

The Prairie Astronomer

January 2020 Volume 61, Issue #1

***In this issue:
"On Walkabout" in Arizona***

Orion Nebula
By Jim White



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

**NEXT PAC MEETING: January 28 at 7:30pm
at Hyde Observatory**

PROGRAM

The Prairie Astronomy Club will offer its annual free session: "How to Use Your Telescope" at Hyde Observatory, Tuesday evening January 28th at 7:30 p.m. Do you own a telescope and need help getting started using it? The Prairie Astronomy Club would like to help. Every year at our January meeting, we offer a session to give hands-on assistance. There is no charge for this session. It is open to the public and if you have a telescope you want to use you are encouraged to bring it. Meetings are at Hyde Observatory and are open to the public.

FUTURE PROGRAMS (Tentative)

February: Astrophotography

CONTENTS

- 4 President's Message
- 5 Mantrap Skies
- 6 Astrophotography
- 7 February Observing
- 8 Walkabout
- 13 From the Archives
- 14 Club Information



Buy the book! The Prairie Astronomy Club: Fifty Years of Amateur Astronomy.

Order online from [Amazon](https://www.amazon.com) or [lulu.com](https://www.lulu.com).

EVENTS



PAC Meeting
Tuesday January 28, 2020, 7:30pm
Program: How to Use Your Telescope

PAC Meeting
Tuesday February 25, 2020, 7:30pm
Program: Astrophotography (tentative)

PAC Meeting
Tuesday March 24, 2020, 7:30pm
Program: TBA

2020 STAR PARTY DATES



Photo by Brian Sivill

	Star Party Date	Star Party Date
January	Jan 17	Jan 24
February	Feb 14	Feb 21
March	Mar 13	Mar 20
April	Apr 17	Apr 24
May	May-15	May 22
June	Jun 12	Jun 19
July	Jul 10	Jul 17
NSP	July 19 - 24	
August	Aug 14	Aug 21
September	Sep 11	Sep 18
October	Oct 9	Oct 16
November	Nov 6	Nov 13
December	Dec 11	Dec 27

Dates in **BOLD** are closest to the New Moon.



PAC E-MAIL:

info@prairieastronomyclub.org

PAC-LIST:

Subscribe through [GoogleGroups](#).
To post messages to the list, send
to the address:

pac-list@googlegroups.com

ADDRESS

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c/o The Prairie Astronomy Club, Inc.
P.O. Box 5585
Lincoln, NE 68505-0585

WEBSITES

- www.prairieastronomyclub.org
- <https://nightsky.jpl.nasa.gov>
- www.hydeobservatory.info
- www.nebraskastarparty.org
- www.OmahaAstro.com
- Panhandleastronomyclub.com
- www.universetoday.com/
- www.planetary.org/home/
- <http://www.darksky.org/>



Night Sky Network

The President's Message

Bob Kacvinsky

Welcome to the New Year.

2020 will be a big Astronomical Year with several highlights throughout the year.

1. There will be 4 Super moons in a row from Feb through May.
2. On Feb 18 the moon occults Mars just before sunrise
3. Meteor showers should be good this year. Lyrids Apr 22-23; Eta Aquarids in May; Perseids August 12-13th during new moon and Genimids on a moonless night Dec 13-14
4. Lunar eclipse will be on the Fourth of July
5. A unique Blue Moon on Halloween night Oct 31st
6. Lastly a super conjunction of Jupiter and Saturn on Dec 21st

We will likely have several requests to participate in several of these highlights with the public.

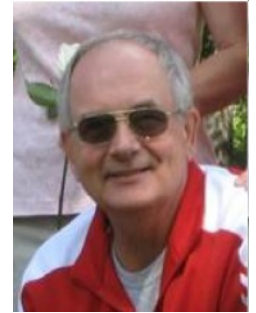
Our first big event will be the "How To Use Your New Telescope" program during the January 28th meeting. There will be a brief presentation to cover some general directions and then we can break up into teams to help our special guests during the night. We will also set up a couple different types of telescopes for those who attend that are still interested in getting a telescope.

2020 promises to be a great year for observing and PAC activities. After a rather overcast 2019 I am looking forward to getting out and observe with everyone. We will continue to

have our first PAC Star party at the Branched Oak Observatory on the cement slab

and the second Star Party at the Farm if weather permits. Jim will send out reminders to let you know where we will all meet. The December Star party at Branched Oak turned out to be a good night with 5 telescopes set up. Thanks to all who attended.

Please let me or any of your PAC Board know if you have any suggestions or ideas on how to improve our Club.



Herschel 400 Observing Program

Jim Kvasnicka

Amateur astronomers have enjoyed the challenge and excitement provided by the 110 objects in the Messier Program for many years. After completing the program, however, most were left in a void. They wanted to further their quest for deep-sky objects, but there was no organized program that provided the next step. With that in mind the Herschel 400 Program was started.

The New General Catalog (NGC) contained almost 8,000 objects of which 2,477 were observed by William Herschel. After considerable study 400 of the objects were selected to comprise the Herschel 400

Program. All the objects they say can be seen through a 6 inch telescope. Having completed the Herschel 400 Program it was difficult at times to find objects with my 10 inch telescope. Some of the objects require dark skies and excellent seeing conditions. A list of the 400 objects in the Herschel 400 Program can be downloaded from the Astronomical League website.

The Herschel 400 Program is meant to be an advanced program for observers who already have a fair degree of experience. Anyone starting out should do the Messier Program first before attempting the Herschel 400 Program.

When you complete the Herschel 400 Observing Program you will need to submit a copy of your observing logs to me for review. If your logs are accurate and complete I will submit your name to the Herschel 400 Observing Program chair for approval. The chair will mail to me your certificate and pin which I will present to you at the next monthly PAC meeting.

If you have any questions regarding the Herschel 400 Observing Program or any other observing program, or need help getting started please contact me and I will be glad to help.

Rick Johnson, a founding member of the Prairie Astronomy Club, passed away in January, 2019. His legacy lives on through his comprehensive catalog of over 1600 images at www.mantrapskies.com.

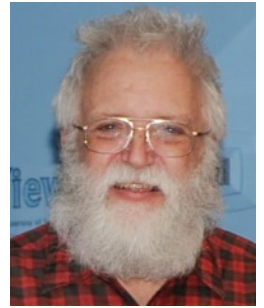
Arp 15 (NGC 7393) is classed as an SB(rs)C pec spiral galaxy. Pec means peculiar in that it certainly isn't a normal galaxy. It also has a ring structure. In this case, the ring is broken and partly made of enormous blue star clusters. Arp classified it under the heading of "spiral galaxies with detached segments". This appears to apply to the star clusters in the broken ring. Obviously, this

galaxy has interacted with another but where is it? Possibly it is due to something it ate leaving only it's distorted shape behind. I found little in the literature about this one. It is about 156 million light-years away based on redshift data.

You can see a shot of it by Arp with the 200" Palomar telescope at <http://ned.ipac.caltech.edu/level5/Arp/Figures/arp15.gif> A bigger

version that shows no more detail is at

http://ned.ipac.caltech.edu/level5/Arp/Figures/big_arp15.jpeg. Notice either shows more detail than in my shot. This is because seeing at Palomar was better than at my location -- not necessarily because their scope cost millions of dollars more than



mine. Seeing refers to how steady the atmosphere is both in the short term and long term. Long term meaning a second or so while short term meaning a few thousands of a second. The first moves the image around on the camera's sensor while the latter blurs it by forming many sharp images of the object all on top of one another each with a different center point. In any case, if you look up at the sky and see the stars twinkling seeing (slow type) is bad. If it isn't twinkling but a scope still can't form an image that's clear then fast seeing is bad. In most

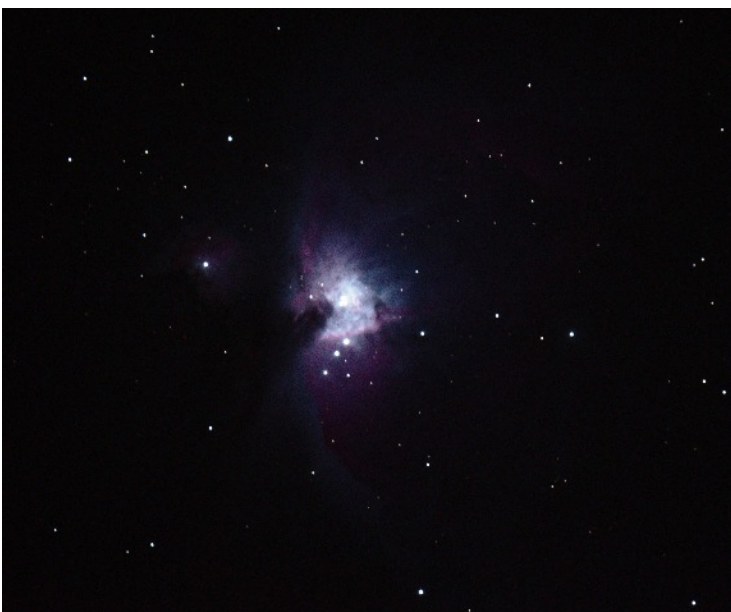
cases, you get both at once. Observatories are located in areas of what is called "laminar air flow". Often this is a mountaintop but doesn't have to be. Irregularities in the air cause bad seeing and laminar air flow evens these out (so does smog!) greatly improving seeing. Such air flow is not seen at my location, however. In any case, both types of seeing were very bad when this image was taken so the stars look fuzzy and detail in the galaxy is lost. Reproduced at 0.75" per pixel rather than my normal 1" per pixel (it was taken at 0.5" per pixel), it still looks

very out of focus. Thanks to the atmosphere that night it is. It was discovered by William Herschel on October 5, 1785 but isn't in either Herschel 400 observing program.

Astrophotography



Taken at the PAC Star Party in June while shooting a sequence of photos for star trails. 30 second exposure. - Jim White



A 15 second exposure of the Orion Nebulae taken at the December PAC Star Party at Branched Oak Observatory. - Jim White

This is a partial list of objects visible for the upcoming month.

Planets

Venus: Shines at -4.3 magnitude 41° above the horizon at sunset.

Mercury: Lower than Venus at sunset 10° above the WSW horizon.

Neptune and Uranus: See the September issue of Sky & Telescope for finder charts.

Mars: Rises three hours before the Sun. On February 18th there will be an occultation of Mars by the Moon.

Jupiter: By the end of February Jupiter will rise 2½ hours before the Sun.

Saturn: Rises two hours before the Sun.

Messier List

M1: The Crab Nebula in Taurus.

M35: Open cluster in Gemini.

M36/M37/M38: Open clusters in Auriga.

M42: The Orion Nebula

M43: Emission nebula just north of M42.

M45: The Pleiades.

M78: Emission nebula in Orion.

M79: Class V globular cluster in Lepus.

Last Month: M33, M34, M52, M74, M76, M77, M103

Next Month: M41, M44, M46, M47, M48, M50, M67, M81, M82, M93

NGC and other Deep Sky Objects

NGC 1964: Galaxy in Lepus.

NGC 2244: Open cluster embedded in the Rosette Nebula in Monoceros.

NGC 2264: The Christmas Tree cluster in Monoceros.

NGC 2301: Open cluster in Monoceros.

NGC 2362: The Tau Canis Majoris Cluster.

NGC 2392: The Eskimo Nebula in Gemini.

NGC 2403: Galaxy in Camelopardalis.



Double Star Program List

32 Eridani: Yellow and white stars.

55 Eridani: Yellow and pale yellow pair.

Gamma Leporis: Pair of yellow stars.

Epsilon Monocerotis: White primary with a pale yellow secondary.

Beta Monocerotis: Three bluish white stars.

Kappa Puppis: Equal pair of white stars.

Alpha Ursa Minoris: Polaris, yellow-white and white stars.

N Hydrae: Equal yellow stars.

Challenge Object

NGC 2158: Dim open cluster just SW of M35 in Gemini.

“On Walkabout” in Arizona

Dr. Chad Tolly

I had the wonderful opportunity to go “on walkabout” this October and November to Arizona, spending a total of 24 days on the road. Knowing I wanted to attend

Arizona Dark Sky Star Party: ADSSP #1.

The ADSSP took place at Kartchner Caverns State Park, just south of Benson, AZ which is

meter Sunday night of NSP #26 on “dob row”). Only sky glow from nearby towns of Whetstone, Huachuca City and Sierra Vista complicate the



the first David H. Levy Arizona Dark Sky Star Party from October 23-27, and also the Annual General Meeting of the International Dark-Sky Association (IDA) in Tucson, AZ on November 8-9, I started to research plane flights and hotels and rental cars for two trips. To heck with that! Ultimately, I decided to go “on walkabout.” It has various definitions and was made famous by Crocodile Dundee, but infers temporary mobility. I loaded up the truck and just went. Staying with friends and in hotels and State Parks as needed on the way through Nebraska, Colorado, New Mexico and Arizona. The first book-end was the inaugural David H. Levy

about an hour east of Tucson, from October 23-27. Kartchner was designated as an International Dark-Sky Park in 2017 by the IDA. (Chant Merritt! Merritt! Merritt! Merritt!) Nestled up to the eastern slope of the Whetstone Mountains of Coronado National Forest provides great shielding from sky glow from Phoenix, and especially Tucson. Desert dry and cool night conditions make it great for viewing. We were also blessed with five perfect viewing nights. Send some of that luck up to the NSP will you! I consistently got 21.50 on my sky quality meter (continually amazed at our Sandhills dark skies, we measured 22.05 on the same

viewing. Along with David Levy, the speakers were Mike Weasner, Bob Garfinkle, Jack Newton, Robert Vice, Ed Guenther, Fred Espanak and Robert Vice. Scott Roberts of Explore Scientific, and Kent Marts were the hosts. The viewing areas were well demarcated and numerous. Like lack of electricity available at the observing site, one of the kinks I’m sure the committee will work out in future parties is how vehicles can come and go at will and disrupt night vision no matter how conscientious the driver. They need an “early bird” spot. The party was well run for a first party, yet made me truly appreciate how well



our Nebraska Star Party is run. Be sure to thank our NSP board of directors the next time you see them!

The overall site of Kartchner Caverns State Park is very accomodating as far as facilities, making a frequent NSP attendee jealous for sure! Bathrooms and a Cafe as part of the main facility are available as part of the main attraction of the caverns themselves, which are a day attraction for a star party. It also includes a nice outdoor amphitheater and an indoor auditorium for gatherings and speakers. Plenty of electrical and primitive camping as well as four cabins that sleep. Nice shower and bath facilities are well maintained.

Party attendees were also able to sign up for field trips. One a VIP tour of nearby Kitt Peak, another

to join a star party at Quail Creek that is held next to an athletic field to display how well modern IDA approved lighting can work. Birding is another theme.

The main thrill of the party for me was meeting and interacting with David Levy. He is, among many others, co-discoverer of Shoemaker-Levy 9, a comet which afforded our species a view, for the first time, of an astronomical collision. One day, sitting and chatting with David in the amphitheater after an evening pre-viewing gathering, people started to filter out and he looked at me and said "I have to go get ready for viewing." I'd seen that look many times before. In friends that hunt, when it is time to hunt. Golfing buddies when messing around time is over and its time to get to serious golf. In my own Dad, taking his young son to his dental practice, when it was time

to go to work. Something in their eyes change, and you can feel their new focus. I saw that look in David's eyes. The first night observing, my sight by chance ended up right next to David's (I'm not kidding!). I stopped for one of those moments in time and said to myself, I'm stargazing next to David Levy. Another night observing, a question popped into my head: "What year did Shoemaker-Levy 9 collide with Jupiter?" I blurted out to David. "It doesn't seem that long ago." I was surprised to learn it was 1994! David replied "I know someone who might know!" A thoughtful, magnanimous and funny man, as well as giving a terrific speaker presentation. The ADSSP is a limited engagement capped at 50 people, but well worth the admission fee of \$175.00. Next



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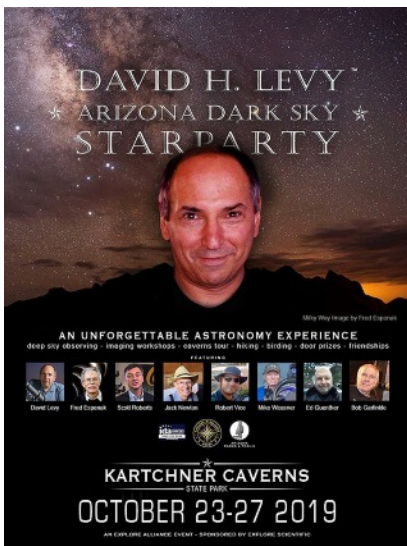


year's date has been set and moved from October to May 20-24th, 2020, in order to keep the Kartchner Caverns facility. So start planning now if you are interested in this highly recommend star party.

In the interim, I played three rounds of golf, making a great new golfing buddy (Jim Howie of Mesa, AZ~three Sandy's!), became a life member of the

Southern Arizonans for Nebraska, attending two Husker watch parties—both of which the Huskers lost (they probably don't want me back!), and thoroughly explored the areas north and south of Tucson as well as Tucson proper. Cities like Green Valley, Oracle and Oro Valley, golf courses like San Ignacio and El Conquistador. And Catalina, Oracle, Patagonia and Picacho Peak State Parks.

The highlight of the interim was visiting my new astronomy buddy Mike Weasner, whom I had met at the ADSSP, at his home and observatory in Oracle, which is north of Tucson, "up the hill" toward Mt. Lemmon. Mike and I hit it off immediately because we are both Advocates for the IDA, and knew we would see each other again in a few days at the IDA AGM. Not everyone you



golf with becomes a golfing buddy, just like not everyone you meet in astronomy becomes an astronomy buddy. If you ever get to meet Mike, you will gain an astronomy buddy. He graciously greeted me, and showed me the ultimate “man cave” in his home and his observatory, Cassiopeia Observatory.

The second book-end was the Annual General Meeting of The International Dark-Sky Association, held in Tucson this year, which is also the home of the IDA. I was able to tour the home office and meet the awesome staff, as well as participate in our monthly IDA advocates meeting on site, with Ax (Bettymaya Foott’s dog) no

less! Next year’s meeting is in San Antonio. The IDA was founded in 1988 and is dedicated to protecting the night skies for present and future generations.

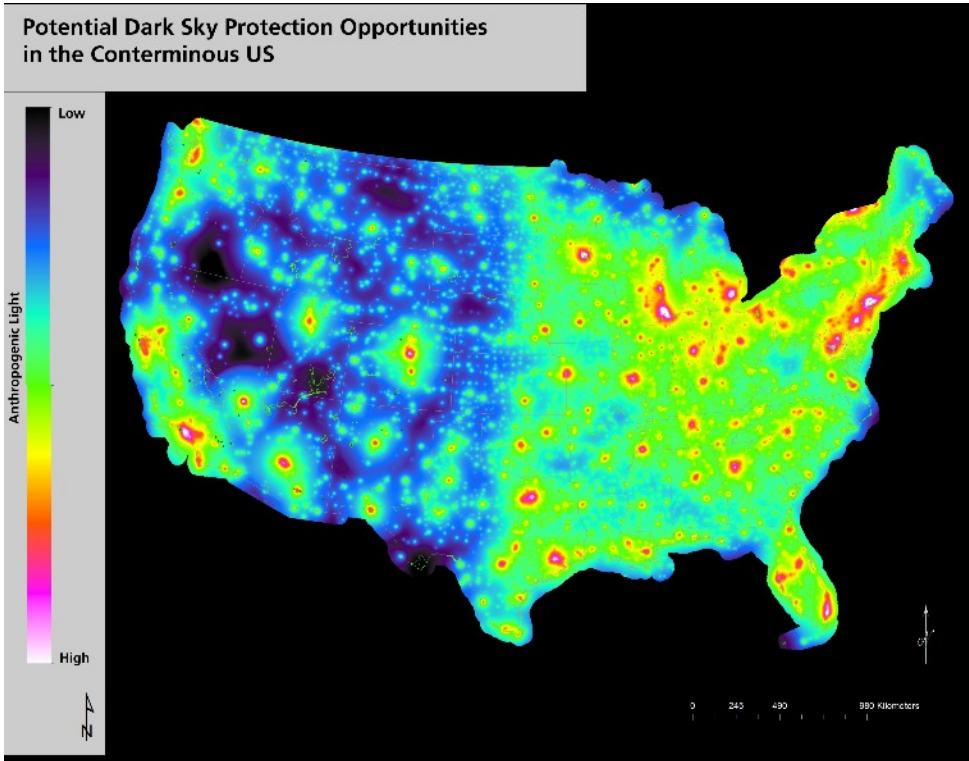
This rendering using anthropogenic light was compiled by the National Parks service about a dozen years ago to identify spots for



potential dark sky preservation. The Parks service eventually settled on preserving the Colorado Plateau region. Note, our Sand Hills region is the eastern-most dark sky bastion. Let's keep it that way! Help us

preserve our Sand Hills' dark skies by joining the IDA. An annual membership is \$35 per year, and the IDA is a 501(c)(3) organization so memberships and donations are fully deductible. In the near future there will also be a

Nebraska chapter of the IDA. Our current focus is the application for designation of International Dark-Sky Park status for Merritt Reservoir SRA, in the heart of the Sand Hills.



This article from 1968 did not have a byline. It's possible that it was written by Rick Johnson.

Even after fifty two years it still contains some useful tips, but it also shows just how far the hobby of astrophotography has evolved.

Astrophotography: Part 1: Stellar Photography Without a Telescope

Scott asked me to write something for the newsletter so I decided to write on what I know the most about, astrophotography. It is impossible to tailor this article to the needs of all potential astrophotographers, as the equipment available to each individual varies widely. I will try and start simply giving some basic techniques which can be the foundation to a successful and enjoyable branch of our basic hobby of astronomy.

Basics are even a problem as there are several basic methods available and they again vary with equipment and personal taste of the photographer. If anyone has ideas that I have not thought of, and there may be many, they should send them in to Scott so they too may be published in the newsletter. I hope that this can develop into a comprehensive guide to astrophotography including knowledge gained by all members who have attempted both successfully and unsuccessfully to take pictures of the heavens.

Obviously the easiest type of astrophotography is a picture of star trails. All this takes is any camera held steady by a tripod, wood blocks, or even rubber bands. If the lens opening is variable, use about f/5.6 on Plus-X film if taking from in town. If you can get out of town, open the lens up all the way. The biggest problem is keeping the shutter open on simple cameras with only a bulb (B) setting as the shutter stays open only as long as the shutter release button is held down. If the camera has a provision for a cable release, buy a locking release. These can be locked so as to hold the release button down. If no such provision exists, try a rubber band, string, or anything you can think of to hold the button down without jarring the camera. The shutter should be left open for at least an hour or all night if possible. Try all areas of the sky. Try a shot at the celestial equator - notice that north of it the trails curve one way and below it, the opposite way, while at the middle, they are straight. If your camera will take color transparencies, try it, it is very colorful. Color prints lose much of the color so stick to the transparencies. If you can put a wide angle lens in the camera, try this and point it so the North Star is to one edge. Expose for several hours. The picture will give the illusion of a tunnel. The next step is to stop the trailing so the constellations may be photographed. Without a drive this requires a camera with a fast lens. Also, fast film is

necessary. An exposure of 18 seconds is the minimum before trailing becomes noticeable. Open the lens all the way and again be sure the camera does not move during the exposure. I have found that most constellations can be picked up this way using Tri-X film and an F-ratio of 1.9. A Polaroid camera will work fine with black and white film. But develop the film for at least 30 seconds instead of the recommended 10-15 seconds. This will greatly increase the contrast between the stars and the sky. Polaroids with electric eyes require the release button to be held down to keep the shutter open. I have found a large rubber band works fine for this purpose. The Polaroid color film is useless for astrophotography as it will not pick up a star in an hour long exposure.

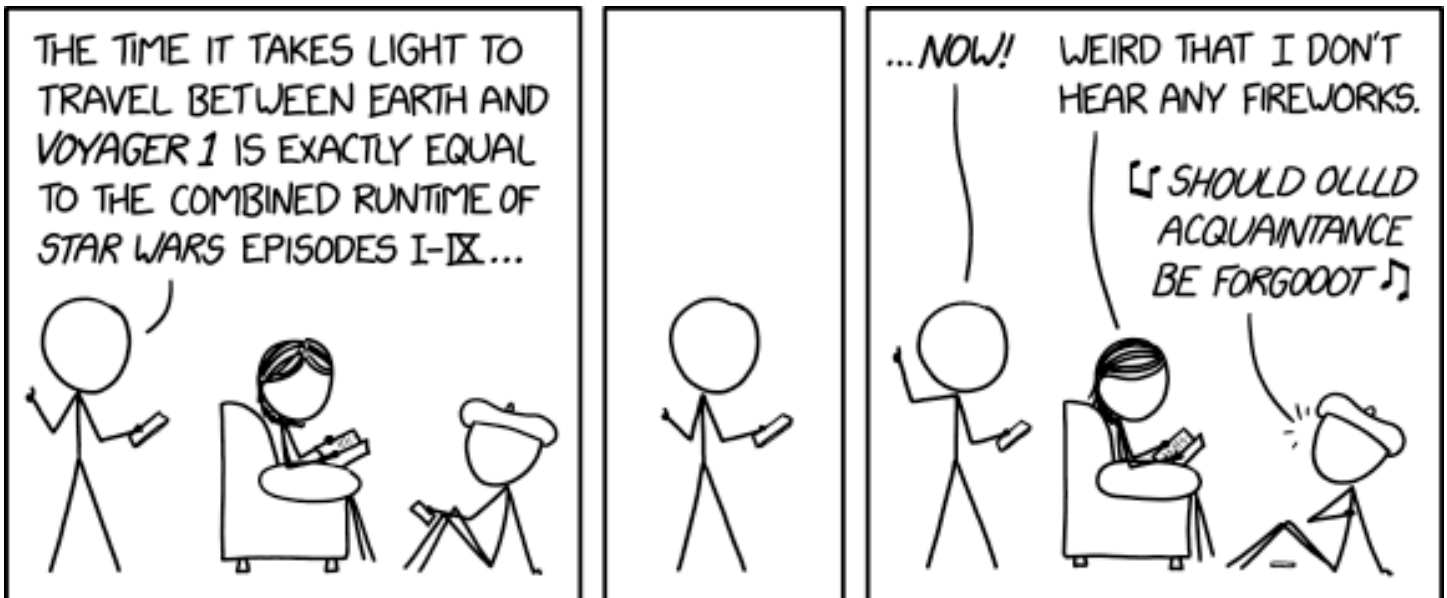
While it is possible to pick up most naked eye stars using this method, there is such a vast distance between them that an average of only about fifteen stars will be picked up in the small area covered by the camera. Much more spectacular pictures can be taken if the camera tracks the stars across the sky. Those of you who use equatorial mounts with clock drives have a distinct advantage here. Rig up some method of rigidly attaching the camera to the mounting or telescope tube itself. As long as a telephoto lens is not used, the mount

need only be roughly aligned on the pole. Unguided exposures of up to ten minutes are possible this way. Using Tri-X film and a lens opening of around $f/2$, a limiting magnitude of about 10 can be reached. If it is impossible to get out into the country and away from the city lights the lens will have to be stopped down as sky fog will ruin the picture. Actually when the lens is stopped-down it has a surprisingly small effect on the stars, but will greatly decrease the brightness of extended objects such as nebulae and even sky fog. Also the star images will be much sharper if the lens is stopped down about three F stops from its widest opening.

If it is possible to set up out of town, longer exposures are

possible. Because the star images spread on the film, drive inaccuracies will not show but faint stars will be lost. Thus for best results and all exposures over 10 minutes, the mount should be set up very accurately and/or manual corrections should be made. The making of manual corrections of this type are easy to make if you have a telescope on the mount. Just put a high power and dirty eyepiece in the telescope and point it so the star appears as a round blob of light. Center the blob over the shadow image of a dust particle on the eyepiece, now whenever the blob moves off the shadow image, move the telescope tube until the star is recentered. This method will work quite well with lenses of up to 250mm focal length. For

longer focal lengths, a cross-hair eyepiece will be necessary. Again be sure to try color transparencies if at all possible. I have found that out of all the brands that I have tried, High Speed Ektachrome is by far the best for general purpose work. Kodachrome X is better for exposures longer than thirty minutes in warm weather Also it has better contrast and somewhat stronger color though generally slower than High Speed Ektachrome. My experience with Ansachrome 500 indicates that it is much faster on short exposures but has little color and the sky is not very black.



xkcd.com

CLUB MEMBERSHIP INFO

REGULAR MEMBER - \$30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - \$35.00 per year. Same as regular member except gets 2 votes at club meetings.

STUDENT MEMBER - \$10.00 per year with volunteer requirement.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

CLUB TELESCOPES

To check out one of the club telescopes, please contact a club officer. Scopes can be checked out at a regular club meeting and kept for one month. Checkout can be extended for another month if there are no other requests for the telescope, but you must notify a club officer in advance.

100mm Orion refractor: Available
10 inch Meade Starfinder Dobsonian: Available
13 inch Truss Dobsonian: Needs repair
10 inch Zhumell: Needs mount

CLUB APPAREL



Order club apparel from cafepress.com:



Shop through Amazon Smile to automatically donate to PAC:



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