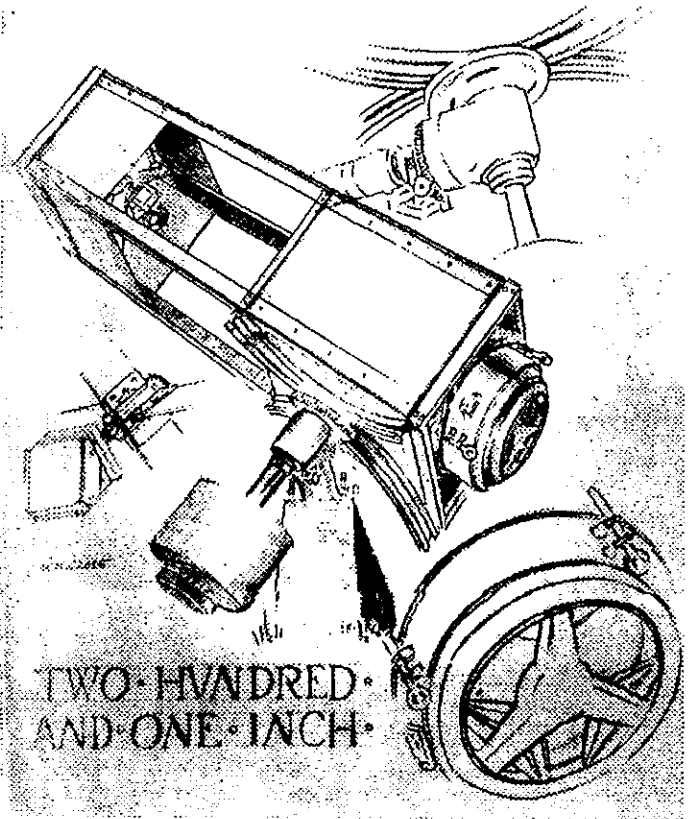


# the focal point

Monthly Notices of the Atlanta Astronomy Club, Inc.

Vol. VII No. 5

October, 1994



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*Bill Close Remembered.*

**NEXT MEETING – OCTOBER 21, AT AGNES SCOTT  
MEETING NOTICE ON PAGE 18**

## the focal point

Monthly Notices of the Atlanta Astronomy Club, Inc.

FROM:

**Leonard B. Abbey, Editor**  
**1002 Citadel Drive**  
**Atlanta, Georgia 30324**

The Atlanta Astronomy Club Inc., the South's largest and oldest astronomical society, meets at 8:00 p.m. on the third Friday of each month at Agnes Scott College's Bradley Observatory. Occasional meetings are held at other locations (check the hot line for details). Membership is open to all. Annual dues are \$20 (\$10 for students). Discounted subscriptions to *Astronomy* (\$18), and *Sky & Telescope* (\$20) magazines are available. Send dues to: Alex Langoussis, Treasurer, 3595 Canton Road, Suite A9-305, Marietta, Ga. 30066

**Hot Line:** Timely information on the night sky and astronomy in the Atlanta area is available on a twenty-four hour basis on the Atlanta Astronomy Club hot line: 621-2661.



**First Class**

W. Tom Buchanan  
105 Carriage Station Circle  
Roswell, Georgia 30075

9510

WHAT'S UP

SUN		MOON	
Date	Rise Azl Set	Date	Rise Azl Set
7:42	99.7 19:04 260.0	16:54	93.7 4:07 263.7 11.7
7:43	100.1 19:02 259.6	17:26	88.4 5:04 269.0 12.6
7:44	100.6 19:01 259.1	17:57	83.4 6:00 274.2 13.5
7:45	101.0 19:00 258.7	18:30	78.6 6:55 279.2 14.5
7:45	101.4 18:59 258.3	19:04	74.3 7:50 283.8 15.4
7:46	101.9 18:58 257.8	19:41	70.8 8:44 287.7 16.2
7:47	102.3 18:57 257.4	20:20	68.1 9:38 290.9 17.1
7:48	102.7 18:55 257.0	21:03	66.4 10:30 293.0 18.0
7:49	103.2 18:54 256.6	21:49	65.8 11:21 294.1 18.9
7:50	103.6 18:53 256.1	22:39	66.3 12:09 294.0 19.8
7:50	104.0 18:52 255.7	23:32	68.1 12:54 292.8 20.7
7:51	104.4 18:51 255.3	---	---
7:52	104.8 18:50 254.9	0:28	71.0 14:16 286.9 22.6
7:53	105.2 18:49 254.5	1:26	74.9 14:53 282.6 23.6
7:54	105.6 18:48 254.1	2:26	79.8 15:30 277.4 24.6
6:55	106.0 17:47 253.7	2:28	85.3 15:06 271.6 25.7
6:56	106.4 17:46 253.3	3:32	91.3 15:44 265.7 26.8
6:57	106.8 17:45 252.9	4:39	97.5 16:24 259.7 28.0
6:57	107.2 17:44 252.5	5:48	103.3 17:07 254.2 29.1
6:58	107.6 17:43 252.1	6:59	108.4 17:55 249.8 0.7
6:59	108.0 17:42 251.8	8:09	112.2 18:49 246.8 1.9
7:00	108.4 17:41 251.4	9:17	114.2 19:49 245.5 3.0
7:01	108.7 17:41 251.0	10:19	114.3 20:52 246.2 4.2
7:02	109.1 17:40 250.7	11:14	112.6 21:56 248.6 5.3
7:03	109.5 17:39 250.3	12:03	109.4 23:00 252.4 6.3
7:04	109.8 17:38 249.9	12:45	105.3 23:57 257.0 7.3
7:05	110.2 17:38 249.6	13:22	100.4 0:03 257.0 8.3
7:06	110.5 17:37 249.3	13:56	95.3 1:02 262.1 9.3
7:07	110.8 17:36 248.9	14:29	90.0 2:00 267.3 10.2
7:08	111.2 17:35 248.6	15:00	84.8 2:56 272.6 11.1
7:08	111.5 17:35 248.3	15:32	80.0 3:51 277.7 12.0
7:09	111.8 17:34 248.0	16:05	75.5 4:45 282.4 12.9

OFFICERS AND OTHER DIGNITARIES

President:	Steve Gilbreath	409-1915
First Vice-President:	Jerry Armstrong	942-4249
(Program)	Eric Shelton	664-2837
Second Vice-President:		
(Observing)		
Recording Secretary:	Terry McHann	441-9097
Corresponding Secretary:	Leonard Abbey	634-1222
Treasurer:	Alex Langoussis	429-8384
Publicity:	Ken Poshedly	979-9842
Edibles:	Terry McHann	441-9097
Facilities:	Leonard Abbey	634-1222
Light Pollution:	Tom Buchanan	587-0774

William H. Close

The Club lost one of its most valued members with the death of Bill Close on September 9th. Bill and Anna Belle were both founding members of our Club in 1947. They have been members continuously since then. Several years ago they were voted honorary life memberships because of their long history of service to the Club and to all amateur astronomers in the Atlanta area.

Bill was born in Atlantic City, New Jersey, eighty-two years ago. The great depression came along when he was a young man, and he left his childhood home to seek his fortune. He had many interesting stories about his adventures on a cross-country hitch-hiking trip. He eventually found himself in Washington D.C., where he enrolled in the Corcoran School of Art. During his art school days he met and married Anna Belle McEath, daughter of a Presbyterian minister and his wife, both of whom were missionaries in Guatemala. After their marriage, Bill and Anna Belle moved to Atlanta, where Bill was a commercial artist for the Rhodes Furniture Co. In 1940 they bought a house on Forkner Drive in Decatur, where Bill lived for the rest of his life.

In 1947 Bill and Anna Belle read a notice in the paper that an astronomy club was to be formed at Agnes Scott College. Anna Belle and her father attended that organizational meeting. Bill joined the next month, and the two of them attended most of the other the meetings in the Club's forty-seven year history.

Now that he was an official amateur astronomer, Bill needed a telescope. Telescopes were not easy to come by in those days, and the only way to get a really good one was to build it yourself. Bill ground a 6" mirror, and mounted it with a combination of aluminum and plumbing fittings. It worked, and it worked well.

Naturally, any amateur astronomer always needs a bigger telescope, so when Bill heard that a few 16" Pyrex blanks were to be surplus by the military, he ordered one. At that time, a 16" telescope was very large. It was almost unheard of for an amateur to build such a large instrument. Bill's adventures with the construction of his 16" are recounted in his own words in our lead article this month. The telescope was a fantastic success. It brought the fascinating world of deep sky observing to many of us.

Bill was always generous with his time and advice. His astronomical paintings have appeared as murals on planetarium walls, and on the front cover of *Sky & Telescope*. His interest in telescope building continued through the rest of his life. He was recently working on an unusual 8" which was to have a novel focusing arrangement. He served as president of the Atlanta Astronomy Club, and as chairman of the Southeast Region of the Astronomical League.

Bill was a resource to all astronomers in the Atlanta area. With his passing, we have all suffered a great loss.

## The October Meeting

You think it's cold skywatching in Atlanta each winter? Heck! Find out what *real* cold is like when April Whitt, Fernbank Science Center astronomer, talks about "Astronomy in Antarctica" at the October 21 meeting of the Atlanta Astronomy Club, which will be held at Agnes Scott College's Bradley Observatory.

As part of an infrared astronomy research project sponsored by the National Science Foundation's Center for Astrophysical Research in Antarctica (CARA) group, April spent Christmas 1993 at the South Pole where there is *no* pole star.

While it was constant sunlight at the South Pole during her stay, she had an opportunity to get a serious look at some of the instrumentation used for the CARA project, witness the annual "staking of the pole" (done each year to mark the exact location of the South Pole to correct for ice shifting) and perform experiments supplied by third through seventh graders from elementary schools in Pittsburgh and Chicago.

She even participated in the annual "Race Around the World," a 3-kilometer foot race held at who-knows-what southern latitude away from the pole. (The winner was another researcher who completed his race around the world in just over 16 minutes -- beating Jules Verne's "80 Days" by a heck of a lot).

Don't forget: Friday, October 21, at 8 p.m. at Bradley Observatory.

## Our Meeting Place . . .

As most members are aware, our Club is growing. Our membership has increased by about 60% in the past 18 months. Sometimes we feel a little cramped at Bradley Observatory, especially when our meetings feature topics of wide interest.

Club President Steve Gilbreath has been negotiating with Emory University for an alternate meeting site there. We now have permission to hold meetings in one of the four auditoriums in White Hall (room 207), near the university's Administration Building. So we now have three meeting sites: Bradley Observatory, Fernbank Science Center, and Emory's White Hall. For the next year, we will schedule meetings at all three sites, so read the meeting announcements carefully!

## THE 201-INCH

by Bill Close

How can an amateur build a 201-inch telescope? Simply apply the mathematical formula  $\pi r^2$  to your 16" Pyrex disc and presto! chango! There you have it. 3.1416 times 8" squared or 64" equals 201". However, there the simplicity stops.

Having reached a degree of completion after three years and two months of work on my 16", I do not choose to stand modestly by and say, "It was easy." On the contrary, it takes a great deal of work, unending anxiety, buckets of sweat, considerable "cussin'", and just plain dogged perseverance. That comes from a man known for his honesty and humility. The reward far surpasses the effort when you can spend hours with good friends watching the "Greatest Show On Earth."

It began some years ago. I had finished a fair six-inch telescope and had gotten a great deal of pleasure from it. One night I walked into Dr. Calder's office where John Brown and Conrad Meaders were arranging to order 16" blanks which had been advertised for \$12.50. I was invited to order one

at the same time, with the enticement of possibly saving a little on express charges by ordering them together. Having conquered a six-inch and being entirely innocent of the "pit" falls ahead, I readily acceded, and a few weeks later was notified that the disc had arrived. Being somewhat conscious of my approaching middle age and expanding mid-section, I began to be a bit squeamish about my physical ability to wrestle with such a project. But once in my possession, the "blank" look of the disc was unbearable to me, so I immediately "pitched" right in.

Using an article on tile tools in *Sky and Telescope* (January, 1949, by George F. Joyner) as a guide, I ran into my first problem, scraping cement from hexagonal tile set 1/8" apart. From hours of experience, I would recommend the use of square tile. It would also be advisable to make sure they are of sufficient thickness and set in cement at least three inches thick. Having finally completed the tool, I placed it on the stand, threw on a handful of #80 carbo, sprinkled it with water and carefully (how else can

## A Note About This Issue . . .

Long before the *Focal Point* first appeared, the Club published an excellent magazine-like newsletter, *The Atlanta Astronomers' Report*. The *Report* was very popular, and even appeared on the shelves of the library at Harvard College Observatory.

Bill Close produced a wonderful set of original astronomical drawings for its cover. We will now bid fond adieu to our series of antique-telescope covers for the *Focal Point*, and will reprint some of Bill's work.

Our lead article this month is one that Bill wrote for the May, 1952, issue of the *Report*. It describes his adventures in telescope making. Our cover this month is the front cover of that issue of the *Report*, and shows his 16". The drawing is in the style of Russell W. Porter's famous drawings of the 200" . . . which went into service at about the time the 16" did.

you handle a 50 lb. piece of glass?) placed the disc in position, and began to shove. Above the immediate din, I heard such remarks as "sounds like a freight taking off!" Then came the question, "How long do you think it will take?" Being rather uncertain, I said nothing, but Mr. Rose who was standing nearby ventured, "At least three years." I need not repeat what I thought of that remark, but in order to show the degree of accuracy in Mr. Rose's statement, I can say it was three years to the month that I got my first look through the 20 1/2-inch.

Footbathly enough to jump from a six-to a sixteen-inch, but not quite irrational enough to tackle the complexities of a compound telescope, I had figured that an 1/5 Newtonian would be most practical from a mounting standpoint. Several tools were required before reaching the desired curvature-one having been ground completely through the tile and another disabled when some of the tile parted company with the cement base in attempting to free a stuck disc.

The pitch lap was next. No statement has yet been uttered or written which can adequately describe the perversity of pitch. The problem involves melting three pounds of pitch, pouring it onto the pre-heated tool, then gently sliding the (still 50 lb.) disc, with a deep curve, onto the pitch and establishing perfect contact. The most convenient vessel at hand in which to heat the tool and disc, was the bath tub. The pitch had to be melted in the kitchen at the opposite side of the house. I do not know how a bachelor amateur would cope with the problem of heating the tool and disc in the bathroom, melting the pitch in the kitchen, and getting the two together at precisely the right moment, but I was ably assisted at this point by a long-suffering "glass widow." I would like to state here that the married man's work is made 100% easier by an understanding and lenient wife. My wife faithfully tended the pitch and appeared with it promptly at the right moment with

pitch in perfect condition in answer to the family whistle during the sixteen attempts before succeeding in making a satisfactory lap. My wife standing over the hot stove, stirring the sticky, viscous mess of pitch continually with a big stick to avoid air bubbles, was thoroughly aware of what Shakespeare meant when he wrote, "Double, double toil and trouble." But still attempt, I must confess I felt more like Erer Rabbit when Tar Baby got through with him. I obtained my final result by covering the mirror with a thickness of wax paper, pouring the pitch onto the wax paper, and slapping the tool into the wet pitch. I am still not convinced that it is possible to make a pitch lap for a short focus 16-inch in the conventional manner.

First polishing disclosed a hole in the center sufficient to warrant a return to fine grinding to bring it back up. Final figuring was accomplished with a nine-inch tool. And to the best of my judgment, with the cautious accuracy obtainable with the Foucault apparatus used, a correction of 98% was attained. John Brown's help was invaluable in testing and recommending treatment for the particular difficulties that arose in figuring, and I don't think I missed any. His original advice was that I should make several small mirrors just to get the experience. I did not make the small mirrors, but there is no way around it, because I certainly got the experience before I finished.

The tube and mount were designed from parts obtained from the junk yard, or rather, the parts available at the junk yard produced the design. The retractable screw of an aircraft landing gear was mounted on a cement base at approximately the right angle for this latitude, with lugs for final adjustment. The screw came equipped with a differential gear at one end. With the main bearing (about a four-inch roller bearing) used as the polar axis and a 2-1/2" shaft slipped through where the axle would

**AAC ACTIVITIES**

by Ken Poshedly

**Our Last Meeting**

Minutes of the September 16, 1994 AAC Meeting:

The meeting was held at the Fernbank Science and was called to order shortly after 8 p.m. by club president Steve Gilbreath. Attendance was about 60 persons.

Club announcements included:

- Appreciation from the AAC membership for the superior job Doug Chesser did on the AAC computer bulletin board. Doug recently discontinued the service only after considerable thought so that he could devote more time to home and use of his own newly-purchased telescope. Thanks again, Doug!
- Announcement by Ken Poshedly that the next Peach State Star Gaze is tentatively scheduled for next April 27-30. More details on the location and other details will be announced as they become available.
- Reminder from Lenny Abbey to all visitors to contact him about membership in the AAC.

Program chairman and vice president Jerry Armstrong then introduced the guest speaker of the evening, Howard Brewington. Originally from South Carolina, Howard and his wife relocated out to Clouderoff, New Mexico, a few years ago specifically for the darker skies.

Howard's program included a very entertaining look at his successful efforts to be the first to discover a comet in South Carolina. Rather than a "tech-talk" on astronomy, Howard covered the human side of astronomy and some of its more lighthearted moments including: relaxing on the couch with a beer while his wife completes the telegram for the MAV claiming the comet; a description of how *not* to drive in the wilds should you also discover a comet; and - in an effort to celebrate his shining moment much as new parents - the house porch banner shouting "IT'S A COMET!" for all the passersby to see (and wonder about).

Howard announced a standing invitation to all to visit the Brewington household in Clouderoff at any time.

Afterwards, the meeting was adjourned for informal conversation, snacks by Clay McEann, and pizza at Jagers's.

But what I enjoyed most was the unabashed curiosity and enthusiasm present in these children. Remember when YOU were young and the heavens were so mysterious? But as we get older, we find less mystery and seem to lose our curiosity and enthusiasm.

I'm looking forward to my next stint at telling youngsters about astronomy. And I'm looking forward to Justin's questions, too.

## REPORT OF DARK SKY COMMITTEE

by Tom Buchanan

An Atlanta City Council member made a motion to amend the Atlanta sign ordinance to state: "Lighting associated with a sign shall not be directed skyward." This restriction will apply to new billboards.

The Zoning Review Board will have a public hearing on Thursday November 3, 1994, beginning at 6:00 p. m. in the City Council Chamber at Atlanta City Hall Annex. Concerned citizens will have 15 minutes to discuss the lighting issue.

### CALL FOR ACTION

1. Attend the meeting and speak in favor of the motion. Speech can be short, a half minute to a minute.
2. Contact your City Council Member if you live in Atlanta.
3. Write a letter to:

Mr. John Bell  
Zoning Staff  
55 Trinity Avenue, S. W.  
Atlanta, Georgia 30335

This is second down on the ten yard line and goal to go! Let's score!

normally be, it serves very satisfactorily as a German equatorial mount. In order to use a larger declination axis, I replaced the roller bearings at that point with bronze oil lite bearings.

Considerable thought went into the design of a tube. This proved a considerable waste, for no junk yard could produce the needed materials. Spying some T-shaped aluminum alloy beams  $3\frac{1}{4} \times 2$ " and acquiring same, I gradually developed a monstrous, oblong, box-like structure in the basement. When the pieces had been cut and fitted together, I recalled hearing about a man who built a boat in his basement and then couldn't get it through the existing doorway. Well, believe it or not, the 201-inch telescope was in the same predicament. So, it was taken apart and reassembled in my wife's sewing work room where it resembled a telephone booth. My little five-year old daughter described it more picturesquely when she excitedly called her mother to the window one day. My wife, expecting to see a flying saucer, was met with, "Look, a flying telescope!" Needless to say one of the neighborhood boys was flying a box kite.

The cell was made from the drip section of an Army coffee urn which is conveniently equipped with very sturdy handles. The mirror rests on a nine-point flotation system of cast aluminum. Most of the work was done with hand tools and a small electric

drill. There is only one welded joint and that is where the plate which supports the tube is attached to the declination axis. Although the telescope was built with a minimum of machine work, the necessary and very vital machine work was generously contributed by Rob Maulsby who is building a six-inch, and by Jim Stusak who has gone to the other extreme from my home-made affair in building a very beautiful, perfectly machined instrument.

The telescope is in a state where it can be used with some unhandiness. Much remains to be done, such as rack and pinion focusing, final alignment, and clock drive – for I want to use it photographically too. Accomplishing these things will have to be stretched out for if I could really call it finished, I should have to become an observer instead of a Telescope Nut. Yet from what little looking we have been able to do with it, I am looking forward to becoming an observer. I have seen faint, wispy nebulae, possibly never seen before from Georgia soil; M-13 resolved beautifully – to borrow John Brown's description, "Like a handful of diamonds on black velvet;" and the Orion Nebula was exceptionally brilliant with splendid detail and pinpoint images, much like the photographs taken by the observatories – except that I was looking millions of light years out in space – and it was real – had color and depth – and life.

## A Historical Footnote . . .

The 201-inch telescope served well for many years in the Close's backyard. When the trees and city lights finally made the site a poor one for astronomical observing, Bill donated the mirror to the Club, and it was given to Howard Landis for use in his photometric work. Years later, it was mounted by Tim Puckett and Jerry Armstrong in a fork mounting built by Tut Campbell and his father. Earlier this year Jerry and Tim used the 201-inch to make their famed discovery of a supernova in M51. A prestigious history for the South's first large amateur telescope.

## Astronomy Day at School

by Ken Poshedly

Maybe one reason we are astronomers is because we enjoy the mystery, enthusiasm and pleasure that comes with observing the heavens. Whether you attribute them to any planets and other wonders, can make you childlike once more.

One of my most rewarding amateur astronomy experiences came not while poking around in a dark field with my telescope, but with a group of young children who wanted to hear about the sky.

The occasion was Enrichment Day at Peimeter Christian School in Norcross, and I was the honored guest speaker who was going to do my best to explain the Sun, Moon and Stars to this cherubic group of second graders.

When asked by a coworker for ideas for a talk on astronomy for 7 and 8 year-olds, I see what I might be in for several years from now. My own son, Justin, now approaching two and one-half years of age, still has a way to go. But I want to be ready when he starts with them, so this was my chance.

The morning of the event, a Friday in September, was hazy, meaning that the solar observing activity was a no-go. Those of you in Atlanta who know me, also know that I'm sort of the resident Critteron RV-6 expert; that's a 6-inch, f/8 Newtonian reflector. Nothing very large, as a matter of fact, pretty small by today's standards. But to see the admiring looks and hear the "wow!" comments from the kids (and Pleiades and a few other simple celestial items.

## MEMORIES OF BILL CLOSE

By BETTY PYRON

I suppose most of us have a few very special friends who have influenced our lives greatly. For me, Bill Close was one such.

As a Georgia Tech student with an interest in astronomy, in the fall of 1947 I noticed and acted on an invitation in the paper from Dr. William A. Calder, Professor of Astronomy at Agnes Scott College, to attend an organizational meeting to form an Atlanta Astronomy Club. Bill and Anna Belle were there. A viable club was indeed set up, and regular meetings began. Since Bill and Anna Belle lived not far from Agnes Scott, soon it was an understood thing that the public meeting adjourned in large part to their living room.

For me it was an exciting time, almost the first real opportunity I had experienced of wide-ranging conversation and interaction with people of similar intellectual interests. Over coffee after the Friday meetings, and soon on most Saturday evenings too, we talked and debated everything from religion to the composition of Saturn's rings. And if the sky was clear, the Close backyard became an observing site.

A year after the first meeting of the Club, Vol. 1, No. 1 of *The Atlanta Astronomers' Report* was handed out at the meeting, produced by Bill Pinson, another of the early leaders of the Club. The very next issue had a sketch on the cover – signed by W. H. Close. Soon it was routine that the covers were all drawn by Bill. And before long, they appeared in an attractive format, basically a blueprint, produced in the Close home on homemade apparatus, designed and built by – yes, Bill.

When classes in telescope making were started, Bill was an enthusiastic learner. Before long, he graduated to the construction of his own "201-inch" scope, shown on the cover reproduced from the *Atlanta Astronomers' Report* of May 1952.

Bill was an artist, truly a gifted one. But he was so much more than that. He could write beautiful lucid descriptive prose. He had a marvelous mechanical knack at improvisation of gadgetry for telescopes, mirrors making – or practical tasks. Bill was a quiet man, a modest man – and one of tremendous accomplishments.

I've been thinking a lot about Bill Close in these recent days since he left us. Quite suddenly, it came to me that Bill was a superb educator too. He surely educated me in many ways. Not art, for which I had no talent, though he was a talented artist in so many varied forms, not building gadgets, though he was so clever at gadgetry, not astronomy, nor even telescope making. No, I think the lessons I learned from Bill Close, and from Anna Belle too, were something different. Different and more valuable.

On a practical level, writing and editing for the *Report*, I gained experience in technical writing that served me well in a long career with the Georgia Tech Research Institute.

**From the Astro Almanac . . .**

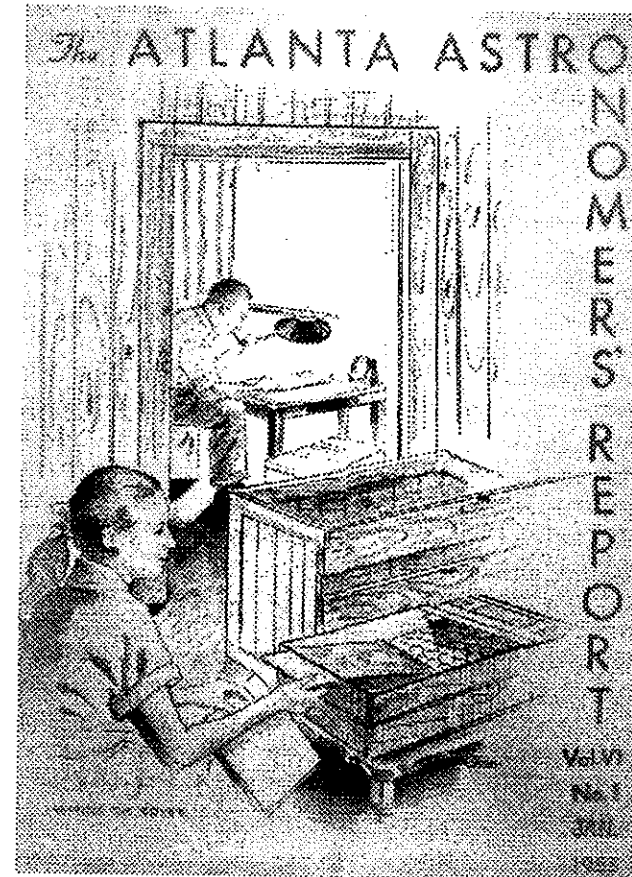
- October 1, 1962 – The 300-foot radio telescope at Green Bank, West Virginia, becomes operational.
- October 3, 1911 – The "Earth-grazing" asteroid 719 Albert discovered by J. Palisa at Vienna Observatory.
- October 11, 1852 – The first verified case of a nebula that varies in brightness (NGC1555, associated with the star T Tauri) was found by J.R. Hind of London.
- October 14, 1608 – Evangelista Torricelli "discovered" outer space by inventing the mercury barometer, which, in turn, he used to calculate the height of the atmosphere.
- October 15, 1582 – The Gregorian calendar comes into use by Catholic countries.
- October 17, 1963 – Saturn's shadow eclipses its outer satellite Iapetus.
- October 19, 1955 – Eugene J. Delporte dies at the age of 73; he drew up the internationally adopted constellation boundaries for the northern half of the heavens.
- October 22, 2137 BC – The Chinese are the first to record a solar eclipse.
- October 22, 1914 – Vienna selenographer Karl Müller dies; he was an expert on lunar history and nomenclature, and co-authored the IAU atlas of the Moon in 1935.
- October 24, 1851 – William Lassell discovers Ariel and Umbriel, the two inner satellites of the planet Uranus.
- October 28, 1959 – Walther Baerensfeld, inventor of the first modern projection planetarium, dies at the age of 80. He was the chairman of the board of directors of Carl Zeiss optics, Oberkochen, West Germany.
- October 29, 1937 – K. Reinmuth discovers the unusual asteroid, Hermes. Two days later, the asteroid passes within 500,000 miles of Earth; at its closest approach, Hermes appears like an 8th magnitude star moving 5 degrees per hour.
- October 29, 1951 – Robert G. Aitken, discoverer of over 3,100 visual double stars, dies.
- October 31, 1961 – The Governor-General of Australia officially commissions the 210-foot radio telescope at Parkes, New South Wales.

But, far more important, I think, from Bill I learned some very important lessons of life. Lessons of modesty – lessons of perseverance and hard work to achieve a wanted goal – lessons of integrity – lessons of character.

Perhaps the most valuable lesson I received in those early get-togethers in the Close living room was the realization of just how much fun study and developing your intellect can be. I'm enjoying that lesson to this day.

Thanks, Bill.

Berry Pyron was editor of *The Atlanta Astronomers' Report* for a number of years. He is a founding member of the Club, and can be seen occasionally at meetings. He lives in north Atlanta.



Making the Cover.

night photo session at Badger Flats in July, I encountered some that tested my patience rather large one flew into my mouth! Try removing a mosquito from your mouth while keeping one eye "glued" to an eye-piece. The Badger Flats area is open range for cattle. Several times, I had to contend with some very irate (and close) cows who moped their discontent over my intrusion. Needless to say, I got a bit nervous when a bull came to investigate. No matter how far away from civilization you go, it seems you must always contend with automobile headlights. When a car passes, you must get up from your guiding position, shield the front end of the scope from the light until the car passes, and return to your guiding position. Hopefully, the car moved fast enough so that the guide star remained within limits. If not, stop the exposure and start another one. Other distractions include clouds, airplanes, and satellites. Again, it's best to shield the scope until they pass. If a cloud obscures your field of view, stop the exposure and start it once the cloud is on its

**Summary**

If you decide to use hypered film, which is the only way to go, I recommend developing the film at home. Hypered film requires reintegration soon after exposure and Unicolor offer home developing kits that are easy to use. A great satisfaction received from amateur astrophotography is removing a wet roll of film from a developing tank and seeing the results of your effort from the previous night. If the photo bug "bites" you as it did me, you will soon begin printing your own photos.

Prime focus astrophotography is a demanding aspect of amateur astronomy. It's also very rewarding. Patience and practice are the keystones. Perhaps, someday, I'll marvel at one of your astrophotos in *Sky & Telescope* or *Astronomy*. Clear skies.

**FOR SALE**

Celestron, 8-inch, Super Polaris, with Star Bright coatings and carrying case. Skyhigh filter, 6 X 30 finder, counterweights, two piggymount adapters. Sky Sensor Computer and dual axis drive motors. 1/4-inch visual back and diagonal. 26-mm Plossl eyepiece. 110 volt AC to DC converter. \$750.  
Art Russell 434-2262.

**BETTER NIGHT VISION**  
By Jack Kramer, Libertyville, Illinois

At an observing session, we all use red-tinted flashlights for illumination; this is to preserve our night vision. The ability of our eyes to become fully dark-adapted varies to some extent for each individual, but the rule of thumb seems to be that it takes about a half hour to become dark-adapted. Since our eyes don't perceive red light as strongly as other colors, it doesn't affect our low light sensitivity as much as do the other colors. But in addition to using a red flashlight, here are a few more tricks.

One technique to speed up dark adaptation was suggested by Vic Stuyker, who was a planetarium director in Arizona. This suggestion was originally published in the *AAVSO Journal*. Says Vic...

White standing up, look down at your feet and blink your eyes as hard and as rapidly as you can for a count of fifteen seconds. If there is no stray white-light contamination about, you will become totally dark-adapted in this time... Note loss of sensitivity; the room really looks dark. The effects of lengthy exposure to bright light linger longer than the normal dark adaptation period. Regular use of sunglasses should help.

Under the heading of dark-adaptation is the simple expedient of installing a cutoff switch for the dome lights in your car or van. This way, if you have to get something from your vehicle, the dome light won't come on and flood your eye with all that nasty white light... not to mention bothering other observers. (Astronomers tend to become especially testy about this.) It's often noted a loss of acuity for a short time. The solution is to keep your observing eye closed while looking at your charts. Once the red light is turned off, you can open that precious eye again and return to the

telescope with little or no loss of night vision.



the box formed by the dual crosshairs. I find it easier to guide with the star in one corner than in the center. Rotate the eyepiece until the crosshairs are aligned with the two axes. When corrections are needed, you will know which direction to move the scope.

**Exposure and Guiding**

Now comes the fun part – guiding. Once the exposure starts, the system must be guided carefully to keep the image sharp and the star points round. No telescope drive system is perfect. All possess periodic speed errors. Therefore, no uncorrected drive system will track well enough to yield round star images. Controlling the right ascension motor speed compensates for the errors. The control box does the job.

Guiding is under way. You are doing your best to keep the star in the corner of the box. How much can the star drift before trailing (star blobs) occurs? There are many factors involved in how much drift is allowed. An excellent reference book on the subject is *Astrophotography* by Barry Gordon. It contains the necessary formulas for determining tolerances for particular systems. The setup I use allows the guide star to drift .2-mm, or 1/4 the box size.

Exposure length is another consideration. The longer the exposure, the more light gets recorded on the film. Also, the chance for guiding errors increases. At some point the natural sky glow begins to record on the film as well. Fogging, as it is known, washes out fine detail and lightens the background. So, the exposure should end before fogging occurs. A general rule of

thumb, as suggested by Dr. Jack Marling, is the exposure equals the focal ratio squared. For a focal ratio of f/6.2, the maximum exposure calculates to 39 minutes. One exception to the rule is when hypered Konica SR1600 is used. The exposure limit is reduced by 2/3, or 13 minutes.

Bright objects, such as the Lagoon Nebula (M8) in Sagittarius, record well in 13 minutes. But, what about dim, small objects? An 8" scope won't record much of the Whirlpool Galaxy's detail in 13 minutes. Using a Deep Sky filter increases contrast, thus extending the fog-limit time. At f/6.2, the exposures can be as long as 65 minutes when SR1600 is used. Of course, the figures apply to a dark sky location, such as Badger Flats. The brighter the sky, the sooner fogging occurs.

I have formulated some exposure times that yield adequate photos with my particular setup. If your scope is larger than 8" or faster than f/6.2, reduce the time. If your scope is smaller than 8" or slower than f/6.2, increase the time.

While guiding, don't touch the scope. The slightest bump could move the guide star out of acceptable limits. By the time the star is returned to the correct position, the light from the subject and surrounding area has recorded on the film. The star images are elongated and the subject is smeared. Wind is an enemy of astrophotography, causing the same effects as stated above. If it's windy, forget it.

Guiding accurately requires intense concentration. Distractions are plentiful, even on a 9000' mountain plateau. During a six-

Bright open star clusters (i.e., M7)	5-10 minutes
Dim open star clusters (i.e., M26)	10-15 minutes
Bright emission nebulae (i.e., M8)	10-20 minutes
Globular star clusters (i.e., M22)	10-15 minutes
Galaxies (i.e., M51)	30-60 minutes



A Bulletin From the British Astronomical Association Aurora Section

AURORA NOISE – REAL OR NOT ?

There have been many reports over the years of intense aurora being accompanied by sounds at ground level like crackling or swishing sounds heard at high latitudes, but few of these reports have been substantiated by accredited observers such as Tromhold, Jelstrup and Stormer's team. Many scientists have not heard such sounds. The sounds are said to modulate with variations in auroral intensity. Recent American measurements suggest that electrical potential of several thousand volts per meter can develop in the atmosphere under intense aurora and one view is that the sounds are the result of point electrical discharges from the earth's surface. Similar sounds can be heard coming from the 400,000 volt grid transmission lines especially from the cable connectors on the catenaries.

An alternative proposal made by Colin Keay of the University of Newcastle, Australia is that objects can form transducers to change electromagnetic energy into sonic energy. This has been tested in an anechoic chamber. The aurora emits at very low frequency waves that were first discovered in the 1930s by linking telephone line to an acoustic amplifier which produced the auroral hiss as it is now known.

It would be interesting to know from any observer if he/she has ever encountered any sound effects when immediately beneath intense aurora, especially if very active and flashing. There is reason to believe that snow itself on the ground may not produce conditions to favor sound production but it has been suggested that frozen coniferous tree needles might produce conditions favorable for sound production.

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AND ON A PHILOSOPHICAL NOTE

Carl H. Breuning (Carl.H.Breuning@DARTMOUTH.EDU) quotes a correspondent on the Club's Internet service, ASTRO:

The light we are seeing in the sky or telescope has traveled as photons for millions (billions) of years (and over the corresponding miles) without hitting *anything* until it hits the retina of one's eye which is the first thing to stop it in its long journey through the universe.

## PRIME FOCUS ASTROPHOTOGRAPHY A NOVICE'S PERSPECTIVE BY PEG WARREN

Every month, as I hear through the latest issues of *Astronomy* and *Sky & Telescope*, I marvel at the beautiful astrophotos taken by amateur astronomers. Many times I had thoughts of capturing the wonders of the visible universe on film. For several months, I had been gaining experience photographing the moon, the planets, and wide expanses of the sky, using fairly simple methods: eyepiece projection for the moon and planets, and piggyback for the wide-angle shots of the night sky. The next method in the natural progression, prime focus, was the most challenging.

The most important piece of astrophotographic equipment is the telescope. It should be well made and sturdy. Schmidt-Cassegrain (SCT) models are excellent, as are Newtonian reflectors. The mount must be equatorial and the tripod must be very stable. Drive motors, a drive corrector, and control box are needed for the right ascension and declination axes. My preference is the Meade 2080/LX3, an 8" SCT on an very stable tripod. Recently, Meade discontinued the LX3 model, replacing it with a more advanced and expensive LX5 version.

Two methods are used for guiding the telescope: the off-axis guider, and the separate guide scope. Guide scopes offer better guide star selection, but are subject to differential flexure (the two scopes moving independently). This causes guiding errors. The off-axis guider is easy to use and produces good results. The units offered by Lumicon (2111 Research Drive, Livermore, CA 94550) are quality guiders. The unit for the LX3 contains a focal reducing lens which allows guiding at the scope's focal ratio of f/10 and photography at the faster ratio of f/6.2. The faster focal ratio reduces exposure time by a factor of two. Most astrophotographers prefer a smaller (and

guiding limits? And more.

The answers were contained in back issues of several periodicals and books. For months, I researched the material making notes of ideas and hints that might be beneficial to me. However, I knew the remainder of my questions had to be answered by personal experience in the field.

We Meant to Say . . .

Russell Whigham's excellent article on touring observatories, which appeared in our August, 1994, issue first appeared in the *Electronic Journal of the Astronomical Society of the Atlantic*. Thanks to Larry Klacs for pointing out our omission of a proper credit note.

therefore brighter) image and less guiding time than visa versa.

An illuminated reticle eyepiece is used in conjunction with the guider for guiding the scope. The eyepiece should have dual crosshairs and a focal length of 12.5-mm. I prefer units with self-contained battery compartments, which means less wires hanging on the scope.

The camera should be the single lens reflex design, use 35-mm film, and be lightweight. Most cameras have automatic exposure control, which is not preferred in astrophotography. A magnifier for the finder aids critical focusing. A shutter cable release is used to keep the shutter open during exposures.

Normally, off-the-shelf slide and negative film is fine for most applications. But prime focus work requires a film that maintains speed and color balance during long exposures. Film bought at the local drug store is unsatisfactory. According to Bill Iburg ("Advances in Gas Hypering", *Sky & Telescope*, January 1987), the best films for deep sky work are hypered Konica SR400 and SR1600. A good substitute is hypered Kodak VR400. Slide film, hypered Kodak Tech Pan 2415 is the best. Hypered Kodak Tech Pan 2415 is the same as Saturn, is a good way to achieve good focus. It is almost impossible to correctly focus on a dim object looking through a viewfinder and a filter. Once the system is focused, it will remain in focus unless you bump the scope.

Camera focusing is the most important step in prime focus work. There is nothing more frustrating than an exposure of thirty minutes or more of an out-of-focus object. Focusing the camera on a bright object, such as Saturn, is a good way to achieve good focus. It is almost impossible to correctly focus on a dim object looking through a viewfinder and a filter. Once the system is focused, it will remain in focus unless you bump the scope.

Okay, everything is set. The telescope is polar aligned and tracking, the system is focused, and the air is calm. What next? Find your first subject. Hopefully, you have a list of objects prepared earlier in the day. This saves valuable time in the field. When the object is centered in the viewfinder, locate a suitable guide star. By suitable, I mean one that is at least magnitude 8. Dim guide stars lead to eye fatigue and guiding errors. If one can't be found with the guider in its present position, carefully rotate the unit until one is found. Move the guider viewer laterally until it is placed in one corner of

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