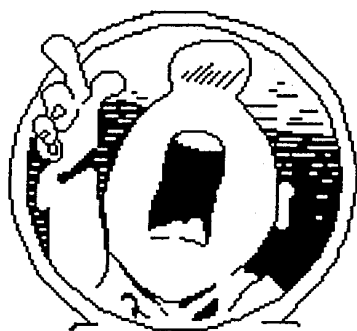


SJAA EPHEMERIS

VOLUME 5 NUMBER 4 OFFICIAL PUBLICATION OF THE SAN JOSE ASTRONOMICAL ASSOCIATION April 1994



The Eyepiece
by Bob Madden

This month is hot! Not only is the weather improving, but the observing is also. In addition, we have several congratulations to pass out. One goes to Ernie Piini, who had his photograph published in *Astronomy* magazine. Ernie took this photograph while he and Joe Shrock were in Australia for the transit of Mercury. Way to go Ernie!

Next, we have Bob Garfinkle send us a message about his new book, ***Star Hopping: Your Vista to Viewing the Universe***, published by Cambridge Press. Bob has had many articles published in *Astronomy* and *Sky and Telescope*. Further on in this newsletter is a short piece about this book, a flyer, and an order form.

As you can tell by this issue, you have selected the members of the board of directors who were up for re-election. There were no challengers. However, this issue is a preview of the new officers. Bob Brauer is slated to become President, Jack Petersen to become Vice President, and Jim Hodgers will be the new treasurer. Just after this issue is published the Board will vote on these new officers. I do not expect any challengers, therefore I have stated what will be the likely outcome. When you see these guys congratulate them. It will

Apr 2: Star Party H. Coe SP. Sset 6:30 pm, 50% Moon Rise 1:29 am.
Apr 3: Darkness squandering time begins at 2 - becomes 3 am.
Apr 9: Star Party at Fremont Pk SP. Sset 7:35 pm. No Moon. Also: Public star party at Grant Ranch County Pk.
Apr 15: Star party at Houge Pk, Sset 7:43 pm, 22% moon Mset 12:10 am.
Apr 16: Observational Astronomy Class at Houge Pk 8:00 pm.
Apr 16: Astronomy Day, daytime at Milpitas Library, evening at Houge Pk.
Apr 23: 15th annual Astronomy Swap and Auction at Houge PK, 1:00 - 8:00 pm. This activity replaces the General Meeting.
Apr 30: No activity. Twilight 9:30 pm. Moon up about 1:30 am.
May 7: Star party at Fremont Peak or H Coe State Park. Your choice.
May 13: Star Party at Houge Park.
May 14: General Meeting 8:00 pm at the Milpitas Library. Board of Dir. Mtg. at 6:15pm. Speaker to be announced.
May 21: Observational Astronomy class at houge Park 8:00pm.
May 28: Riverside Telescope Makers Conference. No other activity planned.

make them feel good.

I have saved the best for last. We all need to thank Jack Zeiders for his dynamic leadership. Jack is always full of ideas for club projects. In fact Jack almost single handedly collected money to purchase the Day Star solar filter and put together the club's solar telescope. Jack is a very dynamic member, who now is in business for himself and has taken on the chairmanship of Public Relations for Group 70's 1.8 meter LAT project. Jack will remain on our Board of Directors providing the inspiration we all need at times.

STATIC CURVED SPACE-TIME MANIFOLD, A NAIVE IDEALISM by Abian

The naive myth that the Cosmos is a Curved Space-Time Manifold must be thrown out as soon as possible - immediately without further delay, along with the naive myths of "instantaneous acting of gravity" and "unsurpassability of the speed of light".

It is utterly naive to believe that the infrastructure of Cosmos is a static Riemannian four dimensional Space-Time manifold (the naive idealistic Curved Space-Time manifold) spun by the larvae of some Cosmic insects as a permanent Cosmic web, static unchangeable and eternally enduring, along whose implacable geodesics, planets roll leaving no trace having no effect on that eternal Cosmic static Space-Time web.

This utterly nonconvincing naive idealistic model of the Universe will totally collapse if galaxies are blown up into smithereens.

With the immense sources of energy at the disposal of mankind the blowing up of galaxies is no longer an impossibility, and, what do you think if the half of the galaxies are blown up is that Riemannian four dimensional Space-Time manifold will remain with its geodesics untouched? Or instantaneously a Riemannian submanifold will be spun by the instantaneous larvae of the instantaneous Cosmic insects acting instantaneously.

TIME has inertia, some Cosmic Mass is irretrievably spent to move TIME forward. There could be no static unchangeable naively idealistic curved Space Time Manifold.

Continued on page 3

Double, Triple and Multiple Stars by Patrick Donnelly

I am always impressed, or frustrated, by how complicated a physical process of structure becomes by adding a single additional element to it. For example, the two body problem in celestial mechanics can be solved in the closed form, but the three body problem is not possible to solve. A computer can solve the four color map problem, but only in two dimensions. No attempt can be made of a five color scheme for three dimensions.

The same is true for double stars. A two star system is relatively easy to see and to find. There is only one separation and two magnitudes to identify and to define the system. For two stars a truly regular system would consist of two equal magnitude stars at any separation and position angle. Gamma Aretis or 61 Cygni would be considered examples of this type. Now consider what would be required to go to a regular triple system. First, the position angles would be a factor, unlike the simple double system. Each star would have to be located at the vertex of an equilateral triangle. Moreover, we now have three stars to match in magnitude. I realize that this sounds like it would be highly unlikely that a system of this type could exist, but there is a pretty triple in the February skies that is a good approximation to a regular triple system.

The system is located in the constellation of Monoceros, the Unicorn. The system is called Sigma-939. This triple system consists of a magnitude 8.3 primary (A) and magnitude 9.6 and 9.7 secondaries (B & C). The angles between the stars at each vertex are A-60, B-61, C-59 degrees, and the separations are AB-30.1", AC-33", and BC-39.7". From the primary the position angles are 90 and 30 degrees respectively.

To find Sigma-939 look for Monoceros. This triple is at declination +5 degrees 18' and 16 hours 35.9' in right ascension. It is located east of the Rosette Nebula and just south of the open cluster NGC 2252. Start by finding NGC 2244, the open cluster in the middle of the Rosette Nebula. Also, while there,

explore this cluster. There are several fine doubles in the system. Now with the lowest power eyepiece move the scope due east. Sigma-939 will end up in the field of view. For my 8"-SCT with the 40mm Plossl, Sigma-939 is centered just as NGC is placed out of the field of view. If you find it, please let me know.

As a final note, The Trapezium in Orion, in M42, is about the best four element regular system, and Theta-2 Orionis in the same low power field of view, is about the best three element straight line system.

Star Hopping: A book review by Bob Madden

San Jose Astronomical Association member, Bob Garfinkle has written a book on how to star-hop. The book, entitled *Star-Hopping: Your Visa to Viewing the Universe* has been published by Cambridge University Press. Bob's book is now available in local bookstores. Ask for it by its full title as there is now also another book, entitled *Star-Hopping* published by *Sky & Telescope* magazine. The ISBN number for Bob's book is 0-521-41590-x. The list price is \$24.95. You can also order it directly from Cambridge and get a 20% discount by using the enclosed flyer. The flyer tells what topics the book covers.

SJAA members Jack Zeiders, Don Macholtz, and Dr. Jack Marling, assisted Bob by reviewing and commenting on parts of the manuscript. Jack Zeiders read the first two chapters, which tell you about the types of celestial objects you will see by following the star-hops in the book, what types of astronomical equipment you may want to purchase and use, how the night sky moves, and how to read sky charts. Don reviewed the chapter that is a Messier Marathon. As you know, Don has led our annual Messier Marathon for the past few years. Jack Marling supplied some of the astrophotos and reviewed the section on light pollution reduction and deep sky filters. He developed most of the types of filters covered in the book.

Bob has written this book with both the novice and advanced stargazer in mind. You will find interesting tips on

equipment, the mythology of the constellations, what we know about different stars and other objects, and how to move about the night sky. Since the main portion of the book consists of monthly star-hops, you can use the book throughout the whole year.

Bob is presently working on two additional astronomy books, some astronomy book reviews, and articles. He has had a couple of star-hopping articles in "Astronomy" magazine during the last few years. "Astronomy" also ran a nice review of Bob's book in the January 1994 issue (page 107). We wish Bob well with this great book.

Uranometria 2000.0

Attached is a message I sent out to our Tandem ASTRO SIG. It's a book recommendation about the Uranometria Field Guide. Just an example of some of the stuff that goes around on our SIG. There were 200 members on the ASTRO SIG, Rich Neuschaefer

Hi Stargazers,

The *Deep Sky Field Guide to Uranometria 2000.0* is a really useful addition to the *Uranometria 2000.0* vols 1 & 2 star atlas. The Field Guide is well organized, for each page in the star atlas the guide lists information about each deep sky object on that page, all the galaxies, clusters, bright nebula, dark nebula, and planetary nebula. I really like the addition of listing surface brightness as well as the usual visual magnitude. This gives the observer a much better idea of the contrast between the object and the background.

A real bonus is the listing of nearly 5,000 additional galaxies beyond the 6,700 galaxies "pictured" in the atlas. The guide lists galaxies within 30 arcminutes of any plotted principal galaxy.

The notes are very good. Page 47, NGC4102 "Small bright nucleus in a very bright isolated lens 0.5x0.25, two main detached bright knotty arms form a pseudo ring 1.2x0.6." It then goes on to note a field galaxy near NGC4102.

The guide really gives you a much better idea of what to look for and will make finding deep sky objects easier. The guide lists for \$49.95.

Space/Time continued from page 1

Again, believing in the existence of a eternal supreme Cosmic Curved-Space Time infrastructure is as naive as believing in Atlas' supporting the entire Universe on his shoulders.

Again, believing in the existence of the eternal Time - Space manifold is a total surrender to a preposterous naive idealism for gaining a feeling of security by creating an ultimate, protective supercosmic penultimate crutch.

TIME HAS INERTIA. EQUIVALENCE OF TIME AND MASS: $(1/T) + (1/\log M) = 1$ (ABIAN) (Internet: sci.astro).

ALTER EARTH'S ORBIT AND TILT - STOP EPIDEMICS OF CANCER, CHOLERA, AIDS, ETC. VENUS MUST BE GIVEN A NEAR EARTH-LIKE ORBIT TO BECOME A BORN AGAIN EARTH

Collimation of Newtonions

by P. Barton

This brief dissertation is hoped to make collimation easier (or easy) by telling what has to be done in theory, rather than a step-by-step procedure.

Collimation is merely the alignment of the optics — primary mirror to eye piece, with the secondary in between.

Of greatest importance, the incoming light wave and the reflected light wave from the primary mirror must be on exactly the same axis. A parabola can only reflect the incoming wave back to a single focus point if the incoming wave and the reflected wave are on exactly the same axis; and this requirement can be met very easily.

With a dot or circle etc., in the exact center of the mirror, and the diagonal with holder removed from spider, look down the throat of the telescope tube. From a distance of about 1 1/2 focal lengths, for a magnified view, move you eye so you see the spider superimposed on it's image. The spider center must be exactly in the telescope tube center.

Observe the primary mirror center dot. Adjust the mirror by the collimation bolts etc., until the primary mirror dot is exactly in the center of the spider —

when the spider is exactly over it's image.

This is so easy it seems there should be more to do, but this adjustment accurately aligns the incoming and the reflected wave to the center of the spider.

If the diagonal is in the spider, blocking the center of the spider, move your eye left then right, up then down seeing that the primary dot is aligned with that arm of the spider.

This is the main message of this treatise— being insufficiently emphasized in other publications.

Adjusting the secondary is a matter of bringing the eye piece optical axis into alignment with the primary optical axis.

Assume (or test) the focuser and eyepiece are properly at right angles to the tube.

Space does not permit discussing how to test for correctness. If the focuser is off only a little, the primary mirror axis can be shifted slightly to correct for it.

Look in the focuser — no eye piece — and adjust the diagonal mirror in and out, rotate left and right till it is centered in the focuser view — probably thru some sort of sight tube.

Next look down the throat of the telescope as in the first step and observe the image of the inside of the focuser. It will look like a tunnel. This tunnel or image of the focuser must be centered in the middle of the telescope tube exactly co-incident with the optical axis of the primary mirror.

Adjust the diagonal mirror (secondary) to obtain this condition. Recheck that the diagonal mirror is still centered in the focuser tube. Re-adjust if necessary.

A dot in the center of the diagonal mirror is helpful but not essential; but the secondary mirror dot must be exactly on the axis of the center adjusting bolt, the rotational axis of the diagonal.

Collimation is complete when the primary mirror dot and the secondary mirror dot exactly coincide in the focuser tube center (via a site tube) and the "tunnel" image of the focuser is exactly centered around the optical axis of

the primary mirror.

This adjustment assures that the eye piece axis (or focuser axis) is co-incident with the primary mirror axis; even tho thru a 45 degree diagonal mirror.

A brief glance down the throat of the Newtonian will tell if it is at least close to collimation.

Exact collimation is merely more precise adjustments of the preceding procedures and is not within the scope of this treatise.

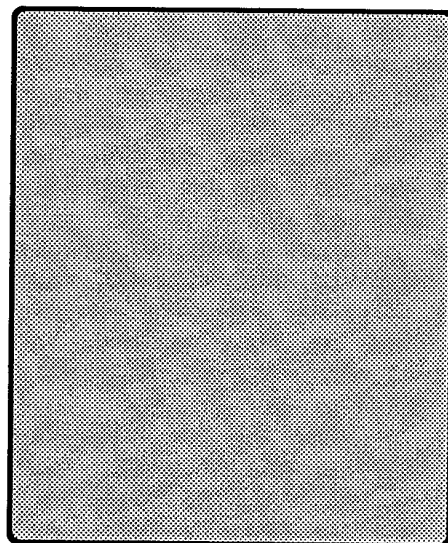
Book Report

by Paul Barton

A Brief History of Time by Stephen W. Hawking, Bantam Books, \$25, is just what we need to help understanding Einstein's Theory of Relativity and Astrophysics. If you have trouble with over three dimensions and curved space, as I do, even Stephen Hawkins admits to having difficulty also and he is considered to be in Einstein's class of "smartz".

The book covers the history of Astrophysics from Aristotle to present. It also discusses subjects such as the "Big Bang", Black Holes, Event Horizons and more in a very readable non math manner. The famous equation $E=mc^2$ explains (in part) why mass can never exceed the speed of light. What is the future of the universe?

I know this book has been out for some time, but it is a must for the serious amateur astronomer.



Messier Hunting

by P. Barton and Bob Madden

The evening was gorgeous as I looked out towards the ocean from Coulter camp parking lot. There was no fog and the coast line could easily be seen. The drive down from home was comfortable and easy. As I locked the car and walked towards the telescopes, I wondered if I should unpack my eight inch dobsonian and decided not to. I looked across the viewing area and I determined that there were enough telescopes to bum from that I didn't need mine.

The first scopes I came to, "Crazy Ed" Erbeck extracted himself from his vehicle and started harassing me right away with Rich Neuschaefer chiming in. There was Mark Wagner, Dean Linebarger, and Alan Nelms. Looking around I noticed that Celeston eight inch SCT's were very popular. Next came home-made Dobson and Meade. Paul Barton's JMI 18 with it's new owner was further down. I found Paul with the Association's C-11 and a new ten-inch Dob he just finished. The primary optics of the ten-inch turned out to be very good.

As dusk came and began to end the stars began to turn on. "Crazy Ed" had the Trapezium in his Dob. It was still so light that the nebulosity couldn't be seen. Soon Betelgeuse, big and red, and Rigel along with Aldebran could be seen naked eye. Looking over towards the west Venus shown like a beacon about to set. Sirius looked cold blue. This was going to be some night! The weather man on the radio said there would be high winds aloft, but the wind here was very light. Later on after dark it would pick up a little, but there was no twinkle in the star light. I would say the seeing was 'good'.

Soon there was no dusk but some ground glow in the east and more to the west over Watsonville and Santa Cruz. In the east it steadily dimmed while it was only objectionable on the ridge looking west.

I began to hear comments about "Let's get started! We have a long night ahead of us". "Which M object is first". "M-m-m-m, how about M41"? "Straight

up twenty degrees is M96" And so on all night. Bob Elsberry showed up and set up next to Paul Barton and began immediately to chase objects. Paul was 'ticking' off objects with great ease. You only had to ask and the big C-11 was right on the object. The Marathon was in full swing. This was the best New Moon night to capture as many Messier objects as you could.

Paul collected names and many were there. I'd say about forty people and twenty five telescopes were at Coulter camp. Ranger Rick Morales came by and waved "Hi" to us. We didn't get up to the observatory to see who was there; probably a half dozen more folks.

I used my 7X50 binoculars a lot this evening. Actually this was one of the best nights for observing this year.

SKY & TELESCOPE NEWS BULLETIN March 5, 1994

NOVA IN SAGITTARIUS

Japanese amateur Minoru Yamamoto has discovered a nova in Sagittarius, about 1 1/2 degrees south-east of the star Xi-2 Sagittarii. He first imaged the new star on February 24th, when it was magnitude 8.9. Over the next few days the nova fluctuated between magnitude 8.5 and 8.7, brightening to 8.0 on the 28th. But now it seems to be fading, having dropped to at least 8.5. Photometric observations suggest that the light coming from this star is highly redened. Here are coordinates in equinox 2000.0 coordinates: right ascension 18 hours 50 minutes 37 seconds, declination -21 degrees 23.5 minutes.

CLEMENTINE'S MOON

Planetary scientists working on the Defense Department's Clementine mission have released a series of images of the Moon and Earth — even the Big Dipper — taken by the spacecraft. It has been in orbit around the Moon since February 19th; the orbit is polar, varies in distance from the lunar surface between 400 and 3,000 kilometers, and takes nearly 5 hours to complete. The images show crisp detail of lunar features at ultraviolet, visible, and infrared wave lengths. One of the views shows

the landing site of Apollo 16. Clementine is to leave lunar orbit on May 3rd, the first step en route to an encounter with the near-Earth asteroid Geographos on August 31st.

ASTEROID IDA'S SATELLITE?

According to scientists at the Jet Propulsion Laboratory, the asteroid Ida has a satellite of some kind. They discovered it as they were getting ready to process more images of Ida that have been patiently waiting on Galileo's tape recorder since the spacecraft flew by last August 28th. Because the images can only be trickled back slowly to Earth, one preliminary step is to radio back thin strips of each image, like a picket fence, to see what's there. That's where a glimpse of the extra asteroid was spotted. Scientists won't be able to say much more about it until more complete images are in hand, and that will take another couple of weeks. But it's clearly another object. In all likelihood it's in orbit around Ida, though imaging-team leader Michael Belton cautions that there's a remote chance that a small, previously undetected asteroid just happened to be whizzing past Ida at just that moment.

In recent years there has been lots of speculation — and more than a few bets — about whether asteroids have satellites. The biggest champion of the idea has been Tom Van Flandern, an astronomer who once worked at the U.S. Naval Observatory. Van Flandern's ideas were never widely accepted. But radar observations of the near-Earth asteroids Castalia and Toutatis show both to have multiple lobes. And Ida may prove to be the first asteroid known to have its own moon. For now the Galileo project is keeping details to a minimum — but watch for a press conference later this month, probably on March 23rd.

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Arlin B Collins

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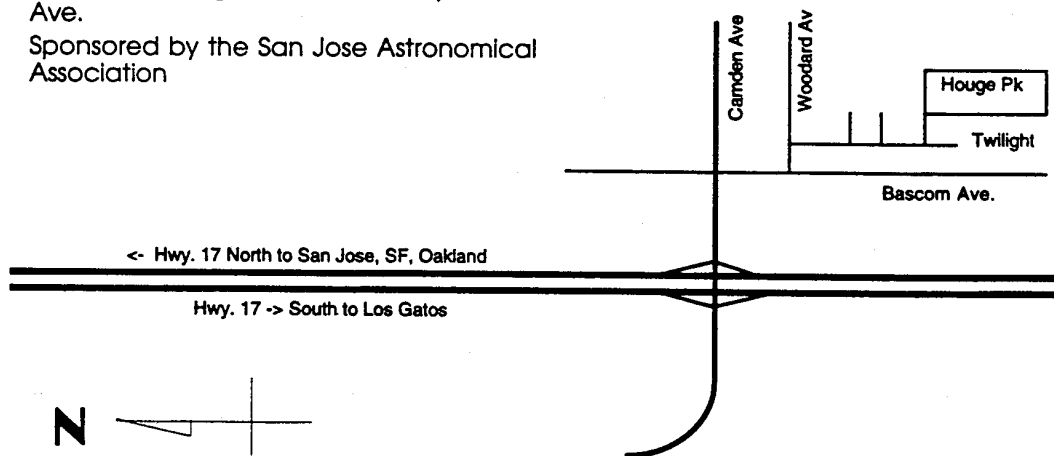
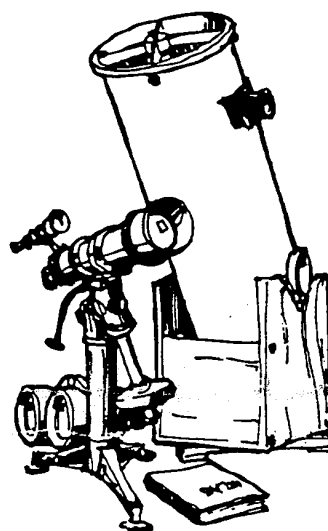
The 14th Annual Bay Area Astronomical Auction April 23rd, 1994

Doors open at 1:00 PM
Swap Meet 2:00 - 5:00 PM
Auction starts at 6:00 PM

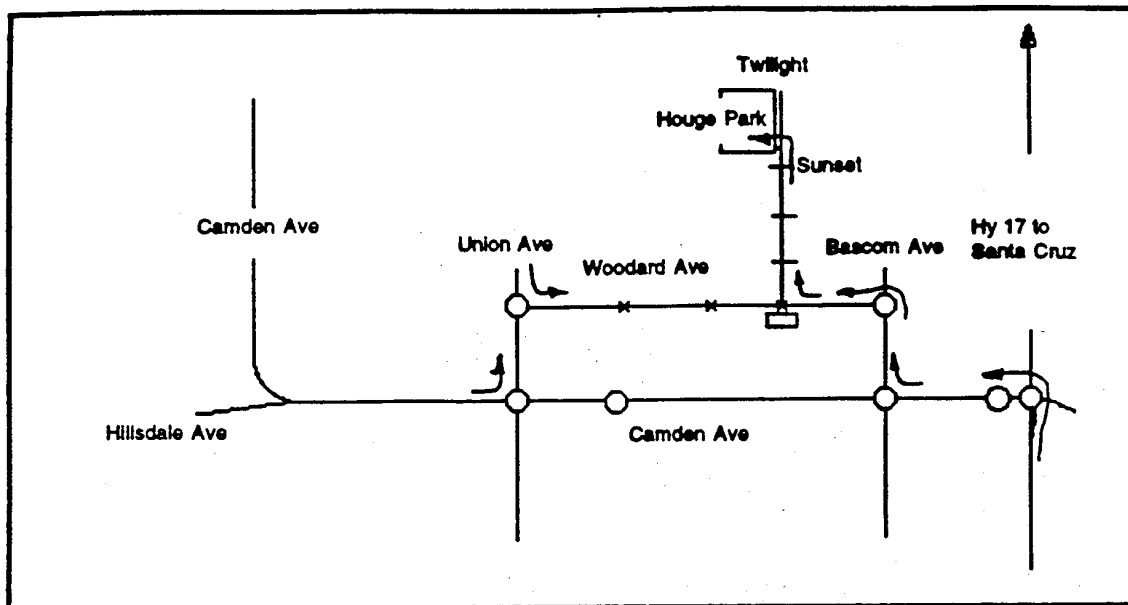
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	Addr		Zip	
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10% of all sales go to the SJAA - Please pre-register - fill this out and Mail to J Van Nuland, 3509 Calico Ave, SJ, CA 95124

Star-Hopping Your Visa to Viewing the Universe

by
Robert Garfinkle

Star-hopping--using easily located bright stars to help find fainter celestial objects in the night sky--is an essential and basic technique for all stargazers, novice and veteran alike.

Robert Garfinkle shows the newcomer how to master this technique. The core of the book describes two or more detailed star-hops for each of the twelve months of the year. These sections can be read in any order and take the reader on step-by-step trips through the stars and reinforce the methods of star-hopping. Garfinkle also provides a guide to the popular Messier Marathon--a night-long hop across the skies.

Additional basic astronomy skills are carefully outlined, including reading star charts, finding celestial directions, understanding telescope types, and using light pollution filters. Finally, the author relates a lively history of the universe and the ancient myths and legends of the sky.

Contents:

How to use this book and what you are going to see/ How the sky works, determining your field of view, observing tips, and how to navigate in the night sky/ January--Taurus and Orion: the bull and hunter/ February--Canis Minor, Canis Major, and Puppis: dog days in February and Jason's Argo/ March--Cancer, Leo, and Corvus: a crab, the king of the beasts, and a crow/ April--Ursa Major: a dipper round tripper/ May--Coma Berenices and Virgo: the sparkling hair of Berenice and the wheat maiden and her bushel of galaxies/ June--Libra and Lupus: the balance scales and the wolf/ July--Scorpius, Sagittarius, and Scutum: the scorpion, archer, and shield of John Sobieski/ August--Draco: following the trail of the dragon/ September--Cygnus, Lyra, Vulpecula, and Sagitta: the swan, lyre, fox, and arrow/ October--Andromeda and Perseus: the chained lady and her rescuer/ November--Cepheus and Cassiopeia: the king and queen of Joppa/ December--Pisces, Triangulum, and Aries: of fishes, a triangle, and a ram/ Messier Marathon, a sundown to sunup hop across the skies/ Appendix A: Classification tables/ Appendix B: The constellations/ Appendix C: The Greek alphabet/ Appendix D: Decimalization of the day/ Glossary

1994	355 pp.	69 halftones	57 line diagrams	13 tables
41590-X	Hardcover	List: \$24.95	Discount: \$19.96	

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Offer valid through August 30, 1994

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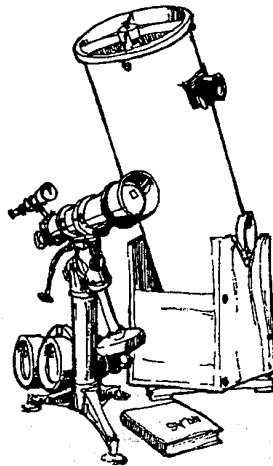
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1994 SJAA Calendar

General Meeting		Houge Park Star Party	Observational Astronomy Class
Apr	23 Auction and Swap	15	16
May	14	13	21
June	25	17	18
July	23	15	16
Aug	13? Picnic at FP SP		

Please read your *Ephemeris* each month for changes



Telescope Loaner Status

by Paul Barton

SJAA no.	Name	User	Due
1	4-1/2" Newt/P mou	Alex Calderon	4/24/94
2	6" Dobson	Ken St. George	3/15/94
3	4" Quantum	----->	available
5	60mm Refractor	Jim Marquis	3/26/94
6	C-8 Celestron	Jim Ricks	3/22/94
7	12-1/2" Dobson	John Schoenenberger	4/22/94
8	14" Dobson	Lee Courtney	4/15/94
9	C-11 Celestron	Paul Barton	*****
14	6" Newt/P mount	Sridhar Lakshmikanthan	3/29/94
15	8" Dobson	Jim Marquis	3/26/94
18	8" Newt/P Mount	----->	available
19	6" Newt/P Mount	Chung-Lin Lee	4/6/94
20	4-1/4" Dobson	John Bettencourt	3/1/94
21	10" Dobson	----->	available

Solar telescope (#16). Available only to experienced members for special occasions such as day time public star parties, etc. Call.

(on waiting list)

#15 Richard Raw #6 Ben Lee

#15 John Schoenenberger

If you want to borrow a telescope call Paul Barton (number is on the credit Marquee) and get your name on a general list (any telescope) or on a specific telescope list.

ASTRO ADS

ASTRO ADS are free to all noncommercial advertisers wishing to sell astronomically related products or services. Please send your ad directly to the Editor:

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CELESTIAL CALENDAR

March 1994

Lunar Phases	Date	Rise	Tran	Set
LQ	18:45hr	03-4	0131	0643 1200
NM	17:18hr	10-4	0517	1157 1844
FQ	23:51hr	19-4	1213	1909 0120
FM	12:45hr	25-4	1912	---- 0504

Nearer Planets

Mercury	07-4	0504	1057	1651
1.28 AU	17-4	0505	1121	1737
Mag -1.8	27-4	0512	1154	1839

Venus	07-4	0638	1325	2013
1.54 AU	17-4	0633	1334	2035
Mag -4.1	27-4	0631	1344	2085

Mars	07-4	0453	1046	1740
2.22 AU	17-4	0432	1035	1639
Mag 0.9	27-4	0412	1024	1637

Jupiter	07-4	2025	0148	0706
4.45 AU	17-4	1940	0104	0624
Mag -2.5	27-4	1855	0020	0541

Saturn	07-4	0413	0946	1518
10.4 AU	17-4	0337	0910	1443
Mag 1.10	27-4	0300	0834	1408

SOL	Star	Type	G2	V	Mag	-	26.72
RA	DEC						
0103	0647	07-4	0630	1219	1808		
0140	1026	17-4	0615	1216	1818		
0218	1348	27-4	0600	1213	1827		

Astronomical Twilight	Dawn	Dusk
JD 2,449,449.5	07-4	0414 - 2006
,459.5	17-4	0357 - 2018
,469.5	27-4	0341 - 2030

Sidereal Time

Transit Right	07-4	0000	PDT=1253
Ascension at	17-4	0000	PDT=1333
Local Midnight	27-4	0000	PDT=1412

Darkest	Saturday Night	Mar. 12
Sunset		1838
Twilight End		2008
Moon Set		1748
Dawn next morning		0409

TIMES AND DATES ARE PACIFIC DAYLIGHT

Times are Local Civil
Planet distance and Magnitude
for 17th of month
Derivation of these values are from
*Astronomy with Your Personal
Computer*
by Peter Duffet-Smith
MacEphem
by Elwood Charles Downey

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Comet Comments

by Don Machholtz

One faint returning comet has been recovered. Meanwhile, several comets remain visible, the most interesting being Comet McNaught-Russell, 1993v. As suggested here two months ago, it has brightened rapidly and should be a binocular object in early April as it passes only 0.46 AU from the earth. Additional study shows that 1993v may actually be the same comet that was visible here in the year 574, making its first return since then. This is a good comet to get out to see.

Periodic Comet Wild 3 (1994b): This was recovered by J. Scotti and T. Gehrels of Kitt Peak on February 10 at magnitude 20. It has a 6.9-year orbital period and will be closest to the sun at 2.30 AU on July 21. It will not be getting much brighter.

EPHEMERIDES

PERIODIC COMET SCHWASSMANN-WACHMANN 2

DATE(00UT)	R.A. (2000)DEC	EL	SKY	MAG
03-24	08h23.5m +21d24'	120d	E	11.6
03-29	08h27.6m +21d16'	116d	E	11.7
04-03	08h32.3m +21d05'	112d	E	11.8
04-08	08h37.6m +20d50'	108d	E	11.9
04-13	08h43.3m +20d33'	105d	E	12.0
04-18	08h49.5m +20d13'	101d	E	12.1
04-23	08h56.1m +19d49'	98d	E	12.2
04-28	09h03.3m +19d23'	95d	E	12.3
05-03	09h10.5m +18d55'	92d	E	12.4
05-08	09h17.7m +18d24'	89d	E	12.5

PERIODIC COMET TEMPEL 1

DATE(00UT)	R.A. (2000)DEC	EL	SKY	MAG
03-24	13h31.2m +12d00'	156d	M	11.0
03-29	13h28.7m +12d21'	159d	M	10.7
04-03	13h25.5m +12d37'	160d	M	10.5
04-08	13h21.8m +12d45'	160d	E	10.3
04-13	13h17.6m +12d44'	158d	E	10.1
04-18	13h13.4m +12d33'	156d	E	9.9
04-23	13h09.2m +12d10'	152d	E	9.7
04-28	13h05.3m +11d34'	148d	E	9.5
05-03	13h02.0m +10d46'	144d	E	9.4
05-08	12h59.5m +09d45'	140d	E	9.3

PERIODIC COMET SHOEMAKER-LEVY (1993e)

DATE(00UT)	R.A. (2000)DEC	EL	SKY	MAG
03-24	14h38.1m -16d02'	141d	M	13.6
03-29	14h36.7m -15d54'	146d	M	13.6
04-03	14h35.0m -15d44'	152d	M	13.6
04-08	14h33.2m -15d33'	157d	M	13.5
04-13	14h31.2m -15d20'	163d	M	13.5
04-18	14h29.1m -15d08'	168d	M	13.5
04-23	14h26.9m -14d54'	174d	M	13.5
04-28	14h24.6m -14d40'	179d	M	13.5
05-03	14h22.4m -14d26'	176d	E	13.5
05-08	14h20.2m -14d12'	170d	E	13.5

COMET MCNAUGHT-RUSSELL (1993V)

DATE(00UT)	R.A. (2000)DEC	EL	SKY	MAG
03-24	04h17.0m -03d43'	62d	E	6.5
03-29	04h32.4m +07d30'	60d	E	6.3
04-03	04h49.2m +20d11'	60d	E	6.2
04-08	05h07.9m +33d15'	62d	E	6.3
04-13	05h29.8m +45d24'	64d	E	6.5
04-18	05h56.3m +55d38'	66d	E	6.2
04-23	06h29.9m +63d43'	69d	E	7.2
04-28	07h14.1m +69d44'	71d	E	7.6
05-03	08h11.5m +73d49'	73d	E	8.0
05-08	09h22.5m +76d06'	75d	E	8.4

PERIODIC COMET MUELLER (1994a)

DATE(00UT)	R.A. (2000)DEC	EL	SKY	MAG
03-24	22h44.4m +01d25'	22d	M	10.2
03-29	22h48.0m +00d37'	26d	M	10.2
04-03	22h51.4m -00d12'	30d	M	10.2
04-08	22h54.7m -01d03'	34d	M	10.3
04-13	22h57.7m -01d55'	38d	M	10.3
04-18	23h00.5m -02d51'	43d	M	10.3
04-23	23h03.0m -03d49'	47d	M	10.4
04-28	23h05.2m -04d52'	52d	M	10.4
05-03	23h07.1m -05d59'	57d	M	10.4
05-08	23h08.6m -07d12'	62d	M	10.4

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