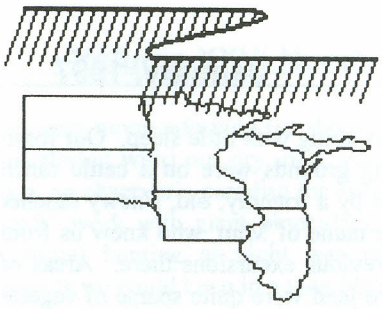


NORTHERN LIGHTS

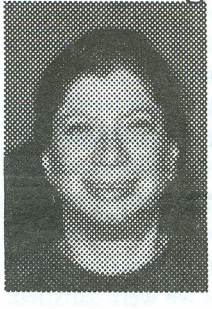
ASTRONOMICAL LEAGUE
NORTH CENTRAL REGION

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Roaming the Region



by Janet Stevens

The Racine Astronomical Society has been busy sprucing up their observatory in preparation for holding the 1997 N.C.R.A.L. Convention in June. The main observatory building has been freshly painted and carpeting has been installed on the floor of the dome. The observing deck is also being resurfaced to stop a leak in the roof.

The Fiftieth Astronomical League National Convention will be held this year from July 1-6, 1997 at the Copper Mountain resort sixty miles west of Denver, CO. This is a great recreational area for the whole family. The skygazers will enjoy observing from the Mt. Evan Observatory at the 14,125-ft summit. Further information will appear in the next issue.

The Sheboygan Astronomical Society is joining forces with the Sheboygan County Amateur Radio Club in constructing an antenna to receive signals from the Mars probes launched in November. Construction of the antenna began in late October. The Sheboygan A.S. is also wrapping holiday gifts on several Sundays during December to help raise funds for their organization.

Minnesota Astronomical Society Member Robert Brose II, is also interested in amateur radio. He has connected his home computer to the Internet via a radio link rather than a telephone line as do most

The 1997 N.C.R.A.L. Convention: Martian Tales and Comet Trails.

The Racine Astronomical Society of Racine, Wisconsin, invites you to attend the Fiftieth Annual Convention of the North Central Region of the Astronomical League. The festivities will begin Friday night, June 6, 1997, with a free barbeque and end Saturday night, June 7, with a fun-filled banquet.

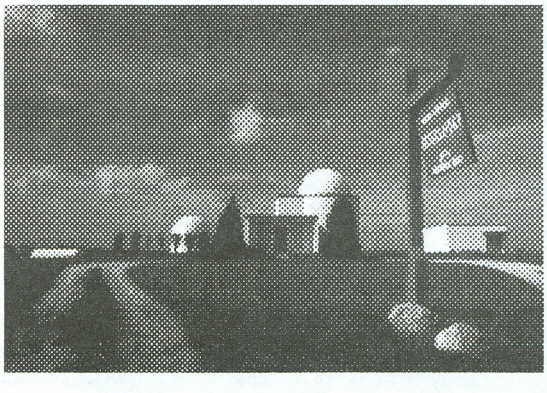
The Modine-Benstead Observatory will be the site of the barbeque and star party/cloud party on Friday night. Hosted by the Racine Astronomical Society, they will be serving brats, hot dogs and all the accompaniments. Be sure to bring along your telescopes and/or binoculars for a night of observing, food, and fun! Low-cost overnight accommodations will be available at the University or a number of motels and hotels nearby.

The convention will be held at the University of Wisconsin-Parkside Campus on the Lake Michigan shore at Kenosha, Wisconsin. Invited speakers include guests from the University of Chicago, and Yerkes Observatory. John Briggs will act as Master of Ceremonies for the banquet and Phyllis Pitluga from the Adler Planetarium in Chicago will be the featured speaker.

For further information, mail your name and address to:

NCRAL Convention
c/o Don or Beth Sorenson
6751 Mariner Drive, #2
Racine, WI 53406

The Modine-Benstead Observatory of the R. A. S. has some excellent instruments that are well worth looking through. We are looking forward to seeing you there!



computer users. His fellow Minnesota A.S. member, Mike Kibat, is organizing a group project to provide support and encouragement toward earning their A. L. observing award certificates. He may plan some regularly scheduled group observing sessions to keep the group focused and energized in that direction. Mike says, "This could be an excellent way for those of you new to astronomy to learn the ropes. More experienced members might enjoy reobserving some old favorites, or meeting new friends."

Northern Lights can be reached via E-mail at 73357.1572@compuserve.com.

A Double Journey Back in Time.

by Randall Wehler
Willmar Astronomical Society



Setting
The Place: Late Cretaceous sandstone outcroppings near the eastern Wyoming Bad-lands outside a small cattle town.
The Time: June 1982
The People: Two brothers caught in time between past and present on a fossil hunting trip beneath the wide-open and uncluttered sky.

The Ford Bronco crossed the Minnesota-South Dakota border an hour or two after midnight on a warm summer night. The change in road surface brought its travelers out of a daydream, trance-like state. My only sibling and I were seated in the front of our "time traveler". Our destination was range land close to the rugged Badlands near a small, eastern Wyoming town. The primary mission was to hunt for fossils from the late Cretaceous period. This is the geological time period during which the dinosaurs are said to have perished, likely due to a comet or asteroid hurling into the Earth's crust approximately 65 million years ago.

Fossil hunting back home in Minnesota left a lot to be desired. Too many glacial deposits from the Ice Ages left very few exposures of fossiliferous sedimentary rock. The journey to our geological fantasy-land farther west had been made maybe half a dozen times before. This year it was a very welcome respite from the demands of my job and a much needed break from college for my brother.

We knew the highways and roadside stops well on the trip from Minnesota -- setting out westerly through southern South Dakota, crossing down into Nebraska to cut across its northwestern corner, then into Wyoming. Starting in southwestern South Dakota, towers and raised fingers of eroded clay blended with the depths of Badlands gullies and dendritic drainage patterns. It was nature's sculpted artwork of many millennia.

This year, our trip included something of a planned diversion to the rigors of searching for fossils. I had brought along my newly purchased 80 mm binoculars to satisfy the appetite of a newly-found interest in astronomy. What better chance would I have to see the night sky in sparsely settled country with hardly any light pollution and having skies clearer and less humid than back home?

Mid-afternoon brought us to the large ranch site that had haunted our thoughts almost the entire trip, a vision that had kept us going with little sleep. Our fossil hunting grounds were on a cattle ranch owned by a friendly, old, sinewy rancher by the name of Mim, who knew us from our previous excursions there. Areas of pasture-land were quite sparse of vegetation among the eroded land forms. The cattle needed vast areas of grazing land to reach their market weight. A herd had congregated on a distant hill as if to herald our arrival, curiously raising their ears and staring. The churning sound of several small oil well pumps reminded us of unseen fossil fuel lying dormant beneath our feet.

We pitched our tent early that first day. Late afternoon and early evening allowed us a chance to scout out the landscape that seemed so different each year we came. No, the topography had not changed *that* much from year to year, but trying to remember how the undulating relief of the land was laid out was the challenge.

Our "pay dirt" would be weathered-out fossils given up by the sandstone rock that had entombed them for 80 million years. These were the rock beds where Triceratops dinosaurs' skeletal remains had been discovered in the 1800's. After a week of diligent searching, our "pickings" were typical of other years. This included finds such as crocodile teeth, garfish scales, bony armor plates, several small mammal-like jaw sections, a handful of Triceratops teeth, and several prized reptilian claws among various other treasures. Again, we would not make the cover of a natural history magazine by a "big" dinosaur find, but we were satisfied.

Dark, cool evenings contrasted well with the warm, sunshiny days. Luckily, there were few clouds both day and night during that week. This trip had been planned to allow no more than a waning or waxing

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Articles and ideas for articles about any astronomical topic of interest to amateur astronomers are invited and should be mailed to the above address or e-mailed to 73357.1572@compuserve.com. *Northern Lights* is edited by Berton and Janet Stevens. All material is copyright 1997 by the authors and used with their permission.

crescent moon adorning (or should I say, interfering with) our dry, dark skies. At last, an observer's paradise for our "night shift" work with giant binoculars! Our celestial hunting at night was not for objects we could keep in a tangible sense, like our fossil specimens. The night would allow only memories that we could keep to take home with us.

The constellation outlines looked much the same as they did back in Minnesota, but many more stars were discernible. Sporadic meteors seemed much brighter, with longer trails. Stars were more readily visible close to the horizon. Naked-eye objects the observing books talk about seemed a lot easier to snap up than back home.

The 80 mm binoculars really came into their own. Galaxies that I could not pick up even in rural, central Minnesota were now sometimes seen in these kinds of sky. It was only the need for sleep that ended our nightly work under the stars.

Our existence that week seemed sandwiched between the two halves of a sphere: a terrestrial (Earth) half and a celestial (sky) half. Both yielded stories of happenings from many, many years ago. The fossils told their story of life's development, struggle, extinction, triumph, and descension. The giant binoculars allowed the heavens to reveal a story of large-scale cosmic events of many (even millions of) light-years away, now viewed by us through photons striking our eyes at 186,000 miles per second.

It struck me how the multimillion year old fossil I held in my hand had belonged to a living animal at a time when light from some of these distant galaxies was just beginning its vast journey to strike my retina at *this* time and at *this* place. I felt mysteriously condensed on a time continuum by glimpsing (through astronomy) and hunting (through paleontology) backward into the past, realizing my "here and now" reality, and speculating about what would yet be. Simultaneously, past, present, and future seemed merged together, blended for an instant. To this day, I still occasionally experience this feeling when observing the night sky, but not as fully or deeply as when my brother and I journeyed backward in time on a combination fossil hunting and celestial observing adventure.

(Ed. Note: The author wishes to acknowledge the typing assistance provided by his wife, Carla Wehler, in preparation of this article.)

Helping Them Connect the Dots

By John L. Jones
Cernan Earth and Space Center



Having taught constellations and their myths to children and adults for many years, both in planetaria and out of doors, I have come at last to recognize a stumbling block in their learning process. It is a thing we in the field never notice ourselves, but it is a dark tripping-stone to novices. You get a glimpse of it whenever a new sky-watcher says to you "How did they ever see a dog in those stars?" after you have pointed out Canis Major to him or her. It is here that learning stops and confusion begins and this is an embarrassment to all.

While it is true that some planetarium sky projectors have an all-sky constellation figure projection globe that impressively overlays all the stars, I have found that it does not solve the problem. It can even make matters worse, when the newcomer is convinced that he or she cannot see the connection between the stars and the purported person or object.

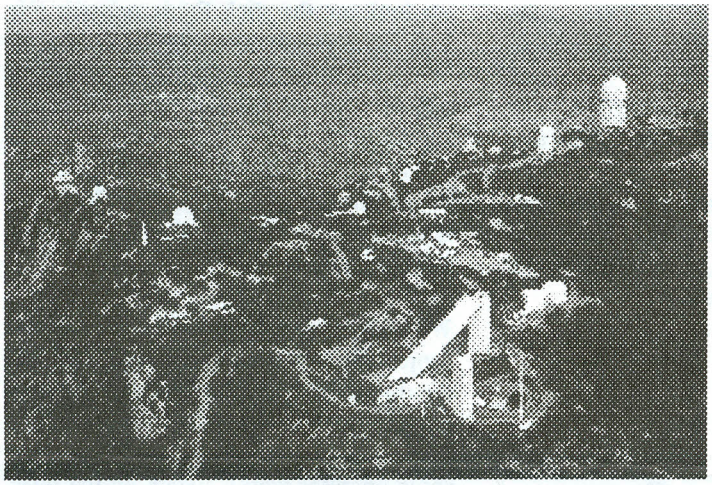
This is a problem of perceptual learning. We have so accustomed ourselves to seeing the latticework of lines connecting the star groups that whenever we look up, the stick-figure patterns just leap out at us unbidden. For us there is no conscious effort to effect their recall, but not so with the public! For them, the translation from stick-figure to constellation is almost impossible. Short of handing out planispheres and red flashlights, there is a way around this tumbling block.

We need to have fabricated a new, all-sky projection sphere on which are graven all the dim lines connecting the stars in their familiar patterns. The lines would approach, but not touch, the stars. The show operator would switch on the lines first and then the constellation drawing itself to flesh out the lines.

Whether you are in a planetarium or under the actual sky, it is a difficult task to make the leap from an unfamiliar star field to the fully drawn constellation figure. If you reflect upon your early training, the constellation lines connecting the dots in all your books and charts were indeed part and parcel of your own learning process.

All we have to do is convince a planetarium-projector manufacturer such as Zeiss, Spitz, or Goto, to work up such a device, test it, and offer it as an improvement on their apparatus. This





An aerial view of the Kitt Peak National Observatory complex about 60 miles southwest of Tucson in southern Arizona. The McMath Solar observatory is in the lower right while the Mayall four-meter telescope is in the upper right.

would be a great step forward in helping the neophyte astronomer to visualize the constellations from the star patterns in our sky.

Dinner and a Few Stars

by Bert Stevens

Next time your spouse says that you should go out to dinner together, agree on the condition that you pick the place. Then call 520-318-8726 and make arrangements to visit Kitt Peak for a night of food and (gasp!) observing! The Visitor's Center at the Kitt Peak National Observatory (KPNO) was recently renovated. A number of new exhibits were created and a 16-inch telescope is now available for use by the public.

KPNO is continuing its traditional daytime walking tours, so you can still visit the many telescopes, including the McMath Solar Telescope and the Mayall 4-meter reflector. Daily guided tours begin at the Visitor Center at 10:30 a.m. and 1:30 p.m. Tours last approximately one hour and are limited to 30 participants. In addition, visitors are welcome to take a self-guided tour of the Kitt Peak facility daily from 10:00 a.m. to 4:00 p.m.

But the high-class affair is the nightly tour that starts a half-hour before sunset and lasts for three hours.

The night tour starts at the renovated Visitors' Center with a 25-minute video. This tape explains the basics of astronomy and telescopes, explaining stars, galaxies, and other celestial bodies. It also discusses how to use both telescopes and binoculars. It provides a backdrop for what is to come.

As the day fades into twilight, the night tour participants move outdoors. Kris Koenig, Visitors' Center Administrator, recounts constellation myths and folklore about the sky as the group views the sky through binoculars.

Kitt Peak is located on the Tohono O'odham Indian Reservation, and Koenig includes some of the Tohono O'odham sky folklore. After a time under the sky-dome, the group moves into the observatory dome of the 16-inch visitors' telescope. There Koenig points the telescope at various celestial objects while discussing stellar evolution. This is a wonderful opportunity for you to observe from near the 6,875-foot summit of Kitt Peak.

About 50,000 people have visited Kitt Peak in each of the past three years. In the early 1980s, 100,000 people visited the site annually. The renovated Visitors' Center and the nightly tours are two steps toward bringing the tourists back to the Peak. Koenig thinks that newer southern Arizona tourist attractions such as Biosphere II, have drawn people away from KPNO. "We have to get competitive, and that's what we're trying to do," he said.

Seven new exhibits have been added to the Visitor's Center. The "Light Path" exhibit provides an interactive optical bench that allows visitors to learn how a telescope gathers light and magnifies an image. A pegboard game allows children to project an image of an apple onto the image of a racoon-like mammal native to Kitt Peak, the coatimundi, using mirrors and prisms.

The gift shop has also been redecorated and restocked with more high-end products. The renovation has left it a brighter and friendlier place.

If you go to KPNO, be sure to bring warm clothing. It is 15 to 20 degrees cooler on the summit than in Tucson. People with cardiac, respiratory or other health concerns are advised to notify the Visitors' Center when making reservations. The nightly stargazing tour costs $35 for adults, $25 for children under 18, students and seniors. A family of four can participate for $100, or you can reserve the whole dome for $600. Maximum group size is 20 people. Kitt Peak is open to the public daily, except Thanksgiving Day, December 24 and 25, and January 1.

More information and reservations for the nightly tours can be obtained by calling 520-318-8726. Clear skies!

(Our thanks go to Don Tate for bringing this news item to our attention. -Eds).

Telescope Myths.

by Ron Parmentier
Neville P. M. A. S.



Long-focal-ratio telescopes are best for the planets:

Keep in mind that what you need is extremely good optics for crisp planetary images. Presently there are new-generation apochromatic refractors in the f/5 to f/9 range that are often on a par or better than the old f/15 refractors. When it comes to Newtonian reflectors, what you want is a small central obstruction. I think you will find an 8-inch f/8 Newtonian superior to an 8-inch f/10 Schmidt-Cassegrain for planetary observing.

Some purists maintain that f/6 Newtonians need such short eyepieces (4mm) to get the high power necessary for magnifications for the planets. But today there are good top-grade multi-coated barlows that will not degrade optical performance. As was said at the beginning of this item, optical quality rather than telescope type is the more important factor.

Also, there is another myth on focal ratios related to performance. Long-focus 'scopes are supposed to yield higher contrast than short-focus models. Again, what you need is good baffling to reduce scattered light and quality optics and as a result you should not detect any difference between an f/7 or an f/12 system with the same magnification.

Making high-quality telescopes that are properly baffled for planetary use is harder than making general purpose models.

Splitting close doubles is a test for good optics:

Even I thought that was the case, but it is not conclusive. Sometimes inferior optics can split a double star that a good optical 'scope shows as barely double. How is this so? The answer lies in the Airy disc.

As you know stars at high power are not points but are tiny discs. This disc is known as the Airy disc. Now a good 'scope puts as much light as possible into the Airy disc. If you have perfect optics that translates to 84% in the Airy disc and the other 16% goes into the surrounding diffraction rings. So what we have here is a miniature bulls-eye. With poor optics, more light goes into the rings and therefore less into the Airy disc.

For example, ¼-wave optics puts 68% of the collected light in the Airy disc and 32% into the rings. The result is that the Airy disc decreases in size that can help split a double star, especially if the components are of equal magnitude. Yet seeing the double, is not a full test. One must keep in mind that for good overall resolution of detail in extended objects, you want to get as close to 84% of the incoming light in the Airy disc as you can get.

The conclusion is that you should look to the planets for fine detail. Hence, Mars, Jupiter, and Saturn are the real test objects.

As a post script on this point, I often looked at the planets as a test. When I would look at doubles, I often had to say that they did not always look that perfect. I often thought something was wrong when double stars or single stars did not look as perfect or of the same test quality as the planets. I thought it was an alignment problem, etc.

Good optics are not needed for deep-sky viewing:

Yes you can use less expensive optics, but elements of structure will become more apparent and less of just a grey patch of light with better optics.

The real difference will be in contrast. To see deep-sky objects, you need contrast between the object and the sky. Better optics will also improve star images so that stars will be pinpoint specs and not bloated fuzzballs. Fainter stars will be visible as well.

Telescope tubes should be white:

Not long ago telescope tubes were always white. White is "clean", the color of lab equipment and other scientific apparatus.

White reflects heat which is important because if the air inside a telescope becomes too warm, it can blur the image. So white seemed a logical color. But look at the current colors of tubes: yellow, orange, blue, black, etc.

What happened? Probably marketing. Certain 'scopes can easily be recognized now by the color of their tubes.

Still, what about white? Is it a good choice? Not!

The best color is black. The instrument's

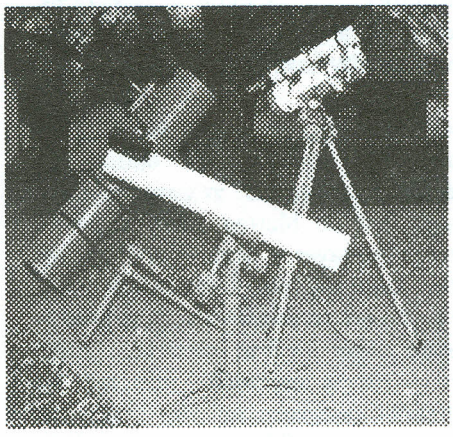
Ode to my Telescope

by Roger Curry and Craig Nance

I think that I shall never see
A scope that's lovelier than thee,
With beauty, elegance, and grace,
Reflecting photons toward my face.

When I show the Moon so bright
To those who stroll about at night,
Thy highest praises they do cheer,
Because you make it seem so near.

When the Sun has gone to bed,
To starry sky I lift thy head.
And when we're far from city's glare,
The dimmest galaxies we share!



Alas, to criticize is tough,
But here it is-you're not enough!
I swear I hear the Horsehead's call,
And thy speculum is too small.

And so, Away, my pretty lass,
Mine eye is fixed on bigger glass.
A fever in my heart ignitith--
I'm consumed with two-inch-itis*!

**Two-inch-itis: the mistaken belief, held by many amateur astronomers, that they would be perfectly happy with their telescope if it only had two inches more aperture.*

temperature should be very close to that of the surrounding air. The best color to promote heat loss is black. It absorbs heat more readily, but it also radiates heat rapidly. Thus the 'scope settles down more quickly.

Note also that a dark tube (with Newtonian models especially) also maintains the observer's night vision. You do not want to be looking at a white tube as you approach your telescope or with your other eye (the non-observing eye). It is very distracting with deep-sky objects.

Closed tubes are better:

Telescopes with closed tubes are usually refractors, Schmidt-Cassegrains, Maksutovs, and the like. Newtonians and others usually have open tubes.

Closed tubes sound good. After all, the closed tube protects the optics, but remember it also seals in warm air. The image will be blurred when it passes through this layer of warmer air inside the tube. Since the tube is sealed, the warm air is trapped, so you must wait an hour or maybe longer for it to match the outside air. This is especially true for the Schmidt-Cassegrain and the Maksutov. The refractor is different in that the light immediately bends away from the offending wall down to the focus. Moreover, light from the refractor only travels once down the tube. The others mentioned above have multiple light passes that increase the distortion by waves of heat.

Thus it is not the closed tube that gives it the freedom from tube currents but the nature of the light path that gives it freedom from tube currents that led to this myth.

A telescope mount must be level:

The leveling of a tripod is often drilled into the backyard astronomer as essential. Manufacturers even supply bubble levels to help get everything just right. But it is all bunk. To polar align even for photography simply requires that the polar axis be aimed directly at the celestial pole. Although leveling adjustments are not imperative, they can help aim the polar axis correctly.

The clearest nights are the ones with the best "seeing":

This common misconception among beginners stems from a misunderstanding of what "seeing" means in astronomy. It refers to the steadiness of a telescopic image, not to the clarity of the air. Stars twinkle vigorously on nights with fair or worse "seeing". Wind is usually accompanied by agitated atmospheric currents and poor "seeing". Invariably, the "seeing" is worse toward the horizon and better overhead due to the quantity of the Earth's atmosphere that must be penetrated before reaching the telescope.

On an otherwise wonderful, clear night, the deep sky observer can be plagued by rotten "seeing" that bloats star images and smears galaxies. The result is a loss of detail and a cutback of as much as a magnitude or two in the faintest star visible. The faintest deep sky objects can be seen only when skies are clear and "seeing" is good. The clarity of the air is called transparency. It is classified by the faintest naked-eye star visible near Polaris. At any particular site, a record of the faintest star visible in the polar region will give a good comparative gauge of conditions at that site. Outstanding transparency will yield stars in the 6.2 to 6.8 magnitude range. Of course it depends on the activity of the observer's eye as well as the site.

(Ron Parmentier was the recipient of the 1993 North Central Region of the Astronomical League Award. Reprinted from The Eyepiece*, the newsletter of the Neville Public Museum Astronomical Society.)*

Universe '97: The ASP comes to Chicago

The 109th Annual Meeting of the Astronomical Society of the Pacific will be held at the Hyatt Regency-Chicago from June 27 to July 2, 1997. One of the Annual Meeting's most popular events, Universe '97-- the weekend of June 28 & 29, 1997-- is an astronomy exposition and fair co-hosted by *Astronomy* Magazine. Noted astronomers from around the country will offer non-technical talks on the latest exciting discoveries in the exploration and observations of the solar system. There is an exhibit hall filled with the newest advancements in telescopes, software, books, and gift items.

Many current and historical topics, will be covered by almost twenty speakers over the weekend. For anyone interested in astronomy and space exploration, this weekend is a unique opportunity to listen to and talk with some of the leading scientists and amateurs in the field, and to meet other people from around the country with similar interests.

Other major components of the full week-long Meeting include: the Friday Night Public Lecture by a special guest TBA, a two-day Teacher's Workshop, a Project ASTRO Astronomer Partners Program Workshop, a two-day Community College Symposium, a two-day History program, tours to Yerkes Observatory during its centennial, and the three-day Scientific Symposium: Astrophysics from Antarctica.

For more information about the weekend, contact: The ASP Meeting Planner, Laurie Keechler, at 390 Ashton Ave., San Francisco CA 94112 or Fax: 415.337.5205. Check out our Web site at www.aspsky.org and click on the Annual Meeting page for more information.

Dan Koehler
Astronomy Magazine