joined. **The deadline for the next issue is the seventh day of the month.** Send your articles to Lorrie Boen at 765 Geary Street #302, San Francisco, CA 94109 or at LorrenLee@aol.com

Mt. Tamalpais State Park
Star Programs

October 20 - 7:30 p.m.

"Saving the World with Sky-Power"

Dr. Joe Jordan, Space and Atmospheric Researcher, SETI Institute

Scientists are searching for a solution to our energy crisis and projected climate changes
with renewable energy systems.

Dinners with the speakers: at Lau's China Bistro, Tam Junction, 252 Almonte Boulevard, Mill Valley, 2 1/2 hours before the scheduled talk. To participate, call the restaurant at (415) 389-8868, and add your name to the "Mt Tam Party." The no-host dinners run between \$10 and \$15, including tax and tip.

Information: **Telephone: (415) 455-5370, (415) 388-2070 Same day Hotlines: (415) 566-2357, (415) 455-5370 (messages after 4:00 pm)** Mailing Address: **MTIA/Astronomy Programs, P.O. Box 3318, San Rafael, CA 94912**

Review of new Aries Chromacor on my 6" Synta Refractor
By Bob Berta

I have always admired the wonderful images that a APO refractor can provide. I own a 8" SCT with the Celestron Fastar CCD imaging setup that is my main telescope. I also have owned a few refractors including the Orion ST-80 and a TV Pronto 70ED. While these are fun refractors they are not APO (including the Pronto) and the only thing that kept me from getting an APO was money.

About a year and a half ago after having good results from my much modified Orion ST80 I became intrigued by the 4.7" and 6" refractors also made by Synta in China and labeled with many different importer names. You may have seen these scopes with Celestron, Orion, Bresser, Sky Watcher and other names on the tube. After looking through a few of these scopes I was impressed enough to get one of the 6" - f8 versions labeled Sky Watcher through Gary Hand at Hands-On-Optics 1 1/2 years ago. It was exactly what I expected...quite good images resolution wise but with false color and ghosting due to the achromat design. I was actually impressed that it was quite reasonable in the color areas for a big refractor. There were a couple of minor shortcomings...mainly the stock tripod which was undersized for the scope. This was easily fixed with a set of massive hardwood home made legs. You can also buy ready made heavier tripods for the scope through several companies. I also regreased the gears and adjusted the brass worm gears axle play and gear lash. I had originally planned on only keeping the German mount until something better came along...but it is working so well now that I am in no hurry to upgrade. Turns out the German mount itself is capable of quite good performance for visual use...and occasional guided imaging.

But the real proof of a telescope is the optical performance. While I was happy with the stock scope....I really wanted to use it for CCD. Right after I got the scope I started hearing about a project that Aries was working on. Val, the owner, had an idea that he would make a device called a Chromacor for these scopes. The device is a second set of optics that would convert the scope into a full APO scope. I can't say for sure if the idea is similar to the design used in the Tele Vue 101...but it has striking similarities in design and execution. The same concept has been used successfully before by other telescope manufacturers. Roland Christen of Astro Physics wrote a note to me describing his clubs 10" refractor that has a similar APO converter that he built a few years back.

Since this sounded like a way to make an inexpensive scope a great scope...for a VERY attractive price, I contacted Val and closely followed his efforts to bring this to the market. Evidently it wasn't an easy task...it required special proprietary glasses and the planned production dates kept getting pushed back with development delays.

A couple of people did get the test samples and they were tickled pink with the performance visually and photographically. I saw some of the photographs taken with these and they were very impressive.

Finally I got the word...I was one of the first to get one from the first production. Getting one required a bit of up front work on my side though. Val asked me to perform some tests to determine the specific correction of my own scope. There is variation from example to example of any scope...and through Vals instructions I was able to determine that my scope was about 1/6th wave undercorrected. This was important information because not only does the device provide APO correction...it also is custom matched to each scope to correct for any under or over correction. The one I got corrected the optics to about 1/20th wave undercorrection.

While Val is obviously a little unwilling to give too much information so he won't reveal all his secrets...the device appears to have two or more likely three cemented elements and uses some pretty special glass. Val says that the good news is that in the small size used in the correctors he can get 4 crossings which is phenomenal...but that making the glass in larger sizes would be prohibitive.

The device itself is an optic assembly about 3" long and with a standard 48mm filter thread size. It simply threads onto the front filter threads of a 2" high quality diagonal like the Intes, TV or my Astro Physics Max Bright. In other words you don't have to go into the scope tube or make some Rube Goldberg device to hold it in place. Couldn't be simpler.

It does help to check the colimatton of your focuser (the Chinese scopes are just so-so in this area). This is simple to do with a Cheshire eyepiece. Just put a dew cap cover over the scope and center the light dot by adjusting the focuser in its tube. You can do this by loosening the three screws that hold the focuser to the tube and shifting it slightly and also a little bit with the two tiny allen screws that adjust the upper rail on the focuser. All of this is explained by Val. This is important as you want the focuser perfectly centered to eliminate any coma or color spikes off of a bright star or planet.

I just got it a week ago and sadly have only had one clear night to star test it...although it was a gloriously dark/clear night at my club's star party. I noted that the familiar color spikes on a bright star like Vega were happily missing. Stars were pin points on black velvet...I could push the magnification higher than before and still maintain wonderful images. M-8 was spectacular and M-11 seemed to resolve right to the core. Images on each side of focus were tight and duplicated showing nearly neutral correction. It was fun to switch back and forth between the Chromacor and without it to do AB testing...the difference was quite impressive. There were probably 200 people in attendance at the star party...and half of them looked through my scope. Everyone was very impressed with the images...even more so when I told them what it cost. Think there will be a few more of these in my club in short order.

My testing isn't finished yet...if the weather ever gets better (new scope curse strikes again)I hope to do a bunch of CCD imaging. While I had to give up on stars...I did set the scope up for some terrestrial CCD imaging to check for any vignetting, light fall off, color correction and especially required back focus. Luckily Val provided me with the key information for camera placement. Ideally it should be around 161.5mm from the back of the threaded filter adaptor on the Chromacor to the focal plane of the camera (or eyepiece visually). This worked out super with my CCD setup. It allowed me to use my small Meade flip mirror in conjunction with my SBIG ST-237 camera. I also want to check out Venus one of these mornings...I consider that one of the toughest tests for color and a refractor.

Note that the Chromacor is designed for the "long" versions of the Syntas. The same scopes are also made in short tube versions which will NOT work with the corrector. While the device is matched to these specific scopes...I know of one case where it was used with a large achromat refractor (think it was either a 8" or 10") and it also yielded improvements. In my preliminary tests it even seemed to have a positive improvement with my TV Pronto refractor...more to follow on that one though. The device doesn't change back focus appreciably from the stock setup...on mine it moved the focuser out about 1/4" from stock.

For those who want more numbers...here are some secondary spectrum values for a stock 150 Synta scope vs. the corrected scope (testing by Val of Aries) and also a well known Japanese flourite APO doublet (figures from published figures for this scope) for comparison:

wave length	150stock	150 w/Chromacor	FS102
656nm	.65	.116	.15
486nm	.66	.04	.15
465nm	1.35	.14	.24

In short, Val, owner of Aries, is to be congratulated on marketing a remarkable device. You can find the 6" Syntas with mounts through several companies for around \$900 U.S. The 4.7" goes for even less and may be the ideal scope with more manageable size and excellent performance when equipped with the Chromacor. There is a little sample to sample variation on these scopes just like any scope line..but generally they are pretty decent scopes. You might buy one through a company that hand selects and inspects them if you want to ensure that you have a good one. The 6" scopes usually come with the German mount called a EQ-4 by most or CG-5 by Celestron and EQ-5 by some others. The 4.7" scopes often have the EQ-3 scope but you may find some dealers that will provide it with the heavier duty mount (recommended if you have that option). But if you already have a high quality German mount you can buy the OT only through companies like Orion. Add in the cost of the Chromacor at a little over \$800, dump the stock diagonal and eyepieces and get some good ones and you will have a fantastic scope for a bargain price. My scope is used with the AP diagonal and one of my Pentax XL or University Optics Abbe Orthos eyepieces and the scope can take advantage of these premium accessories. While this scope won't match a TMB, Astro Physics or TV in fine workmanship...it shouldn't be dismissed as it has excellent true APO image quality now...and the price is a big selling point for those like myself...Rolls Royce taste but Chevy budgets.

"The Extreme Universe"

Dr. Lynn Comisky, Sonoma State University

November 14 - At Foothill College

On November 14th, at 7 pm, Dr. Lynn Cominsky will give an illustrated talk on "Exploding Stars, Blazing Galaxies, and Giant Black Holes: The Extreme Universe of Gamma-ray Astronomy." Dr. Cominsky will discuss how current (and future) telescopes in space can help us explore some of the most bizarre and intriguing objects in the cosmos. Gamma rays, the most energetic waves that the universe sends to us, can show us dying stars, stellar corpses devouring one another, and gargantuan explosions in the hearts of other galaxies -- places and phenomena whose power dwarfs all human activity.

The program is part of the Silicon Valley Astronomy Lecture Series, at Foothill College's Smithwick Theater in Los Altos Hills. Admission is free and the public is invited. Call the program hot-line at 650-949-7888 for more information. The series is co-sponsored by NASA's Ames Research Center, the Astronomical Society of the Pacific, the SETI Institute, and Foothill's Division of Physical Science, Mathematics, and Engineering.

San Jose Astronomical Association

2001 Fall Swap Meet

On Sunday, November 4, 2001, an astronomical Swap Meet will be conducted at Houge (city) Park in San Jose. Hosted by the San Jose Astronomical Association. This is a new event, a follow-on to the Spring Auction that has been run for some years. There is no action, just the Swap sale. Joe Sunseri of Earth and Sky Adventures is expected to be there with many fine new and used items.

For more about SJAA, visit our web site at <http://www.sjaa.net>

Beginning CCD imaging...what is important? by Bob Berta

I have been asked by many people...."I am interested in doing some CCD imaging. What camera should I buy?"

Actually that can be a hard question to answer because the answer to that question might involve a lot of decisions. This is the same puzzle as when someone asks me for my opinion of the best type of telescope to buy...I find that an impossible question without knowing more information. In both questions you would need to know what they are interested in...planets and the moon, deep sky, pretty pictures, scientific work, casual or serious observing. Also how much gear are they willing to tote and what equipment do they already have. How do they expect to spend most of their time...imaging or observing. And probably the least important question at this time..what their budget is.

The biggest mistake you can make is to know very little about CCD imaging and buy a camera. Just as a DOB is desirable for some purposes...and not for others...certain camera/scope/mount combinations are not good matches.

The first and most important decision will be whether your existing scope mount is capable of doing a good job of tracking for CCD imaging. Surprisingly, a good mount is probably the most important single component of a good CCD system...in fact it is probably more important than the scope OR camera! CCD imaging requires not only a good clock drive...but the mount has to have sufficient capacity to support the scope and camera. Often a mount is rated for a given carrying capacity...but for CCD you can usually figure that it would handle no more than half of that maximum visual capacity. Electronics are great today...but mechanical quality is a big issue...and often this shows up as what is known as periodic error or PE. This is the very minor speeding up and slowing down of the mounts tracking. This is generally of no importance for visual use...but can be a serious problem for imaging...this constant speed differential results in egg shaped stars. The better mounts have PEC or Periodic Error Correction...the ability to learn the cycle of errors and cancel them electronically. Vibration is also an issue...when you tap your telescope does it dampen out very quickly...less than a second or two...or does it wobble like a bowl of jello at the slightest touch or breeze. If so this too will show up as egg shaped stars.

There are many decent mounts but way to many to put into a list of good or bad...it is best to talk to someone who is already involved in CCD imaging and ask them if a particular combination would work. In short here are some general rules:

1. Get some advice from existing users...they have already made the expensive mistakes for you!
2. Get the best mount you can afford. There are excellent fork, German mounts and also turkeys in both designs.
3. Look for any excess vibration and reduce it..vibration reducing pads, wooden legs, and other tweaks are well researched for making any existing mount less wobbly and vibration prone.
4. Try to get the faster scope speeds...this means if you have a choice of scope speeds you want the one with the smaller number...a f12 scope might be great for visual use...but would be too slow for CCD...a f8 would be a much better choice..f6.3 even better. You can buy fast scopes...or focal reduce slower scopes which will also make an existing scope faster. A faster scope with a given camera will mean a wider FOV AND faster exposure times. As an example...consider three scope options...f10, f6.3 or f1.95. The shot at f6.3 would be 10 times longer than at f1.95 and 25 times longer at f10. So an exposure of 2 minutes at f1.95 would take 20 minutes at f6.3 and 50 minutes at f10.
5. Faster scopes with a wider FOV and/or shorter exposure time will be far less demanding of the scopes drive accuracy. This means you can get by with a less expensive mount generally with a wider FOV or faster scope.

6. This one is a shocker for most people...aperture isn't very important for CCD imaging. What you lack in aperture you make up with longer duration exposures. It is said that a CCD camera gives about a 2.5 times "increase" in virtual aperture. This means your 8" scope will capture images at least equal to the visual view through a 20" scope...and this is a very conservative estimate in my tests. A APO or semi APO refractor scope with an aperture between 4" to 6" is just about ideal. And a 8" to 12" SCT is also optimum. Of course you can also use a Newtonian on an equatorial mount...but did you know you can also use a DOB for CCD imaging. A device called an equatorial platform will actually allow tracked CCD images with a DOB.

So...what is the best camera to buy? Well...that needs some further discussion...which will follow in an upcoming article.

Morrison Planetarium's
Benjamin Dean Lecture Series
presents

November 20

Pr. Neta A. Bahcall

Princeton University

Will the Universe Expand Forever?

What is the ultimate fate of the Universe? Will it expand forever,
or will it eventually collapse in a Big Crunch?

December 11

Dr. Gia Dvali

New York University

The Universe's Unseen Dimensions

Could the visible world lie on a membrane floating within a higher-dimensional space?
The extra dimensions would help understand the inexplicable weakness
of gravity and help us unify the forces of nature.

January 29

Dr. Alexander Vilenkin

Tufts University

Eternal Inflation

The eternal nature of inflation – an epoch of accelerated expansion driven by the repulsive energy of a “false vacuum” – has profound implications for understanding the Universe.

All programs begin at 7:30 p.m. in the Planetarium - Tickets are \$3.00 each
DEAN LECTURE INFORMATION LINE at (415) 750-7141



Founded in September 1952, the San Francisco Amateur Astronomers (SFAA) is an association of people who share a common interest in astronomy and other related sciences. Our membership consists of people from all walks of life, educational backgrounds and ages. Many SFAA members own their own telescopes; some have been made by hand in local telescope-making classes and vary in size from 6 to 25 inches.

Treasurer, SFAA, 13 Mabry Way, San Rafael, CA 94903

make checks payable to **San Francisco Amateur Astronomers** and mail to:

- \$ 8 enclosed, youth membership (under 18)
- \$30 enclosed, institutional membership
- \$30 enclosed, family membership
- \$30 enclosed, foreign membership
- \$25 enclosed, individual membership

Select one category:

Email address:

Address:

Name: Telephone:

San Francisco Amateur Astronomers Membership Application

San Francisco Amateur Astronomers

c/o Morrison Planetarium
California Academy of Sciences
Golden Gate Park, San Francisco, CA 94118

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