



**February, 2000**

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*At the February 4 meeting...*

## **Structure and Origin of the Universe**

**Dennis Webb**

**The Big Bang, Stars, Galaxies, and What You Can See**

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***Houston Astronomical Society***

# **GuideStar**

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**Starline - 281-568-9340**

Houston Astronomical Society presents *Starline* -- a recorded message of Society events and astronomical happenings. This service is updated regularly, so call often to keep up-to-date on Society functions, new comets and more.

**H.A.S. Web Page: <http://spacsun.rice.edu/~has>**

**Schedule Changes & Up-To-Date Information**

See the GuideStar's Monthly Calendar of Events to confirm dates and times of all events for the month, and call Starline for any last minute changes.

**Observatory Site Telephone: 409-732-8967**

★★★★★ **The Houston Astronomical Society** ★★★★★★

The Houston Astronomical Society is a non-profit corporation organized under section 501 (C) 3 of the Internal Revenue Code. The Society was formed for education and scientific purposes. All contributions and gifts are deductible for federal income tax purposes. General membership meetings are open to the public and attendance is encouraged.

★★★★★★★★★ **Officers** ★★★★★★★★★★

President: Don Pearce H: 713-432-0734	Secretary: Bill Leach H: 713-863-8335
Vice Pres: Barbara Wilson H: 281-933-1289	Treasurer: Gene Horr H: 281-894-4566

★★★★★★★★★ **Additional Board Members** ★★★★★★★★★★

Liaison responsibility

Bill Flanagan ..... 713-699-8819	
Howard Leverenz ..... 713-957-8667	
Jay Levy ..... 281-992-2708	Field Trip and Observing, Program
Debbie Moran ..... 713-666-9428	
Warren Wundt ..... 713-697-2960	
Mike Dye ..... 281-498-1703	Observatory Director

★★★★★★★★★ **Committee Chairpersons** ★★★★★★★★★★

Audit ..... Gary Hlivko ..... 713-864-2541	Program ..... Margaret Nunez ..... 713-529-2549
Education ..... Richard Nugent ..... 713-910-5945	Publicity ..... Mark Egan ..... 281-265-1497
Field Tr./Obsg. .... Kenneth Drake ..... 281-367-1592	Telescope ..... Darin Palmer ..... 713-223-3123
Novice ..... John Garza, III ..... 409-441-1476	Welcoming ..... Bill Leach ..... 713-863-8335
Observatory ..... Michael Dye ..... 281-498-1703	

★★★★★★★★★ **Ad-Hoc Committee Chairpersons** ★★★★★★★★★★

Historian ..... Leland Dolan ..... 713-529-0403	Publ. Star Party ..... Marg Nunez ..... 713-529-2549
Librarian ..... Peggy Gilchrist ..... 281-558-1190	Rice U. Coord. .... Matt Delevoryas ..... 713-795-0808
Logo Mds Sales ..... Judy Dye ..... 281-498-1703	Schedule Obs'v'ty ..... Steve Goldberg ..... 713-721-5077
Long Range Plan ..... Don Pearce ..... 713-432-0734	Texas Star Pty ..... Steve Goldberg ..... 713-721-5077
Parliamentarian ..... Kirk Kendrick ..... 281-391-3834	

★★★★★★ **Special Interest Groups & Help Committees** ★★★★★★★★

These are now listed on the inside of GuideStar (not every month). See the Table of Contents

★★★★★★★★★ **Advisors** ★★★★★★★★★★

Dr. Reginald DuFour, Rice Univ.	Dr. Lawrence Pinsky, U. of H.
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★★★★★★★★★ **Dues and Membership Information** ★★★★★★★★★★

Annual Dues: Regular .... \$33.00	Student ..... \$5.00
Associate .... \$5.00	Honorary ..... None
Sustaining . \$50.00	

All members have the right to participate in Society functions and to use the Observatory Site. Regular and Student Members receive a subscription to *The Reflector*. Regular, Student, and Honorary Members receive *The GuideStar*. Associate Members, immediate family members of a Regular Member, have all membership rights, but do not receive publications. Sustaining members have the same rights as regular members with the additional dues treated as a donation to the Society. *Sky & Telescope* mag \$29.95/year, *Astronomy* mag \$29/year -- see club treasurer.

Membership Application: Send funds to address shown on outside cover of *Guidestar*. Attention - Treasurer, along with the following information: Name, Address, Phone Number, Special Interests in Astronomy, Do you own a Telescope? (If so, what kind?), and where you first heard of H.A.S.

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***Call the Starline, 281-568-9340 for updates and changes***

## Welcome to New Members!

The Houston Astronomical Society encourages you to join our group of active amateur astronomers and take advantage of the benefits of membership. As a member you'll have access to the club observing site near Columbus, Texas. (You're required to participate in a site orientation meeting before you get the gate lock combination.) The site has concrete pads for setting up your telescope, restroom and bunkhouse facilities, and areas set aside for camping.

## Special Interest Group Listing

*Any member who wants specific information on a SIG listed below may call the listed individual. Also, see the "Ad Hoc Committee Chairpersons" on the inside front cover and the "Special Help Volunteers" listing (not in every issue).*

Advanced .....	Bill Flanagan .....	713-699-8819
Comets .....	Kenneth Drake .....	281-367-1592
Lunar & Planetary .....	John Blubaugh .....	713-921-4275
Occultations & Grazes ...	Wayne Hutchison .....	713-827-0828
Advanced .....	Bill Leach .....	713-863-8459

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## *Observations... of the editor*

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**by Bill Pellerin, GuideStar Editor**

I observed the total lunar eclipse from my back patio last night (January 20). Lunar eclipses are great, though not in the same league as a total solar eclipse. As the dark shadow of the earth passed over the moon I saw (during the partial phase) a tinge of redness on the darkened edge of the moon. As the eclipse became total, the whole moon took on a reddish tint and many more stars appeared in the sky (even though the sky was partly hazy). Not bad for free!

An event like this gives you the opportunity to get others excited about the hobby of amateur astronomy. Don't assume that everybody knows how a lunar eclipse works. A co-worker asked me if a lunar eclipse is when the moon comes between the earth and the sun. Nope... that's a solar eclipse, I explained. A lunar eclipse has the sun, earth, and moon in line but in that order, so that the earth's shadow is falling on the moon.

I talked with several people about what they should look for when they see the eclipse. I asked them to notice that the shadow of the earth is curved. What kind of object always has a curved profile... a spherical one. It was by this reasoning (and others) that people long ago decided that the earth must be spherical, not flat. I told them about how Eratosthenes in 250 BC (or thereabouts) was able to determine the size of the spherical earth (to an accuracy of 1%) using only simple geometry.

I was asked why the moon was going to turn red during the eclipse and was able to explain that the sun's rays passing through the earth's atmosphere were refracted and filtered by the air and particulate matter in the air.

The point is... don't miss an opportunity to engage others in seeing the sky and what it has to offer. Point out Jupiter and Saturn (easily visible from the city right now) and people will give you a, "How did you know that?" look.

Have fun, share, get others involved.

*..Bill*

# ***Houston Astronomical Society***

***Meeting Notice  
For Friday, February 4, 2000***

## ***Dennis Webb***

on

### **Structure and Origin of the Universe**

- 1. A quick 6 bullet structure that whisks through stars, star clusters, galaxies, galaxy groups, clusters and superclusters**
- 2. An order of magnitude review of objects you can see**
- 3. A quick review of the standard (big bang) model chronology**

#### **Schedule of meeting activities:**

All meetings are at the University of Houston Science and Research building. See the inside back cover for a map to the location.

Novice meeting: ..... 7:00 p.m.  
Across from Room 117

The new Novice committee leader is John Garza, III. Come see what he has in mind for the Y2K edition of the Novice group!

Site orientation meeting: ..... 7:00 p.m.  
Classroom

General meeting: ..... 8:00 p.m.  
Room 117

**See the inside back cover for a map  
and more information.**

# February/March Calendar:



<i>Date</i>	<i>Time</i>	<i>Event</i>
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## February

4		HAS Club Meeting
	7:00 p.m.	Novice Presentation - U of H
	8:00 p.m.	General Membership Meeting U of H
5		Prime Night-Columbus
	7:04 p.m.	New Moon
12	5:21 p.m.	First Quarter Moon
15	7:30 p.m.	Advanced SIG Mtg. Rice Univ., contact Bill Leach, 713-863-8459
19	10:27 a.m.	Full Moon
26	9:55 a.m.	Moon at Last Quarter
		Members Observatory Night-Columbus

Late February is the best time to look for the zodiacal light. Look high in the West near the ecliptic up to 2 hours after sunset. The darker the skies, the higher it can be seen. From extremely dark skies (like west Texas), I've seen it nearly to the zenith. It is caused by the sun's light reflected off meteor dust along the plane of the ecliptic.

## March

3		HAS Club Meeting
	7:00 p.m.	Novice Presentation - U of H
	8:00 p.m.	General Membership Meeting U of H
4		Prime Night-Columbus
5	11:18 p.m.	New Moon
13	12:59 a.m.	First Quarter Moon
14	7:30 p.m.	Advanced SIG Mtg. Rice Univ., contact Bill Leach, 713-863-8459
17	All day	St. Patrick's Day
18	TBA	HAS banquet. Contact Bill Molinare, 713-664-3261.
19	10:44 p.m.	Full Moon
20	1:35 a.m.	Vernal equinox-Spring begins. Sun enters northern celestial hemisphere.
25		Members Observatory Night-Columbus
27	6:23 p.m.	Moon at Last Quarter

Please note the 17th. Not really astronomical, but it is just a reminder why God invented whisky; so the Irish wouldn't rule the world, of course.

**Send calendar events to [JBlubaugh@aol.com](mailto:JBlubaugh@aol.com)**

**or call 713-921-4275.**

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## ***B&Ps from the IAUCs***

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by Matt Delevoryas



This fall, quite a stir was created in some circles of the Society when IAU Circular 7267 announced the discovery of Comet C/1999 S4 LINEAR. (Well, not really the discovery, confirmation as a comet of what was originally discovered as an asteroid in a parabolic orbit.) Based on its brightness at the time of discovery, its orbit, and an assumption of inverse fourth power relationship to solar distance (typical of non-periodic comets), predictions indicated it would reach naked eye brightness, a maximum of 3.7 during July. To some of us, this comet was the best news since the invention of the telescope. Questions were asked about why this was not being heralded from the highest rooftops (including in this series of articles). (Well, when IAUC 7267 was issued on October 1st, the comet was magnitude 16.1. Most Society members take offense when information about magnitude 16.1 comets is forced upon them, except for Comet P/Shoemaker-Levy 9. But, there was another motivation.) Remember Comet C/1973 E1 Kohoutek? The promised Comet of the Century? Kohoutek was a perfectly fine comet, just not Comet of the Century. There were two reasons, and a rumor of a third, why it did not live up to expectations. The rumor is that in early news distributed about it, there was a careless mathematical error, promising better than could be expected, but don't cite this article as authoritative. The simpler reason Kohoutek disappointed is that the popular press overhyped the comet, a mistake these articles intend not to repeat. The more technical reason why Kohoutek disappointed was that the magnitude predictions were based on its discovery magnitude, assuming that there was nothing atypical about Kohoutek at discovery time. But, there was!! The comet had outgassed vigorously — because it had a thick surface coat of volatiles being exposed to the inner solar system for the very first time. This preliminary burst of evaporation (sublimation, rather) came to an end, and the comet's equilibrium behavior emerged. Put simply, the comet was temporarily excessively brighter than natural at the time it was discovered, and the excessive brightness was long gone before its promised display as Comet of the Century. What does an infamous 1973 comet have to do with a naked eye comet of 2000? IAUC 7342 states that December Lowell Observatory observations appear to indicate a decrease in dust production.

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## ***B&Ps from the IAUCS... from previous page***

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That author suggests "Should the comet be dynamically new..." (i.e., seeing the inner solar system for the first time), "... the decrease in dust production likely predicts behavior similar to that of comet C/1973 E1 (Kohoutek), due to the continued dispersion of dust released at much larger r." Don't make plans for the last and latest Comet of the (20th) Century" just yet.

Updating news about Nova Aquilae 1999 No. 2 = V1494 Aquilae (see last month, p. 8, for more details) IAUC 7343 reported it had faded to magnitude 8.0 by the end of the first week of January.

And, another update, for R Coronae Borealis, (see December article for details). Although the Circulars themselves have had no further mention of the star, other sources report it brightening to almost 7.0 by the start of January. This minimum does seem to be coming to an end.

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## ***HAS Logo Sales***

*by Judy Ann Dye*

If you are interested in any of the following items and would like to place an order, please contact me (Judy Dye) at 281-498-1703, or send a check for the items requested to 12352 Newbrook, Houston Texas, 77072-3910. Below is the current list of logo items for sale:

Grey Hooded Sweatshirt (M to XL) .....	\$25.00
22 Ounce Thermal Cup .....	\$5.00
Observe Messier .....	\$4.00
Observe Comets .....	\$7.00
<b>2000 Observer's Handbooks (NEW!) .....</b>	<b>\$ 14.00</b>



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## ***Election Notice***

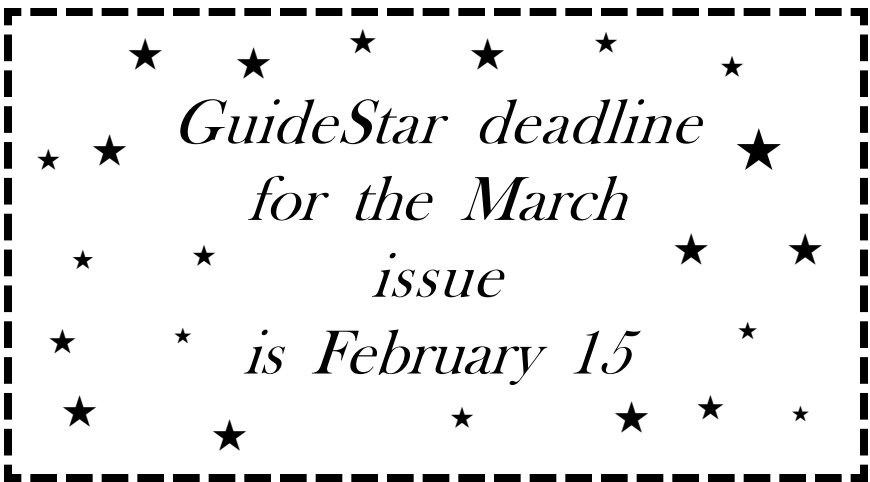
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On December 16th, the Board of Directors noted that an error had been made (determination of eligibility) in the election of a chairman for 2000 for the Telescope Committee, and there is actually no elected chairman yet. This shall serve as notice that the Society shall hold an election for the chairman of the Telescope Committee at the February 4th meeting. The winner of the election shall serve from February 4th until December 31st. Any member with no lapse in membership since February 4th, 1999, is eligible to run. For any further information, contact any Officer of the Society. (See the inside cover for telephone numbers.)

## ***Membership Renewals...***

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Please check the mailing label on your copy of the *GuideStar*. It'll tell you when your membership expires. If it expires soon, please send your renewal to the address on the outside cover of *GuideStar*. The dues information is on the inside front cover. ***Thanks!***



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# ***Observatory Corner***

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*By Michael B. Dye Observatory Chairman*

The Annual Observatory Meeting for the year 2000 was held on January 15. The members of the Year 2000 Observatory Committee are as follows:



Michael B. Dye ..... Chairman/Director  
Kirk Kendrick ..... Site Supervisor/Vice Chairman  
Matt Delevoryas ..... Site Supervisor/Observatory  
Site Trainer  
Allen Gilchrist ..... Site Supervisor  
Dana Lambert ..... Site Supervisor  
Logan Rimes ..... Site Supervisor  
Robert Rogers ..... Site Supervisor  
John Hiatt ..... Committee Advisor  
Steve Goldberg ..... Scope Assignment  
B. Cooper Walls ..... Financial Records

After some discussion we decided on having a Fence Party (more about that later), selected items to be financed with a Fund Raising Drive, came up with a viable Gopher Control plan for the Pad area and discussed the storage or RV vehicles at the Observatory Site. The activity concluded with the annual walk around the Observatory Site perimeter Fence. We observed that the fence is in need of some repair but that we do not have any trees laying across the fence as we did this time last year. The ground cover along the parameter fence path is clear. We just need to fix the Fence.

As result of identifying the fence problems, we are going to have a Fence (repair) party to be held on February 19<sup>th</sup> a Full Moon night. We will need about 14 to 16 volunteers to help with repairing the Fence. Anyone who wants to volunteer to help repair the fence please call me at 281-498-1703 (home) or E-mail me at 'mbdye@aol.com'. The Committee will supply the barbed wire, fence posts and some tools. What we need are members to show up and help. I am going to try for a start time of 10 am. I realize this is a little early for some people, but I figure that this will be an all day affaire, hence the early start time.

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## **Observatory Corner... from previous page**

I have been observing the light pollution at the Observatory Site some time and it looks like that we will not be getting any light pollution from the Oak Ridge Ranch area. The Oak Ridge Ranch residents have formed a wildlife preservation group to keep the area like it (the ranch area) is. In other words, not much light. This is all right with us. Anyway despite some members fears that the addition of the Oak Ridge Ranch would ruin our skies, it appears that this problem is not going to be a problem.

I am currently working on a new Pay Phone for the Observatory Site. I had to ask for an increase in our Observatory Budget to pay for it but we need it for Emergency's. We should have it installed by (I hope) the end of March.

The Observatory Committee will be changing the combination to the Observatory Site on or about 1 April 1999, which seems to be an appropriate date. We will use the same system that we have been using in the past. I will hand out Combo Changes to members at the General Meeting in February and March to save postage and mail the ones that were not picked up at the General Meetings.

If you have a Randalls card, and have not done so, please have it coded for the Houston Astronomical Society. Our number is #6618. The Society gets 1 percent of the gross sales that members spend at Randalls. Randalls totals up the amount spent each quarter and will send us a check if the amount goes over \$2,500.00, otherwise the total roles over to the next quarter or zeros out at the end of the calendar year. So please link your Randalls card to the Houston Astronomical Society so that the society can benefit from this Randalls program. Our number is #6618. This is very easy to do, just go to the Courtesy Booth and tell the person there what you what to do.

And now a word about Logo Sales. We ordered 55 copies of the 2000 Observers Guide for this year. We got two boxes of books, one indicated it contained 15 books and the other contained 40. We took the boxes to the General Meeting without checking the continents. When we opened the boxes at the meeting, one of the boxes that was supposed to contain 40 books,

*Continued on page 14...*

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# ***Emission Nebulae***

## ***The Great Nebula in Orion***

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***By Bill Leach***

M42, the Great Nebula in Orion, is classified as an emission nebula, a glowing cloud of gas and dust. It is a hot low-density cloud with about 2000 – 20,000 atoms/in<sup>3</sup>. It is what appears to be the middle “star” in the sword of Orion the Hunter. The nebula can even be seen in the sky with the naked eye. In images of the nebula much of it appears pink-red. These colors will reveal the quantum processes occurring in the nebula. Other famous emission nebulae include The Lagoon Nebula, The Cone Nebula and The Trifid Nebula.

A prism (or a diffraction grating) will separate pure white light into a continuous band or rainbow of all the colors of the visible spectrum. This is called a continuous spectrum. The visible surface of a star, the photosphere, produces a continuous spectrum. Beyond the photosphere is another thin layer, the chromosphere, the beginning of the star’s atmosphere. The chromosphere contains electrically neutral atoms that can absorb light from the photosphere as it passes through the chromosphere enroute to the exterior of the star. Light from the star can be separated by a prism into a continuous rainbow but with thin black bands in it representing specific colors that are missing because they have been absorbed by the atoms in the chromosphere. This is called an absorption or dark-line spectrum. This spectrum can be used to determine the chemical composition of the star’s surface. When you look at the edge of a star, you see only the light coming from the chromosphere and not from the star’s interior. This light will form an emission or bright-line spectrum by a prism. It looks like the opposite of an absorption spectrum. It is totally black except for narrow lines of specific color. In fact, it is the missing light of an absorption spectrum, but traveling in a different direction than the star’s original light.

In an emission nebula the pink-red light is mostly a combination of the four colored narrow bands of the bright-line spectrum of hydrogen atoms in the cloud. A hydrogen atom has a single proton, positively charged subatomic particle, at its center, and a single electron, a less massive negatively

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## ***Orion Nebula... from previous page***

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charged particle, in its outer regions. The electron can exist in one of many allowed discrete quantum states (energy states), that is, that only integer quantum states are allowed. They are denoted by  $n = 1, n = 2, n = 3, \dots$ , where  $n = 1$  is the lowest and preferred quantum state (ground state) and where the other quantum states are excited states (higher energy states). An electron can engage in a quantum jump from one state to another. If the electron jumps from a lower to a higher energy state it must have an external energy source to supply the electron with the extra energy needed to engage in the jump to a higher energy state. This increase in an electron's energy state is called an electron excitation. Once in a higher energy state the electron will immediately jump back to a lower energy state emitting the energy loss as a photon, a particle of light, producing the emission spectrum. This decrease in the energy state of the electron is called an electron decay. The color of the photon is determined by its energy. The more energy the bluer it is and the less energy the redder it is. Four electron decays (Balmer decays) to the  $n = 2$  quantum state involve the emission of photons of light that are visible to the human eye giving an emission nebula its color. They are the following:

$n = 3 \rightarrow n = 2$ decay	hydrogen alpha Balmer decay	Red
$n = 4 \rightarrow n = 2$ decay	hydrogen beta Balmer decay	Blue-Green
$n = 5 \rightarrow n = 2$ decay	hydrogen gamma Balmer decay	Violet
$n = 6 \rightarrow n = 2$ decay	hydrogen delta Balmer decay	Violet

In an emission nebula, like the Orion Nebula, hydrogen atoms emit all four of these colors causing it to look pink-red. To observe these Balmer decays the electrons must want to decay to the  $n = 2$  state instead of the preferred lower energy  $n = 1$  state. The 10,000 degree temperature of the nebula is sufficient to assure this. The next step is to get the electrons excited to higher energy states so that they can engage in Balmer decays. Ultraviolet high energy photons of light are needed to accomplish this. Only a 25,000 degree blue-white giant or superblue giant star emits these high-energy photons. In the center of the Orion Nebula, visible in a telescope, is a small quartet of stars called The Trapezium. Only one of these stars is hot enough

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## ***Orion Nebula... from previous page***

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to emit ultraviolet photons that can excite the electron in a hydrogen atom to a higher energy state, but it is sufficient to set the nebula aglow. Once the electron decays back down to the  $n = 2$  energy state, emitting a Balmer photon, it immediately is excited back to a higher energy state by another ultraviolet photon in less than 0.000,000,01 seconds. Most of the ultraviolet photons actually remove the electrons from the atoms creating a region predominated by hydrogen ions ( $H^{+1}$ , protons) instead of neutral atoms of hydrogen. A region predominated by neutral hydrogen atoms is called an HI region and one predominated by positively charged hydrogen ions is called an HII region. Emission nebulae are definitely HII regions. Electrons that have been removed from hydrogen atoms can immediately rejoin an atom and “cascade” down through the energy states of a hydrogen atom in a series of electron decays which includes visible Balmer decays. Because of these quantum processes, emission nebulae are some of the most beautiful sights in the galaxy.

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## ***Observatory Corner... from page 11***

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contained only 15. It was short 25 books. It appears that the box came open during transit and was taped back together by someone unknown, most likely at the Post Office. The books were probably lost then. We are trying to get the other 25 shipped to us. The books did not show up in time for the January meeting, maybe they will for the February Meeting. Call Judy if you want to reserve a copy.

For the last few months, I have been inserting a paragraph requesting membership feedback concerning installing computers in the Observatory. I have actually got a response. This gives me hope that members are actually reading my articles. If you have any ideas about the Observatory Site, including providing some sort of computers for controlling the Observatory Telescopes and maybe for CCD processing. Please contact me at [mbdye@aol.com](mailto:mbdye@aol.com) or 281-498-1703.

Please fill out the appropriate log form when you use the site. Remember we use these forms as attendance records.

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## *Other Meetings...*

**Brazosport Astronomy Society** meets at 7:00 p.m. on the 2nd Thursday of each month in the Planetarium of the fine Arts Center at Brazosport College. Call Steve Lamb for program details (409) 297-3984

**Fort Bend Astronomy Club** meets the third Friday of the month at 8:00 p.m. at the First Colony conference Center. Novice meeting begins at 7:00, regular meeting begins at 8:00. Web site: <http://rampages.onramp.net/~binder/>

**Johnson Space Center Astronomical Society** meets in the the Lunar and Planetary Institute on the 2nd Friday of each month. Web site: <http://www.ghgcorp.com/cbr/jscas.html>

**North Houston Astronomy Club** (formerly Northside Astronomical Society) meets at 7:30 p.m. on the 4th Friday of each month in the Teaching Theatre of the Student Center at Kingwood College. Call 281-312-1650 or E-mail [bill.leach@nhmccd.edu](mailto:bill.leach@nhmccd.edu).

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## *HAS Web Page*

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The Houston Astronomical Society Web page has information on the society, its resources, and meeting information.

The address is: <http://spacsun.rice.edu/~has>

Want your astronomy work and name on the Internet for the whole world to see? Have some neat equipment? Pictures in film, CCD, hand drawings or video format are all welcome on the page. Do you have an idea to improve the page? I'm listening. Send me Email at [goldberg@sccsi.com](mailto:goldberg@sccsi.com). (You can click on my name on the HAS home page). Or, you can call me, Steve Goldberg (WebMaster), at 713-721-5077.

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# ***Observatory Duty Roster***

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by Michael B. Dye, Observatory Chairman

This is the duty list for February, March and April. Some names were moved from one month to another to accommodate some conflicts. If you are listed in this roster, please be sure to contact your supervisor for any information that you may need and the date and time to be at the site. You may change from site duty to open house or from open house to site duty by pre-arrangement with the Site Supervisor for that month. Changes between months require Observatory Chairman coordination.

**February Supervisor ..... Robert Rogers ..... 281-997-9682**

Larry C. Wadle .....	Site		
Mark R. Watson .....	Site		
Barbara Wilson .....	Members	Observatory Night	02-26-00
Buster Wilson .....	Members	Observatory Night	02-26-00
Warren Wundt .....	Members	Observatory Night	02-26-00
W. Charles Barnes .....	Site		
Don Bates .....	Site		
John Blubaugh .....	Site		

**March Supervisor ..... Robert Rogers ..... 281-997-9682**

John Chauvin .....	Site		
Art Ciampi .....	Members	Observatory Night	03-25-00
Mickey Davis .....	Site		
Kenneth Drake .....	Site		
Mark Egan .....	Members	Observatory Night	03-25-00
Jean-Marc Follini .....	Site		
Fred Garcia .....	Members	Observatory Night	03-25-00
John Garza III .....	Site		

**April Supervisor ..... Logan Rimes ..... 713-681-5397**

Charles Foyt .....	Site		
Clifton Goldman .....	Members	Observatory Night	04-29-00
David Granadino .....	Site		
Michael Gumler .....	Site		
Chai S. Heng .....	Members	Observatory Night	04-29-00
Gary Hlivko .....	Site		
Clayton L. Jeter .....	Members	Observatory Night	04-29-00
Stanley G. Jones .....	Site		

Please remember that Site work can be done anytime and does not have to be done just before Members Observatory Night. Contact your Site Supervisor for details. Names are selected for Site Duty using the current Alphabetical listing for Observatory Key Holders. If any member knows of a conflict please call me before your name is listed.



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# ***Minutes of the General Meeting of the Houston Astronomical Society***

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**January 7, 2000**

1. The meeting was called to order by and general announcements were made by President Don Pearce at 8:10 PM.
2. There were 97 members and 2 guests present.
3. The following new members were introduced:  
    Ron Masters    Chuck and Sarah Foster    John and Vanessa  
                    Cunniff  
    Rudy Vargas    Rick and Eileen Raines
4. The following guests were recognized:  
    Billy C. Allen III    Luis Ostrosky
5. A motion was made by Fred Garcia, and seconded, that the General Membership Meeting scheduled on May 5, 2000 be changed to May 12, 2000 due to a conflict with the Texas Star Party and the meeting scheduled for September 1, 2000 be changed to September 8, 2000 due to a conflict with Labor Day weekend. After discussion, the motion was accepted by a show of hands of the membership present with three dissenting votes.
6. Don Pearce announced that there will be a Board of Directors Meeting on Thursday, January 27, 2000 at 7:30 PM in room 106 of the Space Science Building at Rice University. The meeting is open to any member in good standing
7. Richard Nugent announced a public star party on Monday, January 10, 2000 at 6:30 PM at Askew Elementary School and requested volunteers to help.

*Continued...*

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## ***Minutes... from previous page***

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8. Matt Delevoryas and others discussed the conditions that determine the apparent brightness of the Moon.
9. Judy Dye solicited requests for the 2000 Observer's Handbook and other logo items.
10. Darin Palmer was appointed, by President Don Pearce, acting telescope committee chairman, until an election can be held at the general membership meeting in February.
11. Clayton Jeeter displayed a new 6 in. Dobsonian reflector donated by a new member and explained the telescope loaner program.
12. Barbara Wilson announced a total lunar eclipse star party at 7:00 PM at the George Observatory on January 20, 2000 and solicited volunteers.
13. Marg Nunez, program chairman, introduced the speaker for the evening, HAS member Professor Bill Leach, who gave a 60-minute presentation, entitled " Powers of Ten: The Spatial and Temporal Nature of the Universe".
14. After a few more announcements, president Don Pearce adjourned the meeting at 9:45 PM and invited all to stay and visit and have refreshments.

***HAS Secretary: William W. Leach***  
***January 7, 2000***

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## *First and Second Quarter*

# ***Total Occultations***

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*By Matt Delevoryas*

- There are five interesting occultations by the Moon during the remainder of the entire first half of 2000. (The next good one after April is in July.) Here's the information for these events as seen from Houston (times are CST, except for April 10):
- February 7: Although difficult to observe,  $\psi^1$  Aquarii (mag. 4.2) reappears from behind the bright limb of the 6% illuminated waxing crescent moon after 6:53 PM,  $38^\circ$  counterclockwise from the south cusp, moon  $16^\circ$  up, azimuth  $250^\circ$ . (Disappears behind the dark limb before 6:02 PM, during daylight,  $60^\circ$  clockwise from south cusp, moon  $25^\circ$  up, azimuth  $242^\circ$ .) This is a multiple star (ADS 16633 = WDS 23159-0905), with a magnitude 9 secondary  $49''$  west (reappearing later) from the primary, but that secondary is actually a  $0.4''$  east-west nearly equal binary (components B and C). (There are two other magnitude 14 secondaries, one  $80''$  west of the A component as of 1924 with no later measures, and one  $20''$  north-northeast of the B-C double as of 1924, with no later measures.)
- February 12: Mu Ceti (mag. 4.3) disappears behind the dark limb of the 41% illuminated waxing crescent moon after 10:33 PM  $42^\circ$  clockwise from the south cusp, moon  $19^\circ$  up, azimuth  $271^\circ$ . (Reappears before 11:15 PM  $43^\circ$  counterclockwise from south cusp, moon  $11^\circ$  up, azimuth  $276^\circ$ .) This star has been reported in occultations to be binary, but (as of 1984) it has yet to be resolved by speckle interferometry, and there is doubt about its duplicity.
- February 17: Delta Cancri (Asellus Australis, mag. 4.2) disappears behind the dark limb of the 97% illuminated waxing gibbous moon before 9:36 PM,  $37^\circ$  clockwise from the south cusp, moon  $65^\circ$  up, azimuth  $111^\circ$ . (Reappears before 10:21 PM  $29^\circ$  counterclockwise from



*Continued...*

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## ***Occultations... from previous page***

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south cusp, moon  $73^\circ$  up, azimuth  $129^\circ$ .) This is a double star (ADS 6967 = WDS 07041+2034), with separation of more than a half minute, but the A component is thought to be an occultation double.

- March 11: 63 Tauri (mag. 5.6) disappears behind the dark limb of the 37% illuminated waxing crescent moon before 10:54 PM,  $18^\circ$  clockwise from the south cusp, moon  $15^\circ$  up, azimuth  $281^\circ$ . (Reappears before 11:14 PM  $22^\circ$  counterclockwise from south cusp, moon  $11^\circ$  up, azimuth  $284^\circ$ .) The star, a member of the Hyades, is a binary, but don't expect to resolve the 0.6 milliarc second separation of this eight-day spectroscopic binary in an occultation.
- Apr. 10: The center of open cluster NGC 2175 (mag. 6.8, size 18') is missed by the moon, but the north edge is not. For example a spot at the edge of the cluster (and any star at there) exactly 9' north of the center disappears behind the dark limb of the 34% illuminated waxing crescent moon after 12:15 AM CDT  $46^\circ$  clockwise from south cusp, moon  $10^\circ$  up, azimuth  $288^\circ$ . (Reappears before 12:55 AM  $51^\circ$  counterclockwise from south cusp, moon only  $2^\circ$  up, azimuth  $292^\circ$ .)

## ***Notes.....***

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# Special "Help" Volunteers

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Any member who wants specific information on a subject listed below may call the individual listed. If you have a moderate knowledge of a special subject and would be happy to have others ask you about that subject, let the editor know and your subject, name and phone will be listed in *GuideStar* in the future. Note that we have listed a few possible areas where you might volunteer, but, of course, you are not limited to these. You can also have a specialty which is a sub-group of another. Note that the number of names for any subject is not limited to only one person. Also see the "Ad Hoc Committee Chairpersons" on the inside front cover and the "Special Interest Groups Listing article.

<u>Subject</u>	<u>Name</u>	<u>Phone</u>
Asteroids .....	Barbara Wilson .....	281-933-1289
Astrometry .....	Richard Nugent .....	713-910-5945
Astrophotography .....	Steve Goldberg .....	713-721-5077
Beginning in Astronomy .....	Peggy Gilchrist .....	281-558-1190
	Amelia Goldberg .....	713-721-5077
Comets .....	Kenneth Drake .....	281-367-1592
	Don Pearce .....	713-432-0734
Computers .....	Matt Delevoryas .....	713-795-0808
	Leland Dolan .....	713-529-0403
	Ricardo Palmeira .....	713-669-1409
Cosmology .....	Ricardo Palmeira .....	713-669-1409
Deep Sky .....	Larry Mitchell .....	281-448-8700
	Barbara Wilson .....	281-933-1289
Double Stars .....	John Blubaugh .....	713-921-4275
Drawing (Sketching).....	Scott Mitchell .....	713-461-3020
Herschel Objects .....	Larry Mitchell .....	281-448-8700
History, Astro'y - General .....	Leland Dolan .....	713-529-0403
	Ricardo Palmeira .....	713-669-1409
History, Astro'y - Amateurs .....	Tom Williams .....	713-526-2868
Mathematics, Astronomical .....	Richard Nugent .....	713-910-5945
Messier Objects .....	Novice Committee (see inside front cover)	
Photometry .....	Tom Arnold .....	281-495-0142
Radio Telescopes .....	John Hiatt .....	713-464-4010
Satellites, Artificial .....	<open>	
Solar Observing .....	Larry Mitchell .....	281-448-8700
Spectroscopy .....	Tom Arnold .....	281-495-0142
Thin Crescent Moons .....	Don Pearce .....	713-432-0734
Variable Stars .....	Barbara Wilson .....	281-933-1289
	Tom Williams .....	713-526-2868
Video .....	Larry Mitchell .....	281-448-8700

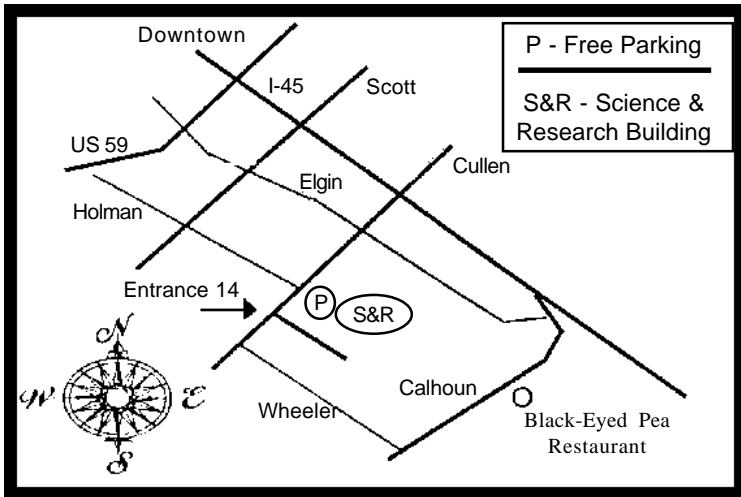
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# ***H.A.S. Banquet 2000***

This year's annual banquet is tentatively set for Saturday, March 18th at the Westwood Country Club. This is conveniently located less than one mile from the intersection of the Southwest Freeway (US 59) and Bissonnet.

At press time the banquet speaker has not been confirmed... Watch the March *GuideStar* for more information and get ready to sign up for this year's event.

For information, contact Bill Molinare (Banquet Chairman) at 713-664-3261.



### General Membership Meeting

The Houston Astronomical Society holds its regular monthly General Membership Meeting on the first Friday of each month, unless rescheduled due to a holiday. Meetings are in Room 117 of the Science and Research Building at the University of Houston. A Novice Presentation begins at 7:00 p.m.. The short business meeting and featured speaker are scheduled at 8:00 p.m. Also typically included are Committee Reports, Special Interest Group Reports, current activity announcements, hardware reviews, an astrophotography slide show by members and other items of interest.

### Board of Directors Meeting

The Board of Directors Meeting is held on dates scheduled by the board at 7:00 p.m. in Room 106 of the Space Science Building at Rice University. Call StarLine for Board Meeting information. Information provided to GuideStar will be published. The meetings are open to all members of the Society in good standing. Attendance is encouraged.

### GuideStar Information

The H.A.S. *GuideStar* is published monthly by the Houston Astronomical Society. All opinions expressed herein are those of the contributor and not necessarily of Houston Astronomical Society. The monthly Meeting Notice is included herein. *GuideStar* is sent via bulk rate mail to Regular, Student, and Honorary Members of H.A.S., selected individuals and recent visitors to the General Membership Meeting. Contributions to *GuideStar* by members are encouraged. Electronic submission is helpful. Submit the article in ASCII text, MS-Word (preferred), or WordPerfect format on an IBM format floppy or via AOL (BILLP10566). Mail copy to the address shown on the outside cover or to the editor at 256 East 5th Street, Houston, TX 77007. Copy must be received by the second Friday of the month for inclusion in the issue to be mailed near the end of the same month. Or, bring copy to the General Membership Meeting and give it to the Editor, or phone to make special arrangements.

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