



East Valley

Astronomy Club

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January

Newsletter

1992

EDITOR'S NOTES

Its hard to predict the weather, but as I sit here with computer keyboard in hand, I just noticed its stopped raining! So here goes!

1992 will be a wetter year - now you can decide when it will be wetter. Will it be on new moon dates or full moon dates, that is the question! Just be sure to take advantage of good weather when ever its available.

Below are the dates for the business meetings through May 1992. Please note the room change for this semester will be to Room PS 172 which is the building north of the Behavioral Science building :

EVAC BUSINESS MEETINGS

January 22
February 19
March 18
April 22
May 20

Ted Heckens will be working hard to provide interesting and informative speakers for these meetings and January's meeting should be a great start. You can read about last month's speaker and the coming speaker in Roy Halverson's column each month. He will be keeping us posted on EVAC news. If you have anything to add be sure to contact him at the above phone number.

MARK YOUR CALENDAR

EVAC BUSINESS MEETINGS

January 22- SCC RoomPS 172
Guest Speaker -Stan Student

DEEP SKY STAR PARTIES

January 4 - Deep Sky (see map page 2)

February 1 - Deep Sky

LOCAL STAR PARTIES

January 25 - Goldfield Site

February 22 - Goldfield Site

EVAC NEWS

by Roy Halverson

Inventor Finds Market for Telescope Accessories

Never was the old adage "necessity is the mother of invention" better exemplified than through the work of Jeff Charles, who described the evolution of his telescope accessories at the December meeting of EVAC.

Frustrated by his need for a wide variety of telescope accessories, Charles devised a series of devices for his own use, then found a ready commercial market for them.

Charles said his inventions basically followed his need for astronomical tools unavailable from equipment manufacturers.

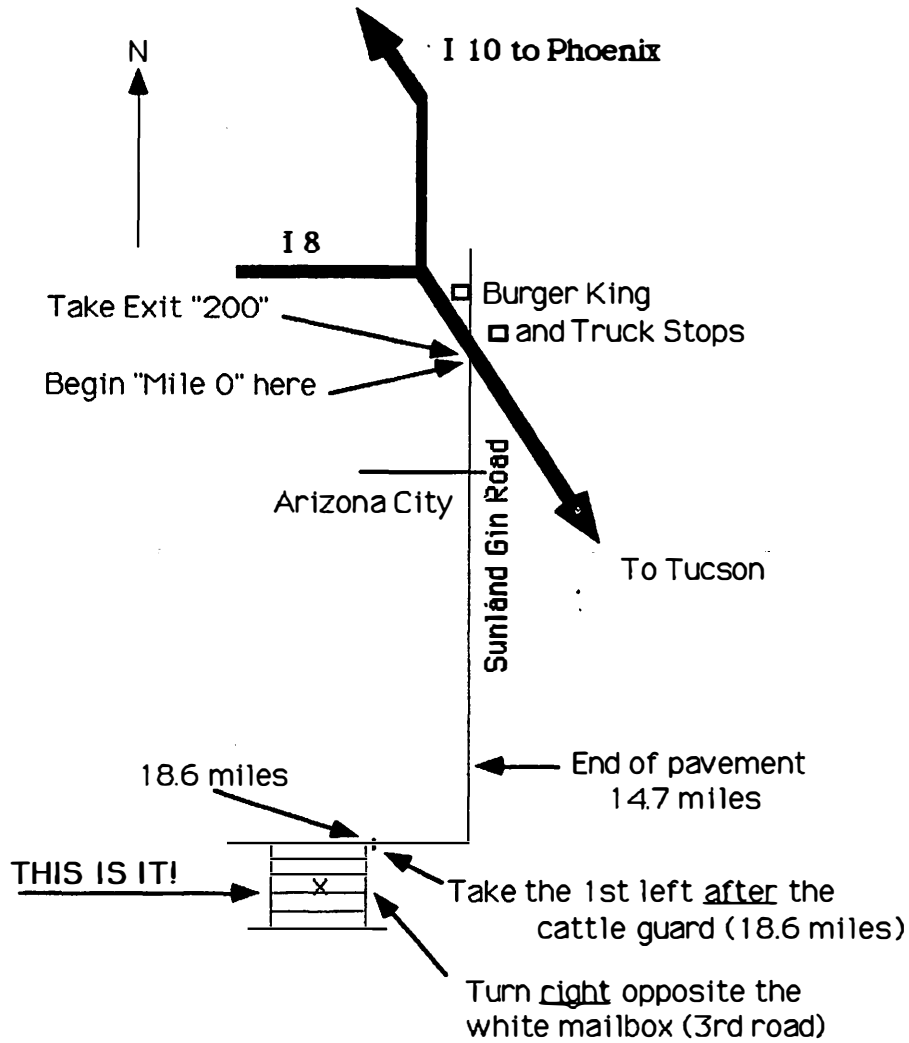
One of his first successes involved solving the problem of focusing an astronomical telescope through a camera viewfinder. An eyepiece holder-camera adaptor with a flip mirror solved that one.

He described his development a single multiple-function attachment that incorporates an eyepiece holder, a camera adaptor, and an off-axis guider. It also accepts CCD cameras. Other devices include a manual shutter, a Barlow lens and a telecompressor.

They are compact and are attached to a telescope in place of the traditional star diagonal.

Charles said he is a self-taught machinist who was unhappy with the crude tolerances of machine work offered at some local shops. His finely designed and machined telescope accessories show superb craftsmanship.

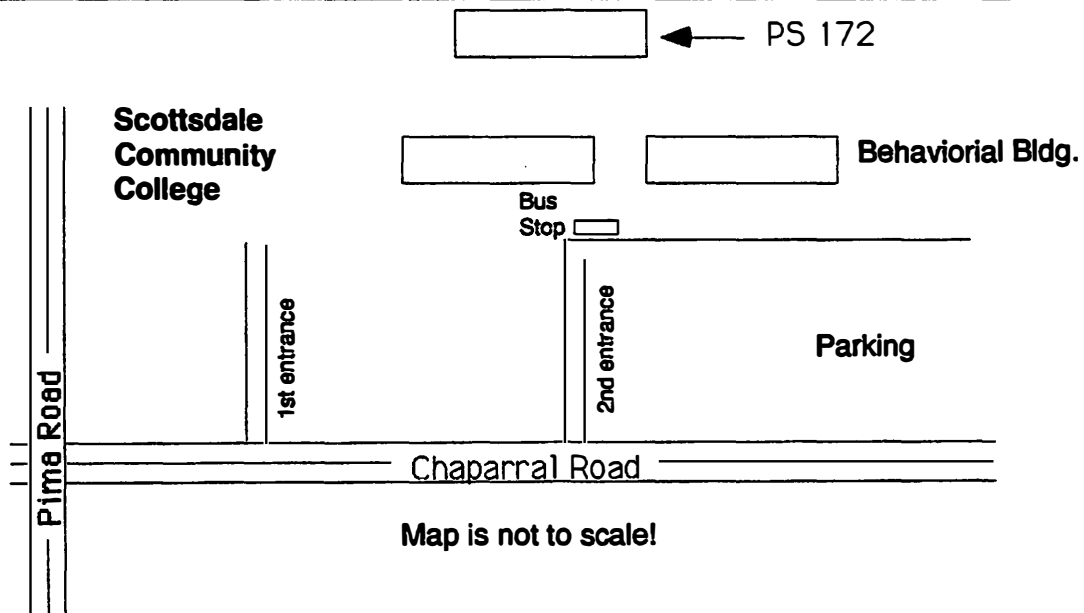
At the January meeting, Stan Student will describe planning and construction of a backyard astronomical observatory.



Believe it or not, they named the street opposite the white mailbox:
MOON CHILD!!

FEBRUARY 1st

Call Bob Kelley four hours prior to departure for final information and directions! 451-7319.



Map is not to scale!

PS 172
left at water tank
Abma School

Photographing the Earth's
Nearest Neighbor—the MOON
by Tom Martinez
Astronomical Society of Kansas City

Have you ever wanted to take pictures of that gorgeous Full Moon, just rising over the horizon? Or possibly a beautiful thin crescent Moon sitting next to a bright planet such as Venus? How about taking a close up of the Moon's features, using either a telephoto or a telescope? These kind of pictures are fairly easy to do. Some require only a minimal amount of equipment, while others take quite a bit to set up.

Assuming you have never taken a picture of the Moon, or have tried and failed, here are some procedures that you can try the next time the Moon beckons your camera out of its bag.

First, we need to establish the kind of camera you need. Most 35mm cameras are capable of doing everything described here. As long as you can set the shutter speed manually you should be okay. If your camera is totally automatic exposure you may be out of luck. The problem with an automatic camera is that its metering system is always trying to make every picture into a normal daylight exposure. Darkness around the Moon fools the meter, and you will never get a good shot.

Okay, let's start with a common mistake. You see that fat Moon high in the sky, so you set up your camera on your tripod and click off a few shots, exposing for a few seconds to possibly up to a few minutes (after all, you think, it's dark outside and you are sure you need long exposures). After having the pictures processed you find that what you have is a featureless blob surrounded by darkness. What happened to the bright and dark features you could see even without optical aid. Well, I think you will understand what happened when you realize that sunlight falls on the Moon just as much as it does on the Earth, therefore, to shoot detail on the Moon, daylight exposures are what is needed.

USING WIDE ANGLE, NORMAL & SMALL TELEPHOTO LENSES

The Moon can be shot with just about any kind of lens you can think of, but you have to realize they all will show the Moon differently. Lets take the the normal lens that usually comes with your 35mm camera, a 50mm lens, and show you another fact-image size. The size of the image of the Moon on film depends on the focal length of the lens, as expressed by the formula:

FORMULA 1

Image Size (on film) = Focal Length/110
 where the focal length is expressed in the same units as the image size (normally millimeters).

So, with a 50mm lens, the image of the Moon on the film will be $50/110 = .45$, or about 1/2 millimeter in diameter. Now, when you see that the width on a frame of 35mm film is 24mm, the .5mm Moon image is very small indeed. Even if you enlarge the image 15X (about the equivalent of a 16X20 inch print from a 35mm negative) the image size on the print is only 1/4 inch in diameter. If you want to see detail on the Moon, the image size of the Moon needs to be increased.

Table 1 shows size of the Moon image using various focal lengths and the size of the Moon when enlarged 15 times:

TABLE 1			
Focal Length	Image Size	15X Enlargement	
mm	mm	mm	inches
28	0.25	3.8	1/8
50	0.45	6.8	1/4
100	0.91	14	1/2
200	1.8	27	1
300	2.7	41	1 5/8
400	3.6	54	2 1/8
500	4.5	68	2 5/8
600	5.4	81	3 1/8
800	7.3	109	4 1/4
1000	9.1	136	5 3/8
1500	13.6	205	8
2000	18.2	273	10 3/4

ASTRO NEWS cont'd

As you can see, if you want detail to show up on your photograph of the Moon, you will need at least a 300mm to 400mm lens, preferably longer. But, lets see what you can do with smaller focal length lenses.

A normal, wide angle, and small telephoto lens pretty much establishes that the pictures you shoot of the Moon will have to include foreground objects to make a pleasing picture. Look for trees, houses, cityscapes, mountains, etc. Foreground objects are dark in this kind of scenes, so exposures have to be longer than you would normally shoot the Moon by itself. This will wash out any detail on the Moon, but the image is so tiny anyway, it doesn't matter. What you are after is a night scene showing the Moon as either a minor detail, or showing its passage near bright stars or planets.

For Moon landscapes, it is best to use fast film, at least ISO 100, but preferably ISO 200 or 400. You really don't need faster film than this, besides, faster film means a grainy looking image. Exposures will depend on the focal length of your lens. Here are some starting exposures:

Focal Length	Exposure
28mm	10 - 30 seconds
50mm	14 seconds
100mm	7 seconds
200mm	4 seconds

As you can see, the longer focal length exposure are shorter. If you shoot exposures longer than this, the Moon and stars will start to trail on the picture because of the Earth's rotation. The higher magnification will emphasize it even more.

Always use a tripod, or some way of holding you camera steady (a pillow on top of a fence post). Use a cable release to prevent camera vibration. Stop down the camera lens at least 2 stops from wide open. Using most lenses wide open will give you gull wing images of stars and street lights around the edges of the picture. Stopping down will diminish this. Take off any

ASTRO NEWS cont'd

filter you may have on the lens (bright objects like the Moon and street lights will show ghost images, even if you don't see them in the viewfinder.

The best time to shoot a night landscape is either shortly after sunset, or before sunrise. During twilight, the sky turns a royal blue that is emphasized by film, and there is enough sky glow to show trees or buildings silhouetted against the horizon.

Look for situations where the Moon is a thin crescent next to some bright planets or stars. You can check out the SKYWATCH feature here on the Astronomy Features section for up-coming events. That usually places the Moon near the horizon. That's not to say that full Moon shots are not bad, but thin crescents, with some earthshine on the dark side of the Moon is always a beautiful sight.

USING LONG TELEPHOTOS & TELESCOPES

As you can see in Table 2, the longer the focal length is, the shorter your exposures must be to keep the Moon from blurring on the picture due to the Earth's movement. But, remember that the Moon is basically a daylight object, and short exposures are required. Table 3 details the exposures to use depending on the speed of the film and the f/ratio on your lens or telescope:

F/RATIO	ISO	FULL	GIBBOUS	QUARTER	CRESCENT	THIN
f/5.6	25	1/125	1/60	1/30	1/15	1/8
	64	1/250	1/125	1/60	1/30	1/15
	100	1/500	1/250	1/125	1/60	1/30
	200	1/1000	1/500	1/250	1/125	1/60
f/11	25	1/30	1/15	1/8	1/4	1/2
	64	1/60	1/30	1/15	1/8	1/4
	100	1/125	1/60	1/30	1/15	1/8
	200	1/250	1/125	1/60	1/30	1/15

Here is an important formula that you should keep in mind while shooting with long telephotos and telescopes:

FORMULA 2

$$700/f1 = \text{LONGEST EXPOSURE FOR NO STAR TRAILS}$$

where f1 is equal to the focal length of lens

Now you know why the exposures were chosen for the various focal lengths in Table 2. If you are using a telescope with a focal length of 1000mm, the longest exposure to assure no movement of the Moon is about .7 second, or on a camera shutter speed, about 1 second. So as long as you keep your exposures faster than the formula states the movement of the Earth will be no factor, however, another factor is just as important, and that is movement by vibration. A long telephoto requires a sturdy tripod, and a cable release so that the camera is not shaken during the exposure.

ASTROPHOTOGRAPHY TIPS FROM KIM ZUSSMAN

BY JASON WARE

Readers of Astronomy, Sky & Telescope, and Deep Sky magazines have probably seen the name Kim Zussman. He is a California Astrophotographer who's photos appear in almost every issue of these magazines. I have written a few letters to Kim and would like to share a few of his words with you. Kim now exclusively uses hypered 2415 for astrophotography. One of its advantages is the large dynamic range (about 1:10000) which allows long exposures without saturation of the emulsion. He typically takes pictures two or three hours in duration. Sky-limited exposures generally require a background density (sky fog but not hyper or developer fog) of 0.8-1.0. From his location sky fog builds up at about 0.1 density unit/hour at F/10. This means that he would need to go 8 to 10 hours to reach this density!

Kim uses a C11 prime focus at F/10. He does not use tele-compressors because of the added field curvature and aberrations they cause. I tend to agree with him. He has a Shaeffer mount with a 10.3" Byers gear which is accurate enough to let him occasionally look away from the eyepiece during long exposures. I have found that my Meade 8" LX5 is not accurate enough to do this and I must constantly look at the guide star. This leads to eye fatigue so I interrupt the exposure about every 30 minutes to take a break. Kim says he does all his exposures without breaks and his longest exposure so far is four hours. The longer the exposure the more can go wrong. One of the biggest problems is that commercial SCT's focus by moving the primary mirror. The mirror can shift during long exposures causing focus shifts. Kim says he focuses on a bright star very near the subject and makes his final adjustment by turning the knob counter-clockwise, this pushes the mirror toward the sky to take up any backlash in the screw so the mirror doesn't later shift. Another problem is as the telescope cools a focus shift can occur. I recently ran a test with my 8" in which I found that when the scope was moved from room temperature to about 45 degree air temperature outside the scope took over an hour and a half to stabilize! When you arrive at your observing sight get the scope out first and let it begin to cool as you set up. I sent Kim a couple of shots I did on Ektar 1000, M42 and M13. He said these objects have a wide dynamic range so they photograph well on low contrast color film. 2415 developed in D19 does not do well because of the high contrast. He said that using a low contrast developer like Technidol for 20 minutes at 68 degrees F. may work well although he has only tried it on shots of the moon. He is currently trying unsharp masking to print D19 processed negatives with large dynamic range.

I hope these hints will help those of you who are interested in astrophotography.

Reported by Michael Janes

The Deep Sky Notebook

by Robert Kerwin

The Clusters and Nebulae of Auriga

In the introduction to his Celestial Handbook, Robert Burnham, Jr. writes, "...the amateur astronomer has access at all times to the original objects of his study; the masterworks of the heavens belong to him as much as to the great observatories of the world. And there is no privilege like that of being allowed to stand in the presence of the original."

We have the privilege of seeing with our own eyes a universe filled with fascinating and beautiful things. In the coming months, I hope to share with you some of the "masterworks of the heavens" as well as some lesser known, but no less interesting objects. With the aid of a good star atlas, clear skies and a little patience, you should have no trouble finding most of the objects. This month we will be exploring Auriga.

The constellation Auriga is located north of Taurus and Gemini and is ranked 21st in area among the constellations. Auriga's brightest star, Capella, is actually a spectroscopic binary and has a total magnitude of 0.06. The Milky Way passes through the southwestern region of the constellation and clusters and nebulae abound.

A good starting point for our tour of Auriga is NGC 1883. Located less than two degrees east of Capella, this open cluster is not difficult despite its magnitude of 12.0. An 8-inch scope should show a faint, grainy patch of light. A much easier object is NGC 1664, located two degrees west of Epsilon near the Perseus border. This cluster is visible as a sprinkling of faint stars in a 60mm telescope. An 8-inch shows about 30 stars in a 15' circle, with a bright star on the southeast side.

Continuing southeast along the galactic equator, we encounter NGC 1857. This cluster can be found one degree south of Lambda or seven degrees south of Capella. The 8-inch shows four bright stars with numerous faint stars in a 10' area. Five degrees south is IC 405, the "Flaming Star Nebula," an emission nebula surrounding the variable star AE Aurigae. The 8-inch revealed large, faint wisps of nebulosity surrounding AE and some of the nearby stars. A dark sky and low magnification are essential for viewing this object. Interestingly, the star that illuminates the nebula (AE), appears to be a high-velocity star that has only recently entered the nebula.

Moving east, we encounter M38, a rich cluster that is beautiful in any size telescope. Over a hundred stars should be visible in moderate-size telescopes. After admiring M38 for a while, move your scope slightly south to the often-overlooked cluster NGC 1907. At low magnifications, you should be able to see both clusters in the same field. Use medium powers to bring out the cluster's 30 or so stars. Moving southeast one degree, we encounter NGC 1931, a reflection nebula. This nebula appears as a small, fairly bright glow surrounding a double star. This object is visible in my 60mm scope as a fuzzy star. Since this object has a fairly high surface brightness, it will stand considerable magnification (I used 180x on the 8-inch).

Just to the east of NGC 1931 is M36, a cluster containing about 50 stars in a 15' area. Our final object is one of the most spectacular clusters in the winter sky, M37. M37 is located about four degrees east-southeast of M36 and is visible to the unaided eye from a dark sky site. A 60mm telescope will show a cloud of faint stars. In an 8-inch, the cluster is fully resolved, with countless stars filling the field at low to moderate powers. The major portion of the cluster is approximately 30' across, but outlying stars make the cluster seem much larger. Before packing it in for the night, spend some extra time enjoying the view—it will be time well spent.

Auriga

Tirion chart 5
U2000 charts 40-42, 65-68, 96-100

Object	Type	Mag	Size	RA	Dec.
NGC 1883	oc	12.0p	2.5'	05 ^h 26 ^m	+46.7
NGC 1664	oc	7.6	13'	04 ^h 51 ^m	+43.7
NGC 1857	oc	7.0	6'	05 ^h 20 ^m	+39.3
IC 405	en	—	90'	05 ^h 16 ^m	+34.3
M38	oc	6.4	21'	05 ^h 29 ^m	+35.8
NGC 1907	oc	8.2	7'	05 ^h 28 ^m	+35.3
NGC 1931	rn	11.3	1'	05 ^h 31 ^m	+34.3
M36	oc	6.0	12'	05 ^h 36 ^m	+34.1
M37	oc	5.6	20'	05 ^h 52 ^m	+32.6

Hobbies: A creative use of leisure time

By Russ Larson

The term "leisure time" is often used synonymously with "non-working time." There is an important distinction between the two. "Leisure time" should be used to describe those few precious hours each day when you are free to do whatever you want to do. Responsibilities to family, church, community, and employer have been fulfilled for the day and there is still a small chunk of time left for your own use.

The first step toward enjoyment of leisure time is to recognize that it exists; and it does exist for the majority of Americans today. Whether you're conscious of it or not, you decide each day if you're going to use this precious time or waste it. There are many trivial activities which eat up leisure time if you don't decide how you're going to use it — another day not spent doing the things you really wanted to do.

Sadly, it must be noted that there are some Americans who do not make use of their leisure time. They become automatons routinely going to work each morning, putting in their eight hours, going home, watching TV, and then to bed; repeat, repeat, repeat.

There are also those compulsive workers who eliminate any chance of having leisure time by filling all their waking hours with work. Some "moonlight" on part-time jobs and some even manage to hold two full-time jobs. By constantly working, a person can avoid his responsibilities to family, church, and community. In our society, if a person is working he is excused from his inactivity in other areas. But the day is fast approaching when there won't be any jobs for the compulsive worker.

HOBBIES

A hobby is any voluntary activity which is consistently pursued during leisure time. Hobbies play an important role in the lives of many people.

As technology advances, more and more Americans spend their workdays at routine jobs. This is the age of the specialist. Within each spe-

cialty are sub-specialties, and in some fields the divisions go even further. To know everything imaginable about ball bearings, for instance, will enable a person to earn a good wage as a "ball-bearing expert." However, if his interests are limited solely to his speciality, he will be bored with life — and boring to those around him. A hobby can keep today's specialists interested in life and interesting to other people.

Technical advances have also created a group of professionals and executives whose work is very demanding of both their time and energy. Even though their time is limited, many of these busy men and women take up a hobby because they find the hobby activities to be a great way to unwind at the end of a hectic day.

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TYPES OF HOBBIES

Margaret E. Mulac in her book "Hobbies: the Creative Use of Leisure"*

categorizes hobbies into four classes: learning hobbies, making hobbies, doing hobbies, and collecting hobbies.

Learning hobbies—Studying astronomy, law, medicine, science, writing, foreign languages, history, Braille.

Making hobbies—Any of the arts and crafts such as woodworking, carving, photography, sketching, ceramics, jewelry, enameling, miniatures, weaving.

Doing hobbies—Reading, traveling, model railroading, scale modeling, playing games of all kinds, gardening, singing, playing a musical instrument, any of the nature hobbies such as bird watching, raising tropical fish or exotic birds or cats, walking, swimming, horseback riding, etc.

Collecting hobbies—Miniatures, rocks and minerals, coins, stamps, rare books, match folders, autographs, toy trains, collectibles.

*Published by Harper & Row, New York, N.Y.

Elowata → changes to Usasy Pass Rd

Dead ends ~~Bldg~~
near river

Alma Flood →