

THE FOCAL POINT

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January 1992

PROGRAM NOTES

by Bud Rosser

Job #1 for the new year is to thank some folks who deserve it. To David Coffee for the fine fare at the December meeting & to Don Hall for his muscle, such as it is. Further thanks to Dr. Rick Willamon for producing what I feel was the most interesting Christmas Program at the Cherry Planetarium I've ever seen, and additional thanks to our guide through the ages for the evening, Ms. Anita Kern of Fernbank.

What to do in January? How about joining me and a number of good friends on Friday, January 17th at eight o'clock at the Bradley Observatory at Agnes Scott College? Not only will we chat and discuss issues of universal interest, but we will also talk about our neighborhood, the solar system. We will concentrate of differences between that witnessed on Io and that seen on Earth. Slides and a video presentation should quench even the most thirsty for steam, heat and fire. See you there!

A REFLECTOR AND REFLECTIONS

by Dave Riddle

Perhaps some of us are born with an obsessive drive to watch the skies. How many of us instinctively tilt our eyes skyward when stepping outdoors? Often we are rewarded with a sight of something unusual, maybe a corona ringing the moon, an odd coloration of the sky, or even a sundog. Amateur astronomers are among the most meteorologically aware group of people I have ever met.

It has been said that the moment of sunset is the most dramatic time of



day. I think this is not altogether true, for sunset is but a prelude to the night, an almost mystical revelation of the stars. It is true that on a clear night you can see forever. We can see our destiny in the sky but not as astrologers claim. Here we can see some distant generation's home, a house of stars. It seems almost certain to me that mankind must one day ascend the long staircase to the stars.

The constellations bear strange names linking us to our collective past. Represented in the sky are figures that were prominent in past cultures — kings and queens, warriors, a physician, a herdsman. Some constellation's origins are obscured by time. Ursa Major, the great bear, despite its Latin name, probably dates back to the bear cults of the Ice Age cave dwellers.

I paused to comprehend the sights I beheld one night at the Villa Rica Observatory. The Pleiades were just beginning to clear the sky glow to the east. This young cluster is still immersed in the nebulous clouds of its origin. The Merope nebula is one of my favorite objects to seek and observe, though it is not easy to see. Here I can almost visualize the birth of stars from the interstellar cradles of dust and gas.

Overhead, Cygnus winged its way westward. Here a phantom arc of light haunts the stars, the ghostly remnants of a dead star. The Veil nebula defines the shock wave from an ancient supernova explosion. The

20 inch reflector shows the subtle, twisted, tortured details of the Veil, bespeaking of the incomprehensible energies sweeping space.

I think it is important to prepare yourself to observe the sky, and I don't mean just wearing the proper clothing or allowing your eyes to adapt to the darkness. I mean it is important to mentally prepare, for only in the sky do we confront such enormous scales of energy, time and distance. Take the time to see what you observe. Details will slowly reveal themselves that are impossible to see at first glance. The universe is not in a hurry, and we shouldn't be either.

SKYGLOW CAUSED BY STATIONARY OUTDOOR ILLUMINATION IN THE ATLANTA METROPOLITAN AREA

by Tom Buchanan

The nighttime sky is brightened by man-made lighting. Some of this brightening is due to light reflected from objects when their illumination serves a useful purpose. However, much of this brightening is caused by light directed into the sky from the lighting fixture. This light is wasted, since no useful purpose is derived from it. Skyglow is an environmental problem from at least two perspectives; (1) wasting energy fuels to produce the useless light, and (2) destroying the part of the natural environment which includes the night sky.

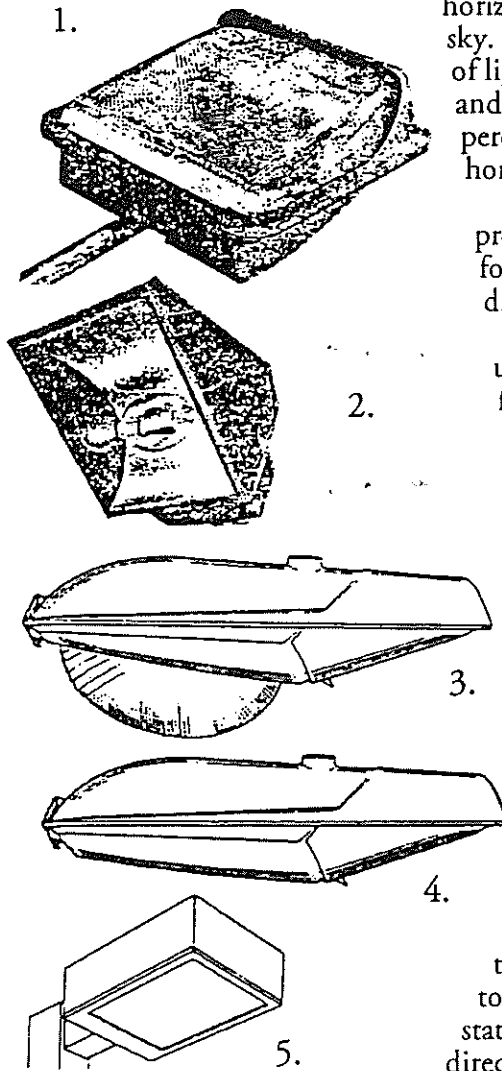
The aesthetics of the starry heavens are part of mankind's heritage and have inspired many people of all ages. In addition, both professional and amateur astronomers study the various celestial bodies and gather

valuable scientific data. However, many outdoor luminaries shine much light directly into the sky, causing a perpetual artificial twilight, and interfering with views of the stars. At Atlanta's latitude, if there were no man-made lights, the sky would get continuously darker for an average of 90 minutes after sunset. Actually, within most of Atlanta, the sky ceases getting darker in only 45 minutes, when the sky is still too bright to allow the Milky Way to be visible. The skyglow seriously diminishes views of the stars not just within Atlanta, but within 30 miles outside the I-285 perimeter highway.

The proportions of skyglow caused by various categories of outdoor luminaries in the Atlanta metropolitan area have been quantified. There are types and applications of outdoor lighting which can be restricted both in direction of pointing and in hours of operation, without diminishing the intended utility of this lighting. Today's technology has made available well designed lighting fixtures which can illuminate the intended object efficiently while preventing any emission of light above the horizontal. Automatic timers which can turn off certain lights during the time while they are not needed are available.

Several examples of common light fixtures are depicted above and described; including the percentage of light directed above the horizontal plane and into the sky:

1. An upward pointed lamp on billboards is usually either a mercury vapor or metal halide lamp. The percentage of light directed onto the billboard is 25% and the percentage of light directed into the sky is 64%, according to derivation.



2. Floodlights pointed at various angles below the horizontal direct various percentages of light into the sky. About 25% is assumed for an average. This type of light fixture is used primarily at car dealerships and at fast food establishments. It directs a high percentage of light into the sky when pointed nearly horizontally.

3. The cobra head semi-cutoff light fixture predominates in roadway lighting; it is also used for parking lots and for area security lights. It directs about 5% of the light into the sky.

4. The cobra head full-cutoff light fixture is used in some roadway and street lighting. This fixture directs about 1% of the light above the horizon.

5. The shoe box full-cutoff light fixture is used in some parking lots and at some car dealerships. This fixture directs no light above the horizon.

The total light in the Atlanta metropolitan area sky is 1,540 million lumens. Of all the light directed skyward, upward shining lights of billboards and expressway signs provide about 57%.

The percentage of light directed into the sky from various applications is shown in Figure 1 on the next page. Billboard lamps provide 50% of all light which is directed into the sky, even though they provide only 7% of the total lumen output. In similar proportions, interstate highway signs provide 6% of the light which is directed into the sky, even though they provide only 0.8% of the total lumen output. Streetlights provide 33% of the total light which is directed into the sky.

Figure 2 shows the contribution of each light source to skyglow. About 57% of skyglow is due to streetlights of all kinds and 23% is due to billboard lamps.

The fraction of light which is directed into the sky from lamps mounted along the bottom of signs, such as billboards and overhead freeway signs, is 64%. No other commonly used lamps direct as high a fraction of light into the sky. Therefore, the skyglow caused by these sign lights are much higher than their proportion of light output.

The approximate total light output in the Atlanta metropolitan area is estimated to be 6.6 billion lumens. If all outdoor lighting fixtures were shielded and pointed to prevent directing any light above the horizon into the sky, 40% of the existing skyglow would be eliminated. If 75% of the non-roadway lights were turned off after business hours, another

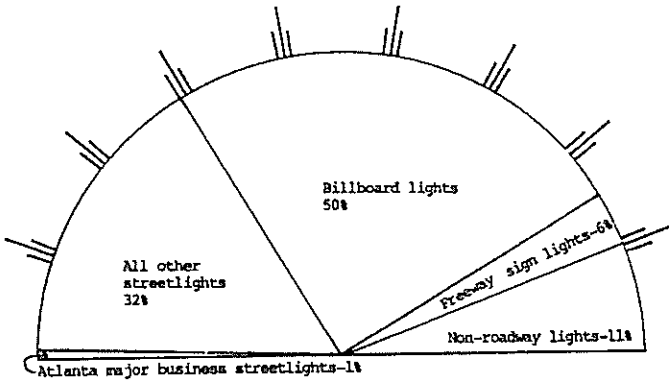


Figure 1. Percentages of Light Directed into the Sky

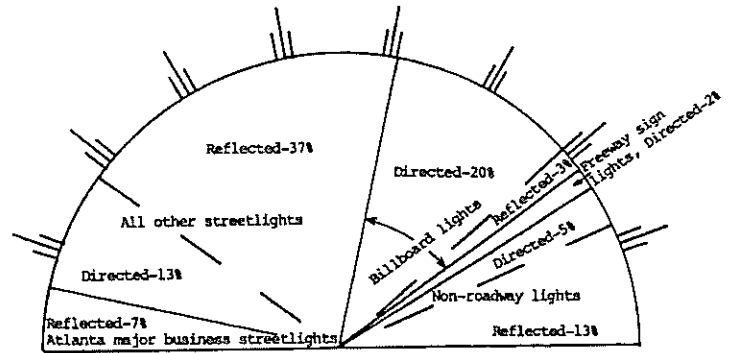


Figure 2. Percentages of Light Causing Skyglow

10% of the original skyglow would be eliminated, for a total decrease of 50% from the existing skyglow.

Without impairing the utility of illumination, the skyglow can be reduced by pointing the lamps downward, and by using shields which cutoff all light directed above the horizontal, as follows:

MODIFICATION	% REDUCTION
1. Shielding streetlights -----	13
2. Pointing billboard lamps downward -----	20
3. Pointing interstate sign lamps downward -----	2
4. Pointing non-roadway lamps downward and shielding them -----	5
5. Turning off 3 out of 4 non-roadway lights after the affected businesses close, or after 11 P.M., if later: -----	10
6. Many of the interstate highway streetlights are being turned off due to lack of funds for electric power and for maintenance. The total number of lamps is 16,0000 with Atlanta's share at 12,000. Reflected lumens are -----	4
TOTAL POSSIBLE REDUCTION OF SKYGLOW -----	54%

The Focal Point is published monthly by the Atlanta Astronomy Club, Inc. The AAC is a non-profit organization dedicated to the advancement of amateur astronomy. Meetings are held on the third Friday of each month (the second Friday in December) at the Bradley Observatory on the Agnes Scott College campus. Dues are \$35 annually and include a subscription to *Sky & Telescope* magazine and use of the observatory in Villa Rica.

Submissions: Article submissions are welcome and encouraged. Please deliver to the editor for consideration. Electronic submissions are accepted at mike@beow.uucp. The submission deadline for the next issue is *February 8*.

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CLUB DISCOUNTS AVAILABLE

Several members have inquired about the notice that appears on your *Sky & Telescope* renewal notice about ordering books and atlases through the Club at a discount. I am glad that you asked! We are pleased to be able to offer this service to our members. The discounts generally range from 12 to 23%. Many of these publications appear in the *Sky Publications Catalogue* which most of you receive regularly.

We will place an order once a month, usually a few days after each club meeting. Payment must be made in full at the time of the order. The publications should be available for distribution at the next club meeting. *[Editor's Note: The Astronomical League has a service which entitles you to a 10% discount on any astronomy book. Read your Reflector or call an officer for information.]*

The Club Treasurer, Jackie Cochran, will have a list of publications available and their prices at each club meeting, or you can contact her (evenings) at 955-0145.

OBSERVING SESSIONS AT VILLA RICA

Future observing sessions have been scheduled for the following date:

Saturday, February 1st, 1992

It is strongly recommended that you call Bill Snell at least one week prior to any observing session to let him know you are going to attend. You can still come to the observatory if you do not call but he will not be

able to inform you of changes due to weather. Also, he will have some idea how many people to expect and hopes to plan better sessions as a result.

If none of the sessions listed above are convenient because of work, school or baby-sitting problems, please let him know and he will try to work around your schedule, if possible.

Binocular Messier Objects for January which are visible are M-2, M-15, M-31, M-32, M-33, M-34, M-52, M-103.

Recent Observations

There have been several major meteor showers in the last couple of months. First, the Geminids in December were rained out on the night on maximum, but the next evening provided me with about 20 per hour in the wee morning. I also persevered to see the Quadrantid shower early in January. This shower only has a four hour maximum, which happened to be timed just right for East Coast observers. At 3 a.m. it was cloudy, but a 4 a.m., clear, windy skies prevailed. I saw about 15 per hour before it clouded up again at 5 a.m. The brightest meteor I saw on either night was -4. I did see a -1 magnitude Geminid which left a 6 second train. — *Mike Kazmierczak*

Congrats to AAC member Phil Bracken! He just earned his Honorary Messier Certificate. That's right, he's seen all 109 Messier objects. His next goal is the NGC Catalogue!

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