

East Valley Astronomy Club

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Newsletter	M. Leon Knott	461-1758

August

Newsletter

1993

FROM THE PRESIDENT

With over sixty people at our last meeting, its evident that our club is growing. Some of this growth is due to growing popularity of amateur astronomy and positive publicity in local newspapers. Our membership is a measure of our strength as a club. Or is it? Just because we have more members now than we had six months ago means we are a stronger club? I think not! I am convinced that only active membership is a measure of club strength. Active members have input at meetings and star parties on ways to improve the club. Active members help promote amateur astronomy to the public and also help to support one another. Active members are willing to do what they can. Now, with this in mind I need help. Please call me at 827-1524 if you can help on newsletter, committees, public starparties and other activities. This year our goal is to increase active membership. I am writing this for the benefit of new members as well, for we need your input too. I'm looking forward to your call. Ted Heckens. President, EVAC

Editor's Note

I'm happy to report that, once again, our newsletter submissions have outstripped our space allotments. What a nice problem to have! Please continue to produce those excellent articles and help us have a really fine newsletter, of interest to amateurs of all kinds. If you miss your article this month, just hang on, we'll be sure to run it as soon as possible.

Also...The mirror making class is proceeding apace, with a number of participants polishing or nearing the polishing stages. Membership has risen to 40 students with a very large spectrum of telescope type and design. We're looking forward to some exquisite results from this class.

NEWSNOTES

SHOOTING STARS August 11 - 12. The famous Perseids are due again on the night of August 11 and morning of August 12. Two separate jaunts are planned for this event. Locally, you may join some of us at the Tortilla Flat site (the first true road to the left east of Tortilla Flat and past mile marker 218...down the road 1/2 mile to turnout on right. Really dark site with clear, dark eastern horizon). For those wishing to go a bit further, and if weather precludes Tortilla Flat, the Sentinel Site (30 miles west of Gila Bend) should be fine. Call Frank Kraljic for details and directions at 991-5105.

TELESCOPE FOR SALE: Meade LX 200. 10 inch Schmidt-Cassegrain, new in box, with super wedge, solar filters, 2 inch star diagonal, computerization, and much more. Call Bob Rasco at 404-1887.

COMET UPDATE: David Levy, co-discoverer of Comet Shoemaker-Levy 9, scheduled to strike Jupiter in a year, reports that the HST had obtained images of the unusual body. At least 20 fragments, each with a diameter of 5 kilometers or more will strike the giant planet, releasing huge amounts of energy and providing astronomers with a unique opportunity to see the mechanics of solar system formation (or destruction) firsthand. The HST is scheduled to photograph this object again in the next few weeks. We'll keep you posted on new developments.

MARK YOUR CALENDAR

EVAC BUSINESS MEETINGS

August 4 SCC Room PS 170, 7:30 p.m.

DEEP SKY STAR PARTIES

August 21 Florence Junction Site-
see map at meeting

LOCAL STAR PARTIES

Aug 11-12 PERSEID METEOR SHOWER
TORTILLA FLAT
see map at meeting

Aug 14 Florence Junction Site
Call Ted Heckens 827-1524

LETTERS TO THE EDITOR

Leon;

It is usually bad form to respond to reviews of one's book. But in the interest of clarifying a few matters, I thought I would provide some remarks in regard to Robert Kerwin's review of Chris Luginbuhl's and my observing handbook. I take no issue with the review as a whole, since Kerwin--unlike many reviewers--seems to have grasped our intention quite clearly.

The Introduction is quite brief in its discussion about telescopes and eyepieces mainly because the general subject of hardware has been treated *ad nauseam* in dozens of other books. Our main intention was to outline what we thought necessary as far as deep-sky observing. When the book was written in the early 1980's (yes, that long ago), the market in eyepieces especially was in a state of unprecedented change. Nagler eyepieces, for instance, had just come on the market. Thus it seemed ill-advised to discuss them outside the periodical literature. Likewise "nebula" filters: they didn't exist when we started the observing for the book in the mid-1970's, and about the time things settled down as far as what you could buy, we were finished.

One reviewer in a prestigious British professional journal complained that every object was not described colorfully. He was obviously someone who had not done a lot of deep-sky observing.

As anyone who has done viewing beyond the Messier list knows, few objects are genuinely astonishing, although they do not necessarily lose visual interest for being faint. Thus when we occasionally let slip a superlative, as Kerwin noticed in our M35 description, readers know that this is a really extraordinary object. We also would have worn out a thesaurus (and strained our readers' credulity!) trying to supply verbal exhilaration for every one of the 2000 objects.

I agree entirely with Kerwin's remark about using the descriptive material in the book after a viewing session. At the Texas Star party a few years ago, someone commented to Chris and me that they used the book at the telescope to compare directly with what they viewed. "I figure if I see all the details L&S give, then I'm done." Chris quickly countered that especially using telescopes larger than the ones we used (as this person was), and from a true-dark site such as Pride Ranch, one is likely to see quite a bit more than what we describe, and not to limit yourself to what we saw. The descriptions ain't gospel!

Finally, no, it is not a book for beginners. Why? As per my second paragraph, there are already about fifty of those out there. We felt the book was necessary because there was almost nothing but books for beginners. It's

sort of like nature programs on TV: they always start at step 1; why can't there be some that assume you already have a good understanding of basic natural history? The basics of amateur astronomy aren't all that complicated, as long as you can cut through the clutter (one thing clubs like EVAC are useful for). I think most people will find that once you've got the basics down, and you decide to explore deep-sky observing, our book is quite rich with information difficult to find elsewhere. As one reader put it, it's a book you can grow into.

Brian Skiff, Lowell Observatory.

MR KERWIN REPLIES:

Mr. Skiff

Thank you for your response to my review of *The Observing Handbook and Catalogue of Deep-Sky Objects*. I do not consider your response "bad form"; rather, I welcome the opportunity to exchange further thoughts about your book and the review.

In the past few years, astronomy products and books have become more sophisticated and expensive. In addition, the sheer number of products on the market has increased dramatically. When I consider purchasing a new astronomy book or product, the choice is no longer simple. To make a good decision, I need to know how the book or product can help me, what the strengths are and, of course, what the weaknesses are. In my review of yours and Luginbuhl's book, I have attempted to address these questions.

I agree with you that many other books
continued next page...

RESPONSE continued...

have thoroughly discussed the topics of telescopes and eyepieces. However, when an author opens a discussion of a particular topic, he creates an expectation in his readers that he will progress through the topic in a logical manner and provide enough details to make the discussion worthwhile. Like you, I believe it would be superfluous to rehash all the standard advice about observing hardware. You did, however, begin a discussion of hardware; my primary criticism of your book is that you did not follow through and complete the discussion.

The comment in the final paragraph of my review about your book not being a book for beginners was intended as a characterization, not a criticism. This was simply meant to steer novices to other books that could better serve their needs at their particular level of observing experience. I heartily agree that we need excellent books for advanced observers. The last five or so years have seen the introduction of many books (yours included) that cater to the more experienced observer. As your letter stated, your book was necessary. Indeed, it continues to fill a gap in observing literature by providing the most comprehensive set of visual descriptions available in one convenient source.

Robert Kerwin, EVAC

THE CHALLENGE OF FAINT GALAXIES

by Michael P. Janes

Late spring can bring out the best in an observer and his or her telescope. For those in Arizona this means longer trips to an observing site with a well deserved reward. As the desert surpasses the century mark we look northward to pristine skies and comfortable temperatures. The Mogollon Rim region of Northeast Arizona is such a place. At seventy five hundred feet Pine and Oak forests are peppered with clearings which seem made for the astronomer. This site offers dark skies with a visual

limiting magnitude of 6.3 when at their best. In open areas, between trees, stars will set right into the horizon and light pollution becomes a thing of the past. When darkness finally falls the pace begins to quicken in tune with the excitement of each observer. The dark clouds of the Milky Way are a feast for the eye and M 11 is a beautiful naked-eye object. It was a night like this on June 19th that EVAC members Bob Kelley, Art Zarkos, Joe Murray, Sharon Jobert, and myself gathered to test our observing skills. It was here that I had the opportunity to push my 16 inch f/4.5 newtonian to its limits and was not disappointed.

As the dedicated observer soon learns what one expects and the actual experience of seeing it are two separate things. Such was the case with the galaxy UGC 7089 in Canes Venatici. This spiral galaxy is listed Sky Catalog 2000.0 as 13.5 magnitude. Oriented North to South the galaxy is about 3.5 minutes of arc long with a low surface brightness and no central condensation. The galaxy is located about half a degree west of the NGC 4111 group. When centering on the 9th magnitude star UGC 7089 is about ten minutes of arc to the East. The bonus was a small, circular, galaxy around 15.5 magnitude and located about equal distance from the star to the West. In my log entry it was given as an anon. galaxy and I have yet to find any additional information.

One of the other test objects for the telescope was IC 4617. Featured in Walter Scott Houston's article in the July issue of Sky & Telescope the galaxy can be found between M 13 and NGC 6207 in Hercules. I was unsuccessful in finding the galaxy with a 12mm Nagler working at 155x. I increased magnification to 232x with an 8mm Clave and after a few patient moments the galaxy appeared with averted vision. Continued observation provided mostly averted vision views with about 5 seconds of direct vision attained. At 15th magnitude I was convinced that high magnification is required to observe these faint galaxies. It is important to note that only after the observation of IC 4617 was made

and a drawing of the field stars with relation to the galaxy was the magazine article brought to my attention and its photograph used as confirmation of my observation.

These are but a few of the observations made that night. Now I look with anticipation toward the next dark sky observing session on the Mogollon Rim to further push the limits of a large aperture telescope. SEE DRAWINGS ON PAGE... 9

PROGRAM NEWS

According to Vice-president Joe Murray, the August program promises to be extraordinary. To begin with, meteoritic expert-in-training Frank Kraljic will speak shortly on the following:

"On the morning of August 12, of this year, the Earth will enter into a stream of countless rock and debris from a comet known as Swift-Tuttle. Since the comet passed by Earth earlier this year, we can expect the Perseids to deliver a show far better than it has ever done before..."

ALSO... Don Farley will present slides taken at the recent UNIVERSE 93 Exposition in San Diego, which we hear was incredible!

FINALLY... Optical expert and recently removed North Carolina (to Tucson) resident Rick Blakley will present the keynote program on the optical aspects of "just why your telescope presents star images as it does". This program will be optical science in a manner that can be understood by novices such as ourselves. DON'T MISS IT!

A PRACTICAL ASTRONOMER LOOKS AT:

1000+

THE AMATEUR ASTRONOMER'S FIELD GUIDE TO DEEP SKY OBSERVING

by Tom Lorenzin

One of the best indicators of the health of amateur astronomy today is the proliferation of associated products targeted toward the astronomical consumer. In fact, there are so many books, charts, atlases, eyepieces, telescopes, aiming devices, flashlights and other paraphernalia that one must be considered courageous if he attempts to add to the glut. And yet... And yet there ARE those capable of inventing a better mousetrap. There are those blessed with some sort of prophetic insight that allows them to see a need, and then to labor endlessly to meet (and capitalize upon) that need. Tom Lorenzin, of Davidson, North Carolina is such a person.

Tom's book is called 1000+ and it certainly fills the need of all beginning amateurs as well as the much more advanced. At the beginning of the book, Tom (who narrated most of my planetarium shows during the 6 years I spent as director of the Settlemyre Planetarium) hides behind a neat disclaimer that says, in part, "The aim of this book is NOT to turn you...into a SERIOUS astronomer. The aim is, rather, to provide you with the challenge and the tools...(in order that you might) have FUN!" To which we exclaim a hearty AMEN! In capitals!

1000+ does just as Tom intends; it takes the rank beginner by the hand, and by a focusing of Tom's unique and fun personality, brings the amateur into a shared experience. Even the older amateur can readily identify with Tom's cogent memories of first times, first problems and first triumphs. 1000+ takes the amateur through the "mystical" portions of amateur astronomy with dispatch, clarity and fun. Polar alignment, setting circles, directions (north, south, etc.), optics, ad infinitum, are handled in the most easily understood and clearcut methods I've ever seen.

While the author's attention is obviously canted toward the beginner, he writes so very well and interestingly that the advanced amateur will return to 1000+ time and time again. Tom can titillate with his, "ah, shucks" routine, and then amaze with his poetic/philosophical sagacity, i.e., "As night falls, Earthlings look astern into the cosmos from their great ship as it courses its way at almost 30 km/sec through the tenous sea of Solar space". See what I mean?

And practically? Tom's 1000+ is a large book that opens flat. It is bound with rings into a slick, shiny, attractive and

much dew-proof binding. At first, I was a bit disturbed at some of the "empty" spaces on some of the pages; after talking with a professional from another field, I now realize that the layout is indeed, done the preferred way. Readers become intimidated with masses of verbiage; that's why we see magazines with two and three columns of print interposed with insets and yes, spaces. And it works...1000+ DOES NOT intimidate.

Chapter order and layout is accomplished in such a way as to allow the naked eye observer immediate use; it also allows the new telescope owner to unpack his new scope, read a few pages and go to work. And without many of the common errors and mistakes that usually accompany the beginner's travails. The scope owner who has setting circles will find his questions answered while the starhopper will find help as well. Gadgeteers will enjoy the chapters on paraphernalia, where its obvious that Tom has spent many evenings setting up and observing. Tom even spends time with us on SEEING and "SEEING", helping us to see the differences and actually coining such terms and concepts as See-Ability, and Tell-Ability. Beautiful stuff!

Continued next page

1000+ continued...

And then, after a couple of other great chapters, its, "ALAS, YOU MEAN THAT'S ALL?" Its like you've set down to a great meal, the waitresses are beautiful, the menu incredible, the appetizer mouth-watering and suddenly, BANG!, the electricity goes off. All that preliminary anticipation, all that great savoring and suddenly it all ends...Tom takes you along much that way; when you are ready for more, knowing it will be great, you turn the page and see..."Appendix A". But wait! Don't despair. Read the appendices; they are as much fun as the main course.

Even the older amateur can identify with memories of first times, first problems and first triumphs....

This abrupt slewing of the reader's mind and attention is pretty slick; it allows you time to realize that Tom has pulled a trick on you. His beginning disclaimer has subtly given way to a sentiment and book with a different slant. Of 1000+, Tom now says, "The making, recording and reporting of scientifically useful observations require skills that 1000+ is intended to help develop."

To that end Tom has included a comprehensive Database (Admiral Smythe would have called it, "a list of objects, that when observed by the amateur will inculcate within him an awe and mastership of

the cosmos"). Tom's database lists over 1000 objects visible to users of an 8 inch telescope; that is from a reasonably dark site. The beautiful thing is that Tom has personally observed all these objects. This database is perfect for the advanced amateur who doesn't wish to prepare a detailed observing list for his viewing sessions. Just take 1000+ along and you have many nights' work ahead of you; observe the objects Tom has listed, comparing his observations with yours. Coordinates are given in Epoch 2000.0 and object name, type, constellation and other designations are given. Its obvious that the author hasn't stinted in the slightest on his research. He must also own an impressive astronomical library. His sharing it with us in the pages of 1000+ is a public service.

Tom's notes in his database are cogent, accurate and plain fun to read. Its probably the only database in existence that can be read and enjoyed from the observer's armchair on cloudy nights. He gives a surprisingly large amount of information in these notes, as well as an occasional, "Aw, go ahead! Try it!" This concession to the beginner in all of us invests these notes with much greater value to the reader. Elliptical (or parenthetic) phrases are liberally sprinkled throughout the database notes; such phrases generally point the observer to another object nearby.

This naturally increases the content of the database greatly.

1000+ ends with a comprehensive naked eye atlas. At the very beginning of the atlas we see Appendix H. This appendix gives limiting magnitudes in the North Circumpolar Region; following instructions in the atlas introduction will enable one to determine the naked eye limiting magnitude (old timers may well remember the old "North Polar Sequence). This is an important consideration for beginners, for it helps to familiarize with the entire concept of brightness estimates, giving us the opportunity to learn the discipline of "seeing" when we "look". The atlas plots most, if not all of the database objects (some of the "parenthetic" components may not appear on the atlas). This gives the atlas an interesting set of parameters - on the one hand it is a sixth magnitude, naked eye atlas - while on the other hand it is a deep sky atlas composed of objects many times too dim to see with the unaided eye.

Complaints? Yep...1000+ just isn't long enough. WE WANT MORE.

The fact is, Tom is even now working on 2000+ and I'm certainly looking forward to seeing it. If you haven't seen 1000+, you're in for a pleasant surprise. Get your copy and you'll very quickly see what I mean. mlk

The Deep Sky Notebook

by Robert Kerwin

Sagittarius, Part 2

Last month we examined several interesting deep sky objects in the southwestern part of Sagittarius, including M22 and M8. This month we will pick up where we left off last month and move northward along the galactic equator.

Less than one degree north of M8 is another famous object, M20, the Trifid Nebula, so named because of the dark lanes that divide the nebula into three sections. This object consists of both an emission (the southern section) and a reflection nebula (the northern section). The southern section is the brightest and most interesting. The dark lanes, which are cataloged as Barnard 85, are probably visible in telescopes as small as three inches. Near the intersection of the three dark lanes is an easy double star; the components are magnitude 7.6 and 8.7 with a separation of 11 arc-seconds. The northern part of the nebula is fainter and almost merges with the northern part. Just to the northeast of the nebula, visible in the same low-power field is an open cluster, M21. This loose cluster contains about 30-40 stars in a 15 arc-minute area. I have also noticed a scattering of bright stars between M21 and the Trifid.

A little less than two degrees northwest of the Trifid is an interesting, though somewhat more challenging pair of objects. NGC 6440 is a 9th magnitude globular. This globular is fairly condensed toward the center and appears about 2 arc-minutes across. The cluster shows no hint of resolution in moderate-size telescopes, although I have glimpsed four very faint stars within the glow with an eight-inch scope. Less than one-half degree north of NGC 6440 is an interesting planetary nebula, NGC 6445. This nebula is about one-half arc-minute across and is darker in the center. The nebula is not uniform in brightness, but is brighter to the north. There is also a faint star to the north. You may wish to try using a nebular filter with this object; I found that a UHC filter gave a modest boost in contrast.

About one degree to the northeast is the open cluster M23. This bright cluster is about 40 arc-minutes across and, with an eight-inch telescope, shows at least 100 stars. The cluster appears somewhat rectangular and the stars are fairly evenly distributed, without the clumpiness often seen in open clusters.

This is a beautiful object in any telescope. Two degrees to the east is a pair of reflection nebulae. NGC 6589 and NGC 6590 appear nearly identical, being a generally round glow around a star. The star in the center of NGC 6590 is double; the components are both magnitude 10.1 and are separated by 20 arc-seconds. Only 20 arc-minutes to the northeast is another nebula, IC 1283-4. This object is a combination emission/reflection nebula. It appears as a faint glow surrounding two bright stars. With averted vision and an eight-inch scope, I glimpsed a dark lane that extends east-west across the nebula between the two bright stars.

Our final object is the brilliant nebula M17. This is one of the brightest and finest nebulae visible in amateur telescopes. This nebula is also known as the Omega Nebula because of its resemblance to the Greek letter. I have always thought that the nebula looks more like a "2" with an extended bar. The bar is aligned approximately east-west, and the hook is on the west end of the bar. The bar is wider to the west and tapers off to the east. With medium-size telescopes, several bright patches are obvious in the bar, especially to the west. To the east, detached from the bar are at least two fainter patches of nebulosity. With good dark skies, this object looks very much like its photographic appearance.

Sagittarius

Tirion charts: 15-16, 22-23

U2000 charts: 293-298, 338-343, 377-381, 410-412

Name	Type	Mag	Size	R.A.	Dec.
M20	diff neb	---	20'	18h 02m	-23.0
M21	open cl	5.9	15'	18h 02m	-22.5
NGC 6440	glob cl	9.1	5.4'	17h 49m	-20.4
NGC 6445	plan neb	11.2	3'	17h 49m	-20.0
M23	open cl	5.5	27'	17h 57m	-19.0
NGC 6589-90	diff neb	---	5'	18h 17m	-19.8
IC 1283-4	diff neb	---	17'	18h 18m	-19.7
M17	diff neb	---	20'	18h 21m	-16.2

The Observer

Several Lifetimes Worth of Observing by Tom Polakis

In 1987, amateur astronomers were inundated with "new" objects to observe with the release of Volume 1 of the star atlas, *Uranometria 2000.0 (U2000)*. The publication of Volume 2 followed the next year and overwhelmed observers with an endless assortment of plotted deep sky objects. U2000 has more than twice the scale of *Sky Atlas 2000.0*. The number of objects in U2000 represented an increase from a few years worth of observing to several lifetimes. With the vast array of objects plotted on U2000, a companion catalogue was needed. At last, that catalogue is here in the form of *The Deep Sky Field Guide to Uranometria 2000.0 (DSFG)*. Having used it before, during, and after my observing sessions, I can say that it was worth the wait.

The past five years in deep sky observing may be known as "The Database Era." Many groups of amateurs tried to solve the lack of data problem by looking it up themselves and entering it into computer files that could be organized to create observing lists. These databases have been available commercially with prices ranging from the price of a floppy disk to around \$100. The authors of these databases have attempted to clean up the errors in the many catalogues by perusing the literature in their local university libraries and by consulting with professional astronomers. Databases have been partially successful, but they don't present the user with a convenient, all-encompassing book. This is why the DSFG will become as common as nebula filters among the accessories of the deep sky observer.

The DSFG presents a chart-by-chart summary of the pertinent data on every deep sky object plotted in U2000. The book conveniently has the same physical size as the two volumes of U2000. This format ensures that it will always accompany the two U2000 volumes on the observer's book shelf.

The DSFG opens with an effusive endorsement in the Preface, written by senior deep-sky observer Walter Scott Houston. He acknowledges the work of authors James Lucyk, Murray Cragin, and Barry Rappaport as "frontier busting." In the Introduction, Lowell Observatory astronomer Brian Skiff clarifies the

contents of the bulk of the book. He explains the nature of the classes of objects and tells the reader where the data was obtained. Some insights into translating this data into eyepiece impressions prove helpful. The list of references at the end of this section illustrate how much homework was required of the authors.

The catalogue fills out the bulk of the book. For each chart, the classes of objects are sorted out into galaxies, open and globular clusters, nebulae, etc. Within the classes, objects are sorted by catalog name (e.g. NCG, UGC, PK) and sorted in order of Right Ascension. This hierarchy of organization is helpful at home and in the field. On some charts only several objects are plotted. On the other end of the scale is Chart #193, which includes the center of the Virgo cluster of galaxies, and is represented by six full pages of data. Descriptions of each object are written in a user-friendly style. Included are directions to get to even fainter objects than are plotted on U2000.

I recently used the DSFG to work my way through an observing list in the constellation Scutum, which is almost wholly contained on Chart #295. Only about one fourth of the 75 objects plotted on this chart "made the cut" for my observing list. Those five-arcsecond planetaries can be left out! After doing my homework, I went to the field with U2000 and the DSFG. Before observing NGC 6712, a globular cluster located in Scutum, I learned that it would be bright, at a V magnitude of 8.2, and well concentrated with some bright stars ($V=13.3$) that I would be able to resolve. The eyepiece view confirmed the data in the catalogue. The book wasn't "observing the object for me", though. I noticed an abruptly ending western edge to the cluster and a wonderfully rich field of foreground stars. The next day, I was able to compare my notes for Scutum to those in the DSFG, before moving on to compare them with other sources.

The great quantity of good data and ease of use make the DSFG a bargain at \$50. The same can be said for the companion U2000 atlases, priced at \$40 each. The DSFG is an accessory that won't become obsolete in several years. For beginners, the DSFG presents object data in an easily follow form that will encourage them to go beyond the same old Messier objects into the Herschel 400 list and beyond. The DSFG will stand alone for amateurs as an invaluable observing aid for years to come.

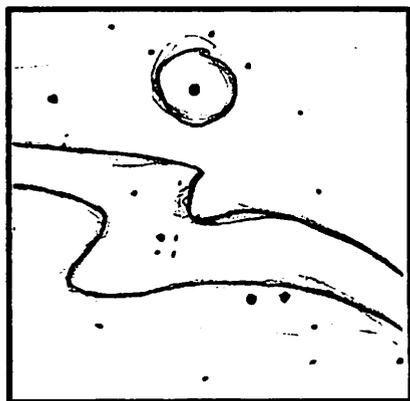
LESSON TWO

STEP THREE:

Outline the Object...

Once you have your stars plotted on your sheet of paper it is now time to outline the object. Outlining the object means exactly what it says, drawing the outer shape of, say, a nebula. This technique is primarily used for sketching nebulae like our target object M42 and planetary bodies, which is as simple as drawing a circle. Very seldom do we use it for galaxies unless it is something like NGC 5128, a peculiar galaxy next to Omega Centauri (NGC 5931) that vaguely resembles a hamburger in space when viewed through a telescope.

Continuing on, we now have the Orion Nebula (M42) through our eyepiece and the stars are plotted on our observing sheet. Now look at the object carefully and make note in your mind the form and shape of it. Lightly form that pattern on your sheet making sure that the object is placed in the exact area of the field in connection with the stars. See the example below...



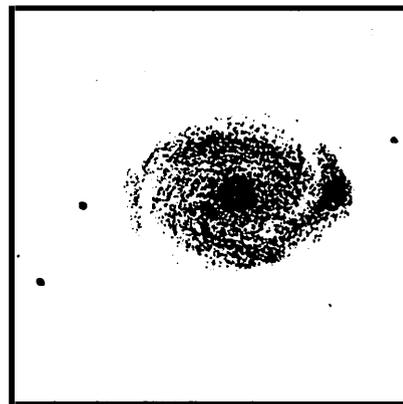
A good way of making sure you do this is concentrating the object in the center of your drawing field and not over at the edge. Another way is to look at the stars around the outside of the object and the stars on the inside of it. This way you can figure out by looking back and forth through your telescope where the perimeter of the object is. This step is fairly simple and quick. In most cases one may skip this section and continue, depending on the object itself. Some objects this step should be used on are M42 and M43, NGC 2023 the Horsehead nebula (if you ever see it), M51, the Whirlpool galaxy, and as mentioned earlier, NGC 5128. Now comes the fun part.

STEP FOUR:

Coloring and Shading...

This step out of all the others takes up probably the most time. Not only must you color it in, but give it texture as well. We'll go through this later on, but now we must begin. Using a fairly sharp pencil—doesn't matter if it's the same one you have been using—use the edge of the tip and slowly shade in the outline of your object. When doing galaxies, M81 for instance, which has a bright core, circle in just the core and with the edge of your pencil lead shade in a small area around it. Whether it's sphere-like or elliptical doesn't matter, just darken it. Now with your finger smudge the lead around until it forms the shape you want. In the case of M81, unless you see detailing, an elliptical

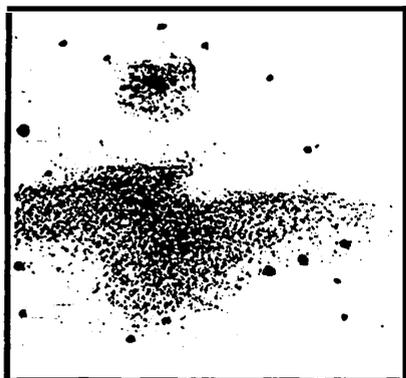
shape. This technique is different when doing a galaxy like M51. You first make the core as before, then, if you have outlined the spiral arms, shade those in. After doing that, smudge the pencil lead around, but note that with a galaxy that has visible spiral arms you want to smudge in the direction that the spiral arms are going. See the drawing of M51 below...



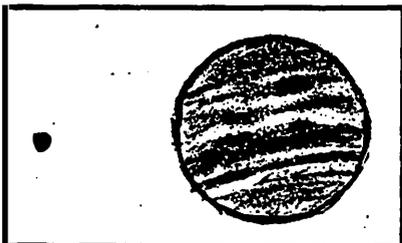
With irregular galaxies that have no noticeable core in them, all you have to do is make an outline of the shape of the object and shade it in, followed by smudging. Galaxies, of all things to shade in, aside for globulars, are by far the easiest. Unfortunately, that isn't the case for nebulae, especially with something like M42.

Going back to where we left off at the beginning, you have just finished shading in the outline for the Orion Nebula and now it's time to give it some texture. Right now, you're probably wondering what I mean about texture. Well, what I mean by that, is that there are different contrast levels in any one object, including galaxies. The Orion Nebula for example, has around three

or four. With that in mind, we have already set up one level by just shading it in. Now look back into your eyepiece and the areas that are brighter compose another level, the same for areas that are darker. So, going on, make darker areas of shading for parts that are bright and erase small portions of an area for parts that are dim. Finally, smudge the lead around until all areas are evenly blended. Note: you might have to continue applying the lead to areas of brightness if you smudge the area and it becomes lighter in contrast. See the drawing of M42 below.

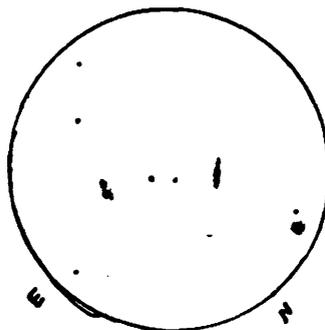


Going away from deep sky objects and coming a bit closer to home, we find planets in our midst. By using the same techniques we discussed earlier in this lesson, it isn't hard to figure out what to do. I'll leave this up to the reader. To aid in this venture, below is also a drawing of Jupiter from a past star party. This concludes Step four.

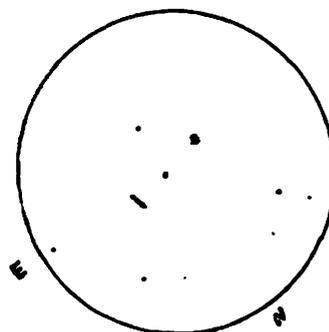


continued from page 3

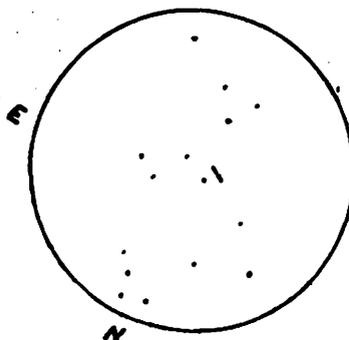
OBSERVATIONS BY MICHAEL P. JANES
16" f/4.5 Newtonian Reflector
Equatorially Mounted



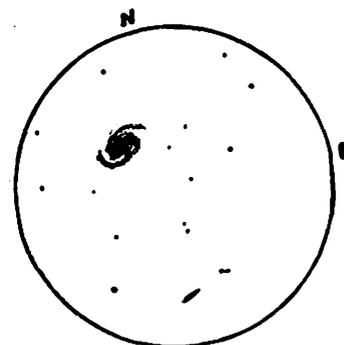
NGC 4111 Group
11.4 mag.
149x



UGC 7089 Anon
13.5 mag. <15 mag.
149x



IC 4617
15.0 mag.
232x



NGC 4725 NGC 4712
10.2 mag. 13.0 mag.
155x

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