East Valley Astronomy Club

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Vice-President	Joe Murray	482-2918
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July *Newsletter* *1993*

EDITOR'S NOTE

President Ted is taking a well deserved break this month and I'd like to use this space to make a simple observation and a not so simple apology. Firstly, in many years of club involvement in one place and another, I've had the privilege of seeing officers work hard and long. But I have to admit that I've never seen one work harder or longer than our president. In the last few weeks, Ted has arranged for a full page newspaper article highlighting the club, has conducted a number of "Have Telescope, Will Travel" programs, has worked to put together another article for Arizona Highways magazine (!) and at the same time has managed to move his domicile and business to another house! Furthermore, this pretty much seems more or less normal for Ted. We can thank our lucky "stars" for a leader such as this.

As to the apology, let me preface it with this. I'm of the opinion that astronomy should be fun, and that the fun should be shared with others. As a writer, I often resort to articles that emphasize the fun or humor inherent in astronomy. A recent article, FEAR ON THE ROAD, was just such an attempt at a satirical look at prejudiced or chauvinistic amateurs. As you know, satire should be composed of caricature (which should be somewhat grotesque...watch your editorial pages in the local paper for cartoons of Ross Perot, to see what I mean) and the absurd. Apparently FEAR wasn't grotesque nor absurd enough and more than one reader felt offended by its content. Let me emphatically state that FEAR was written to poke fun at those individuals out of tune with modern reality, NOT in order to slam women. If you felt offended, please read the article once more, keeping in mind the above and accept my sincere and heartfelt apology. It is NEVER my intent to offend in the practice of astronomy (even owners of SCTs). I'm too busy having fun and enjoying the marvelous hobby of astronomy to waste my time attempting to harass (well, maybe just a little harassment, to the well-deserving) and trying to offend others of our astronomical leanings.

NEWS NOTES

Vice President Joe Murray has once again conjured up an exciting program for our monthly meeting. On July 7, Dr. Paul Scowen will present the program "How to Use Space Telescope and Recent Results" It promises to be an awesome update on this problematic (soon to be repaired?) telescope and observing program.

FOR SALE

8 inch Meade SC in top condition. Clock drive, finder scope with bracket, wedge and sturdy metal tripod. Includes 20mm and 7mm eyepieces and 2x Barlow. Comes with compact case and miniature red LED lights. Call Frank Jr. at 991-5105 for details.

12.5 inch Parks reflector with numerous accessories, massive equatorial mount and so on. For more information call Steve Schklair evenings at 946-4566.

11.5 inch F5.6 STARSTORM by M. Leon Knott. Call 461-1758 for information and to see/see through.

Will Trade...Nagler 12mm Type Two eyepiece for 9mm Nagler or Meade 8.8; Call Leon 461-1758.

MARK YOUR CALENDAR

EVAC BUSINESS MEETINGS

July 7 SCC Room PS 170, 7:30 p.m.

DEEP SKY STAR PARTIES

July 17 Florence Junction Site-see map at meeting

LOCAL STAR PARTIES

July 10 Florence Junction Site-see map at meeting

Call Ted Heckens 827-1524

Book Review: A Guide for Deep Sky Observers

by Robert Kerwin

Observing Handbook and Catalogue of Deep-Sky Objects, by Christian B. Luginbuhl and Brian A. Skiff (Cambridge University Press, 1989), 352 pages, hardbound, $49.50.

Deep sky observers can be likened to celestial adventurers who travel the universe in search of beautiful, awe-inspiring and unusual sights. Like our earthly counterparts who explore the awesome depths of the world-famous Grand Canyon or seek the solitude of the Sonoran desert, we astronomers look in wonder at the Orion Nebula or explore obscure galaxies in Grus. Terrestrial adventurers need three things to make their trip a success: reliable transportation, accurate maps and a guidebook that can help them get the most out of their trip. Similarly, celestial explorers also need three things to make their journey a success: a good telescope, accurate star maps and a guidebook to help them make the most of their time under dark, clear skies. One such book for deep sky observers is Luginbuhl and Skiff's *Observing Handbook and Catalogue of Deep-Sky Objects*.

This book is divided into two sections. The first section is the handbook which covers topics such as telescopes, eyepieces and observing techniques. This section also describes the telescopes used for the observations in the book and the sources used for the data. The second section is the catalogue, which features visual descriptions of over 2,000 deep sky objects through telescopes of various apertures.

The first section of the book is rather lean (13 pages), but still contains some solid, practical advice for observers. The discussion of telescopes and eyepieces is very general and lacks depth. In the discussion of eyepieces, for example, the authors attempt to recommend a set of eyepieces and introduce terms such as "high power" and "medium-high power," but then abruptly terminate the discussion with "The relative terms used here to describe magnifications are difficult to make specific." Even so, there is some good advice here. The authors caution against loading telescopes with gadgets, noting that these devices add more to the cost than to the usefulness of the telescope.

The discussions on the human eye and note-taking, on the other hand, are very good. The authors present a good basic description of how the eye functions under low-light levels, then apply this to techniques of observing with a telescope. The authors are firm believers in keeping notes. While it may be possible to remember many objects, especially the more spectacular ones, there are thousands of objects within the grasp of medium to large telescopes. Only by taking notes can one hope to keep track of the many objects and how they appear.

The second section contains visual descriptions of over 2,000 deep sky objects. The objects are arranged alphabetically by constellation. Each constellation begins with a brief description and the time of midnight culmination, useful information for planning an observing session. Within each constellation, objects are arranged by increasing NGC number, with other objects inserted in order of increasing right ascension. Each object description starts with a header that gives the object type, name, size and other pertinent data, such as magnitude, number of stars (open clusters), and surface brightness (galaxies). The descriptions themselves are concise yet complete. Each object is described as seen in a 6 cm, 15 cm, 25 cm and 30 cm telescope. The authors have deliberately avoided using superlatives such as "beautiful," and "spectacular," although a "marvelous!" did slip through in their description of M35. This may make the descriptions somewhat bland, but in a book of this type it is necessary. After all, the purpose of the descriptions is to accurately express the appearance of the objects, not to convey the authors' opinions. Throughout the descriptions are finder charts for crowded fields, drawings and photographic charts for finding the limiting magnitude for your telescope. At the end of the observation section is a table listing over 2800 objects, all the objects in the descriptions plus many more.

In summary, I recommend this book to those who are looking for a deep-sky guidebook that goes beyond the brightest and most famous objects. This is not really a book for the beginner, since it does not cover the basics of deep sky observing, such as choosing equipment and locating objects. One note of caution: use this and other observing guides carefully. Using a compilation of descriptions such as Luginbuhl and Skiff's to plan your observing session is fine, but if you study the published descriptions too closely before you go out to observe, you may bias your own observations. Not only might you "see" detail that is really not visible, you may pass over an object, thinking it is featureless, when in fact more careful observation reveals a wealth of detail. Describe exactly what you see with your telescope under the given seeing conditions, not what you think should or should not be there. Then, a week or so later, compare your observations with the ones in the *Observing Handbook and Catalogue of Deep-Sky Objects*. In this way, you will keep your observations unbiased and hone your observing skills.

DISCOVER STELLAR OBSERVING
THE R CORONAE BOREALIS STARS
by Michael P. Janes

As one wanders about the dark cluttered field of a star party, a variety of terms can be heard. Many of these are numerical designations preceded by an M, NGC, or IC. However, very rarely will you hear the words LL Lyra, Z Camelopardalis, SS Cygni and the like. Why is this?

The most likely answer is that they are stars, period. They do not exhibit visible disks, no nebulous glow and no structural differences from one to the next. That would be the end of this article if not for one characteristic shared by each of these stars. It is their ability to show variations in brightness, whether intrinsic or extrinsic, that makes them candidates for amateur observation. For multiple observations can make these stars exciting and informative. Furthermore, a base knowledge of the star, coupled with collected observations gives the observer a new, deeper and more comprehensive understanding of what he or she is seeing. One star that is a good starter for variable star observing is R Coronae Borealis.

Discovered in 1795 by E. Pigott, R Coronae Borealis is the prototype of a class of stars that displays similar traits, the most interesting of which is what David Levy calls a "backwards nova". Unlike typical novae, which exhibit bursts in luminosity after periods of quiescence, the R CrB stars remain bright for varied lengths of time. Then, without warning, they can plunge as much as eight magnitudes into obscurity. These periods of minima can last from months to years, then slowly begin to climb back to maximum brightness.

The R CrB's are old stars that have depleted their hydrogen fuel. When we observe them, we see the helium core of the star. This helium becomes the new fuel for the star, where it is converted into carbon. Current theories state that, during the carbon conversion process, a dark carbon soot can collect in the outer, cooler, region of the star's atmosphere. As the soot is expelled by charged particles of the stellar wind, it can form an outer shell, causing the star to fade in visible light. As the carbon soot is pulled back into the star by gravity, it is destroyed, revealing the star's visible light once again. Although a plausible theory, this hypothesis requires additional observational data which is being provided, in part, by the dedicated amateur astronomer.

Well placed in the warm summer evening sky, the constellation of Corona Borealis (the Northern Crown) will transit the meridian by about ten o'clock in July. Aptly named, this little constellation can be found by forming an equilateral triangle with the end of the handle of the Big Dipper and Arcturus, as two of the sides, and then moving eastward to the semi-circle of seven stars. Forming an isosceles triangle with the two stars north of Alpha CrB, is our variable star designated R. Currently at maximum, the star is just at the naked eye limit, under dark skies, at magnitude 6.1. See Figure 1. With binoculars, center on R Crb. Half a degree south of the variable is your first comparison star. Shining at magnitude 7.2, this star will be used as your first reference for change in R CrB.

Now begins the waiting game. Ideally, nightly checks should be made and recorded, because even a slow decline in brightness is possible and can tease the observer. If you suspect the variable appears fainter than on previous nights, with regard to this comparison star, then use the 6.5 and 7.0 magnitude stars which are plotted in Figure 2. When the drop in magnitude has been confirmed, the variable should be observed as often as possible, hourly if necessary. The minimum could reach as faint as 14th magnitude, requiring a 10 inch telescope and high power. For whatever instrument is in use, monitoring the star up to its disappearance is important. Record sheets and information on how to submit your

page 3 continued over

data to the AAVSO are available from the author. Once you are familiar with this star and would like to expand your program to include other R Corona Borealis type stars, try RY Sagittarii, SU Tauri, and XX Camelopardi.

One hundred and forty nine years ago, the author of the star atlas and catalog Bonner Durchmusterung, F.W.A. Argelander wrote an article in which he appealed to amateur astronomers to consider the study of variable stars. Within the article he states, ''Therefore do I lay these hitherto sorely neglected variables most pressingly on the heart of all lovers of the starry heavens. May you increase your enjoyment by combining the useful and the pleasant, while you perform an important part towards the increase of human knowledge.'' The point here is human knowledge. Although some information can be gleaned from published literature, there is no substitute for the pleasure of discovery that can only be obtained by personal observation. For the efforts, the increase in human knowledge will be your own.

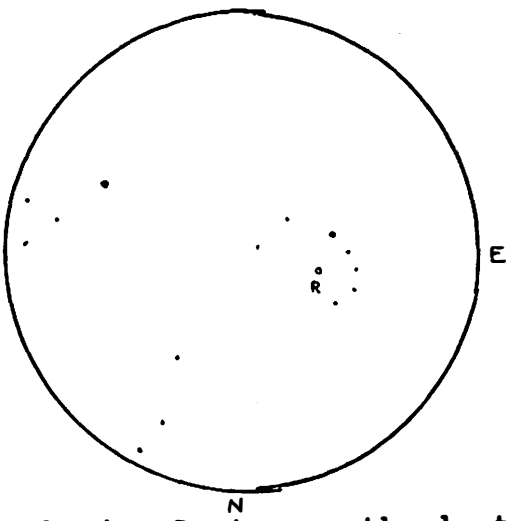


Figure 1.
Naked-eye field showing Arcturus, the last three stars of the Big Dipper, and Corona Borealis.

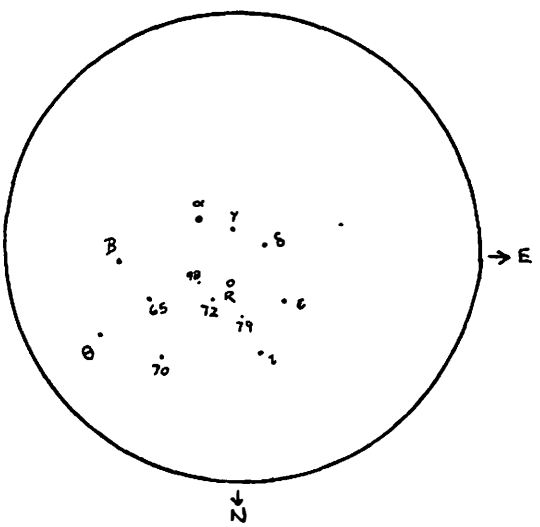


Figure 2.
12 degree field. Comparison stars given with magnitudes. Decimal point removed.

The Deep Sky Notebook

by Robert Kerwin

Sagittarius, Part 1

For many deep sky observers, summer is synonymous with Sagittarius. From the moment it clears the horizon haze to the time it sets, Sagittarius steals the show. It's no wonder Sagittarius is such a popular area for deep sky exploration--this region contains splendid examples of nearly every type of deep sky object. The center of our galaxy lies in the direction of Sagittarius and as a result, we are looking through a greater concentration of stars, gas and dust. Therefore, the brightest and most spectacular expanses of the Milky Way are in Sagittarius. This will be the first of two columns exploring some of the deep sky wonders in Sagittarius.

A good place to start is with the bright globular cluster **M22**. At magnitude 5.1, this object should be visible to the unaided eye under reasonably dark skies. In a telescope, it appears about 20 arc-minutes across, slightly elongated northeast-southwest and broadly concentrated toward the center (M22 is a class VII globular). This globular is one of the easiest to resolve; some resolution is even possible in a 2.4-inch telescope. An eight-inch scope will show a myriad of stars across the surface of the cluster. Approximately three degrees west of M22 is a tiny planetary nebula, **NGC 6629**. This object is only 15 arc-seconds in diameter, so it appears rather star-like at lower powers. At higher powers with moderate-size telescopes, you should be able to see the 13th magnitude central star. About two degrees south of NGC 6629 is **M28**. This globular is concentrated to the center (class IV) and appears fairly well resolved in an eight-inch telescope.

In the southwest part of the constellation between γ and W Sagittarii is a pair of globulars, **NGC 6522** and **NGC 6528**. NGC 6522, the westernmost of the two globulars, is also the larger and brighter. In an eight-inch scope, this object appears as a round patch smoothly concentrated toward the center. I noticed some mottling at higher powers, but no resolution. There is a 12th magnitude star to the northeast. Just 16 arc-minutes east of NGC 6522 is NGC 6528. This cluster looks very similar to NGC 6522, except that it is smaller and fainter and shows no hint of resolution or texture in medium-size instruments. Both globulars lie in a beautiful star field. Moving two degrees north, you will have no trouble locating the open cluster **NGC 6520**. This cluster is about 5 arc-minutes in diameter, with about 40-50 stars visible in an eight-inch telescope. The cluster contains a bright red star near the center which is surrounded by a tiny clump of stars. To the west of the cluster is the dark nebula Barnard 86, which appears as a sharply-defined, roughly oval inky patch. Under good conditions with averted vision, I have traced a chain of dark patches extending from Barnard 86 toward the east and passing just south of the cluster.

Three degrees to the north is one of the most beautiful and interesting objects in the summer sky, **M8**, the Lagoon Nebula. The main part of the nebula is about 45 arc-minutes long and is split into two sections by a curving dark lane which should be visible in just about any telescope. Just east of the dark lane is the open cluster NGC 6530, which shows about 20-30 stars in a 20 arc-minute area. The brightest part of the nebula is to the west of the dark lane surrounding two stars. This area of the nebula is quite intense, in contrast with the softer glow of the surrounding cloud. Under dark skies, I have noticed many subtle wisps throughout the nebula and some swirls in the brightest regions. This object contains abundant detail and will undoubtedly keep you occupied for many hours at the eyepiece.

Next month, we will continue our explorations in Sagittarius and examine some more interesting objects including the splashy open cluster M23 and the fascinating Omega Nebula.

Sagittarius

Tirion charts: 15-16, 22-23
U2000 charts: 293-298, 338-343, 377-381, 410-412

Name	Type	Mag	Size	R.A.	Dec.
M22	glob cl	5.1	24'	18h 36m	-23.9
NGC 6629	plan neb	11.3	15"	18h 26m	-23.2
M28	glob cl	6.8	11'	18h 25m	-24.9
NGC 6522	glob cl	8.4	5.6'	18h 04m	-30.0
NGC 6528	glob cl	9.5	3.7'	18h 05m	-30.1
NGC 6520	open cl	7.6	6'	18h 03m	-27.9
M8	diff neb	---	45'	18h 04	-24.4

RTMC Report
by Tom Polakis

Long holiday weekends can provide some of the year's most memorable experiences. For many amateur astronomers of the western states, Memorial Day weekend is booked, since this is the time of the Riverside Telescope Makers Conference. The holiday's late May time frame brings a great chance for pleasant weather. The mountain setting of Camp Oakes makes for a nice weekend getaway. If the weather and the camping aren't enticement enough, the great variety of activities at the conference make this event a Memorial Day ritual for many.

Each year brings with it some sort of unintended theme to the conference. One year, split ring equatorial mounts will be all the rage, while in the next, these will be all but replaced by refractor-mania. The 1993 conference will be remembered for many things but one of them will certainly be large-aperture reflectors. The main telescope field was dominated by a "land of the giants" at center stage. At least a dozen scopes with apertures in excess of 24 inches could be found on one small part of the main field. Steve Overholt made an encore performance to last year's spectacle by prying a 30-inch Newtonian out of a Ford Festiva, that Yugo-sized vehicle that gets 56 miles per gallon. The showpiece of the field was a 40-inch f/4 that would be sure to draw long lines after nightfall.

Along with just gawking at telescopes, there are plenty of daytime activities at RTMC. The conference has a tradition of great speakers and this year proved to be no exception. Terence Dickinson and Alan Dyer exuded enthusiasm about their recent trip to Las Campanas Observatory in Chile. These veteran observers did everything in their power to demonstrate this site's clear superiority for visual observing. Their photographs of the region around the galactic center backed up their words about the transparency at the site. Their raving about the excellent seeing was supported by CCD images of Jupiter produced with the University of Toronto's 24-inch telescope that are some of the finest earthbound images made to date. Doug George showed off some of the magic of recently developed software to get every bit of detail out of CCD images. Terms like "maximum entropy" and "image deconvolution" are becoming household in the hobby. Tom Johnson, the founder of Celestron, spoke about optical evaluation. Perry Hacking, of JPL, made an excellent comparison between the CCD detector and human vision as it relates to the probability of capturing stars at the limit of detection, whether the image is falling on a chip or a retina.

RTMC has always been known as a place to get great deals on products. The vendors of Southern California set up truckloads of gear that are eagerly devoured by shoppers. Swap tables operate all day on Friday and Saturday. The RTMC officials tried in vain to open the tables no earlier than 9 a.m. They went as far as stringing police lines along the sidewalks. These were promptly ignored and the wheeling and dealing was going full force by 7:00. Books, eyepieces, cameras, computer software; you name it and it was being sold at the tables.

Before the nighttime star party begins, door prizes are given away on Saturday and Sunday nights. Meade gave up a 6-inch refractor valued at over $5000. Celestron offered a C5 SCT. John Dobson and co. presented a 10-inch Dobsonian (what else?) that was made at the site on Saturday afternoon. As always, the audience is divided between those in the comfortable indoor setting of the meeting hall and those who are watching on monitors in the frigid outdoors. A few giveaways in a row to the outdoorsmen can ensure boos and cries of "Inside! Inside!" from the indoor contingent. After the door prizes on Sunday night, the coveted RTMC merit awards are given away for excellent craftsmanship in telescope making. The committee also presents awards for use of cheap materials, a youth award, and the not-so-coveted bozo awards for unsolicited novelty in scope making.

Camp Oakes is a reasonably good observing site as Southern California locations go. At 7500 feet, the smog of the basin below is greatly reduced although not completely gone. The weather was clear and calm on all three nights this year although the presence of a First Quarter moon brightened the sky. This didn't discourage people from standing in long lines to look through some of the larger telescopes. Temperatures were cool, but not uncomfortably so, and thoughts of dew or bugs were only thoughts. A pair of 20-inch binoculars provided a great three-dimensional view of the moon. The splashy globular cluster M13 was a favorite target for the big Newtonians. As it rose, the summer Milky way became the subject of choice with most of the big cannons pointed at the standards like the Dumbbell and Ring Nebulae. The moonlight actually enhanced the experience aesthetically as observers could get a good look at the equipment and the object at once. This is a telescope maker's conference after all!

By Monday afternoon, the scopes were packed up and the amateur astronomers had departed the mountain. After this year's successful conference, surely for many Memorial Day weekend for 1994 is already booked.

TO SKETCH A STAR by Frank Kraljic

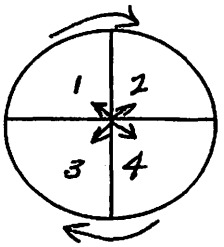
There are many things in this world that don't take a lot of skill, among them pointing a telescope and looking at the moon. Though, one could get a bit more complex and attempt to photograph the moon or some other heavenly body. But seriously, anybody could do that. The one subject that does take a bit of skill and understanding is trying to draw that object with a pencil and paper. I must admit that I am not the best sketcher in the world and am fairly new to this technique, but more and more amateurs and beginning astronomers are getting hooked onto it. Also, there are many other astronomers who may differ with what I have to say about this fascinating hobby and have different ideas about how to proceed with, say, drawing M42 or a globular cluster. Simply put, this is just my way of doing it.

To begin with, there are a set of six rules that I have made up called the "Six Steps to Drawing" or The ABC's of Sketching". They are: Step one...Study and observe; Step two...Sketch the field; Step three...Outline the object; Step four...Coloring and shadowing; Step five...Corrections and finally, Step six...clean-up. Over the next few newsletters, you'll be getting an in-depth look at each step. Let's continue with...

LESSONONE

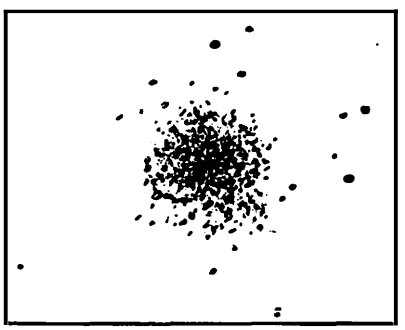
Step one is the easiest of all the steps. Once you have the object centered in your field of view - let's use the Orion Nebula for instance, since it is one of the hardest to draw - you carefully scan the surrounding area for all the stars and nebulosity with your observing eye. It is a wise idea, when looking at an object like this one, to use your peripheral vision (where your eye concentrates on an area away from the target center) to get more detail out of what you're viewing. Now, try to memorize as much detail as possible. This will aid you later as we go through the steps. Once you have completed this, you are now ready for step two, sketching the star field.

This step, as well as step three, can get a bit confusing, but's its really quite simple. Now, get your pencil and paper ready. You should have at least two pencils with you in case something goes wrong and the lead breaks or goes dull. Do not use a pencil that uses lead cartridge, for when you get to step four, it, along with an ink pen of course, is the worst you could have. Also, you might want to be sure you use an object sheet or some other paper that has spaces for information like atmospheric conditions, visibility, date and time, object name, type and magnification being used. Most of all, a place for the object and some notes should be included. Usually, you should describe the object's details that otherwise cannot be detected by the drawing, or that might appeal to you. Once you've filled out all the necessary information, it is best to draw the starfield before sketching the object. Mentally visualize your telescopic and drawing field split into four sections, as shown in figure 1, below...

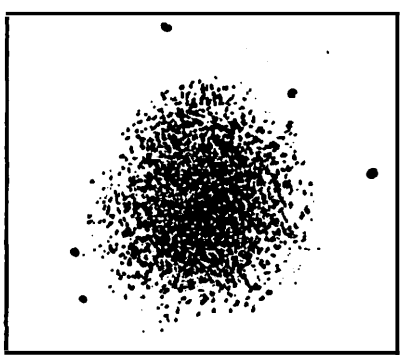


Starting from the top left quadrant, draw each of the stars, coming from the inside out. It may also be known that you do not have to draw every single star. It is best to draw the stars that are brightest, because once you're finally complete, it will seem that the stars take up more room than the object. This method works really well when drawing open and globular star clusters. This brings us to another point; when doing globulars, one can exaggerate to bring out the full potential of the drawing. One reason is because its suicide to try to draw every single star in a globular. The only time you can't really exaggerate is with something like M4, which is not so compact as its brothers and is fairly loose with bright stars all around it. This time it is pretty much necessary to draw the bright out-lying stars in front first and then exaggerate the middle by just tapping your pencil lead all aound the sheet. Compare the drawings of M4 and Omega Centauri below.

Another way to bring out the full effect is to use the tip of your finger and smudge the lead around. This is what you'll be doing for galaxies and nebulae later on, but for globulars, it helps to fill in the empty spaces. Just be sure not to smudge too far beyond the area limit of your sketch. For open clusters, unless you see nebulosity around the star (like the Seven Sisters) do not smudge.



M 4....



Omega Centauri

IN DEFENSE OF: THE SCHMIDT-CASSEGRAIN

I was shocked to see, in the pages of the most recent issue of this journal, an unprovoked, dumbfounding and shocking attack leveled against owners and users of the Schmidt-Cassegrain telescope (see NEW SUPPORT GROUP FORMED...EVAC NEWSLETTER, June 1993). Thinly disguised as "satire" this article left little doubt that the author (who has communicated to the editors his desire to remain "unanimous") is heavily prejudiced and boldly insensitive to the feelings of others.

So I waited, in vain it seems, for an outraged outcry, a "foul ball" call, and a spirited defense of this popular instrument. Are the owners of these telescopes timid? Or are they perhaps just nice people who believe the folly of his views will eventually cause the author of the disparaging article to become "hoist by his own petard"?

Well, my sense of justice was so offended that I feel I must make some small effort to point out a few of the good points of the Schmidt-Cassegrain telescope.

To begin with, let me acknowledge that I've never owned a Schmidt-Cassegrain, although I've tested, by autocollimation, and in star tests many dozens of them. And I will admit, in all honesty, that some of them are less than optically perfect. However, I've tested some whose optics are absolutely beautiful. In fact, I'll go even further and state that the worst Schmidt-Cassegrains I've ever tested, are better than the worst reflectors I've likewise tested.

In a practical sense consider the following:

- Frank Kraljic, using an 8 inch Schmidt-Cassegrain, routinely makes high quality drawings of deep sky objects.

- Bob Kelly, using his 10 inch Schmidt-Cassegrain, makes beautiful photos and enjoys marvelous deep sky observations as well as high quality planetary views.

- Don Wrigley, using an 8 inch SC, is proving to be as adept at deep sky observing as he is at lunar. This author has seen incredible views scope, many of them very nearly equalling the views in considerably larger telescopes (the dark lanes in M51 for instance, are awesome!).

- Don Farley's 10 inch Schmidt-Cassegrain is mounted in an Alt-Az configuration, yet will track, slew and identify an immense catalog of celestial objects. Amazing to watch!

- Joe Murray and Bill Smith both have 8 inch Schmidt-Cassegrains that provide stunningly tiny, pinpoint star images, that are a pleasure to observe.

I could go on and on about different SC's that I've enjoyed observing through, but I desist.

I will however, point out just a couple of the positive aspects of the Schmidt-Cassegrain telescope.

1. The Schmidt-Cassegrain, unlike most Dobsonian telescopes, is "camera ready", being able to, with the addition of a minimal number of accessories, take both piggyback and prime focus photographs. This capability accounts for a great portion of the scopes' popularity.

2. The Schmidt-Cassegrain is portable, with set-up times fairly consistent with other telescope types. This type system is particularly suited to the individual who enjoys the ergonomic qualities of handling a nicely made instrument. This enhances the instruments' "scientific" orientation.

3. Coupled with its photographic capabilities, the SC "tracks" objects in its field of view, giving effortless observing and a steady study for the astronomical artist.

The fact is, any individual observer must set his viewing needs and desires against the telescope, accessory package, price and quality available through any number of designs.

This being the case, I take issue with those who would deign to denigrate any particular telescope design or function. A telescope is, first and foremost, a personal instrument, a gateway into the wonders of the universe, and anyone who owns any type of telescope, is well placed for universal explorations of the memorable variety...

THE MOON AS AN OPTICAL TEST (Part II)

by Don Wrigley

For the sake of brevity, I excluded several interesting lunar formations from last month's article, and so decided to include them this month as as continuation of last month's theme.

To introduce this month's article, I thought it appropriate to briefly discuss the topic of lunar cardinal directions. Hopefully this will clear up any confusion caused by descriptive characterizations of the various lunar features.

When looking at a photograph of the moon, it is easy to describe a particular feature as being either left or right, or up or down (as in ''just left of Plato and down a little'') with respect to another feature, as long as everyone involved is looking at the same picture in the same orientation. Looking through a telescope is another matter; left and right or up and down no longer have any meaning, because no two observers share the same frame of reference. It is therefore necessary to use some form of cardinal direction, and requirements dictate that everyone agree what is north, south, east and west.

Prior to 1961, directions on the moon were determined by it's orientation as viewed from earth, so that east on the moon appeared to face our eastern horizon and west appeared to face our western horizon. In 1961 the International Astronomical Union (the IAU) decided to adopt the system whereby east and west were to be determined as they would appear to an observer ''on the moon'', a decision which effectively switched the directions for east and west, an important fact to know if you're using an older lunar map. The simple rule of thumb now is that east is the part of the moon you see during first quarter, and west is the part you see during third quarter. North and south remain as they have always been, with the lunar highlands (including the crater Tycho) in the south, and the Mare Imbrium area in the north. Keeping this in mind should help clear up any confusion caused by the differing views offered by Newtonian reflectors, which simply invert the image, and telescopes using star diagonals (usually refractors and SCTs) which generally give upright mirror images (with left and right reversed).

Having (hopefully) cleared up the problem of giving directions, let's see if we can use this knowledge to describe a few more lunar features that are fun to test our telescopes on.

THE ALPINE VALLEY: This marvelous formation is located in the northeast section of the Mare Imbrium, just east of the crater Plato. It is, in itself, little challege for any optical device, for it can be seen easily even in binoculars! But initial impressions can be deceiving, for running through the very center of this 3 to 6 mile wide gash is a narrow rille, which has been photographed by earth based telescopes, and should therefore be visible in larger sized amateur instruments. I have never been able to detect it in my 8 inch reflector (though I will continue to try each month), and I suspect that it may require a somewhat larger aperture. Those of you with larger telescopes ought to give this one a try!

LINNE': This small, bright spot stands out boldly in the otherwise featureless moonscape along the western border of the Sea of Serenity, where this great sea merges with the Mare Imbrium. It was, for many years, an object of intense interest and controversy (see Leon Knott's article in the January newsletter for a more detailed historical account), and the source of many reported Lunar Transient Phenomena (LTPs). Close up photographs from the Apollo program laid to rest all scientific interest in the object, when it was revealed to be simply a small, deep, impact crater with an unusually bright ejecta blanket surrounding it. Still, it remains an interesting and challenging object to observe telescopically. Locating Linne' is easy; it appears just before first quarter in the aforementioned location, and its bright halo remains highly visible until third quarter. The crater itself is a tiny black dot located in the center of the bright spot. It is visible in my 8 inch reflector, and can probably be seen in smaller instruments, although I have not been able to see it in my 3 inch refractor. The great depth of this crater allows its interior to remain in shadow for several days after the terminator has passed it. I would be interested in hearing from anyone else who may sight this crater, as I consider it a fairly difficult object. Of particular interest to me are the size of the telescope used, the placement of the terminator, and the seeing conditions.

CRATER CHAIN NEAR STADIUS: Just east of the great crater Copernicus, lies the ghost crater Stadius. Though large, it can be difficult to see unless it is quite near the terminator. Beginning at the northwest wall of Stadius, and heading northward is a chain of craterlets which completely bisects the plain that lies between the craters Copernicus and Erastosthenes. Once believed to be the result of vulcanism, they are now believed to have been created by large pieces of debris thrown out by the impact that created the crater Copernicus, a theory that has led to the study of a new class of craters called ''secondary'' craters. The main chain of craters is fairly easy to see in even the smallest of telescopes, and are a good test for a 60mm refractor. Larger telesocpes reveal a host of smaller pits in the plains surrounding Copernicus that often appear to be elongated in the direction of Copernicus, a feature which clearly indicate the true nature of their origin. Look for them even in the

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THE MOON AS AN OPTICAL TEST continued.....

southern part of the Mare Imbrium, near the crater Pytheas. They are quite small, but with good seeing should be quite easy in medium sized telescopes. Once seen, they cannot help but impress the observer with the enoumous forces at play in the creation of a great impact crater. Look for secondary craters around other fresh impact craters; you'll be surprised how many can be found.

EVAC WELCOMES NEW SCOPE

Don Wrigley, author of the foregoing article, has very recently become the owner of a new 8 inch f15 refracting telescope. While awe-inspiring to look AT, looking THROUGH it is an unforgettable experience. It is probable that those lunar test objects that Don hasn't been able to see with his other 8 inch scopes will readily succumb to the resolving power of this instrument.

A number of observers have viewed through this new scope and report that, while the moon is incredibly crisp and sharp, Jupiter appears much like a Voyager photograph, with just too many bands, festoons and other details to easily take in (a problem we'd ALL like to share). Antares, on an evening with tremendous scintillation and unsteadiness, was fairly easily split.

Don plans to have this scope at the occasional star party, so make your plans to observe through one awesome telescope and join us!