

AD ASTRA

Vol. I, No. IV

The Newsletter of the Atlanta Astronomy Club

December 1986

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CLUB CALENDAR

Next Meeting: December 12

Program: Equipment for the amateur astronomer. Our semi-annual equipment show will display some of what is available to the amateur.

Observing Sessions: December 27, 28.

AD ASTRA is published monthly during the academic year by the Atlanta Astronomy Club, Inc. The Atlanta Astronomy Club, an organization dedicated to the advancement of amateur astronomy, meets on the third Friday of each month (second Friday of December) at the Bradley Observatory on the Agnes Scott College campus at 8:00 PM. Membership dues are \$25 annually and include a subscription to *Sky & Telescope* magazine and use of club observatory facilities.

Editor in Chief:..... John Marsh
Contributing Editors:..... Dave Roberts, Don Barry
..... Rick Clark, Sharone Franklin, Pat Frank
President:..... Dr. Joe Gibson
Vice Presidents:..... Dave Roberts, Mark Wilkinson
Treasurer:..... Bud Rosser
Secretary:..... Sharone Franklin

CLUB MINUTES

The November 21, 1986 meeting was held at the Bradley Observatory with Dr. Joe Gibson presiding.

I. Dr. David Finkelstein, professor of physics at Georgia Tech., gave a lecture on cosmology. He explained the gravitational structure of a black hole and presented detailed information on the quantum theory.

II. Club members voted and approved a motion that the AAC host the 1987 SERAL convention provided two conditions are ratified:

A. A committee will make sure it is feasible for the AAC to be host.

B. SERAL must approve our bid.

THE NEW PORTUGAL?

an editorial by John Marsh

A BIT OF HISTORY

In the late fifteenth century, Europe was beginning its march toward world cultural dominance. For the first time in history, financial resources, technological readiness, and motivation had come together in one culture, enabling it to become dominant. For the tiny Iberian state of Portugal, several factors conspired to make it the early leader in the outward expansion of European civilization.

For nearly seven centuries, much of Iberia had been ruled by the Arabs. This effectively cut off Portugal from trade with the rest of Europe. Portugal was forced to look toward the sea. The motivation was gold and spices from the East -- particularly India. Perhaps the real enabling factor was the political leadership by Prince Henry, known as Henry the Navigator. As befits his name, Prince Henry understood the need to take risks -- to send his seamen into unknown areas, in this case, ever southward along the coast of Africa. While several attractive areas were discovered along the way, Prince Henry did not lose sight of his ultimate objective. Finally, Vasco da Gama sailed around the southern coast of Africa and, with Arab help, made it to India. Portuguese colonists eventually settled in parts of Africa; Portugal won a trade mission in Macao, China. Almost incidentally, Portuguese warships in the course of training exercises in the South Atlantic discovered that area of South America now known as Brazil.

With this auspicious beginning, one might expect a world speaking Portuguese. Of course, it does not. English and Spanish are the most widely spoken languages in areas of the world outside their native turf. With such an apparent head start, what happened to Portugal? Should we care?

Indeed, Portugal's early lead paid dividends. It soon dominated sea commerce over the Indian Ocean. The tiny nation became wealthy, and like many individuals who initially fight hard and become successful, lost its competitive edge. Portugal became complacent, content to enjoy the fruit of early labors. In the meantime, competitors jealous of Portugal's trade empire redoubled their efforts just as the Portuguese began to relax theirs. This was particularly true of England and Spain, and later of the Dutch and French. These nations carved out for themselves extensive global empires; and while such exploitation is not to be condoned, the lesson is clear.

Today, the English language comes as close to being a "lingua Franca" as any world language since Latin during the height of the Roman Empire. English is the world language of computer science and aviation. It is the second language of millions throughout the world; the native tongue of still millions more-- the vast majority outside of England. This is true because England proved most successful at exploitation of technical and financial resources during the age of western European expansion into the world -- especially the New World, our world. One direct result of this British success is the United States -- currently the world's leading technical power. But for how much longer?

Tom + Evelyn Whalen

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What has Portugal left the world in the way of legacy? Portuguese is spoken in Mozambique, Angola, and Brazil. Of these, only Brazil represents a major international influence of the former greatness of the Portuguese Empire. Portugal itself struggles against the greater economic strength of its European trading partners -- its former competitors in the past. It faces political and economic instability; its only well-known export is Port wine. The price Portugal now pays for its complacency during a critical time in history is its current status as a "re-developing country"- a far cry from its earlier, but short lived, prosperity and prominence.

THE NEW PORTUGAL

Why all this history? For one reason -- history tends to repeat, or to use a famous quote: "Those who ignore the lessons of history are condemned to repeat them." Is the United States destined to be, as some have suggested, the "Portugal of the Twenty-First Century?" Have we pioneered space technology, the electronic/computer revolution, advanced technology in general -- only to see others -- Western Europe, Japan, the USSR -- overtake us? A few observations are in order.

LITTLE THINGS

The question can be addressed on two levels, little and large. I'll address little first. While attending the University of Arizona some ten years ago, my astronomy classes made several field trips up to Kitt Peak. One expects a shrine to be two things -- impressive and pristine. Kitt Peak was both. It looked brand new, immaculate. Alas, ten years on, things have changed. Kitt Peak National Observatory- this nation's premier center for astronomical research -- is becoming a scientific slum. The grounds are as attractive as ever, not so the buildings. Peeling paint everywhere to be seen, on domes large and small. Worst of all is the MacMath solar telescope. As much of its surface as not is paintless; it has become the "Great Speckled Telescope."

Another example, even more serious, concerns the fate of the 2.5 meter (100") Hooker reflector on Mt. Wilson. This great telescope revealed the "actual" universe to astronomy. With it, Hubble and Humason finally established beyond doubt the existence of external galaxies; the general expansion of the universe was also vividly confirmed. Modern cosmology began with the Hooker reflector. Today it is in mothballs, unused -- unfunded!

The "official" explanation for closing the Hooker blamed Los Angeles light pollution. This is valid insofar as deep space observations are concerned. However, it does not render the telescope useless. Photometry, planetary work, other fields remain open. Indeed, the optical quality of the Hooker reflector is so good it has been called an "honorary refractor." This makes it particularly suitable for photometry or planetary work. The real reason the Hooker is currently unemployed is lack of funding. It seems very unfortunate that in our country a major telescope would be allowed to sit idle, especially when time on major telescopes is so valuable. If the Hooker reflector could be used to "zap" Russian satellites or otherwise serve "national security" as opposed to pure astronomical research, the funding situation would doubtless be different.

BIG THINGS

The same process of neglect can be seen on a larger scale as well. The loss of the Challenger is certainly the greatest technological trauma this country has suffered since Sputnik, perhaps the greatest ever. Our response to it is quite telling. It is of course required that the precise cause be found, the reason for it determined, and proper corrections be made. Yet it seems that fault finding (or the SGD process, i.e., ScapeGoat Determination) held greater priority than fault correction. Now that corrections are being made, we might get the space program back on course -- but not before the spring of 1988.

Since the accident, it has become quite evident that neglect (read: lack of proper funding) helped to precipitate the disaster. NASA's original plan for the Shuttle called for a winged, reusable booster on which the orbiter would detach from the winged booster and proceed on to orbit. The booster, either manned or un-manned, would return and land much like a conventional aircraft. Among other advantages, this plan did not require solid rocket booster. Though technically feasible, this plan was abandoned due to NASA funding cutbacks. It is my opinion that when new exotic technology is being developed, we should develop the best money can buy, not the best possible with limited, insufficient funding.

The disaster in American manned spaceflight has proved a major setback for astronomy. The Galileo mission to Jupiter, set to have been launched this year, probably will not fly until nearly 1990. With no shuttle flights, it cannot be launched. Even when the shuttle is ready, it is expected that military missions (largely in support of SDI, aka "Star Wars") will dominate. Once again, basic science will be put in the back of the bus -- if not off the bus entirely. Another victim is the Hubble Space Telescope (HST). The HST represents the greatest instrumental advance for observational astronomy since, quite literally, the development of the telescope itself. It was to have been orbited in time for Halley, probably providing better images than either Giotto or the Soviet Vegas. It would be useful to have the HST for observations of Mars during the current pair of favorable oppositions. The Hubble telescope would probably resolve detail as small as a few hundred miles across the Martian surface, maybe even smaller.

Unfortunately, earlier developmental problems with the HST have combined with the shuttle disaster to put the project on indefinite hold. Hubble now sits next to Galileo in the back of the (space) bus, their arrival time in space unknown.

SOLUTIONS

I mention lack of funding several times in this article as an impediment to progress. Lack of funding translates directly to lack of commitment; it indicates the absence of goals, an absence of direction. History suggests Portugal suffered a similar condition during the great age of exploration of our own planet. It was after short term objectives, mainly financial and military in nature. It did not have the vision of propagating its culture, its way of life, that its competitors did. The United States seems similarly short sighted.

The major impetus for shuttle development was for commercial application. NASA sought to compete for the satellite launching trade, and for space-borne manufacturing trials. All well and good, but it put virtually all its resources in

the shuttle basket. Independent means of conducting space science was not given high priority; with the shuttle program on hold, American space science is essentially nonexistent. Of course, the other big player in the shuttle program was (and is) the military. NASA recently announced it was leaving the satellite launching business. The American manned space fleet (such as it is) is becoming, like the sixteenth-century Portuguese navy, a military instrument.

We must change this approach if we are to carve out a meaningful place in the ultimate frontier -- that of space and the knowledge gained from its exploration. This is not to say that commercial (and even military) applications do not have a role to play in space. We must now, however, allow research to be sacrificed. We live in a practical age that stresses practical application of technology. We forget that every new machine, every new application, originally began with basic research -- with the pursuit of "pure" science. Basic research -- in astronomy, in physics, in space -- must be given high priority. It must be given commitment and provided with appropriate goals. If we neglect basic research today, we run the sure risk of aborting our future.

We can be sure of one thing -- our competitors are forging on ahead. The European Space Agency, the Japanese, and the Soviet Union all have shuttle projects under way; the Soviet Union may test theirs as early as next year. All three are interested in contracting satellite launches, and the Soviet Union has openly pursued military applications in space from the beginning. However, all are equally pursuing space research as well -- and actively so. All three sent probes to Halley. The NASA proposal failed for lack of funding. The Russians have even unveiled plans for a comet sampling mission; it will probably fly with ESA support. The United States, with its vast reserve of financial and technical resources, could lead the way if it had the commitment, the will, to do so.

We should waste no time in setting new goals for our space program. We should devote a segment of the NASA budget strictly for space research, and guarantee its sanctity. We should budget all programs generously in order to take maximum advantage of our technical capacities. Our overall goal should be to re-assert our leadership position and set the pace for Man's greatest adventure.

A FINAL NOTE

Cornell astronomer Carl Sagan has proposed what may be an ideal immediate goal for our space program -- a joint manned exploration of Mars. It would serve several purposes. Our space program would receive a badly needed shot in the arm -- a firm goal requiring an equally firm commitment. Also, if the United States and Soviet Union were busy trying to reach Mars together, they might be less interested in finding new way to destroy one another. Granted, Sagan is letting his idealism show, but we need some idealism to provide light in the world darkening by cynicism. At the very least, it would reduce the overall cost of such a mission! The scientific value of a Mars mission goes without saying (or should!). Some argue that unmanned vehicles can do the job equally well -- from a scientific standpoint probably true. I, however, agree with those who assert nothing beats a pair of eyes -- an observer on the spot. Machines provide good science, people provide even better science. Also, as Sagan frankly admits, having Russians and

Americans personally making the trip best serves the political ends of such a mission. The world needs political solutions just as desperately as scientific ones.

The final point -- even if we don't go, the Russians apparently will. Soviet space scientists anticipate lunar bases by around the turn of the century, a possible Mars mission about the decade or so later. This raises an interesting possibility. The year 2017 will mark the centennial of the Bolshevik revolution. What better way to mark this milestone than with a Soviet manned Mars mission. The term "red planet" would take on quite a new meaning!

We must not flag in our resolve as did the Portuguese four centuries ago. Mankind is on its way to the stars, with or without us.

THE RING AND I

by Anna Belle Close

Returning from the Walter Barber, Jr., Memorial Observatory in Villa Rica, I was musing on what we had been looking at in the 20" telescope on the first Saturday in October. M13 was a three dimensional ball of diamonds; the Ring Nebula, a giant smoke ring floating in the eyepiece.

I thought back to nearly 30 years ago when we were first observing from the Agnes Scott Library Grounds. My imagination was captured then by the Ring, and when husband Bill's six-inch telescope was completed that was the first object I wanted to see in it. How naive we were! We searched fruitlessly in the area of Lyra until three o'clock in the morning, sweeping the 'scope slowly back and forth, up and down. Later we laughed at ourselves when we learned that the fuzzy spot we were seeing time and again was really the halo of light we were looking for.

Then Agnes Scott acquired the 30 inch! Standing at the top of the ladder at its eyepiece, I glimpsed the Ring again. This time it filled the field of view. I had never before seen anything to match it and could hardly tear myself away from the sight.

This October I was charmed once more by the jeweled Ring as it appeared in the 20 inch at Villa Rica. Unique and magnificent, softly glowing throughout the ages only to be revealed to man with the aid of fine optics, the Ring ties me to the early days of the Club. History becomes the present, because it is only a wink in time since my first acquaintance with this nebula. No wonder it still has a special appeal and meaning for me. In a way I feel that it is mine.

But the beauty of it is that it can belong to you, too. Just brave the drive to Villa Rica on a cloudless night. It and other wonders will be there for you as well. You can once more encounter your favorite object if it's the right season of the year.

What is your favorite object, by the way? Is it the Milky Way? Ask yourself, "When was the last time I saw the Milky Way?" It's still visible over Villa Rica under proper conditions.

Or is your favorite the Seven Sisters, the sparkling Pleiades? Whatever your answer is, we'd like to hear about it.

ASTROPHOTOGRAPHY WITH A WIDGET

by David Roberts

Ever wanted to take pictures of the night sky but didn't have the finances of Croesus to invest? Or maybe you could afford it but your astronomical funds were devoted to other projects (like a newtonian with a thyroid problem). Take heart because there is a solution, at least for those whose astrophotographical aspirations don't make Palomar look like a department store refractor. That solution is the widget.

John Parker, past president of our club, once observed that if you liked to jab a pencil in your eye the first thing in the morning, then you would enjoy astrophotography. The widget allows you to avoid the pencil and enjoy the pictures. Basically, all the widget is is two boards held together with two door hinges. The resulting axis formed by the two door hinges forms the polar axis of the mount. A threaded rod turned by a synchronous motor (or a synchronous observer!) is threaded through the lower board and pushes against the upper board. As the bolt turns it raises (or lowers. See below.) the end of the upper board. If the bolt turns at the correct speed, a camera mounted on the upper board will follow the stars.

The drawings show one design for an astro-widget. If you know the size of your threaded rod and the speed in rpm of your motor, you can determine the distance of the threaded rod from the axis of the hinge pins from

$$R = 1,436.5 \times (n / (2 \times \pi \times tpi))$$

where n is the motor speed in rpm and tpi is the number of threads per inch on the threaded rod. If you have a 1/4 X 20 threaded rod and a 1 rpm motor, R = 11.43". Take note of the direction of motor rotation! If it is clockwise as seen facing the motor shaft, then the hinges must be on the east side of the widget, and on the western side for counterclockwise rotation.

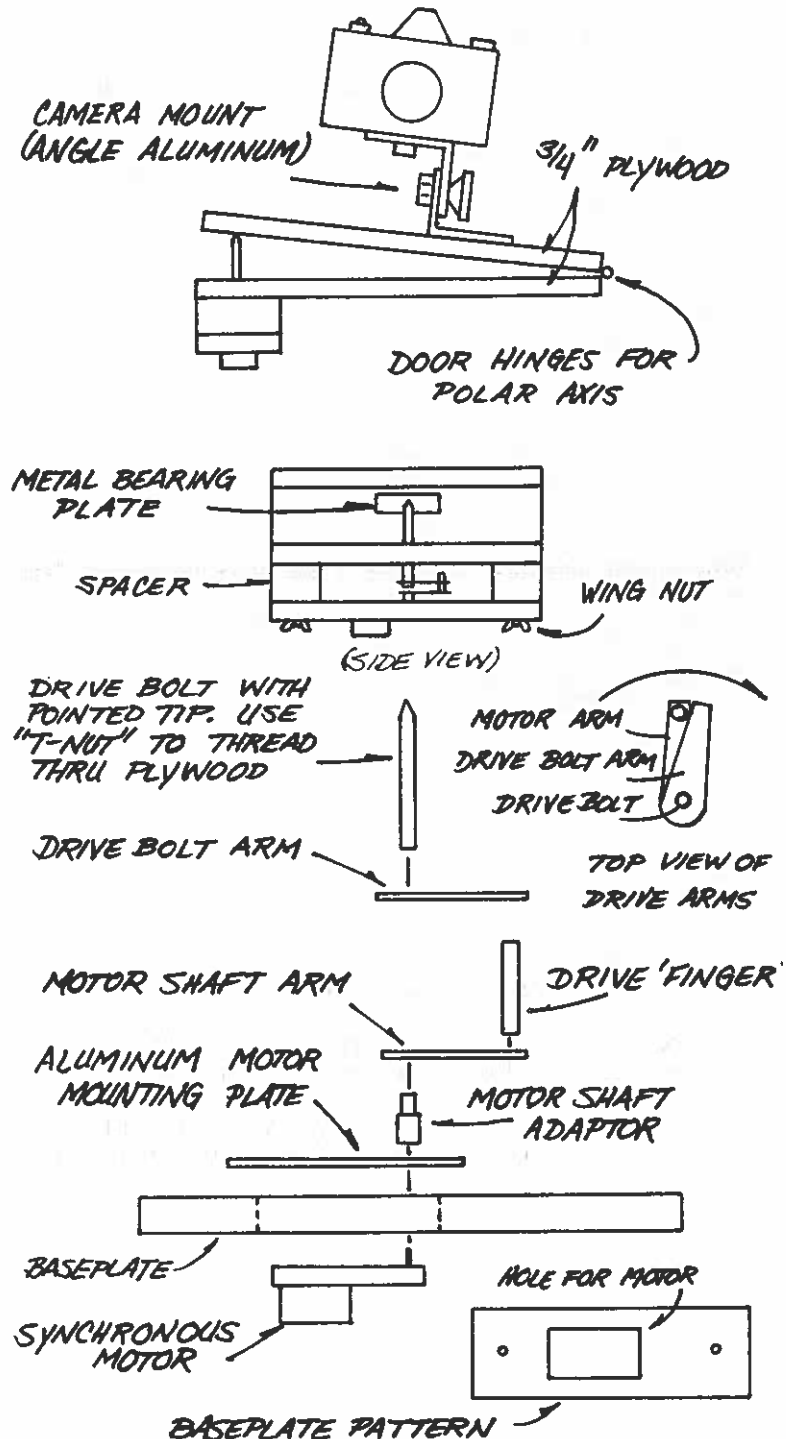
A few suggestions are in order. Use a very sturdy tripod for the widget. The best widget in the world won't track properly if its tripod can't hold it steady. If you don't own a good tripod make one from 2 X 4's or buy one. Use two hinges on a widget to reduce play. Door hinges aren't the most accurate things in the world. Make the camera mount as stiff as possible; flexure can get you here too. Don't try to get much more than 20 minutes of exposure time. Polar alignment is not too accurate for a basic widget and stars will trail. The fast films now available make longer times unnecessary.

To use the widget, place it on its tripod, sight over the hinge pins at Polaris, and you are ready to go. Just make sure your camera is loaded, focused for infinity, and the aperture stop is wide open. Don't laugh, these things are forgotten more often than you would like to know.

The widget isn't accurate enough for long focal length telephoto lenses. Their larger image scales require better polar aligning than hinge-sighting allows. Still, lenses up to 135 mm

give good results, and 200mm can be used if you are careful in polar alignment. Many gorgeous wide field pictures can be taken with lenses in the 17 mm to 200 mm range.

As an incentive to build widgets, I am challenging AAC members to have widget-produced slides ready for our annual show-and-tell meeting in May. Feel free to experiment with the design. What I have drawn is only one possibility. If you would like to see a widget, come to the December meeting.



SOMEWHERE AMONG THE STARS

by Sharone Franklin

The memory of that wintry February evening has always remained with me. Because of a below freezing temperature, the two day old snow had hardened and it crunched and crumbled under my feet as I walked. I was seven years old and living in the North Georgia mountains. That night I noticed a group of stars that formed the pattern of a large dipper. Next to this dipper were thousands of tiny stars that assembled across the sky in a river fashion. It looked like the sky had had a snow fall too. My Dad informed me that the dipper pattern was part of the Orion constellation which merged with the winter milky way. This was my first introduction to the stars and the universe. We would meet again on occasions with each encounter being brief and somewhat indifferent. The one night.....

My dedication to astronomy has evolved because of the beauty of the sky network and my insatiable curiosity for wanting to know how the universe operates. It requires little effort to enjoy the beauty. It's not very different from observing a flower: the loveliness radiates from *all* points of visual contact. Some call this symmetry. Understanding how the universe operates is another matter. I'm not convinced that the universe is completely understandable. This is because it is infinite and I finite, and it is mathematically gifted. But it is human nature to try to understand any complexity.

Not all people are cognizant of the nightly east to west migration of the stars. I believe that light and industrial pollution from our cities is one of the reasons for this apathy. Why should one look up to see a few point sources of light shrouded in smog? But for the few of us who uphold a sensitivity to the stars, it is worth the effort to try to have our city lights dimmed and our air kept clean. This is a continuous battle that has proven very difficult and we must drive great distances to sparsely populated areas to avoid sky contaminates.

I often think of the night sky as a gift package filled with answers yet wrapped with riddles. One must find a way to get inside. For the poet, the entrance is by way of a sonnet. For the musician, it's composing a symphony in the key of C and knowing where to place the accidentals. And while the artist may paint a picture of seemingly organized chaos, the astronomer works with equations and argues about how and when the universe began and how and when it will end. When I gaze at the stars, I see each of these facets. Are we not all cosmic tumbleweeds rolling around on our own gravity wave?

One Saturday not long ago I was preparing to go to the Villa Rica observatory. The evening news on television was showing President Reagan surrounded by all sorts of VIP's. They were very neatly dressed and acting out carefully planned diplomacy as usual. I looked over my faded jeans as I laced my boots. I thought how glad I was that *someone* enjoyed the job of being President and constantly besieged by an entourage. That's his tribe, that's where he belongs.

When I arrived at the observatory, the sun hung low in the south west and a few other people were there. The excitement of a clear sky had everyone eager for nightfall. As twilight began, voices diminished and telescopes were readied. Soon, I thought, my telescope will transport me somewhere among the stars. I will see some of them bunched together like talebearers

exchanging gossip. I will see others loosely attached like a spider web sprinkled with dewdrops. Darkness came quickly. I looked around and saw the silhouettes of telescopes scattered about and the outlines of human figures hunched over them. This is my tribe, this is where I belong.

DOWN PAT

an editorial by Pat Frank

It seems that there are tremendous numbers of new members in the club who don't know a thing about the sky. Many of them want to learn, but see nothing in the club that can teach them anything. Of course, *we* know that there are tremendous resources amongst the members! What I would like to see are *classes*, taught by *members*, on basic stargazing, telescope building, and astrophotography, just for starters. If anyone would be interested in leading such a group, just let me know. I'll be happy to organize this effort....

I have but one other thing to discuss this month. Since our club's beginnings, Agnes Scott has been gracious enough to allow us to meet at Bradley Observatory. The room we meet in, however, has a small problem. With all those hot-blooded astronomers in there it gets rather stuffy, and ventilation is a problem. This is certainly not a very *serious* problem, unless you add one other element: Cigarette smoke. Even a small amount of smoke can clog up noses in that atmosphere, and while I certainly agree that everyone has the unalienable right to practice suicide, the vast majority of club members are non-smokers, so please confine your smoking to the hallway while meetings are in session. *Fair Skies!*

AMATEUR ASTRONOMERS AND
THE HUBBLE SPACE TELESCOPE(reprinted from *Scientific American*)

The Hubble Space Telescope Amateur Working Group is pleased to announce a program for amateur astronomers to apply for observing time on the Hubble Space Telescope (HST), the most advanced telescope ever built. A limited amount of time is being reserved especially for amateur astronomers on HST by NASA and the Space Telescope Science Institute. Your response could open a new era in amateur astronomy.

The program is open to U.S. citizens, who are not professional astronomers and who have specific projects of scientific or educational value requiring the use of the unique capabilities of HST. With its high sensitivity, extended wavelength range and high resolution, Space Telescope offers many exciting opportunities for astronomical study. Observing time on Space Telescope is so highly sought after that its uses are limited to studies impossible from the ground.

Readers interested in receiving instructions for making preliminary proposals should send \$1 (to cover the cost of materials, postage, and handling) to:

HST Amateur Astronomers Working Group c/o AAVSO
25 Birch Street, Cambridge, MA 02138

The deadline for completed applications is March 31, 1987. Please make checks payable to the AAVSO.

OBSERVER'S ALMANAC
Times of Moonrise and Moonset (EST)

Date	Rise	Set	Date	Rise	Set	Date	Rise	Set
12/15	16:52	07:11	12/31	08:30	18:18	01/16	19:23	09:00
12/16	17:40	08:08	01/01	09:25	19:34	01/17	20:23	09:31
12/17	18:34	08:59	01/02	10:09	20:49	01/18	21:22	09:59
12/18	19:31	09:45	01/03	10:45	21:59	01/19	22:20	10:25
12/19	20:30	10:24	01/04	11:16	23:05	01/20	23:20	10:50
12/20	21:29	10:59	01/05	11:43	----	01/21	----	11:16
12/21	22:28	11:29	01/06	12:09	00:07	01/22	00:21	11:44
12/22	23:27	11:56	01/07	12:36	01:08	01/23	01:27	12:16
12/23	----	12:22	01/08	13:04	02:07	01/24	02:36	12:55
12/24	00:27	12:48	01/09	13:34	03:07	01/25	03:49	13:43
12/25	01:29	13:15	01/10	14:09	04:06	01/26	05:02	14:41
12/26	02:33	13:45	01/11	14:49	05:05	01/27	06:10	15:50
12/27	03:43	14:21	01/12	15:36	06:02	01/28	07:09	17:05
12/28	04:56	15:05	01/13	16:28	06:55	01/29	07:58	18:22
12/29	06:12	15:59	01/14	17:24	07:43	01/30	08:38	19:35
12/30	07:25	17:04	01/15	18:24	08:24	01/31	09:12	20:45

(-----) indicates phenomena will occur the next day

LUNAR PHASES

Month	New Moon	First Qtr	Full Moon	Last Qtr
Dec.	30 22:10	8 03:01	16 02:04	24 04:17
Jan	29 08:44	6 17:34	14 21:30	22 17:45

PARABOLIC ELEMENTS FOR COMET SORRELLS

(William Sorrells discovered this comet Nov 1 on photographs he took with a 16" f/5 reflector.)
 Perihelion: 9.622 March 1987 ET
 Perihelion Distance: 1.72253 A.U.
 Argument of Perihelion: 70.153 degrees
 Longitude of Ascending Node: 74.088 degrees
 Inclination: 160.581 degrees
 Elements are Epoch 1950.0

COORDINATES FOR COMETS WILSON AND SORRELLS
(all coordinates are for 7:00 PM EST on date given)

Date	Wilson		Sorrells	
	RA-2000	Dec-2000	RA-2000	Dec-2000
Dec 10	19:54.3	-09d14	01:49.8	+23d59
Dec 15	19:55.6	-10d06	01:24.5	+21d57
Dec 20	19:57.1	-10d55	01:03.4	+20d00
Dec 25	19:58.9	-11d43	00:46.2	+18d14
Dec 30	20:01.0	-12d28	00:32.2	+16d40
Jan 04	20:03.2	-13d13	00:20.9	+15d21
Jan 09	00:13.5	+14d26
Jan 14	00:04.5	+13d19

(.....) denotes object not visible at date

Visual magnitudes remain about 10.5 for both objects.

POSTMASTER:

If undeliverable, please return to:

AD ASTRA
 c/o Mr. Pat Frank III
 465 Pine Forrest Rd., N.E.
 Atlanta, GA 30342



W. Tom Buchanan
 3518 Roswell Rd. Apt. C-6
 Atlanta, GA 30305

If marked with an X above, your membership has expired:
 your expiration date is in the corner of your mailing label.