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# THE FOCAL POINT

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## CLUB CALENDAR

**Next Meeting:** September 21, 1990, 8:00 p.m. at Bradley Observatory on the Agnes Scott campus.

**Program:** Carol Hickson, Aerospace Teacher at Fernbank Science Center and finalist for the ill-fated Teacher-In-Space program, will talk about her NASA training, her views on the Challenger accident, and about the future of space exploration.

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*Contributing Editors:* ..... Dr. Ralph Buice, Hal Crawford

The Focal Point is published monthly during the academic year 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@mathcs.emory.edu](mailto:mike%beow.uucp@mathcs.emory.edu).

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## MY FIRST USE OF A TELESCOPE AS A CAMERA LENS

by Larry Daniel

Three years ago in 1987 I took my first photograph of the sky. At that time I simply used the camera atop a tripod with a 70 mm lens focused upon Jupiter and its moons. The result was a slide that when projected against a far wall showed a terribly overexposed Jupiter and a wondrous set of moons. I was instantly addicted to this arcane art of catching images of the sky. Yet it would be three long years before I would get to try the exciting prospect of photography through a telescope. And now thanks to the Atlanta Astronomy Club and the club's observatory I have successfully photographed the Moon and not so successfully captured Saturn through a telescope. I intend to recount my adventures hopefully to inspire others in the club to join in the fun of astrophotography. If you are like me, you stare in awe at the photos made by other amateur astronomers that show up in the Gallery section of Sky and Telescope magazine every month. You wonder how it is possible to obtain such wonderful images with amateur equipment. Well, I decided to find out. I looked for books, articles, anything to give clues to how to proceed. All I found were clues. Astrophotography is even more esoteric than amateur astronomy and information is hard to come by. Even so, the basic idea is simple — I decided to learn those tricky details the hard way. The clues did tell me that I needed fast film, a way to attach the camera to the telescope, a camera and a telescope. My wife provided a very good camera — a Minolta Maxxum 7000. Kodak provided a fast color print film — Ektar 1000 ASA. The Club had the telescope and the Lumicon Easy-Guider that allows attachment of the camera to either the ten or twenty inch scopes. I purchased a T-ring which adapts the Minolta lens mount to the Lumicon Easy-Guider. T-rings cost about ten to twenty dollars. I also purchased a remote shutter release cable for the camera that allows taking the picture without disturbing the camera.

Then my family packed the bug spray, camera and trekked the 54 miles to Villa Rica to the observatory. Labor Day was fairly clear and I knew the moon was nearly full and would be an easy target. I figured that I would start with the moon just to test the equipment. My wife just wanted to see the moon through the telescope and my 1 1/2 year old son Kevin just wanted to be around us. The first order of business was to connect the camera to the telescope. With some trepidation I connected the camera body to the T-ring and the T-ring to the

Easy-Guider — it fit! After the Easy-Guider was attached to the telescope, I was set. I quickly aligned the monster 20 inch telescope with the moon. My wife was amazed at all the craters (I think she is hooked.) I could easily see the moon through the camera eyepiece. The moon totally filled the frame and was very bright. It was so bright that the camera was telling me that it didn't have a fast enough shutter speed even at 1/2000 of a second! That was my first surprise. The combination of the 1000 ASA film, the 20 inch aperture, and the full moon was too much for the camera.

I had two choices, to take pictures of only part of the moon or to cover up part of the telescope's 20 inch aperture. I tried both with good results. Since I had plenty of light I just let the camera's autoexposure controls tell me when the shutter speed was within its range. First, my wife held a piece of cardboard over about one third of the telescope's aperture. This darkened the image enough so that a shutter speed of 1/2000 of a second could be used. I carefully focused the image and pressed the shutter release. I then tried two pictures of just half of the moon. After being blinded by the brightness of the moon I looked for another target.

I had 20 exposures left on the film. The brightness of the almost full moon totally washed out the sky. I could only see about 1st magnitude stars. I could also see Saturn due south and about 45 degrees above the horizon — a perfect target. My wife liked Saturn even more than the moon. But I noticed very quickly that this would be a more challenging target. First, Saturn is much smaller than the moon. It filled only a very small area of the frame. I could easily see the rings and the gap between the rings and I could also see Titan, the large moon of Saturn. Focus was very difficult. Achieving correct focus is difficult with such a small, dim image, but with care it is possible. The Minolta fortunately has just a frosted glass focusing screen. This is the best type of focusing screen for astrophotography according to the books I had read. I also had no idea what kind of exposure time I needed for Saturn so I decided to bracket what the camera suggested. I had reason to believe that the camera would be wrong as it basically averages the light in the screen and would probably overexpose the image. The camera suggested 8 seconds so I tried 2 through 16 seconds in 2 second intervals.

We were done for the evening. I quickly used up the remaining exposures on conventional subjects and the film was developed at Wolf camera. The results were better than I expected. The moon pictures are fabulous. The full frame image of the moon is perfect. The Ektar film has wonderful color and is quite sharp for such a fast film. The pictures of Saturn are all overexposed. Saturn turned out to be a yellow-white oval, but I could identify 5 moons at least. I need to check a star chart before I can verify the moons and perhaps others. I estimate that I needed about a 1/125 second exposure for Saturn [*Sounds correct* — Ed.] I plan on buying

a book that lists exposure times for common astrophotography targets. I proved that astrophotography is possible with easily accessible equipment here in Atlanta. The 20 inch telescope with 1000 ASA film seems to be a very strong combination. I can't wait for the new moon! I'll keep you posted.

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### FROM THE PRESIDENT

by Hal Crawford

This is the first of what I hope to be a monthly feature in the Focal Point — a message from the President indicating what is happening in the Atlanta Astronomy Club. As things go, I am once again "on the road", and I am actually writing this column on a portable PC while traveling to Salem, Oregon. Since this needs to go to press before I get back, I'll be electronically transmitting this directly back to our intrepid editor Mike via modem. Isn't the 20th century wonderful? [*He did. It is. — Ed.*]

Since in the last month's issue I talked about my travels to St. Louis, you may get the idea that I'm on the road more often than not — let me just say that I really don't travel all that much, but things have been busy at work lately, so off I go! Hopefully things will soon settle down and leave me with a normal 40 hour week.

As we move to a new year, I want to thank all of the officers of the AACFY 1989-90 — most of them put in many hours of hard work for the club. This year we have an excellent slate of officers who I know will do amazing things for the AAC, and I have already been approached by several volunteers with new ideas that will make the difference between this year and years past.

There will immediately be changes that you will undoubtedly notice — we will have more observing sessions, more activities, and more opportunities to learn about the heavens. There will be changes that only some of you may notice: astronomy equipment will be better maintained, a gradual but strong increase in membership. You can count, however, on 1990-91 being the best year ever for the Atlanta Astronomy Club!

I'm not just saying this because we have the best group of officers; I'm saying this because I know that every member will want to work and stand behind what this club stands for. Because the better this club is, the more interesting, and more exciting astronomy will become. Not just for us, but for everyone in the Atlanta area with any interest at all in the night sky.

As members, we have a common interest — astronomy. Some of us love to go out on cold nights and look for comets or novae. Others want to take beautiful pictures of the

heavens. Many of us want to follow NASA and other space programs. We have observers searching for that dim galaxy in Hercules. Some want to drive miles to catch a star grazing the moon. Others are happy examining lunar craters, or counting sunspots on clear days. Whatever your interest is, we want to guarantee that the AAC will have others who share your interests and ideas.

In order to assure that your needs are being met, I will be conducting a series of surveys to determine your interests, and to solicit any ideas you may have for the AAC. Your feedback will be greatly appreciated.

As I mentioned earlier, the obvious changes will be an increase of events — more observing sessions, more special purpose meetings. Do you want to learn more about how stars and planets form? Are you interested in black holes, or how the universe began? Are you looking to buy a telescope, or would you like to build one? Do you feel frustrated because you think your knowledge of astronomy isn't what you'd like it to be? Well, we want to host "tech sessions" to answer these and other questions you may have. And we will certainly be sponsoring field trips, to local as well as more distant places around the south, like the Huntsville Space Center.

We will be considering funding possibilities so we can improve our observational facilities. For example, the 20-inch telescope in Villa Rica is capable of producing fantastic images, but the focusers are, frankly, a nightmare. We have procured some equipment to upgrade the telescope, and they will be installed this year.

CCD cameras are capable of producing incredible images in a fraction of the time used by standard photographic techniques. Once in the \$10,000-\$20,000 range, the prices have now dropped below \$1000. It's time we considered getting one. We are looking at computers to view these images with, and considering the possibility of installing a BBS.

Last year a team was dispatched to consider acquiring a second site for observing, possibly east of Atlanta. This new location would provide a more convenient site for many of our members who live in Decatur, Stone Mountain, and Lithonia. We will continue the search this year.

Light pollution will soon be nothing less than a crisis to amateur astronomers everywhere. We must take a new tack to fight this very insidious problem. Without public awareness of the problems of wasteful light, there is little point in attempting to control them. We will commence a new campaign to bring about this awareness. We will even talk directly with our state legislators to make certain that not only will they become familiar with the problem, but that they will even consider legislation to curb wasteful light use.

I feel like I'm being a bit grandiose in my schemes, but many, if not all of the goals that I am putting together will be

accomplished. Of course, all of this will take work, and will require your support. Please let me or any officer know if you can contribute to meeting our goals for the new year.

— Hal

Astronomy Magazine available to all members

The time is now for all AAC subscribers to renew their subscriptions to *Astronomy* magazine. Subscriptions rates are \$14.00 per year. If you subscribe, keep those issues coming! If you don't subscribe, now is the time to get the best rates on *Astronomy*. Similar specials are also available on *Odyssey* (the children's astronomy magazine) and *Deep-Sky*. See the treasurer (Jackie) at the next meeting for more information.

## GRAZING OCCULTATIONS HIGHLIGHTS FOR 1990

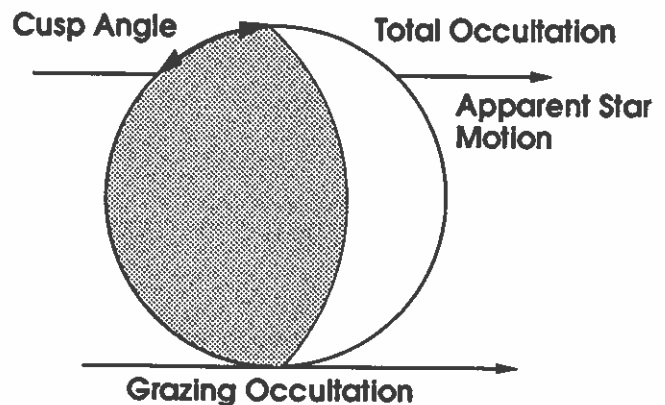
by Mike Kazmierczak

Once again, it's time for the grazing occultation update. There are still several good grazes left before the end of the year.

For those members who might be new to occultations, I'll describe them. An occultation occurs when the moon's disk covers or uncovers a star. It could also be called a stellar eclipse, but occultation sounds more scientific. There is a disappearance when the moon covers the star and a reappearance when the star is uncovered.

Two types of occultations are pictured in Figure 1. If the star makes a path tangent to the moon's limb (edge), such that there is little time between a disappearance and reappearance (also called events), then this is a grazing occultation. Anywhere where there is more than about 5 minutes between the two events, this is a total occultation.

Figure 1. Schematic of an Occultation



The angle between the event and the cusp (dividing line between sunlit and dark limbs) is referred to as the cusp angle. If the event occurs on the bright limb, then the cusp angle is negative. Factors which affect the observability of an occultation are not difficult to understand. Factors which increase the ease of observability are increased star brightness, decreased % moon which is sunlit, increased moon altitude, decreased sun altitude (hopefully, much below the horizon) and increased cusp angle. Each factor has different effects, but a general rule is that a 7<sup>th</sup> magnitude star on a 70% percent sunlit moon, 7° onto the dark limb should be observable using a 6 inch telescope.

The graze paths projected onto the earth are about 2-5 miles wide. Observers spaced along this distance can see a variety of multiple events. The moon's limb is not perfectly smooth and the star can disappear and reappear behind mountains and valleys at any intervals, depending on the moon's shape. Observers 500 feet apart can observe quite different events based on the moon's profile. The data are sent to the International Occultation Timing Association (IOTA) for use in improving star and profile data to predict future grazes. Not only are the observations fun, but they are one area where amateurs can make valuable contributions to astronomy.

Now that I have you all fired up to observe a graze, where and when are they? The table below lists the remaining grazes for 1990. I am planning on leading expeditions to all the grazes below. There are a couple of grazes of Pleiades stars nearby! On the first set of Pleiades grazes, one could hit both within 10 miles and 1 hour. One of the grazes is on the bright limb, or else the circumstances would be perfect. Late in December, two Pleiades stars also graze on the same night. They are about 50 miles away from each other, but only 5

minutes apart. Fortunately, the brighter star is very close, so that is the one I will attempt to observe.

If you are interested in observing one of these wonders, or just finding out more about them, give me a call at 760-8502.

DATE	TIME	MAG	%SN	CA	DIST	COMMENTS
10/28	23:28	7.5	71+	15S	8	SN -9
11/04	03:40	4.0	97+	-3N	141	20 Tau
11/04	04:57	3.8	97+	5S	150	27 Tau
11/06	02:52	4.9	85-	3N	84	139 Tau
12/29	03:25	6.3	90+	6S	57	*24 Tau
12/29	03:29	3.0	90+	6S	12	*h Tau

\* = double star

## For Sale

C-8 Celestron, coated lens, wedge, electric drive and cable, dew cap, tripod with quick-mount knob bolts, carrying case, 8x50 right angle finder scope. Eyepieces included are Celestron 40 mm, 25 mm, Meade OR 18 mm, OR 9 mm, 2x Barlow. All eyepieces are in foam-padded case with rechargeable red flashlight. Also, will include Wil Tirion's Sky Atlas 2000 (Desk Edition). All items are in excellent condition and the price is \$1200 cash.

Offered by H. O. Teeple, 5015 Spalding Dr. NE, Atlanta, GA 30360-1154. Phone (404) 394-5784

## THE FOCAL POINT

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